NPTEL Video Course - Aerospace Engineering - Introduction to Aerospace Propulsion

Subject Co-ordinator - Prof. Bhaskar Roy, Prof. A M Pradeep

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Intro & Historical development of flights
Lecture 2 - Early development of aircraft propulsive devices
Lecture 3 - Development of Jet propulsion for aircraft
Lecture 4 - Introduction to thermodynamics, Scope and method, Basic concepts
Lecture 5 - Quasi-static processes, zeroth law of thermodynamics and temperature, concept of energy and its v
Lecture 6 - Specific heats at constant pressure and volume Work and heat transfers
Lecture 7 - Tutorial
Lecture 8 - First law of thermodynamics for closed systems
Lecture 9 - First law of thermodynamics for open systems/flow processes
Lecture 10 - Second law of thermodynamics, heat engines, refrigerators and heat pumps, Kelvin-Planck and Clau
Lecture 11 - Reversible and irreversible processes, concept of entropy
Lecture 12 - Increase of entropy principle, third law of thermodynamics, absolute entropy, perpetual motion m
Lecture 13 - Tutorial
Lecture 14 - Carnot cycle, Carnot principle, thermodynamic temperature scale
Lecture 15 - Exergy, availability and second law efficiency
Lecture 16 - Tutorial
Lecture 17 - Gas and vapour power cycles, Otto cycle, Diesel cycle, Dual cycle
Lecture 18 - Rankine cycle, Brayton cycle, Stirling and Ericsson cycles
Lecture 19 - Thermodynamic property relations, Jacobean and Legendre transformations, Maxwellâ s equations
Lecture 20 - Tutorial
Lecture 21 - Properties of gas and vapour mixtures
Lecture 22(A) - One-dimensional compressible flows, isentropic flows
Lecture 22(B) - Flows with friction and heat transfer, normal and oblique shocks
Lecture 23 - Piston-prop engines
Lecture 24 - IC Engines for aircraft application
Lecture 25 - Performance parameters of IC engines
Lecture 26 - Supercharging of aircraft IC engines
Lecture 27 - Tutorial
Lecture 28 - Propeller fundamentals

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Lecture 29 - Propeller aerodynamic theories - I
Lecture 30 - Propeller aerodynamic theories - II
Lecture 31 - Tutorial
Lecture 32 - Ideal cycles for Jet engines
Lecture 33 - Ideal cycles for variants of jet engines
Lecture 34 - Tutorial
Lecture 35 - Fundamentals of Ramjets and Pulsejets
Lecture 36 - Fundamentals of Rocket engines
Lecture 37 - Fundamentals of Missile engines
Lecture 38 - Various space vehicles and their engines
Lecture 39 - Closure of the lecture series

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NPTEL Video Course - Aerospace Engineering - Jet Aircraft Propulsion

Subject Co-ordinator - Prof. A M Pradeep, Prof. Bhaskar Roy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction & Development of Jet Aircraft Propulsion
Lecture 2 - How the Aircraft Jet Engines make Thrust
Lecture 3 - Jet Engine Basic Performance Parameters
Lecture 4 - Turbojet, Reheat Turbojet and Multi-spool Engines
Lecture 5 - Turbofan, Turbo-prop and Turboshaft engines
Lecture 6 - Ideal and Real Brayton cycles
Lecture 7 - Jet Engine Cycles for Aircraft propulsion
Lecture 8 - Cycle components and component performances
Lecture 9 - Tute-1
Lecture 10 - Analysis of engine real cycles
Lecture 11 - Tute-2
Lecture 12 - Thermodynamics of Compressors
Lecture 13 - Thermodynamics of Turbines
Lecture 14 - Axial Compressors
Lecture 15 - Cascade analysis; Loss and Blade performance estimation
Lecture 16 - Free Vortex theory; Single-Multi-stage characteristics
Lecture 17 - Tutes-3
Lecture 18 - Elements of centrifugal compressor
Lecture 19 - Centrifugal Compressor characteristics
Lecture 20 - Axial flow turbines; Turbine Blade 2-D (cascade) analysis
Lecture 21 - Multi-staging
Lecture 22 - Radial Turbine Aerodynamics & Thermodynamics; Losses
Lecture 23 - Tutes-4
Lecture 24 - Types of combustion chambers
Lecture 25 - Pr. Loss, Combustion efficiency; Combustion intensity
Lecture 26 - Practical combustion system ; Stability, Fuel injection
Lecture 27 - Intakes for Powerplant
Lecture 28 - Subsonic, Transonic, Supersonic Intake Designs
Lecture 29 - Nozzle

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Lecture 30 - C-D nozzle and their uses
Lecture 31 - Tute-5
Lecture 32 - Engine Off Design Operations
Lecture 33 - Aircraft Engine component matching
Lecture 34 - Engine component matching and Sizing
Lecture 35 - Installed Performance of Engine
Lecture 36 - Tute-6
Lecture 37 - Use of Ramjets and Pulsejets in Aircraft propulsion
Lecture 38 - Thermodynamic Cycle & Performance Parameters
Lecture 39 - Flow in Diffusers, Combustors and Nozzles
Lecture 40 - Performanace and Design of Ramjet & Scramjet Engines
Lecture 41 - Tute-7
Lecture 42 - Future of Aircraft Propulsion

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NPTEL Video Course - Aerospace Engineering - Turbomachinery Aerodynamics

Subject Co-ordinator - Prof. Bhaskar Roy, Prof. A M Pradeep

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Turbo machines Syllabus, References and Schedules
Lecture 2 - Axial Flow Compressors and Fans
Lecture 3 - A two dimensional analytical model
Lecture 4 - 2D losses in Axial flow Compressor Stage
Lecture 5 - Tutorial 1
Lecture 6 - 3D Flows in Blade Passages, Secondary Flows, Tip leakage Flow, Scrubbling
Lecture 7 - Three Dimensional Flow Analysis
Lecture 8 - Classical Blade Design Laws
Lecture 9 - Three Dimensional Flow Analysis in Axial Flow Compressor
Lecture 10 - Tutorial 2
Lecture 11 - Axial Compressor Characteristics
Lecture 12 - Instability in Axial Compressors
Lecture 13 - Inlet Distortion and Rotating Stall, Control of Instability
Lecture 14 - Transonic Compressors and Shock Structure Models, Transonic Compressor Characteristics
Lecture 15 - Axial Flow Compressor Design, Inter Spool Duct
Lecture 16 - Design of Compressor Blades, Aerofoil Design (Subsonic, Transonic, Supersonic Profiles)
Lecture 17 - Design of Compressor Blade
Lecture 18 - Noise Problem in Axial Compressors and Fans
Lecture 19 - Axial Flow Turbines
Lecture 20 - Axial Flow Turbines
Lecture 21 - Axial Flow Turbines
Lecture 22 - Axial Flow Turbines
Lecture 23 - Tutorial 3
Lecture 24 - Multi staging and Multi spooling of Turbine
Lecture 25 - 3D Flow in Turbine
Lecture 26 - Tutorial 4
Lecture 27 - Turbine Blade Cooling â Fundamentals of Heat Transfer, Blade Cooling Requirements
Lecture 28 - Turbine Blade Cooling Technologies
Lecture 29 - Turbine Blade Design

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Lecture 30 - Turbine Blade Design
Lecture 31 - Centrifugal Compressors
Lecture 32 - Centrifugal Compressors
Lecture 33 - Tutorial 5
Lecture 34 - Design of Centrifugal Compressors
Lecture 35 - Radial Turbines
Lecture 36 - Tutorial 6
Lecture 37 - Radial Turbine Characteristics and Design of Radial Turbines
Lecture 38 - CFD for Turbomachinery
Lecture 39 - CFD for Turbomachinery
Lecture 40 - CFD for Turbomachinery

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Aerospace Engineering

Subject Co-ordinator - Prof. Rajkumar Pant

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Layout and Brief Introduction of Course Instructor
Lecture 2 - Introduction to International Standard Atmosphere (ISA)
Lecture 3 - Pressure, Temperature, Density and Viscosity Variation with Altitude in ISA
Lecture 4 - Other Standard Atmospheres
Lecture 5 - Aircraft Component Nomenclature - Wing and its Components
Lecture 6 - Aircraft Component Nomenclature - Fuselage and its Components
Lecture 7 - Aircraft Component Nomenclature - Tail Plane and its Components
Lecture 8 - Tutorial 1 - Aircraft Component Nomenclature
Lecture 9 - Essentials of Incompressible Flow - Part I
Lecture 10 - Essentials of Incompressible Flow - Part II
Lecture 11 - Bernoulli's Equation and Coanda Effect
Lecture 12 - Mach Number
Lecture 13 - Tutorial 2 - Incompressible Flow and Flow Visualization
Lecture 14 - Viscous Flow and Reynolds Number
Lecture 15 - Introduction to Boundary Layer
Lecture 16 - Pressure Measurement
Lecture 17 - Air Speed Measurement - Pitot Static Tube
Lecture 18 - Air Speed Corrections
Lecture 19 - Altitude and ROC/ROD Measurement
Lecture 20 - Measurements in Compressible Flows
Lecture 21 - Non Pneumatic Instruments
Lecture 22 - Introduction to Aerofoils and Aerofoil Nomenclature
Lecture 23 - Aerofoils - A Visit to the Past
Lecture 24 - Thick Aerofoils
Lecture 25 - Low Reynolds Number Aerofoils
Lecture 26 - Lift Generation by Wings - Part I
Lecture 27 - Lift Generation by Wings - Part II
Lecture 28 - Coefficient of Lift and Coefficient of Pressure
Lecture 29 - Tutorial on Aerofoils

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Lecture 30 - Critical Mach Number
Lecture 31 - Wave Drag
Lecture 32 - Swept Wings
Lecture 33 - Introduction to Drag and Types of Drag
Lecture 34 - Factors Affecting Induced Drag
Lecture 35 - Skin Friction Drag
Lecture 36 - Tutorial on Critical Mach Number and Wave Drag
Lecture 37 - Introduction to Propulsion
Lecture 38 - Gas Turbine Engine Types - Part I
Lecture 39 - Gas Turbine Engine Types - Part II
Lecture 40 - Introduction to Electric Propulsion and Ion Propulsion
Lecture 41 - Steady Level Flight
Lecture 42 - Power Required for the Steady Level Flight
Lecture 43 - Steady Level Flight - A Pilot's View
Lecture 44 - Tutorial on Steady Level Flight
Lecture 45 - Gliding Flight
Lecture 46 - Climbing Flight and Ceiling
Lecture 47 - Introduction to Turning Flight
Lecture 48 - Turning Flight Equations
Lecture 49 - Instantaneous and Sustained Turn
Lecture 50 - Tutorial on Climbing Flight and Turning Flight
Lecture 51 - Introduction to Static Stability
Lecture 52 - Aerodynamic Center and Effect of Center of Gravity
Lecture 53 - Effect of Center of Gravity - A Practical Demonstration
Lecture 54 - Introduction to V-n Diagram
Lecture 55 - V-n Diagram as per FAR 23 Regulations
Lecture 56 - Effect of Gusts on V-n Diagram
Lecture 57 - Tutorial on Stability and Control
Lecture 58 - Range
Lecture 59 - Specific Fuel Consumption and Generalized Range Equation
Lecture 60 - Endurance
Lecture 61 - Take-off Performance of Flight - Part I
Lecture 62 - Take-off Performance of Flight - Part II
Lecture 63 - Landing Performance of Flight
Lecture 64 - Tutorial on Range Payload Diagram
Lecture 65 - Tutorial on Range and Endurance
Lecture 66 - Flapping Wing Aerodynamics - Part I
Lecture 67 - Flapping Wing Aerodynamics - Part II

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Aircraft Design

Subject Co-ordinator - Prof. Rajkumar Pant

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Aircraft Design
Lecture 2 - Aircraft Design Process
Lecture 3 - Design Stages
Lecture 4 - Phases in Aircraft Design
Lecture 5 - The Design Spiral
Lecture 6 - Importance of Cost in Aircraft Design
Lecture 7 - Basic Laws of Aircraft Design
Lecture 8 - Requirements Capture
Lecture 9 - Quality Function Deployment
Lecture 10 - House of Quality Chart
Lecture 11 - Example of HoQ for HALE UAV
Lecture 12 - Illustration of HOQ-GA aircraft
Lecture 13 - Airliners
Lecture 14 - Key Issues in Design of Airliners
Lecture 15 - Design Considerations - Future Airliners
Lecture 16 - Supersonic Transport Aircraft
Lecture 17 - Airliner and Supersonic Aircraft, some additional concepts
Lecture 18 - Design Considerations - Cargo Aircraft
Lecture 19 - Design Considerations - GA Aircraft
Lecture 20 - Types of Military Aircraft
Lecture 21 - Cargo, GA and Military Aircraft, Some additional concepts
Lecture 22 - Aircraft Configuration Design
Lecture 23 - Podded Engines on Wings
Lecture 24 - Wing Sweep
Lecture 25 - Canards and Flying Wing
Lecture 26 - Three Surface Aircraft
Lecture 27 - Winglets
Lecture 28 - Thrust Vectoring
Lecture 29 - Few Novel Concepts_01

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Lecture 30 - Aircraft Configuration Design - Closing Remarks
Lecture 31 - Choices in Aircraft Layout
Lecture 32 - Wing Geometry Definitions
Lecture 33 - Options for Wing layout
Lecture 34 - Propulsion System Layout
Lecture 35 - Tail Plane Layout
Lecture 36 - Landing Gear Layout - Part 1
Lecture 37 - Landing Gear Layout - Part 2
Lecture 38 - Landing Gear of some Famous Aircraft
Lecture 39 - Tutorial on OpenVSP
Lecture 40 - Initial Sizing in Aircraft Design
Lecture 41 - Estimation of Empty Weight Fraction
Lecture 42 - Estimation of Mission Segment Weights
Lecture 43 - Estimation of Fuel Weight Fractions
Lecture 44 - Estimation of maximum L/D
Lecture 45 - Estimation of engine parameters
Lecture 46 - Estimation of Design gross weight
Lecture 47 - Take-off weight build up
Lecture 48 - Tutorial on Initial Sizing of Transport Aircraft
Lecture 49 - Tutorial on Initial Sizing of Military Aircraft
Lecture 50 - Subsonic Parasite Drag Estimation
Lecture 51 - Component Buildup Method
Lecture 52 - Drag Estimation of Military Aircraft
Lecture 53 - Tutorial on Drag Polar Estimation of Military Aircraft
Lecture 54 - Estimation of Lift Coefficient
Lecture 55 - Estimation of Maximum Lift Coefficient
Lecture 56 - Flaps as High Lift Devices
Lecture 57 - Tutorial on Lift Coefficient Estimation of Transport Aircraft
Lecture 58 - Tutorial on Lift Coefficient Estimation of Military Aircraft
Lecture 59 - Constraint Analysis- Introductory Remarks
Lecture 60 - Constraint Analysis- Transport Aircraft - Part 1
Lecture 61 - Constraint Analysis- Transport Aircraft - Part 2
Lecture 62 - Tutorial on Constraint Analysis of Transport Aicraft - Part 1
Lecture 63 - Tutorial on Constraint Analysis of Transport Aicraft - Part 2
Lecture 64 - Constraint Analysis- Military Aircraft
Lecture 65 - Tutorial on Constraint Analysis of Military Aicraft - Part 1
Lecture 66 - Tutorial on Constraint Analysis of Military Aicraft - Part 2
Lecture 67 - Refined Sizing
Lecture 68 - Tutorial on Refined Sizing of Jet Fighter Aircraft

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Lecture 69 - Cost Estimation in Aircraft Conceptual Design
Lecture 70 - Aircraft Life Cycle Cost Estimation
Lecture 71 - Tutorial on RDT&E and Production Cost Estimation of Transport Aircraft
Lecture 72 - Tutorial on DT&E and Production Cost Estimation of HALE UAV
Lecture 73 - Estimation of Direct Operating Cost
Lecture 74 - Fighter Aircraft Life Cycle Cost Estimation Model
Lecture 75 - Range Payload Diagram - Part 1
Lecture 76 - Range Payload Diagram - Part 2
Lecture 77 - Tutorial on Range Payload Diagram of Transport Aircraft
Lecture 78 - Environmental issues in Aircraft Design
Lecture 79 - Limit Manoeuvre Envelope
Lecture 80 - Effect of Gust
Lecture 81 - Aircraft Loads
Lecture 82 - Tutorial on V-n Diagram of Transport Aircraft
Lecture 83 - High Altitude Long Endurance (HALE) Aircraft
Lecture 84 - Morphing of Aircraft Configurations
Lecture 85 - Guest Lecture on Air Power and Multi-role Fighter Aircraft - Part 1
Lecture 86 - Guest Lecture on Air Power and Multi-role Fighter Aircraft - Part 2

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Launch Vehicle Analysis and Design

Subject Co-ordinator - Prof. Ashok Joshi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Course Plan
Lecture 3 - Ascent Mission Basics
Lecture 4 - Force and Geometry Models - 1
Lecture 5 - Force and Geometry Models - 2
Lecture 6 - Idealized Performance
Lecture 7 - Trajectory Under Gravity
Lecture 8 - Impact of Gravity
Lecture 9 - Impact of Drag
Lecture 10 - Curvilinear Motion Concept
Lecture 11 - Constant Pitch Rate Solution
Lecture 12 - Constant Velocity Solution
Lecture 13 - Constant (T/m) Solution
Lecture 14 - Ascent Mission Design
Lecture 15 - Multi-stage Rocket Basics
Lecture 16 - Multi-stage Configuration Basics
Lecture 17 - Multi-stage Solution Basics
Lecture 18 - Multi-stage Problem Definition
Lecture 19 - Optimal Staging Strategy
Lecture 20 - Lagrange Solution
Lecture 21 - Approximate Staging Solution
Lecture 22 - Variant Concept
Lecture 23 - Variant Design Solution
Lecture 24 - Parallel Staging Concept
Lecture 25 - Parallel Staging Benefits
Lecture 26 - Jet Damping and Ballistic Missiles
Lecture 27 - Current Rocket Concepts
Lecture 28 - Launch Widow and SSTO Concepts
Lecture 29 - Reentry Concept

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Lecture 30 - Ballistic Reentry Solution
Lecture 31 - Lifting and Other Reentry Modes
Lecture 32 - Concluding Remarks
Lecture 33 - Rectilinear Trajectories
Lecture 34 - Curvilinear Trajectories
Lecture 35 - Multi-stage Rocket Concept
Lecture 36 - Optimal Multi-stage Solutions

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NPTEL Video Course - Aerospace Engineering - NOC:Lighter than Air Systems

Subject Co-ordinator - Prof. Rajkumar Pant

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course Content
Lecture 2 - Differences between LTA and HTA systems
Lecture 3 - The three conventional LTA systems
Lecture 4 - LTA gases, Types of Airships and their components
Lecture 5 - Introduction of Skyship 600 and USP of Airships
Lecture 6 - Applications of Airships
Lecture 7 - Tethered Aerostat systems
Lecture 8 - Why use Aerostats
Lecture 9 - Some Queries on Aerostats
Lecture 10 - Historical developments of LTA systems - Part I
Lecture 11 - Historical developments of LTA systems - Part II
Lecture 12 - Historical developments of LTA systems - Part III
Lecture 13 - Historical developments of LTA systems - Part IV
Lecture 14 - Historical developments of LTA systems - Part V
Lecture 15 - Historical developments of LTA systems - Part VI
Lecture 16 - Overview of PADD
Lecture 17 - Remote Controlled Airships
Lecture 18 - Autonomous Airships
Lecture 19 - Indoor Blimp Projects by students
Lecture 20 - Biomimetic Airships
Lecture 21 - Introduction to Buoyancy
Lecture 22 - Basic Concepts of Aerostatics
Lecture 23 - Ballasting, Weigh off and Fuel weight recovery
Lecture 24 - In flight Ballast Collection methods
Lecture 25 - Static Lift Prediction - Part I
Lecture 26 - Static Lift Prediction - Part II
Lecture 27 - Tutorial Problem 1 on Static Lift Estimation
Lecture 28 - Effect of Humidity and Vapour Pressure
Lecture 29 - Calculation of Ambient Air Density

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Lecture 30 - Tutorial Problem 2 and 3 on Static Lift Estimation
Lecture 31 - Effect of Lifting Gas Purity, Superpressure and Superheat
Lecture 32 - Ballonet Air Weight Estimation
Lecture 33 - Net Static Lift of non rigid airships
Lecture 34 - Net Static Lift for other LTA systems
Lecture 35 - Tutorial Problem 4 on Net Static Lift Estimation
Lecture 36 - Parameters affecting Static Lift
Lecture 37 - Effect of change in Atmospheric Pressure
Lecture 38 - Tutorial Problem 5 on Change in Atmospheric Pressure
Lecture 39 - Effect of Superpressure
Lecture 40 - Tutorial Problem 6 on effect of Superpressure
Lecture 41 - Effect of Slow change in Atmospheric Temperature and Superheat
Lecture 42 - Effect of Rapid change in Atmospheric Temperature
Lecture 43 - Tutorial Problem 7 on Change in Atmospheric Temperature and Superheat
Lecture 44 - Revision and Tutorial Problem 08 and 09 on Affecting Parameters of Static Lift
Lecture 45 - Effect of change in Relative Humidity
Lecture 46 - Effect of change in Lifting Gas Purity
Lecture 47 - Effect of change in Lifting Gas Volume
Lecture 48 - Determination of Inflation Fraction
Lecture 49 - Flight To Lower Ground Elevation
Lecture 50 - Tutorial Problem 10 on Helium Addition
Lecture 51 - Outdoor Hot Air Balloon
Lecture 52 - Pressure Height
Lecture 53 - Tutorial Problem 11 on Pressure Height Calculation
Lecture 54 - Sea Level Inflation Fraction
Lecture 55 - Flight above Pressure Height
Lecture 56 - Effect of Change in Operating Altitude
Lecture 57 - Tutorial Problem 12 on Lifting Gas Loss
Lecture 58 - Descent Following Exceedance
Lecture 59 - Pressure Height for other LTA Vehicles
Lecture 60 - Discussion of Practice Questions
Lecture 61 - Envelope Materials - Part I
Lecture 62 - Envelope Materials - Part II
Lecture 63 - Envelope Materials - Part III
Lecture 64 - Fabric Testing Machines - Part I
Lecture 65 - Fabric Testing Machines - Part II
Lecture 66 - Need for Ground Handling
Lecture 67 - Aerium Hanger for CL 160 Airship
Lecture 68 - Ground Handling of Airships

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Lecture 69 - Types of Mooring Masts and Design Requirements
Lecture 70 - Nose Battens for Envelopes
Lecture 71 - Need for Airship Design Methodology
Lecture 72 - Overview of Airship Design Methodology ADM
Lecture 73 - Details of Airship Design Methodology ADM
Lecture 74 - Inputs to Airship Design Methodology - Part 1
Lecture 75 - Inputs to Airship Design Methodology - Part 2
Lecture 76 - Design Constants in Airship Design Methodology
Lecture 77 - Outputs from Airship Design Methodology
Lecture 78 - Statistical Data Used in Airship Design Methodology
Lecture 79 - Validation of Airship Design Methodology
Lecture 80 - Envelope Shapes for LTA Systems
Lecture 81 - Example of Application of Airship Design Methodology
Lecture 82 - Conclusions and Limitations of Airship Design Methodology
Lecture 83 - Sizing Procedure for Indoor Remotely Controlled Airships - Part 1
Lecture 84 - Sizing Procedure for Indoor Remotely Controlled Airships - Part 2
Lecture 85 - Sizing Procedure for Indoor Remotely Controlled Airships - Part 3
Lecture 86 - Tutorial on Sizing of an Indoor Non Rigid Remotely Controlled Airship
Lecture 87 - Transportation Problems Faced by Remote Regions
Lecture 88 - Airships vs Helicopters - Part I
Lecture 89 - Airships vs Helicopters - Part II
Lecture 90 - Chaar Dham Yatra - Part I
Lecture 91 - Chaar Dham Yatra - Part II
Lecture 92 - Chaar Dham Yatra - Part III
Lecture 93 - Steam and IC engines for Airships
Lecture 94 - Electric motors for Airships
Lecture 95 - Turboprops for Airships
Lecture 96 - Solar Propulsion and Thrust Vectoring on Airships
Lecture 97 - Lectuer on Dynamics
Lecture 98 - Lectuer on Drag
Lecture 99 - Aerodynamic Stability
Lecture 100 - Added Mass Effects
Lecture 101 - Introduction to Aerostat Design Methodology
Lecture 102 - Inputs for Aerostat Design Methodology
Lecture 103 - Design Constants in Aerostat Design Methodology
Lecture 104 - Overview of Aerostat Design Methodology
Lecture 105 - Equilibrium Analysis of Aerostats - Part I
Lecture 106 - Equilibrium Analysis of Aerostats - Part II
Lecture 107 - Methodology for Tether Profile Estimation

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Lecture 108 - Sizing of Reusable Indoor Hot Air Balloon
Lecture 109 - Tutorial on Sizing of RIHAB
Lecture 110 - Features of Hybrid Airships
Lecture 111 - Technological challenges in HALE Platforms development - Part I
Lecture 112 - Technological challenges in HALE Platforms development - Part II
Lecture 113 - Initial sizing of Stratospheric Airships
Lecture 114 - Introduction to Hybrid Airships
Lecture 115 - Lockheed Martin's P 791 Hybrid Airship
Lecture 116 - Aeroscraft ML 866 Hybrid Airship
Lecture 117 - SkyCat Hybrid Airship
Lecture 118 - Rotary and Winged Hybrid Airships
Lecture 119 - Hybrid Ultra Heavy Lift Cargo Vehicle Transport
Lecture 120 - Features of Hybrid Airships
Lecture 121 - Solar Powered Airships

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NPTEL Video Course - Aerospace Engineering - NOC:Air Transportation: An Overview

Subject Co-ordinator - Prof. Rajkumar Sureshchandra Pant

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Panel Discussuion
Lecture 2 - Introduction to Civil Aviation
Lecture 3 - Airline Deregulation Act
Lecture 4 - Civil Aviation Organizations and Freedoms of Air
Lecture 5 - Resilience of Global Aviation Sector
Lecture 6 - Development in Air Transportation in India
Lecture 7 - Introduction to Airline Economics
Lecture 8 - Airport Financing
Lecture 9 - Airline Operating Cost
Lecture 10 - DOC Tutorial - Part 1
Lecture 11 - DOC Tutorial - Part 2
Lecture 12 - Airline Yield Management
Lecture 13 - Dynamic Fare Pricing
Lecture 14 - Budget Airlines
Lecture 15 - Airline Partnerships
Lecture 16 - Airline Scheduling and Disruption Management
Lecture 17 - Tutorial Example on Airline Scheduling
Lecture 18 - Crew Scheduling and Pairing P1
Lecture 19 - Crew Scheduling and Pairing P2
Lecture 20 - Airline Fleet Planning - Part 1
Lecture 21 - Airline Fleet Planning - Part 2
Lecture 22 - Aircraft Storage
Lecture 23 - Aircraft Registration
Lecture 24 - Introduction to ATM 1
Lecture 25 - Introduction to ATM 2
Lecture 26 - Modern Trends in ATM
Lecture 27 - Urban Air Mobility and UAS Traffic Management
Lecture 28 - Human Factors in ATM (Panel Discussion)
Lecture 29 - Air Navigation - Part 1

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Lecture 30 - Air Navigation - Part 2
Lecture 31 - Onboard Avionics for CNS
Lecture 32 - The Airport System
Lecture 33 - Overview of Airfield Design
Lecture 34 - Aircraft Characteristics affecting Airport Design
Lecture 35 - Environmental Impact Assessment of Airport Development
Lecture 36 - Airport Declared Distances
Lecture 37 - Declared Distances Tutorial
Lecture 38 - Runway Length Corrections
Lecture 39 - Wind Rose Diagram
Lecture 40 - Heliports and Vertiports
Lecture 41 - Airport Lighting, Marking and Signage
Lecture 42 - Precision Approaches for Landing
Lecture 43 - Extended-range Twin-engine Operations (ETOPS)
Lecture 44 - Minimum Navigation Performance Specifications (MNPS) and Reduced Vertical Separation Minimum (RV
Lecture 45 - Traffic Collision Avoidance System (TCAS)
Lecture 46 - Polar Operations
Lecture 47 - Regional Airport Cost Estimation Model
Lecture 48 - Estimation of Generalized Cost of Air Travel for Commuter and Regional a/c (CRAGER Intro)
Lecture 49 - Case Studies using CRAGER
Lecture 50 - Sustainable Aviation using Buoyancy Engineering
Lecture 51 - Challenges in Aircraft Maintenance (Panel Discussion)

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NPTEL Video Course - Aerospace Engineering - NOC:Elements of Mechanical Vibration

Subject Co-ordinator - Prof. Ashish K Darpe

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 25
Lecture 26
Lecture 27
Lecture 28 - LABORATORY SESSION (Introduction)
Lecture 29 - EXPERIMENT 1

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Lecture 30 - EXPERIMENT 2
Lecture 31 - EXPERIMENT No. 2
Lecture 32
Lecture 33
Lecture 34
Lecture 35 - LABORATORY SESSION #3
Lecture 36 - LABORATORY SESSION #4
Lecture 37 - LABORATORY SESSION #5
Lecture 38
Lecture 39
Lecture 40
Lecture 41 - LABORATORY SESSION #6
Lecture 42 - LABORATORY SESSION #7
Lecture 43 - LABORATORY SESSION #8
Lecture 44
Lecture 45
Lecture 46
Lecture 47
Lecture 48

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NPTEL Video Course - Aerospace Engineering - Aero Elasticity

Subject Co-ordinator - Prof. C. Venkatesan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Aero elasticity
Lecture 2 - Aero elasticity
Lecture 3 - Aero elasticity
Lecture 4 - Aero elasticity
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Lecture 25 - Aero elasticity
Lecture 26 - Aero elasticity

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NPTEL Video Course - Aerospace Engineering - Foundation of Scientific Computing

Subject Co-ordinator - Prof. Tapan K. Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
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Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24 (Same as Lecture 23)
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Aerospace Engineering - Instability and Transition of Fluid Flows

Subject Co-ordinator - Prof. Tapan K. Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Instability and Transition of Fluid Flows
Lecture 2 - Instability and Transition of Fluid Flows
Lecture 3 - Instability and Transition of Fluid Flows
Lecture 4 - Instability and Transition of Fluid Flows
Lecture 5 - Instability and Transition of Fluid Flows
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Lecture 27 - Instability and Transition of Fluid Flows
Lecture 28 - Instability and Transition of Fluid Flows
Lecture 29 - Instability and Transition of Fluid Flows

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Lecture 30 - Instability and Transition of Fluid Flows
Lecture 31 - Instability and Transition of Fluid Flows
Lecture 32 - Instability and Transition of Fluid Flows
Lecture 33 - Instability and Transition of Fluid Flows
Lecture 34 - Instability and Transition of Fluid Flows
Lecture 35 - Instability and Transition of Fluid Flows
Lecture 36 - Instability and Transition of Fluid Flows
Lecture 37 - Instability and Transition of Fluid Flows
Lecture 38 - Instability and Transition of Fluid Flows
Lecture 39 - Instability and Transition of Fluid Flows

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NPTEL Video Course - Aerospace Engineering - Introduction to Helicopter Aerodynamics and Dynamics

Subject Co-ordinator - Prof. A.R. Manjunath, Prof. C. Venkatesan

Co-ordinating Institute - IIT - Kanpur | HAL

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 2 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 3 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 4 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 5 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 6 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 7 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 8 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 9 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 10 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 11 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 12 - Introduction to Helicopter Aerodynamics and Dynamics
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Lecture 23 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 24 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 25 - Introduction to Helicopter Aerodynamics and Dynamics
Lecture 26 - Introduction to Helicopter Aerodynamics and Dynamics

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NPTEL Video Course - Aerospace Engineering - Introduction to Propulsion

Subject Co-ordinator - Dr. D.P. Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Aerospace Propulsion
Lecture 2 - Fundamentals of Aerospace Propulsion
Lecture 3 - Fundamentals of Aerospace Propulsion
Lecture 4 - Fundamentals of Aerospace Propulsion
Lecture 5 - Fundamentals of Aerospace Propulsion
Lecture 6 - Fundamentals of Aerospace Propulsion
Lecture 7 - Fundamentals of Aerospace Propulsion
Lecture 8 - Fundamentals of Aerospace Propulsion
Lecture 9 - Fundamentals of Aerospace Propulsion
Lecture 10 - Fundamentals of Aerospace Propulsion
Lecture 11 - Fundamentals of Aerospace Propulsion
Lecture 12 - Fundamentals of Aerospace Propulsion
Lecture 13 - Fundamentals of Aerospace Propulsion
Lecture 14 - Fundamentals of Aerospace Propulsion
Lecture 15 - Fundamentals of Aerospace Propulsion
Lecture 16 - Fundamentals of Aerospace Propulsion
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Lecture 18 - Fundamentals of Aerospace Propulsion
Lecture 19 - Fundamentals of Aerospace Propulsion
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Lecture 22 - Fundamentals of Aerospace Propulsion
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Lecture 26 - Fundamentals of Aerospace Propulsion
Lecture 27 - Fundamentals of Aerospace Propulsion
Lecture 28 - Fundamentals of Aerospace Propulsion
Lecture 29 - Fundamentals of Aerospace Propulsion

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Lecture 30 - Fundamentals of Aerospace Propulsion
Lecture 31 - Fundamentals of Aerospace Propulsion
Lecture 32 - Fundamentals of Aerospace Propulsion
Lecture 33 - Fundamentals of Aerospace Propulsion
Lecture 34 - Fundamentals of Aerospace Propulsion
Lecture 35 - Fundamentals of Aerospace Propulsion
Lecture 36 - Fundamentals of Aerospace Propulsion
Lecture 37 - Fundamentals of Aerospace Propulsion
Lecture 38 - Fundamentals of Aerospace Propulsion
Lecture 39 - Fundamentals of Aerospace Propulsion
Lecture 40 - Fundamentals of Aerospace Propulsion

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NPTEL Video Course - Aerospace Engineering - Jet and Rocket Propulsion

Subject Co-ordinator - Dr. A. Kushari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Jet and Rocket Propulsion
Lecture 2 - Jet and Rocket Propulsion
Lecture 3 - Jet and Rocket Propulsion
Lecture 4 - Jet and Rocket Propulsion
Lecture 5 - Jet and Rocket Propulsion
Lecture 6 - Jet and Rocket Propulsion
Lecture 7 - Jet and Rocket Propulsion
Lecture 8 - Jet and Rocket Propulsion
Lecture 9 - Jet and Rocket Propulsion
Lecture 10 - Jet and Rocket Propulsion
Lecture 11 - Jet and Rocket Propulsion
Lecture 12 - Jet and Rocket Propulsion
Lecture 13 - Jet and Rocket Propulsion
Lecture 14 - Jet and Rocket Propulsion
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Lecture 19 - Jet and Rocket Propulsion
Lecture 20 - Jet and Rocket Propulsion
Lecture 21 - Jet and Rocket Propulsion
Lecture 22 - Jet and Rocket Propulsion
Lecture 23 - Jet and Rocket Propulsion
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Lecture 26 - Jet and Rocket Propulsion
Lecture 27 - Jet and Rocket Propulsion
Lecture 28 - Jet and Rocket Propulsion
Lecture 29 - Jet and Rocket Propulsion

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Lecture 30 - Jet and Rocket Propulsion
Lecture 31 - Jet and Rocket Propulsion
Lecture 32 - Jet and Rocket Propulsion
Lecture 33 - Jet and Rocket Propulsion
Lecture 34 - Jet and Rocket Propulsion
Lecture 35 - Jet and Rocket Propulsion
Lecture 36 - Jet and Rocket Propulsion
Lecture 37 - Jet and Rocket Propulsion
Lecture 38 - Jet and Rocket Propulsion
Lecture 39 - Jet and Rocket Propulsion
Lecture 40 - Jet and Rocket Propulsion

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Airplane Performance

Subject Co-ordinator - Dr. A.K. Ghosh, Dr. Deepu Philip

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction
Lecture 2 - George Cayley
Lecture 3 - Introduction to airplane and its components
Lecture 4 - Hansa 3 Aircraft and its Primary Systems
Lecture 5 - Concept of Lift Aerofoil
Lecture 6 - Drag Polar
Lecture 7 - Revision
Lecture 8 - Standard Atmosphere
Lecture 9 - Measuring Instruments
Lecture 10 - Equations of Motion
Lecture 11 - Thrust Required, Power Required
Lecture 12 - Excess Thrust and Power
Lecture 13 - Review
Lecture 14 - Thrust Required
Lecture 15 - Modeling of CL
Lecture 16 - A Closer Look
Lecture 17 - Estimation of Drag Polar Through Flight Test
Lecture 18 - Estimation of Rate of Climb
Lecture 19 - Revision.
Lecture 20 - Range and Endurance
Lecture 21 - Range and Endurance
Lecture 22 - Gliding Flight
Lecture 23 - Accelerated Flight
Lecture 24 - V-n Diagram
Lecture 25 - Revision..
Lecture 26 - V stall
Lecture 27 - Flaps
Lecture 28 - Take off
Lecture 29 - Take off Performance

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Lecture 30 - Take off Performance
Lecture 31 - Revision...
Lecture 32 - Landing Performance
Lecture 33 - Landing Performance
Lecture 34 - Challanges in Takeoff and Landing
Lecture 35 - Introduction to Static Stability
Lecture 36 - Positioning of Center of Pressure for Static Stability
Lecture 37 - Revision.....
Lecture 38 - Stability and Control
Lecture 39 - Stability and Control
Lecture 40 - Longitudinal Control
Lecture 41 - Contribution of Wing and Tail
Lecture 42 - Stability
Lecture 43 - Control
Lecture 44 - Control
Lecture 45 - Control
Lecture 46 - Design Basics
Lecture 47 - Design Basics
Lecture 48 - Revision.

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NPTEL Video Course - Aerospace Engineering - NOC:Stability and control of aircraft

Subject Co-ordinator - Dr. A.K. Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Static Stability
Lecture 3 - Stability and Trim
Lecture 4 - Stability
Lecture 5 - Stability
Lecture 6 - Problems
Lecture 7 - Problems
Lecture 8 - Neutral Point and Fuselage Contribution Completed
Lecture 9 - Longitudinal Control Completed
Lecture 10 - Longitudinal Control (Continued...)
Lecture 11 - Control
Lecture 12 - CL_trim Vs ????e_trim
Lecture 13 - Neutral Point
Lecture 14 - Contribution of Engine towards Stability
Lecture 15 - Revision
Lecture 16 - Trim
Lecture 17 - Trim
Lecture 18 - Maneuvering Point
Lecture 19 - Numerical
Lecture 20 - Revision (Lecture20)
Lecture 21 - Directional Stability
Lecture 22 - Directional Control
Lecture 23 - Lateral Stability and Control
Lecture 24 - Numericals
Lecture 25 - Lecture - 25 Revision
Lecture 26 - Stick Free Stability
Lecture 27 - Stick Free Stability (Continued...)
Lecture 28 - Hinge Moment and Hinge Moment Derivative
Lecture 29 - Aircraft Handling Qualities

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Lecture 30 - Aircraft Handling Qualities (Continued...)
Lecture 31 - Reversible Control
Lecture 32 - Numericals
Lecture 33 - Numericals
Lecture 34 - Handling Qualities
Lecture 35 - Determination of Neutral Point and Maneuvering Point by Flight Experiment
Lecture 36 - Ponit Mass Equation of Motion
Lecture 37 - Forces and Moments
Lecture 38 - Aircraft Equations of Motion
Lecture 39 - Six Degrees of Freedom of an Aircraft
Lecture 40 - 6 DoF
Lecture 41 - Vector in a Rotating Frame
Lecture 42 - Euler Angles
Lecture 43 - Small Perturbation Theory
Lecture 44 - Small Perturbation Theory (Continued...)
Lecture 45 - Perturbed Equations of Motion
Lecture 46 - Perturbed Force
Lecture 47 - Perturbed Force
Lecture 48 - Perturbed Pitching Moment
Lecture 49 - Longitudinal Dimensional Stability Derivatives
Lecture 50 - Dynamic Stability
Lecture 51 - Longitudinal Modes
Lecture 52 - Short Period and Phugoid Approximations
Lecture 53 - Pure Pitching Motion
Lecture 54 - Stability Augmentation System (SAS)
Lecture 55 - Lateral-Directional Motion
Lecture 56 - Tutorial - 1
Lecture 57 - Tutorial - 2
Lecture 58 - Tutorial - 3
Lecture 59 - Tutorial - 4
Lecture 60 - History of Aviation

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NPTEL Video Course - Aerospace Engineering - NOC:Engineering Thermodynamics

Subject Co-ordinator - Dr. D.P. Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thermodynamics and its Applications
Lecture 2 - System and its Surroundings
Lecture 3 - Property of System
Lecture 4 - Energy and its Various Forms
Lecture 5 - Concepts of Equilibrium and its State
Lecture 6 - Energy and its Interactions
Lecture 7 - Heat Interactions
Lecture 8 - Thermodynamic Properties of Fluids - 1
Lecture 9 - Thermodynamic Properties of Fluids - 2
Lecture 10 - Thermodynamic Properties of Fluids - 3
Lecture 11 - Thermodynamic Properties of Fluids - 4
Lecture 12 - Thermodynamic Properties of Fluids - 5
Lecture 13 - First Law of Thermodynamics for Cyclic Process
Lecture 14 - First Law of Thermodynamics for Non-cyclic Process - 1
Lecture 15 - First Law of Thermodynamics for Non-cyclic Process - 2
Lecture 16 - Control Mass and Control Volume
Lecture 17 - First Law of Thermodynamics for Steady Flow Processes
Lecture 18 - First Law of Thermodynamics for Unsteady Flow Processes
Lecture 19 - First Law of Thermodynamics to Reacting Systems
Lecture 20 - Second Law of Thermodynamics
Lecture 21 - Second Law of Thermodynamics
Lecture 22 - Second Law of Thermodynamics
Lecture 23 - Second Law of Thermodynamics
Lecture 24 - Applications of Second Law of Thermodynamics
Lecture 25 - Applications of Second Law of Thermodynamics
Lecture 26 - Exergy
Lecture 27 - Gas Turbine Cycle
Lecture 28 - Vapor Power Cycle - 1
Lecture 29 - Vapor Power Cycle - 2

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Lecture 30 - Vapor Power Cycle - 3
Lecture 31 - Gas Power Cycles - 1
Lecture 32 - Gas Power Cycles - 2
Lecture 33 - Refrigeration Cycles
Lecture 34 - Non-Reacting Mixture and Psychrometry
Lecture 35 - Gas-Vapor Mixture and Air Conditioning - 1
Lecture 36 - Gas-Vapor Mixture and Air Conditioning - 2
Lecture 37 - Thermodynamic Property Relations - 1
Lecture 38 - Thermodynamic Property Relations - 2

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NPTEL Video Course - Aerospace Engineering - NOC:Aircraft Dynamic Stability and Design Stability Augmentation

Subject Co-ordinator - Dr. A.K. Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Dynamic Stability
Lecture 2 - Spring-Mass-Damper System
Lecture 3 - Spring-Mass-Damper System
Lecture 4 - Laplace Transform
Lecture 5 - Pitch Dynamics
Lecture 6 - Numericals
Lecture 7 - Aircraft Rigid Body Equation of Motion
Lecture 8 - Six Degree of Freedom Equation of Motion
Lecture 9 - Vector in Rotating Frame
Lecture 10 - Forces and Moments on Aircraft
Lecture 11 - Euler Angles
Lecture 12 - Trajectory of the Aircraft
Lecture 13 - Small Perturbation Theory
Lecture 14 - Perturbed Aerodynamic Forces and Moments
Lecture 15 - U-derivatives
Lecture 16 - Alpha - derivatives
Lecture 17 - Alpha Dot Derivatives
Lecture 18 - q and delta Derivatives
Lecture 19 - Dimensional Stability Derivatives
Lecture 20 - Longitudinal Characteristic Equation
Lecture 21 - Routh's Criteria and Longitudinal Dynamic Stability
Lecture 22 - Longitudinal Modes
Lecture 23 - Short period Mode Approximation
Lecture 24 - Long Period Mode (Phugoid) Approximation
Lecture 25 - Lateral Directional Stability Derivatives
Lecture 26 - Lateral Directional Stability Derivatives (Continued...)
Lecture 27 - Perturbed Equation of Motion for Lateral Dynamics
Lecture 28 - Modes of Lateral Directional Dynamics
Lecture 29 - Spiral and Dutch Roll modes Approximation

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Lecture 30 - RouthÂ Hurwitz Stability Criterion
Lecture 31 - Introduction to Stability Augmentation
Lecture 32 - Pure Yawing and Pure Rolling Motion
Lecture 33 - SAS for Longitudinal Dynamics
Lecture 34 - SAS for Lateral Dynamics
Lecture 35 - Flight Handling Qualities
Lecture 36 - Numericals
Lecture 37 - Revision
Lecture 38 - Mode Shape
Lecture 39 - Mode Shape
Lecture 40 - Numericals
Lecture 41 - Stability Augmentation System
Lecture 42 - Numericals
Lecture 43 - Numericals

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Ancient Indian Technology

Subject Co-ordinator - Dr. D.P. Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ancient Indian Civilization
Lecture 2 - Ancient Indian Civilizationâ s Gift to the World
Lecture 3 - Why do we need to look at Ancient Indian Science and Technology?
Lecture 4 - Glimpses of Ancient Indian Science and Technology
Lecture 5 - Brief Review of Ancient Indian Scriptures
Lecture 6 - Basic Principles of carrying out science and technology
Lecture 7 - Arrays of Physics, chemistry and Indoor games
Lecture 8 - Marvels of Ancient Indian Technology
Lecture 9 - Introduction to Indian Agriculture
Lecture 10 - Problems arising due to modern agricultural practices
Lecture 11 - Pesticides and soil degradation
Lecture 12 - Agriculture - A Primary Productive Activity
Lecture 13 - An Agricultural Tools - A Plough
Lecture 14 - Soil and seeds
Lecture 15 - Sowing Methods
Lecture 16 - Indigenous cattle and manuring
Lecture 17 - Availability of Water and Freshwater
Lecture 18 - Ancient Indian Wells
Lecture 19 - Temple Water tanks and Dams
Lecture 20 - Tank Irrigation system and Rainwater Harvesting
Lecture 21 - Waterbodies - Lakes and Canals
Lecture 22 - Sluices and Embankments
Lecture 23 - Ancient Indian Textile Technology
Lecture 24 - Handlooms and Charkha
Lecture 25 - Different types of Handlooms
Lecture 26 - Ancient Rural Indian Housing
Lecture 27 - Thatched Roof House
Lecture 28 - Rural Walls and Roof materials
Lecture 29 - Indus Valley and Harappan Civilization

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Lecture 30 - First and Second of Indian Civilization
Lecture 31 - Town topologies and Brick and Tile making process
Lecture 32 - Cooling and Ventilation System in Building
Lecture 33 - Temple Architecture in ancient India - Part 1
Lecture 34 - Temple Architecture in ancient India - Part 2
Lecture 35 - World of Materials
Lecture 36 - Metals - Gold Silver Lead
Lecture 37 - History of Copper
Lecture 38 - Iron during Vedic period
Lecture 39 - Iron smelting process in ancient India
Lecture 40 - Iron and Steel crafts in ancient India
Lecture 41 - Extraction and smelting of Zinc in Ancient India
Lecture 42 - Wootz Steel Technology
Lecture 43 - Metal Casting in Ancient India
Lecture 44 - Glass Technology in Ancient India
Lecture 45 - Environmental Consciousness in Ancient India
Lecture 46 - Environmental Policy in Ancient India

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Experiments in Flight

Subject Co-ordinator - Prof. Mahendra Verma, Dr. A.K. Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Weighment and Calculation of CG (Theory)
Lecture 2 - Cruise Experiment (Theory)
Lecture 3 - Weighment Experiment and cockpit panel description
Lecture 4 - Drag Polar Experiment
Lecture 5 - CG and Climb Experiment
Lecture 6 - Calibration of Control Surface
Lecture 7 - Calibration of Control Surfaces (Experiment)
Lecture 8 - Introduction to Flight Data Recorder
Lecture 9 - Sensors - Part I
Lecture 10 - Sensors - Part II
Lecture 11 - Data Acquisition using MEMS devices
Lecture 12 - Estimation of Stick-Fixed Neutral Point
Lecture 13 - Estimation of Stick-Free Neutral Point and Stick-Free Maneuvering Point
Lecture 14 - Static
Lecture 15 - Static
Lecture 16 - Steady Coordinated Turn
Lecture 17 - Introduction to Parameter Estimation
Lecture 18 - Parameter Estimation using Least Squares Method
Lecture 19 - Aerodynamic Parameter Estimation using Least Squares Method
Lecture 20 - Aerodynamic Parameter Estimation using Delta Method
Lecture 21 - Aerodynamic Parameter Estimation using Delta Method (Continued...)

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NPTEL Video Course - Aerospace Engineering - NOC:Engineering Thermodynamics (2017)

Subject Co-ordinator - Dr. Jayant K. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamental laws of nature, system definitions and applications
Lecture 2 - Thermodynamic property, state, equilibrium and process
Lecture 3 - Temperature scale and pressure
Lecture 4 - Macroscopic and microscopic forms of energy
Lecture 5 - Different forms of work, energy transfer and sign convention
Lecture 6 - First law of thermodynamics and energy balance
Lecture 7 - Efficiency of mechanical and electrical devices
Lecture 8 - Examples on basic concept and energy balance
Lecture 9 - Phase change of a pure substance
Lecture 10 - Property diagrams of pure substances
Lecture 11 - Thermodynamic properties of a pure substance from a property table
Lecture 12 - Thermodynamic properties of a pure substance
Lecture 13 - Equations of state and compressibility chart
Lecture 14 - Examples on properties of pure substances
Lecture 15 - Quasi equilibrium, moving boundary work
Lecture 16 - Polytropic process
Lecture 17 - Energy analysis of closed system and unrestrained expansion
Lecture 18 - Internal energy, enthalpy, and specific heats of ideal gas
Lecture 19 - Internal energy, enthalpy, and specific heats of solids and liquids
Lecture 20 - Examples on energy balance for closed systems and moving boundary work
Lecture 21 - Conservation of mass and steady flow processes
Lecture 22 - Flow work and energy of flowing fluid
Lecture 23 - Energy balance for steady flow devices
Lecture 24 - Throttling valve, mixing chamber and heat exchanger
Lecture 25 - Energy analysis of steady and unsteady flow devices
Lecture 26 - Examples on mass and energy analysis of open systems
Lecture 27 - Second law of thermodynamics, heat engine and cyclic devices
Lecture 28 - COP of refrigerator and heat pump, second law statements
Lecture 29 - Perpetual motion machines, reversible and irreversible processes, Carnot cycle

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Lecture 30 - Carnot principles, thermodynamic temperature scale, Carnot HE and HP
Lecture 31 - Examples on second law of thermodynamics
Lecture 32 - Clausius inequality, application of second law
Lecture 33 - Entropy, increase in entropy principle, isentropic process
Lecture 34 - Change in entropy of solids, liquids and ideal gases
Lecture 35 - Reversible flow work, multistage compressor, efficiency of pump and compressors
Lecture 36 - Entropy balance in closed system and control volume
Lecture 37 - Examples on entropy change in a system
Lecture 38 - Exergy and second law efficiency
Lecture 39 - Exergy of a fixed mass and flowing stream
Lecture 40 - Exergy transfer due to heat, mass and work, exergy destruction
Lecture 41 - Exergy balance and second law efficiency for closed systems and steady flow devices
Lecture 42 - Examples related to exergy change and exergy destruction
Lecture 43 - Gas power cycles and air-standard assumptions
Lecture 44 - An overview of reciprocating engines and otto cycle
Lecture 45 - Analysis of Diesel cycle
Lecture 46 - Analysis of Brayton cycle
Lecture 47 - Examples on gas power cycles such as Otto, Diesel and Brayton
Lecture 48 - Rankin and Carnot vapour power cycles
Lecture 49 - Ideal regenerative Rankin cycle and combined gas-vapour cycle
Lecture 50 - Refrigeration cycles
Lecture 51 - Examples on vapour power cycles
Lecture 52 - Thermodynamic property relations
Lecture 53 - hermodynamic property relations
Lecture 54 - Thermodynamic property relations
Lecture 55 - Combustion and conservation of mass in a chemical reaction
Lecture 56 - Energy balance for reacting systems
Lecture 57 - Enthalpy of formation and combustion, adiabatic flame temperature
Lecture 58 - Examples on property relations and reaction thermodynamics

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NPTEL Video Course - Aerospace Engineering - NOC:Aircraft Design

Subject Co-ordinator - Dr. A.K. Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Wing Loading and Thrust Loading
Lecture 3 - Basic Design - Lift and Drag
Lecture 4 - Range and Endurance
Lecture 5 - Mission Requirements
Lecture 6 - Range and Endurance
Lecture 7 - Fuel Consumption
Lecture 8 - L/D for Maximum Range and Endurance
Lecture 9 - Range and endurance for Jet-driven Aircraft
Lecture 10 - Estimation of Fuel for a Mission
Lecture 11 - Design Considerations
Lecture 12 - Design Considerations
Lecture 13 - Design Considerations
Lecture 14 - Wing Design
Lecture 15 - Wing Design
Lecture 16 - Wing Design
Lecture 17 - Wing Design
Lecture 18 - Wing Arrangements
Lecture 19 - Tail Arrangements
Lecture 20 - Tail Arrangements (Continued...)
Lecture 21 - Aircraft Structure
Lecture 22 - Wing Loading and Power Loading
Lecture 23 - Thrust Loading and Wing Loading
Lecture 24 - Thrust Loading
Lecture 25 - Wing Loading
Lecture 26 - Wing Loading
Lecture 27 - Take off
Lecture 28 - Take off
Lecture 29 - Wing Loading

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Lecture 30 - Revision (Wing Loading and Thrust Loading)
Lecture 31 - Numerical
Lecture 32 - Wing Loading
Lecture 33 - Stability Considerations
Lecture 34 - Static Stability Basics
Lecture 35 - Wing and tail contribution to Longitudinal Static Stability
Lecture 36 - Conceptual Design
Lecture 37 - Conceptual design (Continued...)
Lecture 38 - Elevator Effectiveness
Lecture 39 - Elevator Effectiveness (Continued...)
Lecture 40 - Numerical - Pitching moment
Lecture 41 - Numerical - Elevator Effectiveness
Lecture 42 - Aircraft Maintenance Guidelines
Lecture 43 - Inspection for Aircraft
Lecture 44 - Numerical of Weight Fraction
Lecture 45 - Inspection of Sinus 912 Motor Glider
Lecture 46 - Numericals

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NPTEL Video Course - Aerospace Engineering - NOC:Fundamentals Of Combustion-I

Subject Co-ordinator - Dr. D.P. Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to fundamentals of combustion
Lecture 2 - Scope and applications of combustion
Lecture 3 - Scope of combustion (Continued...) and types of fuel and oxidizers
Lecture 4 - Characterization of liquid and gaseous fuel
Lecture 5 - Properties of liquid and solid fuels, various modes of combustion
Lecture 6 - Thermodynamics of combustion
Lecture 7 - Thermodynamics of combustion (Continued...)
Lecture 8 - Laws of thermodynamics and Stoichiometry
Lecture 9 - Stoichiometric calculations for air-gas mixture
Lecture 10 - Mixture fraction calculation for diffusion flames
Lecture 11 - Thermochemistry
Lecture 12 - Heat of reaction and bond energy
Lecture 13 - Adiabatic flame temperature
Lecture 14 - Adiabatic flame temperature and its effect on various parameters
Lecture 15 - Introduction to chemical equilibrium
Lecture 16 - Chemical equilibrium and Gibbs free energy
Lecture 17 - Equilibrium constants and Le chatlier principle
Lecture 18 - Determination of chemical equilibrium composition
Lecture 19 - Chemical and reaction kinetics
Lecture 20 - Compact notation and reaction rate of chemical reaction
Lecture 21 - Collision Theory
Lecture 22 - Collision theory (Continued...)
Lecture 23 - Collision frequency of molecules
Lecture 24 - Specific reaction rate and Arrhenius law
Lecture 25 - First order, Second order and Third-order reactions
Lecture 26 - Classification of chemical reactions
Lecture 27 - Elementary chain reactions
Lecture 28 - Quasi-steady state and partial equilibrium approximation
Lecture 29 - Physics of combustion

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Lecture 30 - Transport equations and molecular model for transport process
Lecture 31 - Mean free path length
Lecture 32 - Lennard-Jones potential model for diffusivity
Lecture 33 - Lennard-Jones potential model (Continued...)
Lecture 34 - Mass conservation law
Lecture 35 - Momentum conservation equation
Lecture 36 - Introduction to mass transfer
Lecture 37 - Species transport equation
Lecture 38 - Energy conservation equation
Lecture 39 - Conserved scalar approach for one dimensional flows
Lecture 40 - Introduction to turbulent combustion

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NPTEL Video Course - Aerospace Engineering - NOC:Aircraft Maintenance

Subject Co-ordinator - Dr. A.K. Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rules and Regulations for Civil Aviation in India
Lecture 2 - Rules and Regulations for Civil Aviation in India (Continued...)
Lecture 3 - Aircraft Hydraulic System
Lecture 4 - Aircraft Fuel System
Lecture 5 - Aircraft Landing Gear System
Lecture 6 - Aircraft Wheels
Lecture 7 - Aircraft Brakes System
Lecture 8 - Basic Aircraft Design
Lecture 9 - Aircraft Electrical System
Lecture 10 - Aircraft Electrical Circuit
Lecture 11 - Inspection of Aircraft
Lecture 12 - Maintenance Schedule
Lecture 13 - Maintenance Schedule (Continued...)
Lecture 14 - Inspection of Cessna 206

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NPTEL Video Course - Aerospace Engineering - NOC:Fundamentals of Combustion - Part 2

Subject Co-ordinator - Dr. D.P. Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Combustion Modes and Classsification of Flames
Lecture 2 - Analysis of One Dimensional Combustion Wave
Lecture 3 - Analysis of One Dimensional Combustion Wave (Continued...)
Lecture 4 - Introduction to Laminar Premixed Flame
Lecture 5 - Structure of One Dimensional Premixed Flame
Lecture 6 - Laminar Flame Theory for Premixed Flames
Lecture 7 - Laminar Flame Theory for Premixed Flames (Continued...)
Lecture 8 - Determination of Laminar Burning Velocity for Premixed Flames
Lecture 9 - Flame Thickness and Burning Velocity Measurement Methods
Lecture 10 - Stationary Flame Method for Burning Velocity Measurement
Lecture 11 - Effects of Chemical and Physical Variables on Burning Velocity
Lecture 12 - Effects of Chemical and Physical Variables on Burning Velocity (Continued...)
Lecture 13 - Effect of Inert Additives on Burning Velocity and Flame Extinction
Lecture 14 - Simplified Analysis for Quenching Diameter
Lecture 15 - Flammability Limits and Flame Stabilization
Lecture 16 - Ignition in Premixed Flames
Lecture 17 - Introduction to Turbulent Premixed Flames
Lecture 18 - Turbulent Burning Velocity and Premixed Flame Regimes
Lecture 19 - Intoduction to Gaseous Jet Diffusion Flame
Lecture 20 - Phenomenological Analysis of a Laminar Jet Diffusion Flame
Lecture 21 - Theoretical Analysis of a Two-Dimensional Diffusion Flame
Lecture 22 - Theoretical Analysis of a Two-Dimensional Diffusion Flame (Continued...)
Lecture 23 - Flame Height Estimation and Smoke point in Diffusion Flames
Lecture 24 - Mechanism of Soot Formation and Introduction to Liquid Fuel Combustion
Lecture 25 - Introduction to Droplet Combustion
Lecture 26 - Liquid Droplet Combustion
Lecture 27 - Droplet Combustion (Continued...)
Lecture 28 - Droplet Combustion in Convective Environment
Lecture 29 - Droplet Combustion in Convective Environment and Introduction to Spray Combution Mode

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Lecture 30 - Spray Combustion Model
Lecture 31 - Introduction to Solid Fuel Combustion
Lecture 32 - Solid Fuel Combustion (Continued...)
Lecture 33 - Diffusional theory for Carbon Combustion
Lecture 34 - Carbon Burning Rate
Lecture 35 - Carbon Burning Rate (Continued...)
Lecture 36 - Carbon Sphere in Convective Environment
Lecture 37 - Combustion and Effects on Environment
Lecture 38 - Chemicals from Combustion
Lecture 39 - Emission Control Methods
Lecture 40 - Combustion Modification Methods

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NPTEL Video Course - Aerospace Engineering - NOC:Design of Fixed Wing Unmanned Aerial Vehicles

Subject Co-ordinator - Prof. Saderla Subrahmanyam

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, course content and classification of UAVs
Lecture 2 - Measurement of Flight Velocity and Standard Atmosphere
Lecture 3 - Anatomy of Airplane and Airfoil Nomenclature
Lecture 4 - Examples, Pitot and static tube and differential pressure sensor
Lecture 5 - Generation of Lift and Drag
Lecture 6 - Aerodynamic center and center of pressure, Various wing planform
Lecture 7 - Lifting line theory, NACA airfoil nomenclature
Lecture 8 - Airfoil and Finite wing, Various wing planform
Lecture 9 - Interpreting airfoil data, Cl vs Alpha and drag polar, selection of airfoil
Lecture 10 - Introduction to Airplane performance, Equation of motion
Lecture 11 - Thrust required and Power required
Lecture 12 - Calculation of Performance parameters and selection of power plant
Lecture 13 - Climb Performance, Engine Sizing and Power Plant selection
Lecture 14 - Weight Estimation , Common propulsion systems
Lecture 15 - Weight Estimation contd., Electric propulsion, Battery Sizing
Lecture 16 - Iterative weight estimation and Wing sizing
Lecture 17 - Wing Planform selection and sizing and Flight test of Cropped delta wing UAVs
Lecture 18 - Effect of variation of CG location and Static Stability
Lecture 19 - C.G. location and Longitudinal Static stability
Lecture 20 - Tutorial 1
Lecture 21 - Contribution of tail in static stability and Neutral point.
Lecture 22 - Tutorial 2
Lecture 23 - Tutorial 3

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Finite Volume Methods-I

Subject Co-ordinator - Prof. Ashoke De

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Finite Volume Method
Lecture 2 - Governing Equations and Discretization
Lecture 3 - Boundary Conditions and Classification of PDEs
Lecture 4 - Mathematical Description of fluid flow - I
Lecture 5 - Mathematical description of fluid flow - II
Lecture 6 - Discretization Process - I
Lecture 7 - Discretization Process - II
Lecture 8 - Discretization Process - III
Lecture 9 - Taylor Series - I
Lecture 10 - Taylor Series - II
Lecture 11 - Derivatives and Errors - I
Lecture 12 - Derivatives and errors - II
Lecture 13 - Grid Transformation
Lecture 14 - Finite Volume Formulation - I
Lecture 15 - Finite Volume Formulation - II
Lecture 16 - Properties of discretized equations
Lecture 17 - Introduction to Finite Volume Mesh
Lecture 18 - Structured Mesh System
Lecture 19 - Unstructured Mesh System - I
Lecture 20 - Unstructured Mesh System - II
Lecture 21 - Properties of Unstructured Mesh - I
Lecture 22 - Properties of Unstructured Mesh - II
Lecture 23 - Finite Volume discretization of Diffusion Equation - I
Lecture 24 - Finite Volume discretization of Diffusion equation - II
Lecture 25 - Finite Volume discretization of Diffusion equation - III
Lecture 26 - Discretization of Diffusion Equation for Cartesian orthogonal systems - I
Lecture 27 - Discretization of Diffusion Equation for Cartesian orthogonal systems - II
Lecture 28 - Calculation of Diffusivity
Lecture 29 - Discretization of Diffusion Equation for non-Cartesian orthogonal systems - I

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Lecture 30 - Discretization of Diffusion Equation for non-orthogonal systems - I
Lecture 31 - Discretization of Diffusion Equation for non-orthogonal systems - II
Lecture 32 - Discretization of Diffusion Equation for non-orthogonal systems - III
Lecture 33 - Gradient Calculation for Diffusion Equation - I
Lecture 34 - Gradient Calculation for Diffusion Equation - II
Lecture 35 - Gradient Calculation for Diffusion Equation - III
Lecture 36 - Properties of matrices - I
Lecture 37 - Properties of matrices - II
Lecture 38 - Error Analysis - I
Lecture 39 - Error Analysis - II
Lecture 40 - Error Analysis - III

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NPTEL Video Course - Aerospace Engineering - NOC:Advance Aircraft Maintenance

Subject Co-ordinator - Dr. A.K. Ghosh, Mr. V. Mathur

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engines
Lecture 2 - Introduction to Engines (Continued...)
Lecture 3 - Construction of Reciprocating Engine
Lecture 4 - Construction of Reciprocating Engine (Continued...)
Lecture 5 - Construction of Reciprocating Engine (Continued...)
Lecture 6 - Lubrication System
Lecture 7 - Lubrication System Demonstration
Lecture 8 - Lubrication System (Continued...)
Lecture 9 - Induction System
Lecture 10 - Induction System (Continued...)
Lecture 11 - Cooling System
Lecture 12 - Exhaust System
Lecture 13 - Cooling and Exhaust System (Lab Session)
Lecture 14 - Engine fuel and Fuel Metering Systems
Lecture 15 - Engine Fuel and Fuel Metering Systems (Continued...)
Lecture 16 - Engine Fuel and Fuel Metering Systems (Lab Session)
Lecture 17 - Carburetor troubleshooting and Fuel Injection System
Lecture 18 - Fuel injection Systems (Continued...)
Lecture 19 - Fuel System
Lecture 20 - Ignition system
Lecture 21 - Ignition system (Continued...)
Lecture 22 - Ignition system (Lab session)
Lecture 23 - Basics of propeller and maintenance
Lecture 24 - Aircraft Reciprocating Engine Inspection - Part 1
Lecture 25 - Aircraft Reciprocating Engine Inspection - Part 2
Lecture 26 - Aircraft Reciprocating Engine Inspection - Part 3
Lecture 27 - Checklist for Aircraft Reciprocating Engine Maintenance
Lecture 28 - Aircraft Maintenance (Aircraft Performance Point of View)

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Finite Volume Methods-II

Subject Co-ordinator - Prof. Ashoke De

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Linear solvers - I
Lecture 2 - Linear solvers - II
Lecture 3 - Linear solvers - III
Lecture 4 - Linear solvers - IV
Lecture 5 - Linear solvers - V
Lecture 6 - Linear solvers - VI
Lecture 7 - Linear solvers - VII
Lecture 8 - Linear solvers - VIII
Lecture 9 - Convection term discretisation - I
Lecture 10 - Convection term discretisation - II
Lecture 11 - Convection term discretisation - III (Private)
Lecture 12 - Convection term discretisation - IV (Private)
Lecture 13 - Convection term discretisation - V (Private)
Lecture 14 - Convection term discretisation - VI (Private)
Lecture 15 - Convection term discretisation - VII (Private)
Lecture 16 - Convection term discretisation - VIII
Lecture 17 - Convection term discretisation - IX
Lecture 18 - High Resolution Schemes - I
Lecture 19 - High Resolution Schemes - II
Lecture 20 - High Resolution Schemes - III
Lecture 21 - High Resolution Schemes - IV
Lecture 22 - High Resolution Schemes - V
Lecture 23 - High Resolution Schemes - VI
Lecture 24 - High Resolution Schemes - VII
Lecture 25 - Temporal discretisation - I
Lecture 26 - Temporal discretisation - II
Lecture 27 - Temporal discretisation - III
Lecture 28 - Temporal discretisation - IV
Lecture 29 - Discretisation of the Source Term, Relaxation and Other Details - I

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Lecture 30 - Discretisation of the Source Term, Relaxation and Other Details - II
Lecture 31 - Fluid Flow Computation
Lecture 32 - Fluid Flow Computation
Lecture 33 - Fluid Flow Computation
Lecture 34 - Fluid Flow Computation
Lecture 35 - Fluid Flow Computation
Lecture 36 - Fluid Flow Computation
Lecture 37 - Fluid Flow Computation
Lecture 38 - Fluid Flow Computation
Lecture 39 - Fluid Flow Computation
Lecture 40 - Some Advanced Topics - I

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Rocket Propulsion

Subject Co-ordinator - Dr. D.P. Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - A Brief History of Rocket Propulsion and ISRO
Lecture 3 - Types of Rocket Engine
Lecture 4 - Fundamentals of Aero-thermodynamics
Lecture 5 - Control Volume Analysis and Governing Equations
Lecture 6 - Adiabatic Steady 1-D flow and Speed of Sound
Lecture 7 - Basics of Thermochemistry
Lecture 8 - Adiabatic Flame Temperature and Chemical Equilibrium
Lecture 9 - Ideal Rocket Engine, Thrust Equation and Performance Parameters
Lecture 10 - Performance Parameters of Rocket Engine
Lecture 11 - Performance Parameters of Rocket Engine (Continued...)
Lecture 12 - Ideal Nozzle
Lecture 13 - Rocket Nozzle
Lecture 14 - Convergent Nozzle
Lecture 15 - Convergent-Divergent Nozzle and Shock Reflection
Lecture 16 - Effect of Back Pressure and Thrust Coefficient
Lecture 17 - Thrust Coefficient
Lecture 18 - Characteristics Velocity, Combustion Efficiency and Thrust Effectiveness
Lecture 19 - Actual Rocket Nozzle Characteristics
Lecture 20 - Flight Performance of a Rocket Vehicle
Lecture 21 - Flight Performance of a Rocket Vehicle
Lecture 22 - Flight Trajectory of Single Stage Rocket Vehicle
Lecture 23 - Orbital Mechanics
Lecture 24 - Types of Orbits
Lecture 25 - Orbital and Escape Velocity
Lecture 26 - Interplanetary Transfer Path
Lecture 27 - Multi-staging Rocket
Lecture 28 - Chemical Propellants-Characteristics and Classification
Lecture 29 - Solid and Composite Propellants

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Lecture 30 - Composite Propellants and it's Manufacturing
Lecture 31 - Classification of Liquid Propellants
Lecture 32 - Solid Propellant Rocket Engine
Lecture 33 - Propellant Burning Mechanism and Flame Structure
Lecture 34 - Composite Propellant Combustion
Lecture 35 - Regression Rate of Solid Propellant and Effect of Operating Parameters
Lecture 36 - Characteristics of Solid Propellants
Lecture 37 - Effect of Acceleration and Particle Size on Burning Rate
Lecture 38 - Erosive Burning, Effect of Propellant Temperature and Thermal Model
Lecture 39 - Chamber Pressure in Solid Propellant Rocket Engine
Lecture 40 - Types of Propellant Grains
Lecture 41 - Types of Solid Propellant Grains and Evolution of Burning Surface
Lecture 42 - Burning Stability and Ignition System in SPRE
Lecture 43 - Liquid Propellant Rocket Engine
Lecture 44 - Injection System in LPRE
Lecture 45 - Atomization of Liquid Propellants
Lecture 46 - Types of Injection System in LPRE
Lecture 47 - Analysis of Impinging Atomizer
Lecture 48 - Injection Distributor and Combustion Process in LPRE
Lecture 49 - Variation of Gas Specific Volume and Combustion Chamber Geometry
Lecture 50 - Liquid Propellant Feed System in LPRE
Lecture 51 - Turbo-Pump Feed Configuration
Lecture 52 - Ignition System in LPRE
Lecture 53 - Cooling of Thrust Chamber and Nozzle of a Rocket Engine
Lecture 54 - Cooling System of Rocket Engine (Continued...)
Lecture 55 - Modes of Heat Transfer through combustion Chamber Wall and Nozzle Wall
Lecture 56 - Heat Transfer Analysis of Cooling System
Lecture 57 - Hybrid Propellant Rocket Engine
Lecture 58 - Regression Rate of Solid Fuel Grain in HPRE and Types of Port Configurations
Lecture 59 - Non-Chemical Rocket Engine
Lecture 60 - Electromagnetic Thruster, Nuclear and Solar Rocket Engine

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NPTEL Video Course - Aerospace Engineering - NOC:UAV Design - Part II

Subject Co-ordinator - Prof. Saderla Subrahmanyam

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Design Algorithms
Lecture 2 - Thrust Generation and Power Required
Lecture 3 - Lift and Drag for Infinite Wing
Lecture 4 - Lift and Drag for an Infinite Wing (Continued...)
Lecture 5 - Relation between Aerodynamic center and Center of Pressure
Lecture 6 - Aerodynamic Characteristics of Wing
Lecture 7 - Stability and Criteria for Longitudinal Static Stability
Lecture 8 - Numericals
Lecture 9 - Longitudinal Static Stability - Wing Contribution
Lecture 10 - Flight Demonstration of Flat Plate
Lecture 11 - Numericals (Continued...)
Lecture 12 - Example Problems for Wing alone Configuration
Lecture 13 - Wing-Tail Contribution and Neutral Point
Lecture 14 - Example problems of wing and tail combination
Lecture 15 - Example problems of wing and tail combination (Continued...)
Lecture 16 - Flight demonstration of same wing and tail combination
Lecture 17 - Matlab Tutorial
Lecture 18 - Trim Requirements of UAV
Lecture 19 - Example on performance analysis of UAV
Lecture 20 - Weight Estimation and wing Sizing with Example
Lecture 21 - Power Plant Selection with Example
Lecture 22 - Subroutine for takeoff performance (Powerplant selection)
Lecture 23 - Subroutine for Climb Performance (Powerplant Selection)
Lecture 24 - Subroutine for Weight Estimation
Lecture 25 - Subroutine for Planform Geometry Selection
Lecture 26 - Subroutine for Airfoil Selection

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Airbreathing Propulsion

Subject Co-ordinator - Prof. Ashoke De

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Review of Fluid Mechanics
Lecture 5 - Review of Fluid Mechanics, Thermodynamics
Lecture 6 - Review of Compressible Flows
Lecture 7 - Review of Compressible Flows (Continued...)
Lecture 8 - Review of Compressible Flows (Continued...)
Lecture 9 - Review of Compressible Flows (Continued...)
Lecture 10 - Review of Compressible Flows (Continued...)
Lecture 11 - Introduction to gas turbine engines
Lecture 12 - Introduction to gas turbine engines (Continued...)
Lecture 13 - Introduction to gas turbine engines (Continued...)
Lecture 14 - Introduction to gas turbine engines (Continued...)
Lecture 15 - Introduction to gas turbine engines (Continued...)
Lecture 16 - Introduction to gas turbine engines (Continued...)
Lecture 17 - Introduction to gas turbine engines (Continued...)
Lecture 18 - Piston Engines and Propellers
Lecture 19 - Piston Engines and Propellers (Continued...)
Lecture 20 - Piston Engines and Propellers (Continued...)
Lecture 21 - Piston Engines and Propellers (Continued...)
Lecture 22 - Piston Engines and Propellers (Continued...)
Lecture 23 - Piston Engines and Propellers (Continued...)
Lecture 24 - Performance/cycle analysis
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Lecture 28 - Performance/cycle analysis
Lecture 29 - Performance/cycle analysis

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Lecture 30 - Performance/cycle analysis
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Lecture 36 - Stationary components
Lecture 37 - Stationary components
Lecture 38 - Stationary components
Lecture 39 - Introduction to turbomachinery
Lecture 40 - Centrifugal compressor
Lecture 41 - Centrifugal compressor (Continued...)
Lecture 42 - Centrifugal compressor (Continued...)
Lecture 43 - Centrifugal compressor (Continued...)
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Lecture 47 - Axial compressor
Lecture 48 - Axial compressor (Continued...)
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Lecture 53 - Axial compressor (Continued...)
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Lecture 55 - Axial turbine
Lecture 56 - Axial turbine (Continued...)
Lecture 57 - Axial turbine (Continued...)
Lecture 58 - Axial turbine (Continued...)
Lecture 59 - Axial turbine (Continued...)
Lecture 60 - Radial Flow Turbine, Module Matching

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NPTEL Video Course - Aerospace Engineering - NOC:Computational Science in Engineering

Subject Co-ordinator - Prof. Ashoke De

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Linear Algebra: Introduction
Lecture 2 - Linear Algebra: Introduction (Continued...)
Lecture 3 - Linear Algebra: Permutation Matrix, Existence of Solution
Lecture 4 - Linear Algebra: Permutation Matrix, Existence of Solution (Continued...)
Lecture 5 - Linear Algebra: Linear Independence, Basis Vector and Dimensions
Lecture 6 - Linear Algebra: Null Space, Column Space, Row Space, Introduction to Orthogonal System
Lecture 7 - Linear Algebra: Orthogonal System, Projection, Determinant
Lecture 8 - Linear Algebra: Orthogonal System, Projection, Determinant (Continued...)
Lecture 9 - Linear Algebra: Properties of Determinant, Cramer's Rule, Introduction to Eigen Values
Lecture 10 - Linear Algebra: Eigen Values, Eigen Vectors, SVD
Lecture 11 - Linear Algebra: Eigen Values, Eigen Vectors, SVD (Continued...)
Lecture 12 - ODE: Introduction to ODEs, Initial Value Problem, Separation of Variables
Lecture 13 - ODE: Solution of Exact ODEs, First Order Linear Systems
Lecture 14 - ODE: Solution of Second Order Linear ODEs
Lecture 15 - ODE: Existence and Uniqueness of Solution, Non-Homogeneous System
Lecture 16 - ODE: Higher Order Linear ODEs, Variation of Parameters, System of ODEs
Lecture 17 - ODE: Linear Systems, Superposition for Homogeneous Systems
Lecture 18 - Fourier Analysis, Orthogonality of Trigonometric Systems, Euler's Formula
Lecture 19 - Parseval's Theorem, Fourier Integrals, Laplace Transforms
Lecture 20 - PDE: Introduction to PDEs, Solution of PDEs using Characteristics Curve
Lecture 21 - PDE: First Order PDEs, Dilation Invariant Solution of Differential Equations
Lecture 22 - PDE: Solution of Linear PDEs
Lecture 23 - PDE: Separation of Variables, Eigenvalue Problem, Poisson Integral Representation
Lecture 24 - PDE: Boundary Conditions, Solution of 2D systems
Lecture 25 - Introduction to Numerical Methods, Mathematical Models, Errors
Lecture 26 - Errors, Numerical Differentiation, Stability
Lecture 27 - Roots of Equations: Graphical Method, Bi-Section Mehtod, False-Position Method
Lecture 28 - Secant Method, Brent's Method, Multipoint Iteration Method, Derative Free Method
Lecture 29 - Complex Roots, Birge-Vieta Method, Bairstow's method

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Lecture 30 - Solution of Linear Algebric Equations, Gauss Elimination Method
Lecture 31 - Direct Methods: Gauss Elimination, Gauss-Jordan, Crout's Method, Cholesky Method, Iterative Meth
Lecture 32 - Extrapolation Method, Eigenvalue Problem, Jacobi Method, Householder's Method for Symmetric Matr
Lecture 33 - Interpolation: Taylor's Series, Lagrange and Newton Interpolation, Iterated Interpolation, Hermi
Lecture 34 - Piecewise and Spline Interpolation, Bivariate Interpolation, Least Square Approximation, Uniform
Lecture 35 - Numerical Differentiation and Intergration, Methods Based on Finite Differences, Methods based o
Lecture 36 - Numerical Integration: Newton-Cotes Method, Gaussian Integration Methods, Lobatto Integration Me
Lecture 37 - Double Integration: Trapezoidal Rule, Simpson's Rule, Solution of ODEs: Difference Equation, Sir
Lecture 38 - Runge-Kutta Methods, Euler-Cauchy Method, Multi-step Methods, Predictor-Corrector Methods
Lecture 39 - System of Differential Equations, Stability Analysis, Solution of Boundary Value Problem: Shooti
Lecture 40 - Numerical Approach to Solution of PDEs: Heat Conduction Equation, Convergence and Stability

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to Aircraft Control System

Subject Co-ordinator - Prof. Dipak Kumar Gir

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Aerospace Engineering - NOC:Applied Computational Fluid Dynamics

Subject Co-ordinator - Prof. Rajesh Ranjan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - CFD Introduction - I
Lecture 2 - CFD Introduction - II
Lecture 3 - CFD Introduction - III
Lecture 4 - CFD Approaches, Compressible Flows - I
Lecture 5 - CFD Approaches, Compressible Flows - II
Lecture 6 - Thermodynamics - I
Lecture 7 - Thermodynamics - II
Lecture 8 - Governing Equations - I
Lecture 9 - Governing Equations - II
Lecture 10 - Governing Equations - III
Lecture 11 - Governing Equations - IV
Lecture 12 - Governing Equations (Energy) - I
Lecture 13 - Governing Equations (Energy) - II
Lecture 14 - Non-dimensionalization - I
Lecture 15 - Non-dimensionalization - II
Lecture 16 - Classification of PDEs - I
Lecture 17 - Classification of PDEs - II
Lecture 18 - Numerical Discretization - I
Lecture 19 - Numerical Discretization - II
Lecture 20 - Compact Schemes - I
Lecture 21 - Compact Schemes - II
Lecture 22 - Model Equations - I
Lecture 23 - Model Equations - II
Lecture 24 - Numerical Schemes: MPDE - I
Lecture 25 - Numerical Schemes: MPDE - II
Lecture 26 - MPDE, Lax Theorem - I
Lecture 27 - MPDE, Lax Theorem - II
Lecture 28 - Stability
Lecture 29 - Dissipation/Dispersion Error - I

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Lecture 30 - Dissipation/Dispersion Error - II
Lecture 31 - Advanced Schemes - I
Lecture 32 - Advanced Schemes - II
Lecture 33 - Multistep Schemes, MATLAB Linear - I
Lecture 34 - Multistep Schemes, MATLAB Linear - II
Lecture 35 - Solution Nonlinear/Eulers equations, Shock Tube - I
Lecture 36 - Solution Nonlinear/Eulers equations, Shock Tube - II
Lecture 37 - Introduction to FV - I
Lecture 38 - Introduction to FV - II
Lecture 39 - Introduction to FV - III
Lecture 40 - Introduction to FV - IV
Lecture 41 - Introduction to FV - I
Lecture 42 - Introduction to FV - II
Lecture 43 - Turbulent Flows - I
Lecture 44 - Turbulent Flows - II
Lecture 45 - Incompressible RANS Equations
Lecture 46 - RANS Equations, Eddy Viscosity Model - I
Lecture 47 - RANS Equations, Eddy Viscosity Model - II
Lecture 48 - Turbulence Models
Lecture 49 - Advanced Turbulence Models - I
Lecture 50 - Advanced Turbulence Models - II
Lecture 51 - Boundary Conditions - I
Lecture 52 - Boundary Conditions - II
Lecture 53 - Boundary Conditions - III
Lecture 54 - Boundary Conditions - IV
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Lecture 56 - LES
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NPTEL Video Course - Aerospace Engineering - NOC:Advanced Aircraft Control Systems with MATLAB-SIMULINK

Subject Co-ordinator - Prof. Dipak Kumar Giri, Prof. Prabhjeet Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics of Linear Algebra
Lecture 3 - State Space Equation and its Solution
Lecture 4 - Example
Lecture 5 - Linear Transformation of States
Lecture 6 - Example of Linear Transformation
Lecture 7 - State Space Analysis of Aircraft Longitudinal Dynamics
Lecture 8 - Introduction to State Feedback Controller Design
Lecture 9 - Controller Design in the Presence of Noice
Lecture 10 - Tracking Controller Design
Lecture 11 - Observability and Observer Design
Lecture 12 - Example of Observer Design
Lecture 13 - Ackermann's Formula
Lecture 14 - Example to Demonstrate use of Ackermann's Formula
Lecture 15 - Separation Principle
Lecture 16 - Example of Separation Principle
Lecture 17 - Example of Control Design for Aircraft System
Lecture 18 - Example of Observer Design for Aircraft System
Lecture 19 - Linear Quadratic Regulator
Lecture 20 - Example of Linear Quadratic Regulator Design
Lecture 21 - Stability Augmentation for Pitch Dynamics
Lecture 22 - Stability Augmentation System for Short Period Longitudinal Dynamics
Lecture 23 - Stability Augmentation System for full Longitudinal Dynamics
Lecture 24 - Stability Augmentation for Lateral Dynamics
Lecture 25 - Stability Augmentation for Lateral-Directional Dynamics
Lecture 26 - Altitude Hold Auto-Pilot Design
Lecture 27 - Introduction to Nonlinear Systems
Lecture 28 - Stability of Nonlinear Systems
Lecture 29 - Classification of Equilibrium Points of Planar Nonlinear Systems

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Lecture 30 - Limit Cycles
Lecture 31 - Lyapunov's First Method
Lecture 32 - Sign Definiteness of Scalar Functions
Lecture 33 - Lyapunov Stability Theorem
Lecture 34 - Krasovskii's Theorem
Lecture 35 - Feedback Linearization
Lecture 36 - Feedback Linearization (Continued...)
Lecture 37 - Feedback Linearization Control for Longitudinal Dynamics
Lecture 38 - Feedback Linearization Based Control for Lateral Dynamics
Lecture 39 - Introduction to Backstepping Control
Lecture 40 - Backstepping Controller (Continued...)
Lecture 41 - Backstepping Controller (Continued...)
Lecture 42 - Backstepping Controller for Longitudinal Dynamics of Aircraft
Lecture 43 - Backstepping Control for Lateral-Directional Dynamics of Aircraft
Lecture 44 - Introduction to Sliding Mode Control
Lecture 45 - Chattering Reduction in Sliding Mode Control
Lecture 46 - Sliding Mode Control for Longitudinal Dynamics of Aircraft
Lecture 47 - Quasi-Sliding Mode control and Backstepping-Sliding Mode Control for Longitudinal Dynamics of Ai
Lecture 48 - Adaptive Sliding Mode Control
Lecture 49 - Adaptive Back-Stepping Control
Lecture 50 - MATLAB Implementation of First Order Systems
Lecture 51 - Second Order System and its Solution
Lecture 52 - MATLAB Simulation of Mass Spring Damper System
Lecture 53 - SIMULINK Implementation of Pendulum System
Lecture 54 - SIMULINK Implementation of Pendulum System (Continued...)
Lecture 55 - Aircraft Equations of Motion for SIMULINK Block
Lecture 56 - MATLAB and SIMULINK Implementation of Aircraft Dynamics
Lecture 57 - 6 Dof Aircraft Equations of Motion
Lecture 58 - MATLAB and SIMULINK Implementation of Complete 6 Dof Aircraft Dynamics
Lecture 59 - Recap and Conclusion

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NPTEL Video Course - Aerospace Engineering - NOC:Wind Energy

Subject Co-ordinator - Prof. Ashoke De

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Renewable Energy
Lecture 2 - Introduction to Renewable Energy (Continued...)
Lecture 3 - Fluid Mechanics - Basics
Lecture 4 - Fluid Mechanics - Integral Form of Conservation Equations
Lecture 5 - Fluid Mechanics - Dimensional Similarity
Lecture 6 - Fluid Mechanics - External Flows
Lecture 7 - Fluid Mechanics - Boundary Layer and Turbulence
Lecture 8 - Wind Turbine Basics
Lecture 9 - Wind Turbine Basics (Continued...)
Lecture 10 - Wind Turbine Technology
Lecture 11 - Wind Turbine Technology (Continued...)
Lecture 12 - Wind Turbine Technology (Continued...)
Lecture 13 - Mechanics of Wind
Lecture 14 - Mechanics of Wind (Continued...)
Lecture 15 - Atmospheric Boundary Layer
Lecture 16 - Atmospheric Boundary Layer (Continued...)
Lecture 17 - Wind Velocity profile
Lecture 18 - Wind Data Analysis
Lecture 19 - Wind Data Analysis (Continued...)
Lecture 20 - Turbine Calculations
Lecture 21 - HAWT-History
Lecture 22 - HAWT-Components
Lecture 23 - Momentum Theory
Lecture 24 - Momentum Theory with wake rotation
Lecture 25 - BEM Theory
Lecture 26 - BEM Example
Lecture 27 - Airfoil Nomenclature
Lecture 28 - Wake
Lecture 29 - Blade Design with Momentum Theory

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Lecture 30 - Rotor Blade Design
Lecture 31 - Off-design Performance Issues
Lecture 32 - Blade Shape Optimization
Lecture 33 - HAWT Performance Calculation
Lecture 34 - HAWT Optimum Performance Analysis
Lecture 35 - VAWT
Lecture 36 - VAWT (Continued...)
Lecture 37 - VAWT Performance Calculation
Lecture 38 - VAWT Performance Calculation (Continued...)
Lecture 39 - Aerodynamic of Darrieus and Savonius Turbines
Lecture 40 - Mechanics and Dynamics
Lecture 41 - Mechanics: Beam Analysis
Lecture 42 - Mechanics: Oscillations and Eigenmodes
Lecture 43 - Mechanics: Dynamic Beam Analysis
Lecture 44 - Mechanics: Tower Oscillations
Lecture 45 - Mechanics: Blade Oscillations
Lecture 46 - Mechanics: Linearized Analysis
Lecture 47 - Mechanics: Wind Turbine Rotor Dynamics
Lecture 48 - Mechanics: Simplified Hinge-Spring Model
Lecture 49 - Mechanics: Flapping Blade Model (Free Motion)
Lecture 50 - Mechanics: Flapping Blade Model (Forced Motion)
Lecture 51 - Mechanics: Flapping Blade Model (Forced Motion) (Continued...)
Lecture 52 - Mechanics: Linearized Aerodynamic Model
Lecture 53 - Mechanics: Linearized Aerodynamic Model (Continued...)
Lecture 54 - Mechanics: Full Flapping Blade Model
Lecture 55 - Mechanics: Solution of Flapping Equation
Lecture 56 - Mechanics: Solution of Flapping Equation (Continued...)
Lecture 57 - Mechanics: General Solution of Flapping Equation
Lecture 58 - Control and miscellaneous aspects of wind turbines
Lecture 59 - CFD aspects of wind turbines
Lecture 60 - CFD and Alternative Wind Energy Systems

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NPTEL Video Course - Aerospace Engineering - NOC:Space Environment and its Effects on Orbital Spacecrafts

Subject Co-ordinator - Prof. Soumyabrata Chakrabarty

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Space environment and its Types, Space Weather Definition, Anatomy of Sun, Solar Activities as Sp
Lecture 2 - Solar Activities, Solar Wind, Solar Flare, Coronal Mass Ejection and Solar Energetic Particles Ev
Lecture 3 - Interplanetary Magnetic Field (IMF), Co-rotating Interaction Regimes Corona, Coronal Structures,
Lecture 4 - Interplanetary Magnetic Field (IMF), Co-rotating Interaction Regions
Lecture 5 - Coupling of Solar Wind to Earth's Magnetosphere and Ionosphere, Geomagnetic Storm, Geomagnetic Su
Lecture 6 - Earth's Radiation Belt, Ring Current and South Atlantic Anomaly
Lecture 7 - Satellite Orbits, Geometry, Velocity and Period, Orbital Parameters and Orbital Perturbations
Lecture 8 - Different Types of Earth's Orbit for Useful Satellite Applications
Lecture 9 - Satellite Segments, Space segments, Mechanical Main Frames, Structures and Thermal Control System
Lecture 10 - Satellite Segments, Space segments, Mechanical Main Frames, Mechanisms, Propulsion System, Elect
Lecture 11 - Satellite Segments, Space segments, Electrical Main Frame, TT and C, Attitude and Orbit Control
Lecture 12 - Satellite Segments, Earth Segments, Receive-Only Earth Station, Transmit-Receive Earth Stations
Lecture 13 - Characteristics of Vacuum Environment, The Effects on Spacecraft, Extreme Temperatures, Exposure
Lecture 14 - Vacuum Environment, Outgassing, Outgassing Mechanism and Transport of Outgassed Material
Lecture 15 - Outgassing of Spacecraft Materials, TML, CVCM, WVR and Its Significance, Ground Simulation of Va
Lecture 16 - Vacuum Environment, The Effect of Exposure of UV Radiation on Spacecraft Material, Design Guidel
Lecture 17 - Neutral Gas Flow Around a Spacecraft, Effects on Spacecraft, Atomic Oxygen Attack, Sputtering, C
Lecture 18 - Neutral Space Environment, Atmospheric Drag, Drag Force and Satellite Orbital Parameters
Lecture 19 - Neutral Space Environment, The Micrometeoroid/Orbital Debris Particulate Environment and Hyper V
Lecture 20 - Spacecraft Induced Neutral Environment, Scattering of Electromagnetic (EM) Radiation from Partic
Lecture 21 - Orbital Debris, Dealing with Space Debris- Management, International Cooperation, Monitoring, De
Lecture 22 - Capturing of Orbital debris, Contact capturing method, Contactless capturing method and Removal
Lecture 23 - Removal of Orbital debris, Space Environment based and Non-space Environment
Lecture 24 - Removal of Orbital debris, Non-space Environment based methods and Mitigation strategies
Lecture 25 - What is plasma and its nature, Behavior of plasma in external Electromagnetic field, Uniform mag
Lecture 26 - Charge particle movement in a uniform magnetic field, Helical particle trajectory, Guiding cente
Lecture 27 - Introduction to Plasma, Magnetic moment, E x B drift, Plasma Oscillations and plasma frequency a
Lecture 28 - Debye Shielding, External charge introduced in plasma, Debye length and Debye volume
Lecture 29 - Collective Behavior of plasma and Velocity, Energy, Temperature of plasma

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Lecture 30 - Non-uniform magnetic field, Magnetic mirroring and Trapping of charged particles
Lecture 31 - Plasma environment in earth's orbit, Origin of space plasma in earthâ s orbit, Effects on space
Lecture 32 - Spacecraft charging, Capacitor charging, Probe theory, Langmuir probe, Physics of Spacecraft cha
Lecture 33 - Spacecraft charging: probe theory, Langmuir probe, Langmuir probe equation for a sphere in the c
Lecture 34 - Spacecraft charging, Spacecraft Equilibrium Potential, Repelling of Like Charges, Attraction of
Lecture 35 - Spacecraft charging, Current balance equation, Current collection in spacecrafts and Different c
Lecture 36 - Spacecraft charging, Different Plasma Fluxes Affecting Spacecraft, Charging and Current balance
Lecture 37 - Spacecraft charging, Lumped Circuit model of spacecraft, Different types of spacecraft charging
Lecture 38 - Spacecraft charging, Analysis, design, testing, inspection and Mitigation strategies
Lecture 39 - Numerical problems related to plasma physics
Lecture 40 - What is radiation, What is space radiation environment and Itâ s classifications and origin
Lecture 41 - Ionizing and non-ionizing Radiation, Ionizing radiation, Linear Energy Transfer, Total Ionizing
Lecture 42 - Radiation Energy: Classical Vs Relativistic, Bremsstrahlung Radiation, X- Rays, Gamma Rays, Phot
Lecture 43 - Displacement damage and Total Radiation Dose
Lecture 44 - Single Event Effects, Single Event Upset (SEU), Single Event Latch-Up (SEL), Single Event Burnou
Lecture 45 - Effects of Space Radiations on Spacecrafts and Space Radiation Risks to Astronauts, Case Studies
Lecture 46 - Modelling, Simulation and Testing and Mitigation towards Space Radiation Risks
Lecture 47 - Ground Simulation of space environment and launch conditions, Test and Evaluation for Space qual
Lecture 48 - Reliability and Failure function, Failure probability density function and Failure or hazard rat
Lecture 49 - Significance of hazard or failure rate, Reliability in terms of failure or hazard rate and Failu
Lecture 50 - Failure rate and bathtub curve, Gaussian and Weibull probability density function, Meantime to f
Lecture 51 - Mean satellite lifetime, Satellite System Availability, Without backup and With backup
Lecture 52 - Satellite System Availability, Without backup, With backup and System reliability
Lecture 53 - System reliability, Subsystems in series and Redundant Subsystems
Lecture 54 - System reliability, Redundant Subsystems (static redundancy), MTTF, Failure rate, n- sub-systems
Lecture 55 - System reliability, Reliability if k out of n elements are necessary and Dynamic Redundant Subsy
Lecture 56 - System reliability, Dynamic redundancy (with switching), Generalized expression for system relia
Lecture 57 - Equipment redundancy taking account of the reliability of the switching element and Example: Red
Lecture 58 - Equipment having several failure modes, Component Reliability and Quality assurance
Lecture 59 - Component selection and Quality assurance
Lecture 60 - Component selection and Quality assurance
Lecture 61 - What is a space mission and its types and Mission Objectives and Planning
Lecture 62 - Mission Planning, Satellite operation and Autonomous Satellite system

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NPTEL Video Course - Aerospace Engineering - NOC:Computational Gas Dynamics

Subject Co-ordinator - Prof. Rajesh Ranjan, Prof. Niranjan Sahoo

Co-ordinating Institute - IIT Kanpur, IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Governing Laws of Fluid Motion and Thermodynamic Property Relations
Lecture 2 - One-Dimensional Flow equations and Theory of Sound Waves
Lecture 3 - Introduction to Compressible Flows
Lecture 4 - Normal Shock Waves: Physical mechanisms and Governing Relations
Lecture 5 - Normal Shock Waves: Entropy and Irreveribility
Lecture 6 - Mach Waves and Oblique Shock Wave in Compressible Flow
Lecture 7
Lecture 8 - Rayleigh Flow: Compressible Flow with Heat Addition in Constant-Area Ducts
Lecture 9 - Fanno Flow: Compressible Flow with Friction in Constant-Area Ducts
Lecture 10 - Quasi-One-Dimensional Flow: Area-Mach Relations and Chocking
Lecture 11 - Expansion Waves in Supersonic Flow (Prandtl-Meyer Theory)
Lecture 12 - Shock Patterns and Shock-Expansion Theory in Supersonic Flow
Lecture 13 - Compressible Flow Through Nozzles: Isentropic Expansion and Shock Formation
Lecture 14
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NPTEL Video Course - Aerospace Engineering - NOC:Aeromechanics of Unmanned Aerial Vehicles-Drones

Subject Co-ordinator - Prof. Abhishek

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Aeromechanics of Unmanned Aerial Systems
Lecture 2 - Introduction to Vertical Takeoff and Landing UAVs
Lecture 3 - Aerodynamics of Fixed Wing Aerial Vehicles: Concept of Lift and Drag
Lecture 4 - Basics of Aerodynamics
Lecture 5 - Basics of Aerodynamics and Flight Instruments
Lecture 6 - Concepts of Aerodynamics and International Standard Atmosphere
Lecture 7 - International Standard Atmosphere and Aircraft Equation of Motion
Lecture 8 - Thrust and Power Considerations for Fixed Wing UAVs
Lecture 9 - Flight Performance
Lecture 10 - Range and Endurance
Lecture 11 - Load Factor and V-n Diagram
Lecture 12 - Design philosophy for structures; Load factor in turning flight
Lecture 13 - Concepts of Stability; Introduction to Rotary Wing Systems
Lecture 14 - Elements of Rotary Wing Aerial Vehicles
Lecture 15 - Momentum Theory of Rotor / Propeller in hover
Lecture 16 - Momentum Theory of Propellers / Rotors in Climb
Lecture 17 - Operating States of Propeller
Lecture 18 - Inflow for Descending Flight and Edgewise Flight
Lecture 19 - Power for Rotor in Edgewise Flight and Blade Element Theory
Lecture 20 - Blade Element Theory and Momentum Theory
Lecture 21 - Blade Element Momentum Theory (BEMT)
Lecture 22 - Ideal Hovering Rotor and Mean Lift Coefficient
Lecture 23 - Prandtl Tip Loss Factor
Lecture 24 - Performance of Edgewise Rotor in Forward Flight - I
Lecture 25 - Performance of Edgewise Rotor in Forward Flight - II

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NPTEL Video Course - Aerospace Engineering - NOC:Fluid Mechanics

Subject Co-ordinator - Prof. Sanjay Mittal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fluid Mechanics and Rate Processes
Lecture 2 - The Continuum Hypothesis and Property
Lecture 3 - The Stress Tensor
Lecture 4 - Fluid Statics
Lecture 5 - Kinematics - 1
Lecture 6 - Kinematics 2 - Part A
Lecture 7 - Kinematics 2 - Part B
Lecture 8 - Reynolds Transport Theorem: Conservation of Mass
Lecture 9 - Conservation of Mass - Integral and Differential Forms - Part A
Lecture 10 - Conservation of Mass - Integral and Differential Forms - Part B
Lecture 11 - Integral Form of Momentum Theorem
Lecture 12 - Derivation of Differential Form of Momentum Equation
Lecture 13 - Continuity and Momentum Equations in Cartesian and Cylindrical Coordinate System
Lecture 14 - Boundary Conditions and Various Kind of Flows
Lecture 15 - Flow Between Two Parallel Plates
Lecture 16 - Flow in a Pipe of Circular Section
Lecture 17 - Integral Form of Total Energy Equation - I
Lecture 18 - Integral Form of Total Energy Equation - II
Lecture 19 - Integral Form of Total Energy Equation - III
Lecture 20 - Bernoulli Equation - Part A
Lecture 21 - Bernoulli Equation - Part B
Lecture 22 - Similitude and Modeling - I
Lecture 23 - Similitude and Modeling - II
Lecture 24 - Similitude and Modelling - III - Part A
Lecture 25 - Similitude and Modelling - III - Part B
Lecture 26 - Flow in a Pipe - I
Lecture 27 - Flow in a Pipe - II
Lecture 28 - Flow in a Pipe - II
Lecture 29 - Low Reynolds Number Flows: Stokes Equation

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Lecture 30 - Viscous Flow: Concept of a Boundary Layer
Lecture 31 - Inviscid Flows: Velocity Potential
Lecture 32 - Potential Flow Equations
Lecture 33 - Some Simple 2D - Potential Flows
Lecture 34 - Potential Flows - Rankine Half Body and Doublet
Lecture 35 - Flow Past a Cylinder : Potential and Real Flow - Part A
Lecture 36 - Flow Past a Cylinder : Potential and Real Flow - Part B
Lecture 37 - Flow Past a Rotating Cylinder : Robins - Magnus Effect
Lecture 38 - Boundary Layer - Part A
Lecture 39 - Boundary Layer - Part B
Lecture 40 - Sports Aerodynamics - Conventional and Reverse Swing of a Cricket Ball

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NPTEL Video Course - Aerospace Engineering - High Speed Aero Dynamics

Subject Co-ordinator - Dr. K.P. Sinhamahapatra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Review of Thermodynamics
Lecture 2 - Review of Thermodynamics (Continued...)
Lecture 3 - Review of Thermodynamics (Continued...)
Lecture 4 - Review of Thermodynamics (Continued...)
Lecture 5 - One-dimensional gas dynamics
Lecture 6 - One-dimensional gas dynamics (Continued...)
Lecture 7 - One-dimensional gas dynamics (Continued...)
Lecture 8 - One-dimensional waves
Lecture 9 - One-dimensional waves (Continued...)
Lecture 10 - One-dimensional waves (Continued...)
Lecture 11 - Waves and Supersonic Flow
Lecture 12 - Waves and Supersonic Flow (Continued...)
Lecture 13 - Waves and Supersonic Flow (Continued...)
Lecture 14 - Waves and Supersonic Flow (Continued...)
Lecture 15 - Shock Expansion Theory
Lecture 16 - Flow through ducts and channels
Lecture 17 - Flow in ducts
Lecture 18 - Flow in ducts (Continued...)
Lecture 19 - Adiabatic Flow in ducts with friction
Lecture 20 - Adiabatic flow in ducts with friction (Continued...)
Lecture 21 - Isothermal flow in ducts with friction
Lecture 22 - Flow in uniform duct with heating
Lecture 23 - Multi - dimensional flow problems
Lecture 24 - Multi - dimensional flow problems (Continued...)
Lecture 25 - Linearized flow problems
Lecture 26 - Linearized flow problems (Continued...)
Lecture 27 - Linearized flow problems (Continued...)
Lecture 28 - Linearized flow problems (Continued...)
Lecture 29 - Linearized flow problems (Continued...)

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Lecture 30 - Linearized flow problems (Continued...)
Lecture 31 - Linearized flow problems (Continued...)
Lecture 32 - Linearized Problems - Forces on Slender Bodies
Lecture 33 - Linearized Problems - Forces on Slender Bodies (Continued...)
Lecture 34 - Similarity Rules for High Speed Flows
Lecture 35 - Similarity Rules for High Speed Flows (Continued...)
Lecture 36 - Similarity Rules for High Speed Flows (Continued...)
Lecture 37 - Similarity Rules in Hypersonic Flow
Lecture 38 - Transonic Flow
Lecture 39 - Transonic Flow (Continued...)
Lecture 40 - Transonic Flow (Continued...)

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NPTEL Video Course - Aerospace Engineering - Space Flight Mechanics

Subject Co-ordinator - Dr. Manoranjan Sinha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Space Flight Mechanics
Lecture 2 - Particle Kinematics
Lecture 3 - Particle Kinematics (Continued...)
Lecture 4 - Conic Section
Lecture 5 - Two Body Problem
Lecture 6 - Two Body Problem (Continued...1)
Lecture 7 - Two Body Problem (Continued...2)
Lecture 8 - Two Body Problem (Continued...3)
Lecture 9 - Two Body Problem (Continued...4)
Lecture 10 - Two Body Problem (Continued...5)
Lecture 11 - Two Body Problem (Continued...6)
Lecture 12 - Two Body Problem (Continued...7) & Three Body Problem
Lecture 13 - Three Body Problem (Continued...1)
Lecture 14 - Three Body Problem (Continued...2)
Lecture 15 - Three Body Problem (Continued...3)
Lecture 16 - Three Body Problem (Continued...4)
Lecture 17 - Three Body Problem (Continued...5)
Lecture 18 - Three Body Problem (Continued...6)
Lecture 19 - Three Body Problem (Continued...7)
Lecture 20 - Three Body Problem (Continued...8)
Lecture 21 - Trajectory Transfer
Lecture 22 - Trajectory Transfer (Continued...1)
Lecture 23 - Trajectory Transfer (Continued...2)
Lecture 24 - Trajectory Transfer (Continued...3)
Lecture 25 - Trajectory Transfer (Continued...4)
Lecture 26 - Trajectory Transfer (Continued...5)
Lecture 27 - Trajectory Transfer (Continued...6)
Lecture 28 - Trajectory Transfer (Continued...7)
Lecture 29 - Trajectory Transfer (Continued...8)

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Lecture 30 - Trajectory Transfer (Continued...9)
Lecture 31 - Trajectory Transfer (Continued...10)
Lecture 32 - Trajectory Transfer (Continued...11) and Attitude Dynamics
Lecture 33 - Attitude Dynamics (Continued...1)
Lecture 34 - Attitude Dynamics (Continued...2)
Lecture 35 - Attitude Dynamics (Continued...3)
Lecture 36 - Attitude Dynamics (Continued...4)
Lecture 37 - Attitude Dynamics (Continued...5)
Lecture 38 - Attitude Dynamics (Continued...6)
Lecture 39 - Attitude Dynamics (Continued...7)
Lecture 40 - Attitude Dynamics (Continued...8)
Lecture 41 - Attitude Dynamics (Continued...9)
Lecture 42 - Propulsion
Lecture 43 - Propulsion (Continued...1)
Lecture 44 - Propulsion (Continued...2)
Lecture 45 - Propulsion (Continued...3)

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NPTEL Video Course - Aerospace Engineering - Introduction to Aerodynamics

Subject Co-ordinator - Dr. K.P. Sinhamahapatra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Aircraft and Aerodynamic Forces and Moments
Lecture 2 - Aircraft and Aerodynamic Forces and Moments (Continued...)
Lecture 3 - Fluids and Forces in Fluids
Lecture 4 - Fluids and Forces in Fluids (Continued...)
Lecture 5 - Forces in Fluids
Lecture 6 - Forces in Fluids (Continued...)
Lecture 7 - Kinematics of fluid motion
Lecture 8 - Kinematics of fluid motion (Continued...)
Lecture 9 - Kinematics of fluid motion (Continued...)
Lecture 10 - Kinematics of fluid motion (Continued...)
Lecture 11 - Kinematics of fluid motion - Velocity with specified extension and vorticity
Lecture 12 - Kinematics of fluid motion - Velocity with specified extension and vorticity (Continued...)
Lecture 13 - Kinematics of fluid motion - Vorticity Distribution
Lecture 14 - Kinematics of fluid motion - Velocity without expansion and vorticity
Lecture 15 - Irrotational Solenoidal Flow in Multiply Connected region
Lecture 16 - Irrotational Solenoidal Flow in Multiply Connected region (Continued...)
Lecture 17 - Equations of Fluid Motion - Navier - Stokes Equation
Lecture 18 - Equations of Fluid Motion - Navier - Stokes Equation (Continued...)
Lecture 19 - Equations of Fluid Motion - Navier - Stokes Equation (Continued...)
Lecture 20 - Conservation of Energy and Energy Equation
Lecture 21 - Equations of Motions
Lecture 22 - Equations of Motion (Continued...)
Lecture 23 - Exact Solution for Simple Problems
Lecture 24 - Exact Solution for Simple Problems (Continued...)
Lecture 25 - Non-dimensional Form of the Equations and Possible Simplifications
Lecture 26 - High Reynolds Number Approximation
Lecture 27 - Conditions fior Incompressibility
Lecture 28 - Potential Flow
Lecture 29 - Potential Flow - Combination of Basic Solutions

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Lecture 30 - Potential Flow - Combination of Basic Solutions (Continued...)
Lecture 31 - Potential Flow - Combination of Basic Solutions (Continued...)
Lecture 32 - Potential Flow - Combination of Basic Solutions (Continued...) - Lifting Cylinder
Lecture 33 - Conformal Transformation
Lecture 34 - Conformal Transformation (Continued...)
Lecture 35 - Zhukovsky Transformation
Lecture 36 - Zhukovsky Transformation (Continued...)
Lecture 37 - Zhukovsky Transformation - Applications
Lecture 38 - Zhukovsky Transformation - Applications (Continued...)
Lecture 39 - Zhukovsky Transformation - Applications (Continued...)
Lecture 40 - Transformation
Lecture 41 - Transformation (Continued...)
Lecture 42 - Boundary - Layer Theory
Lecture 43 - Boundary - Layer Theory (Continued...)
Lecture 44 - Boundary - Layer Theory (Continued...)
Lecture 45 - Boundary - Layer Theory (Continued...)
Lecture 46 - Boundary - Layer Theory (Continued...)

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NPTEL Video Course - Aerospace Engineering - NOC:Satellite Attitude Dynamics and Control

Subject Co-ordinator - Dr. Manoranjan Sinha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Kinematics of Rotation
Lecture 2 - Kinematics of Rotation (Continued...)
Lecture 3 - Kinematics of Rotation (Continued...)
Lecture 4 - Kinematics of Rotation (Continued...)
Lecture 5 - Kinematics of Rotation (Continued...)
Lecture 6 - Kinematics of Rotation (Continued...)
Lecture 7 - Rotation
Lecture 8 - Rotation (Continued...)
Lecture 9 - Rotation (Continued...)
Lecture 10 - Rotation (Continued...)
Lecture 11 - Rotational Kinematics
Lecture 12 - Rotational Kinematics (Continued...)
Lecture 13 - Rotational Kinematics (Continued...)
Lecture 14 - Rotational Kinematics (Continued...)
Lecture 15 - Rotational Dynamics (Rigid Body Dynamics)
Lecture 16 - Rotational Dynamics (Rigid Body Dynamics) (Continued...)
Lecture 17 - Rotational Dynamics (Rigid Body Dynamics) (Continued...)
Lecture 18 - Rigid Body Dynamics
Lecture 19 - Rigid Body Dynamics (Continued...)
Lecture 20 - Rigid Body Dynamics (Continued...)
Lecture 21 - Rigid Body Dynamics (Continued...)
Lecture 22 - Rigid Body Dynamics (Continued...)
Lecture 23 - Rigid Body Dynamics (Continued...)
Lecture 24 - Rigid Body Dynamics (Continued...)
Lecture 25 - Rigid Body Dynamics (Continued...)
Lecture 26 - Stability of Torque Free Rotation
Lecture 27 - Stability of Torque Free Rotation (Continued...)
Lecture 28 - Gravity-gradient Satellite
Lecture 29 - Gravity-gradient Satellite (Continued...)

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Lecture 30 - Gravity-gradient Satellite (Continued...)
Lecture 31 - Gravity-gradient Satellite (Continued...)
Lecture 32 - Gravity-gradient Satellite (Continued...)
Lecture 33 - Gravity-gradient Satellite (Continued...)
Lecture 34 - Gravity-gradient Satellite (Continued...)
Lecture 35 - Gravity-gradient Satellite (Continued...)
Lecture 36 - Gravity-gradient Satellite (Continued...)
Lecture 37 - Gravity-gradient Satellite (Continued...)
Lecture 38 - Spin Stabilization
Lecture 39 - Spin Stabilization (Continued...)
Lecture 40 - Spin Stabilization (Continued...)
Lecture 41 - Spin Stabilization (Continued...)
Lecture 42 - Spin Stabilization (Continued...)
Lecture 43 - Control Moment Gyroscope
Lecture 44 - Control Moment Gyroscope (Continued...)
Lecture 45 - Gyroscope/Top Motion
Lecture 46 - Gyroscope/Top Motion (Continued...)
Lecture 47 - Gyroscopic Motion
Lecture 48 - Gyroscopic Motion (Continued...)
Lecture 49 - Reaction Wheel/Gyrostat
Lecture 50 - Reaction Wheel/Gyrostat (Continued...)
Lecture 51 - Gyrostat
Lecture 52 - Gyrostat (Continued...)
Lecture 53 - Gyrostat (Continued...)
Lecture 54 - Gyrostat (Continued...)
Lecture 55 - Control Moment Gyro
Lecture 56 - Control Moment Gyro (Continued...)
Lecture 57 - Control Moment Gyro (Continued...)
Lecture 58 - Control Moment Gyro (Continued...)
Lecture 59 - Satellite Dynamics with Control Moment Gyro
Lecture 60 - Satellite Dynamics with Control Moment Gyro (Continued...)
Lecture 61 - Satellite Dynamics with Control Moment Gyro (Continued...)
Lecture 62 - Simplified Control Gyro for Satellite Attitude Control
Lecture 63 - Satellite Attitude Control using Magnetic Torquer
Lecture 64 - Satellite Attitude Control using Magnetic Torquer (Continued...)
Lecture 65 - Satellite Attitude Control using Magnetic Torquer (Continued...)
Lecture 66 - Satellite Attitude Control using Magnetic Torquer (Continued...)
Lecture 67 - Satellite Attitude Control using Magnetic Torquer (Continued...)
Lecture 68 - Satellite Attitude Control using Lorentz Force

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Lecture 69 - Satellite Attitude Control using Thruster
Lecture 70 - Atmospheric Drag on the Satellite
Lecture 71 - Atmospheric Force and Moment on the Satellite
Lecture 72 - Atmospheric Force and Moment on the Satellite (Continued...)
Lecture 73 - Solar Radiation Force and Moment on the Satellite

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NPTEL Video Course - Aerospace Engineering - NOC:Vibration and Structural Dynamics

Subject Co-ordinator - Prof. Mira Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Undamped Free Vibration
Lecture 3 - Damped Free Vibration
Lecture 4 - Damped Free Vibration (Continued...)
Lecture 5 - Damped Free Vibration (Continued...)
Lecture 6 - Force Vibration
Lecture 7 - Harmonic Loading
Lecture 8 - Harmonic Loading (Continued...)
Lecture 9 - Harmonic Loading (Continued...)
Lecture 10 - Harmonic Loading (Continued...)
Lecture 11 - Impulse Load and Arbitrary Load
Lecture 12 - Impulse Load and Arbitrary Load (Continued...)
Lecture 13 - MDOF, 2-Dof System
Lecture 14 - Normal Mode of Vib
Lecture 15 - Natural Frequency and Mode Shapes
Lecture 16 - Mode Shapes of MDOF
Lecture 17 - Mode Shapes and Free Vibration Response of MODF
Lecture 18 - Example on MODF
Lecture 19 - Example on MODF (Continued...)
Lecture 20 - Modal Expansion Theorem, Generalized Coordinate
Lecture 21 - Examples on Modal Analysis
Lecture 22 - Damping
Lecture 23 - Rigid Body Modes
Lecture 24 - Numerical Time Integration
Lecture 25 - Continuous System
Lecture 26 - Axial Vibration of Bar
Lecture 27 - Axial Vibration of Bar (Continued...)
Lecture 28 - Bending Vibration in Beam
Lecture 29 - Bending Vibration in Beam (Continued...)

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Lecture 30 - Bending Vibration in Beam (Continued...)
Lecture 31 - Modal Analysis
Lecture 32 - Modal Analysis (Continued...)
Lecture 33 - Modal Analysis of Continuous System
Lecture 34 - Modal Analysis of Continuous System (Continued...)
Lecture 35 - Approximate Method
Lecture 36 - Approximate Methods (Continued...)
Lecture 37 - Collocation Method
Lecture 38 - Analytical Methods
Lecture 39 - Analytical Methods (Continued...)
Lecture 40 - Analytical Methods (Continued...)

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NPTEL Video Course - Aerospace Engineering - NOC:Space Flight Mechanics

Subject Co-ordinator - Dr. Manoranjan Sinha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Conic Section
Lecture 2 - Conic Section (Continued...)
Lecture 3 - Conic Section (Continued...)
Lecture 4 - Central Force Motion
Lecture 5 - Gravitational Central Force Motion
Lecture 6 - Gravitational Central Force Motion (Continued...)
Lecture 7 - Gravitational Central Force Motion (Continued...)
Lecture 8 - 2-Body Problem
Lecture 9 - 2-Particle System Motion Under Mutual Gravitational Attraction
Lecture 10 - 2-Particle Body Problem
Lecture 11 - 2-Particle Body System
Lecture 12 - Classical Orbital Elements / Parameters
Lecture 13 - Classical Orbital Elements / Parameters (Continued...)
Lecture 14 - Classical Orbital Elements / Parameters (Continued...)
Lecture 15 - Classical Orbital Elements and Its Inverse Problems
Lecture 16 - Inverse Problem of Orbit Determination (Classical Orbital Elements)
Lecture 17 - Problem Solving on 2-Body Problem Related to Orbit and Orbital Elements
Lecture 18 - Problem Related to Orbital Elements
Lecture 19 - Kepler's Equation / Kepler's Problem
Lecture 20 - Kepler's Problem (Continued...)
Lecture 21 - Kepler's Problem (Continued...)
Lecture 22 - Kepler's Equation
Lecture 23 - Kepler's Equation (Continued...)
Lecture 24 - Kepler's Equation (Continued...)
Lecture 25 - Kepler's Equation (Continued...)
Lecture 26 - Kepler's Equation (Continued...)
Lecture 27 - Kepler's Equation (Continued...)
Lecture 28 - Kepler's Equation (Continued...)
Lecture 29 - 3-Body Problem

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Lecture 30 - 3-Body Problem (Continued...)
Lecture 31 - 3-Body Problem (Continued...)
Lecture 32 - 3-Body Problem (Continued...)
Lecture 33 - 3-Body Problem (Continued...)
Lecture 34 - Restricted 3-Body Problem
Lecture 35 - Restricted 3-Body Problem (Continued...)
Lecture 36 - Restricted 3-Body Problem (Continued...)
Lecture 37 - Restricted 3-Body Problem (Continued...)
Lecture 38 - Restricted 3-Body Problem (Continued...)
Lecture 39 - Restricted 3-Body Problem (Continued...)
Lecture 40 - Restricted 3-Body Problem (Continued...)
Lecture 41 - Restricted 3-Body Problem (Continued...)
Lecture 42 - Restricted 3-Body Problem (Continued...)
Lecture 43 - Restricted 3-Body Problem (Continued...)
Lecture 44 - Restricted 3-Body Problem (Continued...)
Lecture 45 - Restricted 3-Body Problem (Continued...)
Lecture 46 - Restricted 3-Body Problem (Continued...)
Lecture 47 - General Perturbation Theory
Lecture 48 - General Perturbation Theory (Continued...)
Lecture 49 - General Perturbation Theory (Continued...)
Lecture 50 - General Perturbation Theory (Continued...)
Lecture 51 - General Perturbation Theory (Continued...)
Lecture 52 - General Orbit Perturbation Theory
Lecture 53 - General Orbit Perturbation Theory (Continued...)
Lecture 54 - General Orbit Perturbation Theory (Continued...)
Lecture 55 - General Orbit Perturbation Theory (Continued...)
Lecture 56 - General Orbit Perturbation Theory (Continued...)
Lecture 57 - General Orbit Perturbation Theory (Continued...)
Lecture 58 - General Orbit Perturbation Theory (Continued...)
Lecture 59 - General Orbit Perturbation Theory (Continued...)
Lecture 60 - General Orbit Perturbation Theory (Continued...)
Lecture 61 - General Orbit Perturbation Theory (Continued...)
Lecture 62 - General Orbit Perturbation Theory (Continued...)
Lecture 63 - General Orbit Perturbation Theory (Continued...)
Lecture 64 - General Orbit Perturbation Theory (Continued...)
Lecture 65 - General Orbit Perturbation Theory (Continued...)
Lecture 66 - General Orbit Perturbation Theory (Continued...)
Lecture 67 - General Orbit Perturbation Theory (Continued...)
Lecture 68 - Orbit Determination

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Lecture 69 - Orbit Determination (Continued...)
Lecture 70 - Orbit Determination (Continued...)
Lecture 71 - Orbit Determination (Continued...)
Lecture 72 - Transformation from Celestial to Earth Fixed Reference Frame
Lecture 73 - Time
Lecture 74 - Time (Continued...)
Lecture 75 - Orbit Determination
Lecture 76 - Orbit Determination (Continued...)
Lecture 77 - Orbit Determination (Continued...)
Lecture 78 - Orbit Determination (Continued...)
Lecture 79 - Trajectory Transfer
Lecture 80 - Trajectory Transfer (Continued...)
Lecture 81 - Trajectory Transfer (Continued...)
Lecture 82 - Trajectory Transfer (Continued...)
Lecture 83 - Trajectory Transfer (Continued...)
Lecture 84 - Trajectory Transfer (Continued...)
Lecture 85 - Trajectory Transfer (Continued...)
Lecture 86 - Trajectory Transfer (Continued...)
Lecture 87 - Interplanetary Transfer
Lecture 88 - Interplanetary Transfer (Continued...)
Lecture 89 - Interplanetary Transfer (Continued...)
Lecture 90 - Patched Conic Section Method for Interplanetary Transfer
Lecture 91 - Interplanetary Mission
Lecture 92 - Interplanetary Mission (Continued...)
Lecture 93 - Interception in Coplanar Orbit
Lecture 94 - Interception in Coplanar Orbit (Continued...)
Lecture 95 - Interception in non-coplanar Orbit
Lecture 96 - Interception in non-coplanar Orbit (Continued...)
Lecture 97 - Interception in non-coplanar Orbit (Continued...)
Lecture 98 - Non Coplanar Transfer
Lecture 99 - Sphere of Influence

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NPTEL Video Course - Aerospace Engineering - NOC:Aircraft Structures - I

Subject Co-ordinator - Dr. Anup Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Load Encountered by a Typical Aircraft
Lecture 5 - Conceptual Structural Details of a Typical Aircraft
Lecture 6 - Airworthiness of An Aircraft
Lecture 7 - Aerodynamic Loads and Load Factors
Lecture 8 - Loads From A Symmetric Manoeuvre Of An Aircraft
Lecture 9 - Shear and Moment on Wing An Aircraft
Lecture 10 - Distribution Of Load On The Fuselage
Lecture 11 - Unit Load Analysis Of Fuselage
Lecture 12 - Truss System
Lecture 13 - Truss System (Continued...)
Lecture 14 - Space Structures
Lecture 15 - Space Structures (Continued...)
Lecture 16 - Wing Truss System
Lecture 17 - Introduction to Energy Methods
Lecture 18 - Dummy and Unit Load Method
Lecture 19 - Dummy and Unit Load Method - Examples
Lecture 20 - Castigliano's Theorems
Lecture 21 - Rayleigh - Ritz Method
Lecture 22 - Statically Indeterminate Structures
Lecture 23 - Theory of Elasticity - Stress
Lecture 24 - Theory of Elasticity - Equilibrium
Lecture 25 - Stress Transformation and Principal Stress
Lecture 26 - Theory of Elasticity - Principal Stress Boundary Condition
Lecture 27 - Shear Stresses
Lecture 28 - Introduction of Strain
Lecture 29 - Introduction of strain - Equations of compatibility

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Lecture 30 - Formulation of Elasticity Problems
Lecture 31 - Inverse Method of Solution
Lecture 32 - Semi-Inverse Method of Solution
Lecture 33 - Equilibrium Equation in Polar Coordinate System
Lecture 34 - Compatibility Condition in Polar Cordinate System
Lecture 35 - Effects of Circular Hole on Stress Distributions in a Plate
Lecture 36 - Effects of Circular Hole on Stress Distributions in a Plate
Lecture 37 - Effects of Circular Hole on Stress Distributions in a Plate
Lecture 38 - Theory of Elasticity - Torsion Problems
Lecture 39 - Theory of Elasticity - Torsion Problems (Continued...)
Lecture 40 - Torsion of an Elliptical Bar
Lecture 41 - Membrane Analogy for Torsion Problem
Lecture 42 - Membrane Analogy for Torsion Problem (Continued...)

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NPTEL Video Course - Aerospace Engineering - NOC:Introduction to CFD

Subject Co-ordinator - Prof. Arnab Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Overview of CFD
Lecture 2 - Governing Equations of Fluid Flow
Lecture 3 - Governing Equations of Fluid Flow (Continued...)
Lecture 4 - Classification of PDEs
Lecture 5 - Classification of PDEs (Continued...)
Lecture 6 - Methods for Approximate Solution of PDEs
Lecture 7 - Finite Difference Method
Lecture 8 - Methods for Approximate Solution of PDEs (Continued...)
Lecture 9 - Methods for Approximate Solution of PDEs (Continued...)
Lecture 10 - Methods for Approximate Solution of PDEs (Continued...)
Lecture 11 - Methods for Approximate Solution of PDEs (Continued...)
Lecture 12 - Taylor Table Approach for Constructing Finite Difference Schemes
Lecture 13 - Taylor Table Approach for Constructing Finite Difference Schemes (Continued...)
Lecture 14 - Taylor Table Approach for Constructing Finite Difference Schemes (Continued...)
Lecture 15 - Taylor Table Approach for Constructing Finite Difference Schemes (Continued...)
Lecture 16 - Taylor Table Approach for Constructing Finite Difference Schemes (Continued...)
Lecture 17 - Numerical Solution of Steady State Heat Conduction (Elliptic PDE)
Lecture 18 - Numerical Solution of Steady State Heat Conduction (Elliptic PDE) (Continued...)
Lecture 19 - Numerical Solution of Steady State Heat Conduction (Elliptic PDE) (Continued...)
Lecture 20 - Numerical Solution of Steady State Heat Conduction (Elliptic PDE) (Continued...)
Lecture 21 - Numerical Solution of Steady State Heat Conduction (Elliptic PDE) (Continued...)
Lecture 22 - Numerical Solution of Unsteady Heat Conduction (Parabolic PDE)
Lecture 23 - Numerical Solution of Unsteady Heat Conduction (Parabolic PDE) (Continued...)
Lecture 24 - Numerical Solution of Unsteady Heat Conduction (Parabolic PDE) (Continued...)
Lecture 25 - Numerical Solution of Unsteady Heat Conduction (Parabolic PDE) (Continued...)
Lecture 26 - Numerical Solution of Unsteady Heat Conduction (Parabolic PDE) (Continued...)
Lecture 27 - Numerical Solution of Linear Wave Equation (Hyperbolic PDE)
Lecture 28 - Numerical Solution of Linear Wave Equation (Hyperbolic PDE) (Continued...)
Lecture 29 - Numerical Solution of Linear Wave Equation (Hyperbolic PDE) (Continued...)

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Lecture 30 - Numerical Solution of Linear Wave Equation (Hyperbolic PDE) (Continued...)
Lecture 31 - Numerical Solution of Linear Wave Equation (Hyperbolic PDE) (Continued...)
Lecture 32 - Numerical Solution of Linear Wave Equation (Hyperbolic PDE) (Continued...)
Lecture 33 - Numerical Solution of One Dimensional Convection - Diffusion Equation
Lecture 34 - Numerical Solution of One Dimensional Convection - Diffusion Equation (Continued...)
Lecture 35 - Numerical Solution of One Dimensional Convection - Diffusion Equation (Continued...)
Lecture 36 - Numerical Solution of One Dimensional Convection - Diffusion Equation (Continued...)
Lecture 37 - Numerical Solution of One Dimensional Convection - Diffusion Equation (Continued...)
Lecture 38 - Numerical Solution of One Dimensional Convection - Diffusion Equation (Continued...)
Lecture 39 - Numerical Solution of Two Dimensional Incompressible Navier Stokes Equations
Lecture 40 - Numerical Solution of Two Dimensional Incompressible Navier Stokes Equations (Continued...)
Lecture 41 - Numerical Solution of Two Dimensional Incompressible Navier Stokes Equations (Continued...)
Lecture 42 - Numerical Solution of Two Dimensional Incompressible Navier Stokes Equations (Continued...)
Lecture 43 - Numerical Solution of Two Dimensional Incompressible Navier Stokes Equations (Continued...)
Lecture 44 - Numerical Solution of Two Dimensional Incompressible Navier Stokes Equations (Continued...)
Lecture 45 - Numerical Solution of One Dimensional Euler Equation for Shock Tube Problem
Lecture 46 - Numerical Solution of One Dimensional Euler Equation for Shock Tube Problem (Continued...)
Lecture 47 - Numerical Solution of One Dimensional Euler Equation for Shock Tube Problem (Continued...)
Lecture 48 - Numerical Solution of One Dimensional Euler Equation for Shock Tube Problem (Continued...)
Lecture 49 - Numerical Solution of One Dimensional Euler Equation for Shock Tube Problem (Continued...)
Lecture 50 - Basics of Interface Capturing Methods for Applications in Multiphase Flow
Lecture 51 - Basics of Interface Capturing Methods for Application in Multiphase Flow (Continued...)
Lecture 52 - Basics of Interface Capturing Methods for Application in Multiphase Flow (Continued...)
Lecture 53 - Basics of Interface Capturing Methods for Application in Multiphase Flow (Continued...)
Lecture 54 - Basics of Interface Capturing Methods for Application in Multiphase Flow (Continued...)
Lecture 55 - Basics of Turbulence Modeling
Lecture 56 - Basics of Turbulence Modeling (Continued...)
Lecture 57 - Basics of Turbulence Modeling (Continued...)
Lecture 58 - Basics of Turbulence Modeling (Continued...)
Lecture 59 - Basics of Turbulence Modeling (Continued...)
Lecture 60 - Basics of Turbulence Modeling (Continued...)
Lecture 61 - Structured and Unstructured Grid Generation
Lecture 62 - Structured and Unstructured Grid Generation (Continued...)
Lecture 63 - Structured and Unstructured Grid Generation (Continued...)
Lecture 64 - Structured and Unstructured Grid Generation (Continued...)
Lecture 65 - Structured and Unstructured Grid Generation (Continued...)

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NPTEL Video Course - Aerospace Engineering - NOC:Fundamentals of Theoretical and Experimental Aerodynamics

Subject Co-ordinator - Prof. Arnab Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction on Aerodynamics-its relevance and applications
Lecture 2 - Atmosphere
Lecture 3 - Flow velocity, pressure, skin friction
Lecture 4 - Generation of aerodynamic forces and moments on an aircraft
Lecture 5 - Generation of aerodynamic forces and moments on an aircraft (Continued...)
Lecture 6 - Generation of aerodynamic forces and moments on an aircraft (Continued...)
Lecture 7 - Eulerian and Lagrangian perspectives of flow: Fluid element trajectories
Lecture 8 - Fluid element trajectories, Angular velocity, and vorticity
Lecture 9 - Irrotational and Rotational flow, Strain of a fluid element, Gradient
Lecture 10 - Line Surface and Volume Integrals, Circulation, Velocity
Lecture 11 - Conservation equations of mass, momentum and energy
Lecture 12 - Conservation equations of momentum and energy
Lecture 13 - Inviscid and viscous flows
Lecture 14 - Inviscid and viscous flows (Continued...)
Lecture 15 - Bernoulliâ s equation and its applications
Lecture 16 - Bernoulliâ s equation applications; Potential flow; Boundary layer flow
Lecture 17 - Boundary layer flow
Lecture 18 - Boundary Layer (Continued...) and Laminar and turbulent flow
Lecture 19 - Airfoil Geometry, forces and moments acting on an airfoil
Lecture 20 - Pressure distribution on an airfoil, Airfoil nomenclature and characteristics
Lecture 21 - Airfoil characteristics; Aerodynamic center; Some more elementary flows
Lecture 22 - Elementary flows- Doublet and Point Vortex; Vortex sheet
Lecture 23 - Kutta condition; Kelvinâ s circulation theorem; Introduction to thin airfoil theory
Lecture 24 - Results of thin airfoil theory for symmetric
Lecture 25 - Multi element airfoils, Laminar and turbulent
Lecture 26 - Finite wing geometry and flow features
Lecture 27 - Biot Savart Law; Prandtlâ s lifting line theory
Lecture 28 - Prandtl lifting theory for finite wings
Lecture 29 - Finite wing aerodynamics; Delta wing aerodynamics

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Lecture 30 - Delta wing aerodynamics; Unsteady aerodynamics
Lecture 31 - Fundamentals of high speed flows
Lecture 32 - Velocity potential equation and its application; Finite Waves
Lecture 33 - Normal shocks
Lecture 34 - Normal shocks, Mach waves and oblique shocks
Lecture 35 - Oblique shock; Prandtl Meyer expansion
Lecture 36 - Shock expansion theory; Flow through converging diverging nozzle
Lecture 37 - Flow through converging diverging nozzle under different back pressure
Lecture 38 - Priliminary concepts of hypersonic flow; Shock tube
Lecture 39 - Computing aerodynamic flows - trying to connect with the theory
Lecture 40 - Computing aerodynamic flows - trying to connect with the theory (Continued...)
Lecture 41 - Some more on flow physics; The different steps involved in flow computations
Lecture 42 - An introduction to Panel Method
Lecture 43 - Panel method and Vortex Lattice Method
Lecture 44 - Mathematical classification of PDEs and their physical behavior
Lecture 45 - Basics of grid and discretization of governing PDEs
Lecture 46 - Different aspects of numerical schemes
Lecture 47 - Basics of Euler Equation
Lecture 48 - Basics of Compressible Navier Stokes Equations
Lecture 49 - Wind tunnel-an experimental tool in aerodynamics; Types of wind tunnels
Lecture 50 - Wind Tunnel design basics - Subsonic Wind Tunnels
Lecture 51 - Wind Tunnel design basics - Subsonic wind tunnels (Continued...)
Lecture 52 - Wind Tunnel design basics - Supersonic wind tunnels
Lecture 53 - Continuous closed circuit supersonic wind tunnel
Lecture 54 - Scalling of wind tunnel models; Safety issues in wind tunnel handling
Lecture 55 - Flow visualization techniques
Lecture 56 - Schlieren and Shadowgraph techniques
Lecture 57 - Measurement of Pressure using mechanical instruments
Lecture 58 - Rayleigh Pitot tube; Drag measurement using wake survey and direct weighing method
Lecture 59 - Mechanical balance
Lecture 60 - Electronic transducers
Lecture 61 - Wheatstone bridge circuits for force and moment measurement
Lecture 62 - Strain gauge based balances; Electronic pressure gauges
Lecture 63 - Absolute-Gauge-Differential pressure sensors; Data Acquisition System
Lecture 64 - Measurement error and uncertainty
Lecture 65 - Velocity measurement using Particle Image Velocimetry
Lecture 66 - Velocity measurement using Particle Image Velocimetry (Continued...)
Lecture 67 - Particle image velocimetry (Continued...)
Lecture 68 - How wind tunnel and associated instrumentation are used

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Lecture 69 - Quick recapitulation of course content and closure

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NPTEL Video Course - Aerospace Engineering - NOC:Aerodynamic Design of Axial Flow Compressors and Fans

Subject Co-ordinator - Prof. Chetankumar Sureshbhai Mistry

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Introduction (Continued...)
Lecture 7 - Stage Configurations and Parameters
Lecture 8 - Stage Configurations and Parameters (Continued...)
Lecture 9 - Stage Configurations and Parameters (Continued...)
Lecture 10 - Stage Configurations and Parameters (Continued...)
Lecture 11 - Stage Configurations and Parameters (Continued...)
Lecture 12 - Stage Configurations and Parameters (Continued...)
Lecture 13 - Stage Configurations and Parameters (Continued...)
Lecture 14 - Stage Configurations and Parameters (Continued...)
Lecture 15 - Stage Configurations and Parameters (Continued...)
Lecture 16 - Design Concepts
Lecture 17 - Design Concepts (Continued...)
Lecture 18 - Design Concepts (Continued...)
Lecture 19 - Design Concepts (Continued...)
Lecture 20 - Design Concepts (Continued...)
Lecture 21 - Design Concepts (Continued...)
Lecture 22 - Design Concepts (Continued...)
Lecture 23 - Cascade Aerodynamics
Lecture 24 - Cascade Aerodynamics (Continued...)
Lecture 25 - Cascade Aerodynamics (Continued...)
Lecture 26 - Cascade Aerodynamics (Continued...)
Lecture 27 - Cascade Aerodynamics (Continued...)
Lecture 28 - Selection of Design Parameters
Lecture 29 - Selection of Design Parameters (Continued...)

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Lecture 30 - Selection of Design Parameters (Continued...)
Lecture 31 - Selection of Design Parameters (Continued...)
Lecture 32 - Selection of Design Parameters (Continued...)
Lecture 33 - Design Strategies
Lecture 34 - Design Strategies (Continued...)
Lecture 35 - Design Strategies (Continued...)
Lecture 36 - Design Strategies (Continued...)
Lecture 37 - Design of Low Speed Compressor
Lecture 38 - Design of Low Speed Compressor (Continued...)
Lecture 39 - Design of Low Speed Compressor (Continued...)
Lecture 40 - Design of Low Speed Compressor (Continued...)
Lecture 41 - Design of Low Speed Compressor (Continued...)
Lecture 42 - Design of Low Speed Compressor (Continued...)
Lecture 43 - Design of Low Speed Contra rotating Fan
Lecture 44 - Design of Low Speed Contra rotating Fan (Continued...)
Lecture 45 - Design of Low Speed Contra rotating Fan (Continued...)
Lecture 46 - Design of Low Speed Contra rotating Fan (Continued...)
Lecture 47 - Design of Low Speed Contra rotating Fan (Continued...)
Lecture 48 - Design of Low Speed Contra rotating Fan (Continued...)
Lecture 49 - Transonic Compressors
Lecture 50 - Transonic Compressors (Continued...)
Lecture 51 - Transonic Compressors (Continued...)
Lecture 52 - Transonic Compressors (Continued...)
Lecture 53 - Transonic Compressors (Continued...)
Lecture 54 - Design of Transonic Compressor
Lecture 55 - Design of Transonic Compressor (Continued...)
Lecture 56 - Design of Transonic Compressor (Continued...)
Lecture 57 - Design of Transonic Compressor (Continued...)
Lecture 58 - Design of Transonic Compressor (Continued...)
Lecture 59 - Design of Transonic Compressor (Continued...)
Lecture 60 - Design of Industrial fan
Lecture 61 - Design of Industrial fan (Continued...)
Lecture 62 - Design of Industrial fan (Continued...)
Lecture 63 - Design of Industrial fan (Continued...)
Lecture 64 - Design of Industrial fan (Continued...)
Lecture 65 - CFD application to Design and Performance assessment
Lecture 66 - CFD application to Design and Performance assessment (Continued...)
Lecture 67 - CFD application to Design and Performance assessment (Continued...)
Lecture 68 - CFD application to Design and Performance assessment (Continued...)

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Lecture 69 - CFD application to Design and Performance assessment (Continued...)

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NPTEL Video Course - Aerospace Engineering - NOC:Smart Structures

Subject Co-ordinator - Prof. Mohammed Rabius Sunny

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Smart Structures (Continued...)
Lecture 2 - Introduction to Smart Structures (Continued...)
Lecture 3 - Introduction to Smart Structures (Continued...)
Lecture 4 - Introduction to Piezoelectric Materials
Lecture 5 - Introduction to Piezoelectric Materials (Continued...)
Lecture 6 - Mathematical Preliminaries
Lecture 7 - 3D Constitutive Modeling of Piezoelectric Materials - 1
Lecture 8 - 3D Constitutive Modeling of Piezoelectric Materials - 2
Lecture 9 - 3D Constitutive Modeling of Piezoelectric Materials - 3
Lecture 10 - 3D Constitutive Modeling of Piezoelectric Materials - 4
Lecture 11 - Piezoelectric Sensors and Actuators
Lecture 12 - Numercial Problems and Solutions
Lecture 13 - Induced Strain Actuation - Static Analysis
Lecture 14 - Induced Strain Actuation - Static Analysis (Continued...)
Lecture 15 - Induced Strain Actuation - Static Analysis
Lecture 16 - Induced Strain Actuation - Static Analysis (Continued...)
Lecture 17 - Induced Strain Actuation - Static Analysis (Continued...)
Lecture 18 - Induced Strain Actuation - Static Analysis - Numerical Examples
Lecture 19 - Introduction to Energy Principles for Structural Analysis
Lecture 20 - Introduction to Energy Principles for Structural Analysis (Continued...)
Lecture 21 - Statis Analysis of beam for Induced Strain Actuation using Energy Principles
Lecture 22 - Static Analysis of beam for Induced Strain Actuation using Energy Principles (Continued...)
Lecture 23 - Static Analysis of beam for Induced Strain Actuation using Energy Principles (Continued...)
Lecture 24 - Static Analysis of beam for Induced strain Actuation using Energy Principles Numerical
Lecture 25 - Dynamic Analysis of Beam for Induced Strain Actuation Using Energy Principle
Lecture 26 - Dynamic Analysis of Beam for Induced Strain Actuation Using (Continued...)
Lecture 27 - Energy Harvesting and Vibration Control
Lecture 28 - Energy Harvesting and Vibration Control (Continued...)
Lecture 29 - Solution of Coupled Linear Ordinary Differential Equations

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Lecture 30 - Introduction to Fibre Reinforced Plastic Composites
Lecture 31 - Constitutive Relation of Unidirectional FRP Composite Ply
Lecture 32 - Constitutive Relation of Unidirectional FRP Composite Ply (Continued...)
Lecture 33 - Constitutive Relation of Unidirectional FRP Composite Ply (Continued...)
Lecture 34 - Mechanics of FRP Composite Laminate Numerical Examples
Lecture 35 - Mechanics of FRP Composite Laminate Numerical Examples (Continued...)
Lecture 36 - Analysis of composite laminate with piezoelectric patches (Continued...)
Lecture 37 - Analysis of composite laminate with piezoelectric patches (Continued...)
Lecture 38 - Analysis of composite laminate with piezoelectric patches (Continued...)
Lecture 39 - Analysis of composite laminate with piezoelectric patches (Continued...)
Lecture 40 - Analysis of composite laminate with piezoelectric patches - computer programming
Lecture 41 - Introduction to Shape Memory Alloys
Lecture 42 - Temperature and Stress Dependent Phase Transformation Modeling
Lecture 43 - Temperature and Stress Dependent Phase Transformation Modeling (Continued...)
Lecture 44 - Stress-strain Curve at Low Temperature, Pseudo elasticity Two Way Shape Memory Effect
Lecture 45 - Constitutive Relations of Shape Memory Alloys
Lecture 46 - Constitutive Relations of Shape Memory Alloys (Continued...)
Lecture 47 - Constitutive Relations of Shape Memory Alloys (Continued...)
Lecture 48 - Constitutive Relations of Shape Memory Alloys (Continued...)
Lecture 49 - Constitutive Relations of Shape Memory Alloys (Continued...)
Lecture 50 - Finite Element Formulation of Euler - Bernoulli Beam
Lecture 51 - Finite Element Formulation of Euler - Bernoulli Beam (Continued...)
Lecture 52 - Anlsysis of a Beam with Shape Memory Alloy Wire
Lecture 53 - Analysis of a Beam with Shape Memory Alloy Wire (Continued...)
Lecture 54 - Introduction to Electro and Magneto Rheological Fluids
Lecture 55 - Analaysis of Electro and Magneto Rheological Fluid Flow
Lecture 56 - Analaysis of Electro and Magneto Rheological Fluid Flow (Continued...)
Lecture 57 - Analaysis of Electro and Magneto Rheological Fluid Flow (Continued...)
Lecture 58 - Analaysis of Electro and Magneto Rheological Fluid Flow (Continued...)
Lecture 59 - Analaysis of Electro and Magneto Rheological Fluid Flow
Lecture 60 - 60 Analaysis of Electro and Magneto Rheological Fluid Flow (Continued...)
Lecture 61 - Analaysis of Electro and Magneto Rheological Fluid Flow (Continued...)
Lecture 62 - Analysis of a Beam with ER/MR Fluid Layer

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NPTEL Video Course - Aerospace Engineering - NOC:Aeroengine Gas Turbine Cycles

Subject Co-ordinator - Prof. Chetankumar Sureshbhai Mistry

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Introduction (Continued...)
Lecture 7 - Component Performance
Lecture 8 - Component Performance (Continued...)
Lecture 9 - Component Performance (Continued...)
Lecture 10 - Component Performance (Continued...)
Lecture 11 - Component Performance (Continued...)
Lecture 12 - Turbojet Engine - I
Lecture 13 - Turbojet Engine - I (Continued...)
Lecture 14 - Turbojet Engine - I (Continued...)
Lecture 15 - Turbojet Engine - I (Continued...)
Lecture 16 - Turbojet Engine - I (Continued...)
Lecture 17 - Turbojet Engine - I (Continued...)
Lecture 18 - Turbojet Engine - II
Lecture 19 - Turbojet Engine - II (Continued...)
Lecture 20 - Turbojet Engine - II (Continued...)
Lecture 21 - Turbojet Engine - II (Continued...)
Lecture 22 - Turbojet Engine - II (Continued...)
Lecture 23 - Turbofan Engine - I
Lecture 24 - Turbofan Engine - I (Continued...)
Lecture 25 - Turbofan Engine - I (Continued...)
Lecture 26 - Turbofan Engine - I (Continued...)
Lecture 27 - Turbofan Engine - I (Continued...)
Lecture 28 - Turbofan Engine - II
Lecture 29 - Turbofan Engine - II (Continued...)

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Lecture 30 - Turbofan Engine - II (Continued...)
Lecture 31 - Turbofan Engine - II (Continued...)
Lecture 32 - Turbofan Engine - II (Continued...)
Lecture 33 - Turbofan Engine - III
Lecture 34 - Turbofan Engine - III (Continued...)
Lecture 35 - Turbofan Engine - III (Continued...)
Lecture 36 - Turbofan Engine - III (Continued...)
Lecture 37 - Turbofan Engine - III (Continued...)
Lecture 38 - Turbofan Engine - IV
Lecture 39 - Turbofan Engine - IV (Continued...)
Lecture 40 - Turbofan Engine - IV (Continued...)
Lecture 41 - Turbofan Engine - IV (Continued...)
Lecture 42 - Turbofan Engine - IV (Continued...)
Lecture 43 - Turbofan Engine - IV (Continued...)
Lecture 44 - Recent Advances in Turbofan Engines
Lecture 45 - Recent Advances in Turbofan Engines (Continued...)
Lecture 46 - Recent Advances in Turbofan Engines (Continued...)
Lecture 47 - Recent Advances in Turbofan Engines (Continued...)
Lecture 48 - Recent Advances in Turbofan Engines (Continued...)
Lecture 49 - Recent Advances in Turbofan Engines (Continued...)
Lecture 50 - Turboprop Engine
Lecture 51 - Turboprop Engine (Continued...)
Lecture 52 - Turboprop Engine (Continued...)
Lecture 53 - Turboprop Engine (Continued...)
Lecture 54 - Turboprop Engine (Continued...)
Lecture 55 - Turboshaft Engine
Lecture 56 - Turboshaft Engine (Continued...)
Lecture 57 - Turboshaft Engine (Continued...)
Lecture 58 - Turboshaft Engine (Continued...)
Lecture 59 - Turboshaft Engine (Continued...)
Lecture 60 - Component Matching and Testing
Lecture 61 - Component Matching and Testing (Continued...)
Lecture 62 - Component Matching and Testing (Continued...)
Lecture 63 - Component Matching and Testing (Continued...)
Lecture 64 - Aircraft Engine Testing

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NPTEL Video Course - Aerospace Engineering - NOC:Combustion of Solid Fuels and Propellants

Subject Co-ordinator - Prof. Srinibas Karmakar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Principle of Rocket
Lecture 2 - Basic Principle of Rocket (Continued...)
Lecture 3 - Performance Parameters
Lecture 4 - Performance Parameters (Continued...)
Lecture 5 - Performance Parameters (Example problems)
Lecture 6 - Solid Propellant Rocket - Brief Description
Lecture 7 - Solid Propellants - Introduction
Lecture 8 - Solid Propellants - Selection Criteria
Lecture 9 - Solid Propellants - Selection Criteria (Continued...)
Lecture 10 - Solid Propellants - Selection Criteria (Continued...)
Lecture 11 - Propellants Ingredients (Continued...) and Classification of Solid Propellants
Lecture 12 - Tutorial Problems
Lecture 13 - Combustion of Solid Propellants - Introduction
Lecture 14 - Combustion of Double-Base Propellants
Lecture 15 - Combustion of Double-Base Propellants (Continued...)
Lecture 16 - Combustion of Double-Base Propellants (Continued...)
Lecture 17 - Evaluation of Burn Rate of DB Propellants
Lecture 18 - Evaluation of Burn Rate of DB Propellants (Continued...)
Lecture 19 - Combustion of Composite Propellants - Introduction
Lecture 20 - Combustion of Composite Propellants (Continued...)
Lecture 21 - Evaluation of Burn Rate of Composite Propellants
Lecture 22 - Effect of Various Parameters on Burn Rate of Composite Propellants
Lecture 23 - Effect of Transients, Vehicle Acceleration, Binder, Catalysts on Burning Rate of CP
Lecture 24 - Effect of Catalysts on Burning Rate of CP (Continued...)
Lecture 25 - Combustion of Nitra mine Composite Propellants
Lecture 26 - Combustion of CMDB Propellants
Lecture 27 - Choice of Pressure Index (n); Tutorial Problems
Lecture 28 - Metal Combustion Classification-Introduction
Lecture 29 - Metal Combustion Classification (Continued...)

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Lecture 30 - Metal Combustion Classification (Continued...)
Lecture 31 - Metal Particle Combustion Regimes
Lecture 32 - Metal Particle Combustion Regimes (Continued...)
Lecture 33 - Combustion Times for Diffusion and Kinetic Controlled Regimes
Lecture 34 - Ignition and Combustion of Boron Particle
Lecture 35 - Ignition and Combustion of Boron Particle (Continued...)
Lecture 36 - Ignition and Combustion of Aluminum Particle,Recent Future Developments on Metal Fuels
Lecture 37 - Erosive Burning in Solid Propellant Rockets - Introduction
Lecture 38 - Methods for Determination of Erosive Function
Lecture 39 - Methods for Determination of Erosive Function (Continued...)
Lecture 40 - Erosive Burning Theories

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NPTEL Video Course - Aerospace Engineering - NOC:Aerospace Structural Analysis

Subject Co-ordinator - Prof. Mira Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Aerospace Structures
Lecture 2 - Introduction to Aerospace Structures
Lecture 3 - Recap of Theory of Elasticity
Lecture 4 - Torsion of Circular Cross-Section Shaft
Lecture 5 - Torsion of Non-Circular Cross-Section Shaft
Lecture 6 - Torsion of Non-Circular Cross-Section Shaft
Lecture 7 - Torsion of Non-Circular Cross-Section Shaft
Lecture 8 - Torsion of Non-Circular Cross-Section Shaft
Lecture 9 - Membrane Analogy
Lecture 10 - Membrane Analogy
Lecture 11 - Torsion of Thin-Walled Cross-Section
Lecture 12 - Torsion of Thin-Walled Cross-Section
Lecture 13 - Torsion of Thin-Walled Closed Cross-Section
Lecture 14 - Torsion of Thin-Walled Closed Cross-Section
Lecture 15 - Torsion of Thin-Walled Closed Cross-Section
Lecture 16 - Bi-directional Bending
Lecture 17 - Bi-directional Bending
Lecture 18 - Bi-directional Bending
Lecture 19 - Deflection in Bi-directional Bending
Lecture 20 - Deflection in Bi-directional Bending
Lecture 21 - Shear Stresses due to Shear Forces
Lecture 22 - Shear Stresses due to Shear Forces
Lecture 23 - Shear Stresses due to Shear Forces
Lecture 24 - Shear Center
Lecture 25 - Shear Center
Lecture 26 - Shear Flow in Thin-walled Closed Cross-Section due to Shear Force
Lecture 27 - Shear Flow in Thin-walled Closed Cross-Section due to Shear Force
Lecture 28 - Shear Flow in Thin-walled Closed Cross-Section due to Shear Force
Lecture 29 - Shear Flow in Thin-walled Closed Cross-Section due to Shear Force

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Lecture 30 - Skin-Stringer Idealization
Lecture 31 - Skin-Stringer Idealization
Lecture 32 - Skin-Stringer Idealization
Lecture 33 - Skin-Stringer Idealization
Lecture 34 - Skin-Stringer Idealization
Lecture 35 - Skin-Stringer Idealization
Lecture 36 - Buckling of Column
Lecture 37 - Buckling of Column
Lecture 38 - Buckling of Column with Initial Imperfection
Lecture 39 - Buckling of Column with Different Boundary Conditions
Lecture 40 - Buckling of Column with Different Boundary Conditions

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NPTEL Video Course - Aerospace Engineering - NOC:Fundamentals of Supersonic and Hypersonic Flow

Subject Co-ordinator - Prof. Arnab Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to supersonic and hypersonic flows
Lecture 2 - Introduction to supersonic and hypersonic flows (Continued...)
Lecture 3 - Characteristics of these two flow regimes
Lecture 4 - Characteristics of these two flow regimes (Continued...)
Lecture 5 - Where do these flows occur
Lecture 6 - Basic Concepts and Governing Equations of Compressible Flow
Lecture 7 - Basic Concepts and Governing Equations of Compressible Flow (Continued...)
Lecture 8 - Basic Concepts and Governing Equations of Compressible Flow (Continued...)
Lecture 9 - Basic Concepts and Governing Equations of Compressible Flow (Continued...)
Lecture 10 - Basic Concepts and Governing Equations of Compressible Flow (Continued...)
Lecture 11 - Brief introduction to waves
Lecture 12 - Shocks and Expansion waves
Lecture 13 - Shock and expansion wave relations in the high Mach number limit
Lecture 14 - Revisiting Waves, Conservation Equations and Shocks
Lecture 15 - More on shock and expansion wave relations
Lecture 16 - Introduction to viscous compressible flow
Lecture 17 - Introduction to viscous compressible flow - boundary layer equations
Lecture 18 - Compressible Boundary Layer Equations (Continued...)
Lecture 19 - Compressible Boundary Layer Equations (Continued...)
Lecture 20 - Compressible Boundary Layer Equations - aerodynamic heating and drag
Lecture 21 - Introduction to High Temperature Gas Dynamics
Lecture 22 - Introduction to High Temperature Gas Dynamics (Continued...)
Lecture 23 - Introduction to High Temperature Gas Dynamics (Continued...)
Lecture 24 - Thermodynamics and chemistry of high temperature gases
Lecture 25 - Equilibrium chemically reacting gas mixture
Lecture 26 - Introduction to Statistical Thermodynamics
Lecture 27 - Macrostates and Microstates and counting of microstates
Lecture 28 - Most probable macrostate - Boltzmann Distribution
Lecture 29 - Partition function and its role in finding thermodynamic properties of a single

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Lecture 30 - Equilibrium composition of high temperature air
Lecture 31 - Introduction to Hypersonic Non Equilibrium Flows
Lecture 32 - Basics of Kinetic Theory of Gases
Lecture 33 - Kinetic Theory of Gases (Continued...)
Lecture 34 - Vibrational Nonequilibrum
Lecture 35 - Chemical Nonequilibrum
Lecture 36 - Inviscid High Temperature Equilibrium Flow
Lecture 37 - Inviscid High Temperature Equilibrium Flow (Continued...)
Lecture 38 - Governing equations of Inviscid High Temperature Equilibrium Flow
Lecture 39 - Inviscid High Temperature Equilibrium Flow-normal and oblique shock
Lecture 40 - Inviscid High Temperature Equilibrium Flow-flow through CD nozzle
Lecture 41 - Inviscid High Temperature Non Equilibrium Flow - Introduction
Lecture 42 - Inviscid High Temperature Non Equilibrium Flow - Introduction (Continued...)
Lecture 43 - Inviscid High Temperature Non Equilibrium Flow - Governing Equations
Lecture 44 - Inviscid High Temperature Non Equilibrium Flow - frozen, equilibrium
Lecture 45 - Inviscid High Temperature Non Equilibrium Flow - shocks, nozzle flow
Lecture 46 - Viscous High Temperature Flows - Introduction
Lecture 47 - Viscous High Temperature Flows - Introduction (Continued...)
Lecture 48 - Transport properties and Governing Equations of Viscous High Temperature Flows
Lecture 49 - Governing Equations of Viscous High Temperature Flows, Boundary layer Equations
Lecture 50 - Introduction to radiative heat transfer, computational results on viscous
Lecture 51 - Recapitulating the basics of high speed aerodynamics from an application perspective
Lecture 52 - Recapitulating the basics of high speed aerodynamics from an application perspective
Lecture 53 - Supersonic and Hypersonic Shock Interactions
Lecture 54 - Supersonic and hypersonic shock interactions (Continued...); Hypersonic Flight
Lecture 55 - Hypersonic Flight Trajectories (Continued...), Basics of wave rider, Recapitulation
Lecture 56 - Reference Temperature Method; Brief discussion on boundary layer transition
Lecture 57 - Recapitulation of the Reference Temperature Method; Governing equations
Lecture 58 - Some numerical simulations on shock diffraction, shock wave boundary
Lecture 59 - High speed intakes; scramjet engines; other applications of shock waves
Lecture 60 - Other applications of shock waves - astrophysical flows, a quick

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NPTEL Video Course - Aerospace Engineering - NOC:Industrial Aerodynamics

Subject Co-ordinator - Prof. Sunil Manohar Dash

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Atmosphere and Atmospheric Circulation
Lecture 2 - Atmospheric Circulation (Continued...)
Lecture 3 - Atmospheric condition monitoring devices
Lecture 4 - Equation of the wind motion
Lecture 5 - Tutorial - 1
Lecture 6 - Atmospheric wind types
Lecture 7 - Description of wind
Lecture 8 - Tutorial - 2
Lecture 9 - Atmospheric boundary layer
Lecture 10 - Atmospheric boundary layer structure
Lecture 11 - Governing equations of atmospheric boundary layer
Lecture 12 - Atmospheric boundary layer velocity profile
Lecture 13 - Modification of the atmospheric boundary layer velocity profile
Lecture 14 - Air pollutationts
Lecture 15 - Air pollutants (Continued...)
Lecture 16 - Adverse effects of air pollution
Lecture 17 - Measurement Methods of Air Pollutants
Lecture 18 - Air Quality Standards
Lecture 19 - Atmospheric Dispersion and Stability
Lecture 20 - Exhaust Plume Types
Lecture 21 - Motion of the Buoyant Plume
Lecture 22 - Motion of the Buoyant Plume (Continued...)
Lecture 23 - Gaussian Plume Dispersion Model
Lecture 24 - Gaussian Plume Dispersion Model (Continued...)
Lecture 25 - Tutorial - 3
Lecture 26 - Bluff-Body Aerodynamics Review of Flow Types
Lecture 27 - Bluff-Body Aerodynamics Review of Aerodynamic Forces
Lecture 28 - Definition of the Bluff- Bodies
Lecture 29 - Tutorial - 4

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Lecture 30 - Flow Regime around a Single Circular Cylinder
Lecture 31 - Flow Regime around a Single Square Cylinder
Lecture 32 - Flow Regime and Aerodynamic Forces of Different Bluff Bodies
Lecture 33 - Flow Regime around Multiple Cylinders
Lecture 34 - Flow-Induced Vibration
Lecture 35 - Passive Flow Separation Control Methods
Lecture 36 - Active Flow Separation Control Methods
Lecture 37 - Building Aerodynamics
Lecture 38 - Wind Flow Regime around a Tall Building
Lecture 39 - Wind Flow Regime around a Tall Building (Continued...)
Lecture 40 - Wind Flow Regime in a Building Complex
Lecture 41 - Tutorial - 5
Lecture 42 - Building Design Modifications
Lecture 43 - Renewable Wind Energy Harvesting
Lecture 44 - Historical Background of Wind Energy Harvesting
Lecture 45 - Energy Contained in the Wind
Lecture 46 - Betz Limit of Wind Energy Harvesting
Lecture 47 - Betz Limit of Wind Energy Harvesting (Continued...)
Lecture 48 - Actuator Disc Theory with Wake Rotation
Lecture 49 - Actuator Disc Theory with Wake Rotation (Continued...)
Lecture 50 - Airfoil Aerodynamics of the Wind Turbine Blade
Lecture 51 - Wind Turbine Blade Element Theory
Lecture 52 - Horizontal Axis Wind Turbine
Lecture 53 - Vertical Axis Wind Turbine
Lecture 54 - Tutorial - 6
Lecture 55 - Industrial Aerodynamic Testing Facilities
Lecture 56 - Wind Tunnel Instrumentations - I
Lecture 57 - Wind Tunnel Instrumentations - II
Lecture 58 - Wind Tunnel Instrumentations - III
Lecture 59 - Wind Tunnel Instrumentations - IV
Lecture 60 - Concluding Remarks

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NPTEL Video Course - Aerospace Engineering - NOC:Mechanics of Composite Materials and Structures

Subject Co-ordinator - Prof. Mohammed Rabius Sunny

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Composite Materials
Lecture 2 - Fabrication of FRP Composites
Lecture 3 - Applications of FRP Composites
Lecture 4 - Introduction to Energy/Virtual Work Method
Lecture 5 - Introduction to Energy/Virtual Work Method (Continued...)
Lecture 6 - Micromechanics of Composite Plies - 1
Lecture 7 - Micromechanics of Composite Plies - 2
Lecture 8 - Micromechanics of Composite Plies - 3
Lecture 9 - Micromechanics of Composite Plies - 4
Lecture 10 - Micromechanics of Composite Plies - 5
Lecture 11 - Micromechanics of Composite Plies - 6
Lecture 12 - Macromechanics - Anisotropic Elastic Materials (3D)
Lecture 13 - Macromechanics - Anisotropic Elastic Materials (3D) (Continued...)
Lecture 14 - Macromechanics - Anisotropic Elastic Materials (3D) (Continued...)
Lecture 15 - Macromechanics - Anisotropic Elastic Materials (3D) (Continued...)
Lecture 16 - Macromechanics - Anisotropic Elastic Materials (3D) (Continued...)
Lecture 17 - Macromechanics - Orthotropic Plies (2D)
Lecture 18 - Macromechanics - Orthotropic Plies (2D) (Continued...)
Lecture 19 - Macromechanics - Orthotropic Plies (2D) (Continued...)
Lecture 20 - Macromechanics - Orthotropic Plies (2D) (Continued...)
Lecture 21 - Macromechanics - Orthotropic Plies (2D) (Continued...)
Lecture 22 - Macromechanics of Composite Laminates Laminates of Various Types
Lecture 23 - Macromechanics of Composite Laminates Laminates of Various Types (Continued...)
Lecture 24 - Macromechanics of Composite Laminates Laminates of Various Types (Continued...)
Lecture 25 - Macromechanics of Composite Laminates Laminates of Various Types (Continued...)
Lecture 26 - Macromechanics of Composite Laminates Laminates of Various Types (Continued...)
Lecture 27 - Macromechanics of Composite Laminates Laminates of Various Types (Continued...)
Lecture 28 - Macromechanics of Composite Laminates Laminates of Various Types (Continued...)
Lecture 29 - Static Analysis of Composite Laminates

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Lecture 30 - Static Analysis of Composite Laminates (Continued...)
Lecture 31 - Static Analysis of Composite Laminates (Continued...)
Lecture 32 - Static Analysis of Composite Laminates (Continued...)
Lecture 33 - Static Analysis of Composite Laminates (Continued...)
Lecture 34 - Static Analysis of Composite Laminates (Continued...)
Lecture 35 - Buckling Analysis of Composite Laminates
Lecture 36 - Buckling Analysis of Composite Laminates (Continued...)
Lecture 37 - Buckling Analysis of Composite Laminates (Continued...)
Lecture 38 - Buckling Analysis of Composite Laminates (Continued...)
Lecture 39 - Buckling Analysis of Composite Laminates (Continued...)
Lecture 40 - Vibration of Composite Laminates
Lecture 41 - Vibration of Composite Laminates (Continued...)
Lecture 42 - Vibration of Composite Laminates (Continued...)
Lecture 43 - Vibration of Composite Laminates (Continued...)
Lecture 44 - Vibration of Composite Laminates (Continued...)
Lecture 45 - Shear Deformation Theories
Lecture 46 - Shear Deformation Theories (Continued...)
Lecture 47 - Shear Deformation Theories (Continued...)
Lecture 48 - Shear Deformation Theories (Continued...)
Lecture 49 - Shear Deformation Theories (Continued...)
Lecture 50 - Hydro-thermal Analysis of Composites
Lecture 51 - Hydro-thermal Analysis of Composites (Continued...)
Lecture 52 - Hydro-thermal Analysis of Composites (Continued...)
Lecture 53 - Hydro-thermal Analysis of Composites (Continued...)
Lecture 54 - Hydro-thermal Analysis of Composites (Continued...)
Lecture 55 - Failure Analysis of Composite Plies and Laminates
Lecture 56 - Failure Analysis of Composite Plies and Laminates (Continued...)
Lecture 57 - Failure Analysis of Composite Plies and Laminates (Continued...)
Lecture 58 - Failure Analysis of Composite Plies and Laminates (Continued...)
Lecture 59 - Failure Analysis of Composite Plies and Laminates (Continued...)
Lecture 60 - Failure Analysis of Composite Plies and Laminates (Continued...)
Lecture 61 - Analysis of Composite Beams
Lecture 62 - Analysis of Composite Beams
Lecture 63 - Testing of Composite Materials
Lecture 64 - Composite Joints, Sandwich Composites

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NPTEL Video Course - Aerospace Engineering - Acoustic Instabilities in Aerospace Propulsion

Subject Co-ordinator - Prof. R.I. Sujith

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Thermoacoustic Instabilities
Lecture 2 - Part I
Lecture 3 - Wave Equation and its Solution in Time Domain
Lecture 4 - Part I
Lecture 5 - Standing Waves - 1
Lecture 6 - Standing Waves - 2
Lecture 7 - Power Flow and Acoustic Admittance
Lecture 8 - Impedance Tube Technique
Lecture 9 - Admittance and Standing Waves
Lecture 10 - Admittance, Stability and Attenuation
Lecture 11 - Attenuation
Lecture 12 - Sound Propagation Through Inhomogeneous Media - 2
Lecture 13 - Sound Propagation Through Inhomogeneous Media - 3
Lecture 14 - Multidimensional Acoustic Fields - 1
Lecture 15 - Multidimensional Acoustic Fields - 2
Lecture 16 - Interaction between Sound and Combustion
Lecture 17 - Reference Books Derivation of Rayleigh Criteria
Lecture 18 - Effect of Heat release on the Acoustic Field
Lecture 19 - Modal Analysis of Thermoacoustic Instability - 1
Lecture 20 - Modal Analysis of Thermoacoustic Instability - 2
Lecture 21 - Active Control of Thermoacoustic Instability
Lecture 22 - Toy model for a Rijke tube in Time Domain
Lecture 23 - Galerkin Technique for Thermoacoustics
Lecture 24 - Evolution Equation for Thermoacoustics
Lecture 25 - Non linear analysis of Thermoacoustic Instability
Lecture 26 - Non-normality, Transient Growth and Triggering Instability - 1
Lecture 27 - Non-normality, Transient Growth and Triggering Instability - 2
Lecture 28 - Non-normality, Transient Growth and Triggering Instability - 3
Lecture 29 - Bifurcations

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Lecture 30 - Premixed Flame Acoustic Interaction - 1
Lecture 31 - Premixed Flame Acoustic Interaction - 2
Lecture 32 - Combustion instability due to Equivalence Ratio Fluctuation
Lecture 33 - Role of Hydrodynamic Instabilities - 1
Lecture 34 - Role of Hydrodynamic Instabilities - 2
Lecture 35 - Role of Hydrodynamic Instabilities - 3
Lecture 36 - Active Control of Thermoacoustic Instability Revisited
Lecture 37 - Solid Propellant Combustion Instability - 1
Lecture 38 - Solid Propellant Combustion Instability - 2
Lecture 39 - Response of a Diffusion Flame to Acoustic Oscillations - 1
Lecture 40 - Response of a Diffusion Flame to Acoustic Oscillations - 2
Lecture 41 - Response of a Diffusion Flame to Acoustic Oscillations - 3

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NPTEL Video Course - Aerospace Engineering - Aerospace Propulsion

Subject Co-ordinator - Dr. P.A. Ramakrishna

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Air breathing Engines - Turbojet I
Lecture 3 - Air breathing Engines - Turbojet II
Lecture 4 - Air breathing Engines - Turboprop & Turbofan
Lecture 5 - Air breathing Engines - Ramjet & Scramjet
Lecture 6 - Non-air breathing Engines I
Lecture 7 - Non-air breathing Engines II
Lecture 8 - General Performance Parameters I
Lecture 9 - General Performance Parameters II
Lecture 10 - Cycle Analysis - Ramjet
Lecture 11 - Cycle Analysis - Turbojet I
Lecture 12 - Cycle Analysis - Turbojet II
Lecture 13 - Cycle Analysis - Turbojet III
Lecture 14 - Cycle Analysis - Turbojet IV
Lecture 15 - Cycle Analysis - Turbojet V
Lecture 16 - Cycle Analysis - Turbojet VI
Lecture 17 - Cycle Analysis - Turbofan
Lecture 18 - Rocket Nozzles - 1D Analysis I
Lecture 19 - Rocket Nozzles - 1D Analysis II
Lecture 20 - Rocket Nozzles - 1D Analysis III
Lecture 21 - Rocket Nozzles - Real Effects I
Lecture 22 - Rocket Nozzles - Real Effects II
Lecture 23 - Rocket Nozzles - Thrust Vectoring
Lecture 24 - Solid Rockets - Propellants
Lecture 25 - Solid Rockets - Burn rate
Lecture 26 - Solid Rockets - Performance
Lecture 27 - Solid Rockets - Grain
Lecture 28 - Solid Rockets - Ignition, Quenching
Lecture 29 - Solid Rockets - Igniter, Depressurization

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Lecture 30 - Propellant Combustion - Combustion Modelling
Lecture 31 - Liquid Rocket - Propellants
Lecture 32 - Liquid Rocket - Nozzle Cooling I
Lecture 33 - Liquid Rocket - Nozzle Cooling II
Lecture 34 - Liquid Rocket - Nozzle Cooling III
Lecture 35 - Liquid Rocket - Pressure fed system
Lecture 36 - Liquid Rocket - Pump fed system
Lecture 37 - Liquid Rocket - Pumps
Lecture 38 - Liquid Rocket - Fuel Injection
Lecture 39 - Hybrid Rocket - Basics
Lecture 40 - Hybrid Rocket Performance
Lecture 41 - Hybrid Rocket Combustion
Lecture 42 - Chemical Equilibrium Analyser - SP 273

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NPTEL Video Course - Aerospace Engineering - Combustion

Subject Co-ordinator - Prof. S.R. Chakravarthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Chemical Reactions, Heats of Reaction and Formation
Lecture 3 - Sensible Enthalpy and Adiabatic Flame Temperature
Lecture 4 - Dissociation of Products, Role of Pressure
Lecture 5 - Numerical Calculation of Adiabatic Flame Temperature, Chemical Kinetics 1
Lecture 6 - Chemical Kinetics 2
Lecture 7 - Equilibrium Reactions, Global Kinetics, Order of Reaction
Lecture 8 - Reduced Chemistry, Steady State Approximation
Lecture 9 - Steady State Approximation, Partial Equilibrium Approximation
Lecture 10 - Partial Equilibrium Approximation, Chemical Explosions
Lecture 11 - Combining Chemical and Thermal Processes 1
Lecture 12 - Combining Chemical and Thermal Processes 2
Lecture 13 - Combining Chemical and Thermal Processes 3
Lecture 14 - Combining Chemical and Thermal Processes 4
Lecture 15 - Mass and Molar Diffusion, Fick's Law
Lecture 16 - Conservation Equations for Multi-Component Mixtures
Lecture 17 - Multi-Component Diffusion Equation
Lecture 18 - Multi-Component Momentum Equation
Lecture 19 - Energy Equation
Lecture 20 - One Dimensional Steady Flow
Lecture 21 - Schvab-Zeldovich Formulation 1
Lecture 22 - Schvab-Zeldovich Formulation 2
Lecture 23 - Rankine-Hugoniot Relations 1
Lecture 24 - Rankine-Hugoniot Relations 2
Lecture 25 - Rankine-Hugoniot Relations 3
Lecture 26 - Velocity, Temperature and Entropy Variation along Hugoniot Curve
Lecture 27 - Laminar Premixed Flames
Lecture 28 - Laminar Premixed Flames - Corrections
Lecture 29 - Laminar Premixed Flames - Rigorous Analysis 1

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Lecture 30 - Laminar Premixed Flames - Rigorous Analysis 2
Lecture 31 - Flame Speed Dependencies, G-Equation
Lecture 32 - Bunsen Burner 1
Lecture 33 - Bunsen Burner 2
Lecture 34 - Flame Stabilisation 1
Lecture 35 - Flame Stabilisation 2
Lecture 36 - Ignition
Lecture 37 - Burke-Schumann Problem 1
Lecture 38 - Burke-Schumann Problem 2
Lecture 39 - Burke-Schumann Problem 3
Lecture 40 - Flame Structure
Lecture 41 - Mixture Fraction Formulation 1
Lecture 42 - Mixture Fraction Formulation 2
Lecture 43 - Droplet Burning 1
Lecture 44 - Droplet Burning 2
Lecture 45 - Spray Combustion 1
Lecture 46 - Spray Combustion 2
Lecture 47 - Turbulent Combustion 1
Lecture 48 - Turbulent Combustion 2
Lecture 49 - Combustion Instabilities
Lecture 50 - Detonations
Lecture 51 - Detonation Wave - ZND Structure

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NPTEL Video Course - Aerospace Engineering - Flight Dynamics II (Stability)

Subject Co-ordinator - Dr. Nandan Kumar Sinha

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Earth Atmosphere, Aircraft components, Aircraft nomenclature
Lecture 2 - Basic aerodynamics
Lecture 3 - Equilibrium and stability
Lecture 4 - Static vs dynamic stability
Lecture 5 - Criterion for stability, Wing contribution
Lecture 6 - Horizontal tail contribution
Lecture 7 - Wing plus tail contribution
Lecture 8 - Static margin and CG limits
Lecture 9 - Fuselage contribution
Lecture 10 - Powerplant contribution
Lecture 11 - Power effects on neutral point
Lecture 12 - Elevator
Lecture 13 - Stick free stability, Most fwd CG location
Lecture 14 - Longitudinal stick force per 'g', Ground effect
Lecture 15 - Control requirement, Pull-up maneuver, Maneuver point
Lecture 16 - Elevator per 'g', Maneuver point
Lecture 17 - Example problems
Lecture 18 - Lateral-Directional Stability Derivatives, Fuselage/Vertical fin contribution
Lecture 19 - Roll stability, Wing sweep effect, Rudder
Lecture 20 - Dihedral effect, Various contributions
Lecture 21 - Power effects, Roll control, Aileron
Lecture 22 - Example problems
Lecture 23 - Derivation of Translational Motion Equations
Lecture 24 - Derivation of Angular Motion Equations
Lecture 25 - Description of various forces and moments
Lecture 26 - Nonlinearities and Associated Aircraft Behavior
Lecture 27 - Small perturbation method, Linearization of equations
Lecture 28 - Aerodynamic force and Moment Derivatives
Lecture 29 - Contribution of Aircraft components to Aerodynamic Derivatives

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Lecture 30 - Linear Model and Aircraft Dynamics Modes
Lecture 31 - Short Period, Phugoid (Lanchester's formulation)
Lecture 32 - Short period mode approximation
Lecture 33 - Flying and Handling Qualities, Cooper Harper Scale
Lecture 34 - Pure rolling motion, Pure yawing motion,Spiral approximation
Lecture 35 - Spiral, Roll, Dutch roll Mode approximations
Lecture 36 - Lateral directional Flying Qualities, Routh's Stability criterion
Lecture 37 - Stability in Steady Roll Maneuver
Lecture 38 - Wind Effect on Aircraft Pure Plunging Motion
Lecture 39 - Wind Profiles, Longitudinal Mode Response to Wind Shear
Lecture 40 - Stability control/Augmentation
Lecture 41 - Autopilots, Automatic Landing System

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NPTEL Video Course - Aerospace Engineering - Gas Dynamics

Subject Co-ordinator - Dr. T.M. Muruganandam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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NPTEL Video Course - Aerospace Engineering - Introduction to CFD

Subject Co-ordinator - Prof. M. Ramakrishna

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Why and how we need computers
Lecture 2 - Representing Arrays and functions on computers
Lecture 3 - Representing functions - Box functions
Lecture 4 - Representing functions - Polynomials and Hat functions
Lecture 5 - Hat functions, Quadratic and Cubic representations
Lecture 6 - Demo - Hat functions, Aliasing
Lecture 7 - Representing Derivatives - finite differences
Lecture 8 - Finite differences, Laplace equation
Lecture 9 - Laplace equation - Jacobi iterations
Lecture 10 - Laplace equation - Iteration matrices
Lecture 11 - Laplace equation - convergence rate
Lecture 12 - Laplace equation - convergence rate Continued
Lecture 13 - Demo - representation error, Laplace equation
Lecture 14 - Demo - Laplace equation, SOR
Lecture 15 - Laplace equation - final, Linear Wave equation
Lecture 16 - Linear wave equation - Closed form and numerical solution, stability analysis
Lecture 17 - Generating a stable scheme and Boundary conditions
Lecture 18 - Modified equation
Lecture 19 - Effect of higher derivative terms on Wave equation
Lecture 20 - Artificial dissipation, upwinding, generating schemes
Lecture 21 - Demo - Modified equation, Wave equation
Lecture 22 - Demo - Wave equation / Heat Equation
Lecture 23 - Quasi-linear One-Dimensional. wave equation
Lecture 24 - Shock speed, stability analysis, Derive Governing equations
Lecture 25 - One-Dimensional Euler equations - Attempts to decouple
Lecture 26 - Derive Eigenvectors, Writing Programs
Lecture 27 - Applying Boundary conditions
Lecture 28 - Implicit Boundary conditions
Lecture 29 - Flux Vector Splitting, setup froms averaging

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Lecture 30 - Roes averaging
Lecture 31 - Demo - One Dimensional flow
Lecture 32 - Accelerating convergence - Preconditioning, dual time stepping
Lecture 33 - Accelerating convergence - Intro to Multigrid method
Lecture 34 - Multigrid method
Lecture 35 - Multigrid method - final, Parallel Computing
Lecture 36 - Calculus of Variations - Three Lemmas and a Theorem
Lecture 37 - Calculus of Variations - Application to Laplace Equation
Lecture 38 - Calculus of Variations - Final and Random Walk
Lecture 39 - Overview and Recap of the course

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NPTEL Video Course - Aerospace Engineering - NOC:Rocket Propulsion

Subject Co-ordinator - Prof. K. Ramamurthi, Prof. S. Varunkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Motion in Space
Lecture 3 - Rotational Frame of Reference and Orbital Velocities
Lecture 4 - Velocity Requirements
Lecture 5 - Theory of rocket propulsion
Lecture 6 - Rocket Equation and Staging of Rockets
Lecture 7 - Review of Rocket Principles
Lecture 8 - Examples Illustrating Theory of Rocket Propulsion and Introduction to Nozzles
Lecture 9 - Theory of Nozzles
Lecture 10 - Nozzle Shape
Lecture 11 - Area Ratio of Nozzles
Lecture 12 - Characteristic Velocity and Thrust Coefficient
Lecture 13 - Divergence Loss in Conical Nozzles and the Bell Nozzles
Lecture 14 - Unconventional Nozzles and Problems in Nozzles
Lecture 15 - Criterion for Choice of Chemical Propellants
Lecture 16 - Choice of Fuel-Rich Propellants
Lecture 17 - Performance Prediction Analysis
Lecture 18 - Factors Influencing Choice of Chemical Propellants
Lecture 19 - Low energy liquid propellants and Hybrid propellants Chapter 5
Lecture 20 - Introduction to Solid Propellant Rockets
Lecture 21 - Burn Rate of Solid Propellants and Equilibrium Pressure in Solid Propellant Rockets
Lecture 22 - Design Aspects of Solid Propellant Rockets
Lecture 23 - Burning Surface Area of Solid Propellant Grains
Lecture 24 - Ignition of Solid Propellant Rockets
Lecture 25 - Review of Solid Propellant Rockets
Lecture 26 - Feed Systems for Liquid Propellant Rockets
Lecture 27 - Feed System Cycles for Pump Fed Liquid Propellant Rockets
Lecture 28 - Analysis of Gas Generator and Staged combustion cycles and introduction to injectors
Lecture 29 - Injectors, Cooling of Chambers and Mixture Ratio Distribution

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Lecture 30 - Efficiencies due to mixture ratio distribution and incomplete vaporization
Lecture 31 - Pumps and Turbines
Lecture 32 - Review of Liquid Bi-propellant Rockets and Introduction to Mono-propellant Rockets
Lecture 33 - Introduction to Hybrid Rockets and a Simple Illustration of Combustion instability in Liquid Pro
Lecture 34 - Principles of Electrostatic and Electromagnetic Rockets
Lecture 35 - Electrical Thrusters
Lecture 36 - Electrical and Nuclear Rockets; Advanced Propulsion

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NPTEL Video Course - Aerospace Engineering - Advanced Control System Design for Aerospace Vehicles

Subject Co-ordinator - Dr. Radhakant Padhi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation for Advanced Control Design
Lecture 2 - Classical Control Overview - I
Lecture 3 - Classical Control Overview - II
Lecture 4 - Classical Control Overview - III
Lecture 5 - Classical Control Overview - IV
Lecture 6 - Basic Principles of Atmospheric Flight Mechanics
Lecture 7 - Overview of Flight Dynamics - I
Lecture 8 - Overview of Flight Dynamics - II
Lecture 9 - Representation of Dynamical Systems - I
Lecture 10 - Representation of Dynamical Systems - II
Lecture 11 - Representation of Dynamical Systems - III
Lecture 12 - Review of Matrix Theory - I
Lecture 13 - Review of Matrix Theory - II
Lecture 14 - Review of Matrix Theory - III
Lecture 15 - Review of Numerical Methods
Lecture 16 - Linearization of Nonlinear Systems
Lecture 17 - First and Second Order Linear Differential Equations
Lecture 18 - Time Response of Linear Dynamical Systems
Lecture 19 - Stability of Linear Time Invariant Systems
Lecture 20 - Controllability and Observability of linear Time Invariant Systems
Lecture 21 - Pole Placement Control Design
Lecture 22 - Pole Placement Observer Design
Lecture 23 - Static Optimization
Lecture 24 - Calculus of Variations
Lecture 25 - Optimal Control Formulation using Calculus of Variations
Lecture 26 - Classical Numerical Methods for Optimal Control
Lecture 27 - Linear Quadratic Regulator (LQR) Design - 1
Lecture 28 - Linear Quadratic Regulator (LQR) Design - 2
Lecture 29 - Linear Control Design Techniques in Aircraft Control - I

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Lecture 30 - Linear Control Design Techniques in Aircraft Control - II
Lecture 31 - Lyapunov Theory - I
Lecture 32 - Lyapunov Theory - II
Lecture 33 - Constructions of Lyapunov Functions
Lecture 34 - Dynamic Inversion - I
Lecture 35 - Dynamic Inversion - II
Lecture 36 - Neuro-Adaptive Design - I
Lecture 37 - Neuro-Adaptive Design - II
Lecture 38 - Neuro-Adaptive Design for Flight Control
Lecture 39 - Integrator Back-Stepping; Linear Quadratic (lQ) Observer
Lecture 40 - An Overview of Kalman Filter Theory

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NPTEL Video Course - Aerospace Engineering - Optimal Control, Guidance and Estimation

Subject Co-ordinator - Dr. Radhakant Padhi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Motivation and Overview
Lecture 2 - Overview of SS Approach and Matrix Theory
Lecture 3 - Review of Numerical Methods
Lecture 4 - An Overview of Static Optimization - I
Lecture 5 - An Overview of Static Optimization - II
Lecture 6 - Review of Calculus of Variations - I
Lecture 7 - Review of Calculus of Variations - II
Lecture 8 - Optimal Control Formulation Using Calculus of Variations
Lecture 9 - Classical Numerical Methods to Solve Optimal Control Problems
Lecture 10 - Linear Quadratic Regulator (LQR) - I
Lecture 11 - Linear Quadratic Regulator (LQR) - II
Lecture 12 - Linear Quadratic Regulator (LQR) - III
Lecture 13 - Linear Quadratic Regulator (LQR) - III
Lecture 14 - Discrete-time Optimal Control
Lecture 15 - Overview of Flight Dynamics - I
Lecture 16 - Overview of Flight Dynamics - II
Lecture 17 - Overview of Flight Dynamics - III
Lecture 18 - Linear Optimal Missile Guidance using LQR
Lecture 19 - SDRE and Î¸ - D Designs
Lecture 20 - Dynamic Programming
Lecture 21 - Approximate Dynamic Programming (ADP), Adaptive Critic (AC) and Single Network Adaptive Critic (
Lecture 22 - Transcription Method to Solve Optimal Control Problems
Lecture 23 - Model Predictive Static Programming (MPSP) and Optimal Guidance of Aerospace Vehicles
Lecture 24 - MPSP for Optimal Missile Guidance
Lecture 25 - Model Predictive Spread Control (MPSC) and Generalized MPSP (G-MPSP) Designs
Lecture 26 - Linear Quadratic Observer & An Overview of State Estimation
Lecture 27 - Review of Probability Theory and Random Variables
Lecture 28 - Kalman Filter Design - I
Lecture 29 - Kalman Filter Design - II

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Lecture 30 - Kalman Filter Design - III
Lecture 31 - Integrated Estimation, Guidance & Control - I
Lecture 32 - Integrated Estimation, Guidance & Control - II
Lecture 33 - LQG Design; Neighboring Optimal Control & Sufficiency Condition
Lecture 34 - Constrained Optimal Control - I
Lecture 35 - Constrained Optimal Control - II
Lecture 36 - Constrained Optimal Control - III
Lecture 37 - Optimal Control of Distributed Parameter Systems - I
Lecture 38 - Optimal Control of Distributed Parameter Systems - II
Lecture 39 - Take Home Material
Lecture 40 - Take Home Material

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NPTEL Video Course - Aerospace Engineering - NOC:Combustion in Air Breathing Aero Engines

Subject Co-ordinator - Prof. Swetaprovo Chaudhuri

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Chemical Equilibrium - I
Lecture 3 - Chemical Equilibrium - II
Lecture 4 - Chemical Kinetics - I
Lecture 5 - Chemical Kinetics - II
Lecture 6 - Chemical Kinetics - III
Lecture 7 - Chemical Kinetics - IV
Lecture 8 - Oxidation Mechanism of Fuels - I
Lecture 9 - Oxidation Mechanism of Fuels - II
Lecture 10 - Oxidation Mechanism of Fuels - III
Lecture 11 - Oxidation Mechanism of Fuels - IV
Lecture 12 - Transport Phenomena
Lecture 13 - Governing Equations - I
Lecture 14 - Governing Equations - II
Lecture 15 - Governing Equations - III
Lecture 16 - Governing Equations - IV
Lecture 17 - Governing Equations - V
Lecture 18 - Laminar Non-Premixed Flames - I
Lecture 19 - Laminar Non-Premixed Flames - II
Lecture 20 - Laminar Non-Premixed Flames - III
Lecture 21 - Laminar Non-Premixed Flames - IV
Lecture 22 - Laminar Premixed Flames - I
Lecture 23 - Laminar Premixed Flames - II
Lecture 24 - Laminar Premixed Flames - III
Lecture 25 - Laminar Premixed Flames - IV
Lecture 26 - Laminar Premixed Flames - V
Lecture 27 - Laminar Premixed Flames - VI
Lecture 28 - Laminar Premixed Flames - VII
Lecture 29 - Limit Phenomena - I

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Lecture 30 - Limit Phenomena - II
Lecture 31 - Introduction to turbulent flows
Lecture 32 - Non-reacting turbulent flows - I
Lecture 33 - Non-reacting turbulent flows - II
Lecture 34 - Reacting turbulent flows - III
Lecture 35 - Reacting turbulent flows - IV
Lecture 36 - Reacting turbulent flows - V
Lecture 37 - Reacting turbulent flows - VI
Lecture 38 - Reacting turbulent flows - VII
Lecture 39 - Turbulent Non-Premixed Flames - I
Lecture 40 - Turbulent Non-Premixed Flames - II
Lecture 41 - Turbulent Non-Premixed Flames - III
Lecture 42 - Turbulent Premixed Flames - I
Lecture 43 - Turbulent Premixed Flames - II
Lecture 44 - Turbulent Premixed Flames - III
Lecture 45 - Turbulent Premixed Flames - IV
Lecture 46 - Turbulent Premixed Flames - V
Lecture 47 - Turbulent Premixed Flames - VI
Lecture 48 - Aero Gas Turbine Combustors - I
Lecture 49 - Aero Gas Turbine Combustors - II
Lecture 50 - Aero Gas Turbine Combustors - III
Lecture 51 - Aero Gas Turbine Combustors - IV
Lecture 52 - Aero Gas Turbine Combustors - V
Lecture 53 - Flame Stabilization and Blow off - I
Lecture 54 - Flame Stabilization and Blow off - II
Lecture 55 - Flame Stabilization and Blow off - III
Lecture 56 - Flame Stabilization and Blow off - IV
Lecture 57 - Flame Stabilization and Blow off - V
Lecture 58 - Combustion in Scramjets - I
Lecture 59 - Combustion in Scramjets - II
Lecture 60 - Combustion in Scramjets - III
Lecture 61 - Combustion in Scramjets - IV
Lecture 62 - Review

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NPTEL Video Course - Aerospace Engineering - NOC:Gasdynamics: Fundamentals and Applications

Subject Co-ordinator - Prof. Srisha Rao M V

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Flow Regimes
Lecture 3 - Thermodynamics - 1
Lecture 4 - Thermodynamics - 2
Lecture 5 - Thermodynamics - Numerical
Lecture 6 - Flow equations - Integral Form
Lecture 7 - Flow equations - Differential Form
Lecture 8 - Quasi-1D Assumption
Lecture 9 - Speed of Sound
Lecture 10 - Speed of Sound - Numerical
Lecture 11 - Stagnation properties
Lecture 12 - Pitot tube
Lecture 13 - Sonic/Star properties
Lecture 14 - Numerical
Lecture 15 - Normal Shock - I
Lecture 16 - Normal Shock - II-a
Lecture 17 - Normal Shock - II-b
Lecture 18 - Normal Shock - III
Lecture 19 - Normal Shock - IV
Lecture 20 - Normal Shock - Numerical
Lecture 21 - The Shock Tube
Lecture 22 - Waves of infinitesimal Amplitude
Lecture 23 - Waves of finite amplitude
Lecture 24 - Shock Tube Relations
Lecture 25 - Unsteady Flows - Numerical
Lecture 26 - Oblique Shock Waves
Lecture 27 - Expansion waves
Lecture 28 - Shock Expansion Method
Lecture 29 - Shock Reflection

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Lecture 30 - Oblique Shock and Expansion waves - Numerical
Lecture 31 - Varying Area Duct Flows - I
Lecture 32 - Varying Area Duct Flows - II
Lecture 33 - Converging Nozzle and Chocking
Lecture 34 - Converging and Diverging Nozzle Operation
Lecture 35 - Varying area flow- Numericals - I
Lecture 36 - Diffusers Intakes/Inlets
Lecture 37 - Experimental facilities
Lecture 38 - Varying area flow - Numericals - II
Lecture 39 - Varying area flow - Numericals - III
Lecture 40 - Varying area flow - Numericals - IV
Lecture 41 - 1D flow with friction - Fanno flow - I
Lecture 42 - 1D flow with friction - Fanno flow - II
Lecture 43 - 1D flow with friction - Fanno flow - III
Lecture 44 - 1D flow with friction - Fanno flow - Numericals
Lecture 45 - 1D Flows with Heat Addition: Rayleigh Flows - I
Lecture 46 - 1D Flows with Heat Addition: Rayleigh Flows - II
Lecture 47 - 1D Flows with Heat Addition: Rayleigh Flows - Numericals
Lecture 48 - Generalized 1D Flows
Lecture 49 - Small perturbation theory - I
Lecture 50 - Small perturbation theory - II
Lecture 51 - Small perturbation theory - III
Lecture 52 - Method of Characteristics: 2D Supersonic Flow - I
Lecture 53 - Method of Characteristics: 2D Supersonic Flow - II
Lecture 54 - Method of Characteristics: Applications
Lecture 55 - Hypersonic Flows - I
Lecture 56 - Hypersonic Flows - II
Lecture 57 - Edney Shock Interaction
Lecture 58 - Shock Boundary Layer Interaction - I
Lecture 59 - Shock Boundary Layer Interaction - II
Lecture 60 - Concluding Remarks

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NPTEL Video Course - Aerospace Engineering - NOC:Drone Systems and Control

Subject Co-ordinator - Prof. Suresh Sundaram

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Basics of drone operations
Lecture 3 - Tutorial 1: Vectors and coordinates
Lecture 4 - Tutorial 2: Vectors and coordinate transformations
Lecture 5 - Coordinate frames and transformations
Lecture 6 - Rigid body transformations
Lecture 7 - Dynamic model of multirotors
Lecture 8 - Drone sensors
Lecture 9 - Drone sensors - Context
Lecture 10 - MATLAB demonstration - drone sensors
Lecture 11 - Basics of Estimation
Lecture 12 - Kalman filtering Technique
Lecture 13 - Extended Kalman Filters (EKF)
Lecture 14 - Matlab Demonstration of Kalman Filtering
Lecture 15 - Matlab Demonstration of EKF
Lecture 16 - Introduction to Control Systems
Lecture 17 - Laplace Transforms
Lecture 18 - Matlab Demonstration of Laplace Transforms
Lecture 19 - Transfer Function Representation
Lecture 20 - Matlab Demonstration of Transfer Functions
Lecture 21 - Transient Response
Lecture 22 - Matlab Demonstration of Transient Response
Lecture 23 - Eigenvalues and Eigenvectors
Lecture 24 - State Space Representations
Lecture 25 - Matlab Demonstration of State Space Representations
Lecture 26 - Canonical Forms, State Transition Matrix (STM), Controllability, Observability
Lecture 27 - Examples on STM, Controllability and Observability
Lecture 28 - Pole Placement Methods
Lecture 29 - PID Controller

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Lecture 30 - Drone Autopilot Design
Lecture 31 - Drone Autopilot Design
Lecture 32 - Drone Autopilot Design
Lecture 33 - MATLAB Demonstration of Autopilot Design
Lecture 34 - Global Path Planning
Lecture 35 - A* Algorithm for Global Path Planning
Lecture 36 - RRT & RRT* Algorithms Global Path Planning
Lecture 37 - Introduction to Sense-and-Avoidance (SaA)
Lecture 38 - Sensor for SAA, Trajectory Prediction, Decision making
Lecture 39 - Artificial Potential Field (APF)
Lecture 40 - Control Barrier Function (CBF)
Lecture 41 - Trajectory tracking with PID Control
Lecture 42 - Scenario Generation for UAV Operations
Lecture 43 - Scenario Generation with MATLAB Demonstrations
Lecture 44 - Autonomous Drone
Lecture 45 - Essential of Neural Network for Aerial Perception
Lecture 46 - Recurrent Neural Network (RNN) for Trajectory Prediction
Lecture 47 - Memory Neural Network (MNN) for Trajectory Prediction
Lecture 48 - Emerging Technology in UAV Swarm
Lecture 49 - Cooperative Multi-swarm UAV Operation for Forest Fire Fighting
Lecture 50 - Advanced Drones - Variable Pitch propeler Quadcopter

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NPTEL Video Course - Agriculture - NOC:Thermal Processing of Foods

Subject Co-ordinator - Prof. R. Anandalakshmi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Food Microbiology
Lecture 2 - Blanching, Pasteurization, Ultra-pasteurization, Hot fill and UHT
Lecture 3 - Thermal processing equipment
Lecture 4 - Milk pasteurization
Lecture 5 - Canning operations
Lecture 6 - Temperature distribution and heat penetration
Lecture 7 - Kinetics of reactions
Lecture 8 - F value and process requirements
Lecture 9 - Quality considerations and process optimization
Lecture 10 - Shelf life studies
Lecture 11 - Validation of heat processes
Lecture 12 - Fundamentals of aseptic processing
Lecture 13 - Aseptic equipment design
Lecture 14 - Aseptic process design
Lecture 15 - Microwave and radio frequency heating
Lecture 16 - Ohmic heating
Lecture 17 - Overview of non-thermal processing technologies
Lecture 18 - Advanced separation processes
Lecture 19 - High pressure dialysis, ultrafiltration and reverse osmosis
Lecture 20 - Nanofiltration, electrodialysis and membrane separation
Lecture 21 - Various types of heat exchangers for food process engineering
Lecture 22 - Various types of driers for food process engineering
Lecture 23 - Importance and applications of extrusion technology in food processing
Lecture 24 - Changes of properties and functional components of extruded foods
Lecture 25 - Food biosensors
Lecture 26 - Types of functional foods
Lecture 27 - Packaging considerations
Lecture 28 - Biocomposite/bionanocomposite materials for food packaging applications
Lecture 29 - Sanitary components and requirements

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Lecture 30 - Regulatory considerations
Lecture 31 - Special Lecture

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NPTEL Video Course - Agriculture - NOC:Natural Resources Management

Subject Co-ordinator - Prof. Sudip Mitra

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Natural Resource bases - Part 1
Lecture 2 - Introduction to Natural Resource bases - Part 2A
Lecture 3 - Introduction to Natural Resource bases - Part 2B
Lecture 4 - Introduction to Natural Resource bases - Part 2C
Lecture 5 - Resource management Paradigms - Part 1
Lecture 6 - Resource management Paradigms - Part 2
Lecture 7 - Approaches to NRM
Lecture 8 - Biodiversity and conservation - Part 1
Lecture 9 - Biodiversity and conservation - Part 2
Lecture 10 - Biodiversity and conservation - Part 3
Lecture 11 - Participatory Rural Appraisal and Rapid Rural Appraisal - Part 1
Lecture 12 - Participatory Rural Appraisal and Rapid Rural Appraisal - Part 2
Lecture 13 - Participatory Rural Appraisal and Rapid Rural Appraisal - Part 3
Lecture 14 - Participatory Rural Appraisal and Rapid Rural Appraisal - Part 4
Lecture 15 - Introduction to INRM
Lecture 16 - Learning cycle in Integrated Natural Resources Management
Lecture 17 - Technologies for Integrated Natural Resources Management
Lecture 18 - PRA techniques within INRM
Lecture 19 - Ranking technique
Lecture 20 - Community Based Natural Resources Management - Part 1
Lecture 21 - Community Based Natural Resources Management - Benefits from CBNRM
Lecture 22 - Community Based Natural Resources Management - Part 2
Lecture 23 - Watershed management
Lecture 24 - Watershed management: Flood control
Lecture 25 - National Water Policy
Lecture 26 - Soil erosion management
Lecture 27 - Landuse management for flood risk reduction
Lecture 28 - Drought Management
Lecture 29 - Common Property Right (CPR)

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Lecture 30 - A Tutorial on Tragedy of the Commons
Lecture 31 - Environmental Management Systems (EMS)
Lecture 32 - National Environment Policy (NEP)
Lecture 33 - Modeling And Simulations Applications in Agriculture for NRM - Part 1
Lecture 34 - Modeling And Simulations Applications in Agriculture for NRM - Part 2
Lecture 35 - Modeling And Simulations Applications in Agriculture for NRM - Part 3
Lecture 36 - Modeling And Simulations Applications in Agriculture for NRM - Part 4
Lecture 37 - Modeling And Simulations Applications in Agriculture for NRM - Part 5
Lecture 38 - Precision Farming and Protected Cultivation - Part 1
Lecture 39 - Precision Farming and Protected Cultivation - Part 2
Lecture 40 - Precision Farming and Protected Cultivation - Part 3
Lecture 41 - Environmental Impact Assessment (EIA) - Part 1
Lecture 42 - Environmental Impact Assessment (EIA) - Part 2
Lecture 43 - Environmental Impact Assessment (EIA) - Part 3
Lecture 44 - Environmental Impact Assessment (EIA) - Part 4
Lecture 45 - Environmental Impact Assessment (EIA) - Part 5
Lecture 46 - Environmental Impact Assessment (EIA) - Part 6
Lecture 47 - Environmental Impact Assessment (EIA) - Part 7
Lecture 48 - CBNRM in Kenya
Lecture 49 - Model sensitivity and Uncertainty
Lecture 50 - MCDA in Agriculture
Lecture 51 - MCDM for NRM - Part 1
Lecture 52 - MCDM for NRM - Part 2
Lecture 53 - MCDM for NRM - Part 3
Lecture 54 - Remote Sensing and GIS Application in Agriculture and NRM (Introduction)
Lecture 55 - Remote Sensing and GIS Application in Agriculture and NRM - Part 1
Lecture 56 - Remote Sensing and GIS Application in Agriculture and NRM - Part 2
Lecture 57 - Remote Sensing and GIS Application in Agriculture and NRM - Part 3
Lecture 58 - Climate change; vulnerability; adaptation - Part 1
Lecture 59 - Climate change; vulnerability; adaptation - Part 2
Lecture 60 - Climate change; vulnerability; adaptation - Part 3
Lecture 61 - ICT: Introduction
Lecture 62 - ICT for Soil management
Lecture 63 - ICT for Water management
Lecture 64 - Collective Management of resources
Lecture 65 - Revision

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NPTEL Video Course - Agriculture - NOC:Basic Crop Production Practices (BCPP)

Subject Co-ordinator - Prof. J. R. Yadav, Dr. Vinod Kumar, Dr. Sharwan Kumar Shukla

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Irrigation and irrigation needs
Lecture 3 - Source of Irrigation
Lecture 4 - Importance of crops and classification
Lecture 5 - Crop rotation principle
Lecture 6 - Importance of vegetable and classification
Lecture 7 - Paddy crop production
Lecture 8 - Sorghum crop production
Lecture 9 - Pearl millet crop production
Lecture 10 - Maize crop production
Lecture 11 - Pigeon pea crop production
Lecture 12 - Green gram crop production
Lecture 13 - Black gram crop production
Lecture 14 - Cowpea crop production
Lecture 15 - Groundnut crop production
Lecture 16 - Sesame crop production
Lecture 17 - Soybean crop production
Lecture 18 - Sunflower crop production
Lecture 19 - Mango crop production
Lecture 20 - Guava crop production
Lecture 21 - Banana crop production
Lecture 22 - Papaya crop production
Lecture 23 - Tomato crop production
Lecture 24 - Brinjal crop production
Lecture 25 - Chili crop production
Lecture 26 - Okra crop production

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NPTEL Video Course - Agriculture - NOC:GIS in Ag-Essentials and Applications (GIS)

Subject Co-ordinator - Dr. Venkataraman Balaji, Dr. R. Nagarajan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Our Agriculture Practices and Lessons
Lecture 3 - Climate and Scale of Change
Lecture 4 - Course Corrections
Lecture 5 - Modified Agriculture - Precision Agriculture
Lecture 6 - Modififed Agriculture Practice - Climate Smart Agriculture
Lecture 7 - Maps and Information in Practice
Lecture 8 - Geographical Information System (GIS)
Lecture 9 - Types of input
Lecture 10 - Analysis - Map overlay
Lecture 11 - Buffering and Perspective View
Lecture 12 - GIS Type and Available GIS Softwares
Lecture 13 - Village Cadastral Map and Property Card
Lecture 14 - Cadastral Maps and Contents
Lecture 15 - Creation of Cadastral Information Base
Lecture 16 - Land Information System
Lecture 17 - Creation of Village Boundary Based Basin Analysis
Lecture 18 - Village Information System
Lecture 19 - Needs and Weather Forecast
Lecture 20 - Cloud Types and Rain Bearing Clouds
Lecture 21 - Weather Satellites and Cloud Pattern Reading
Lecture 22 - Rainfall and Supplementary Irrigation
Lecture 23 - Synergistic Use
Lecture 24 - Surface Rainfall - Run off Assessment and Model
Lecture 25 - Soil and Water Assessment Tools (SWAT) Model
Lecture 26 - Groundwater Availability
Lecture 27 - Groundwater Potential Mapping
Lecture 28 - Water Storage and Water Availability and Release
Lecture 29 - Growth of Crop Area in Command Area and Impact Climate Change

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Lecture 30 - Impact of Climate on Agriculture
Lecture 31 - Crop Water Requirement and Distribution Loss
Lecture 32 - Village Agriculture and Other Water Demand and Supply Source
Lecture 33 - Water Security Assessment
Lecture 34 - Land Degradation
Lecture 35 - Water Logging
Lecture 36 - Water Balance Under Different Rainfall
Lecture 37 - Drought and Characteristics
Lecture 38 - Drought Vulnerability and Risk Assessment
Lecture 39 - Monitoring and Warning
Lecture 40 - Drought Monitoring
Lecture 41 - Drought Risk and Vulnerability Assessment
Lecture 42 - GIS in Sustainable Agriculture
Lecture 43 - Assessment of Existing Water Storage Structures and Rehabilitation
Lecture 44 - Sustainable Development and Agriculture
Lecture 45 - Climate Change and Drought
Lecture 46 - GIS and Drought Management

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NPTEL Video Course - Agriculture - NOC:Integrated Pest Management (IPM)

Subject Co-ordinator - Prof. M. Bheemanna, Prof. B.V. Patil, Prof. Prabhuraj A

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Insect, abundance and diversity
Lecture 3 - Insect classification based on economic importance
Lecture 4 - Pest, causes for outbreaks and categories
Lecture 5 - Pest, causes for outbreaks and categories (Continued...)
Lecture 6 - Pest surveillance and methods of sampling
Lecture 7 - Principles of Pest Management and History
Lecture 8 - IPM, Definition and Concepts
Lecture 9 - Ecological Methods of Pest Management - Legal and Cultural
Lecture 10 - Ecological Methods of Pest Management - Cultural (Continued...)
Lecture 11 - Ecological Methods of Pest Management - Cultural (Continued...)
Lecture 12 - Ecological Methods of Pest Management - Physical
Lecture 13 - Ecological Methods of Pest Management - Mechanical
Lecture 14 - Host Plant Resistance
Lecture 15 - Host Plant Resistance (Continued...)
Lecture 16 - Biological Control - Predators
Lecture 17 - Biological Control - Parasitoids
Lecture 18 - Biological Control - Microbes
Lecture 19 - Biological Control - Microbes
Lecture 20 - Pest management by modifying insect behaviour
Lecture 21 - Use of sex pheromones in pest management
Lecture 22 - Use of attractants and repellants in pest management
Lecture 23 - Pest management through radiation technology - Principles
Lecture 24 - Sterile Insect Technique - case studies
Lecture 25 - Pest management through botanicals
Lecture 26 - Pest management through botanicals (Continued...)
Lecture 27 - Chemical Control - History and classification
Lecture 28 - Mode of Action of different insecticide groups
Lecture 29 - Chemical Control - Considerations for Chemicals Integration

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Lecture 30 - Insecticide Resistance and Management
Lecture 31 - Insecticide as component of IPM
Lecture 32 - Biotechnological Approaches in IPM
Lecture 33 - Agro-ecosystem Analysis
Lecture 34 - IPM in Paddy
Lecture 35 - IPM in Paddy (Continued...)
Lecture 36 - IPM in Pigeon pea
Lecture 37 - IPM in Pigeon pea (Continued...)
Lecture 38 - IPM in Groundnut
Lecture 39 - IPM in Mustard and Soyabean
Lecture 40 - IPM in Cotton
Lecture 41 - IPM in Cotton (Continued...)
Lecture 42 - IPM in Sugarcane
Lecture 43 - IPM in Sugarcane (Continued...)
Lecture 44 - IPM in Tomato
Lecture 45 - IPM in Cabbage
Lecture 46 - IPM in Mango
Lecture 47 - IPM in Grapes

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NPTEL Video Course - Agriculture - NOC:Nutrition, Therapeutics and Health (NM)

Subject Co-ordinator - Dr. V. Vijaya Lakshmi (Instructor Incharge)

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Relationship between Food, Nutrition and Health 1
Lecture 3 - Relationship between Food, Nutrition and Health 2
Lecture 4 - Digestion, absorption and utilization of Nutrients 1
Lecture 5 - Digestion, absorption and utilization of Nutrients 2
Lecture 6 - Recommended dietary allowances
Lecture 7 - Carbohydrate
Lecture 8 - Fiber
Lecture 9 - Protein
Lecture 10 - Protein - health significance
Lecture 11 - Fat
Lecture 12 - Energy 1
Lecture 13 - Energy 2
Lecture 14 - Energy 3
Lecture 15 - Fat Soluble Vitamins 1
Lecture 16 - Fat Soluble Vitamins 2
Lecture 17 - Fat Soluble Vitamins 3
Lecture 18 - Water Soluble Vitamins 1
Lecture 19 - Water Soluble Vitamins 2
Lecture 20 - Water soluble Vitamins 3
Lecture 21 - Water soluble Vitamins 4
Lecture 22 - Major minerals 1
Lecture 23 - Major minerals 2
Lecture 24 - Trace minerals 1
Lecture 25 - Trace minerals 2
Lecture 26 - Water
Lecture 27 - Nutritional Disorders
Lecture 28 - Balanced diet and food groups
Lecture 29 - Food guide for selecting adequate diet, practical aspects of food selection

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Lecture 30 - Meal planning
Lecture 31 - Other aspects affecting food selection
Lecture 32 - Food sanitation and hygiene
Lecture 33 - Water Purification
Lecture 34 - Therapeutic adaptation of normal diet
Lecture 35 - Principles of therapeutic diet
Lecture 36 - Diet during fevers
Lecture 37 - Diet in lung disease
Lecture 38 - Diet in GI disorders Â constipation
Lecture 39 - Diet during diarrhoea
Lecture 40 - Diet in disorders of liver
Lecture 41 - Diseases of gall bladder
Lecture 42 - Diet in Diabetes
Lecture 43 - Diseases of Heart and blood vessels
Lecture 44 - Diet for myocardial infarction
Lecture 45 - Diet in kidney disorders
Lecture 46 - Diet in renal failure
Lecture 47 - Diet in cancer
Lecture 48 - Diet in metabolic disorders
Lecture 49 - Diet in stress, burns and surgery

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NPTEL Video Course - Agriculture - NOC:Weather Forecast in Agriculture and Agro-advisory (WF)

Subject Co-ordinator - Dr. R. Nagarajan, Co Faculty, Dr.T.N.Balasubramanian (Rtd.), Instructor Incharge

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic aspects of Atmosphere, Climate, Weather
Lecture 3 - Basic aspects of Rainfall and their application in crop production
Lecture 4 - Basic aspects of Temperature and their application in crop production
Lecture 5 - Basic aspects of Relative humidity, Cloud cover and their application in crop production
Lecture 6 - Basic aspects of wind, wind direction and their application in crop production
Lecture 7 - Three weather codes and crop production
Lecture 8 - Crop production risks and their management
Lecture 9 - Weather sensitive crops, stages and farm operations
Lecture 10 - Crop-weather interactions and definition
Lecture 11 - Crop-Weather Interactions
Lecture 12 - Crop-Weather Interactions
Lecture 13 - Crop-Weather Interactions
Lecture 14 - Crop-Weather Interactions
Lecture 15 - Crop-Weather Interactions
Lecture 16 - Genesis of weather forecast in India and Abroad
Lecture 17 - Types of weather forecast and details
Lecture 18 - Types of weather forecast and details (Continued...)
Lecture 19 - Simple methods of verification of weather forecast with real event
Lecture 20 - Traditional knowledges on weather forecast and their validity
Lecture 21 - Weather thumb rules and their validity
Lecture 22 - Development and component of agro advisory for weather forecast
Lecture 23 - Development and component of agro advisory for weather forecast (Continued...)
Lecture 24 - Model agro advisories for selected five days weather forecast
Lecture 25 - Mass communication mode of agro advisories and their effectiveness
Lecture 26 - Discussion on weather forecast and agro advisory from different website
Lecture 27 - Role of climate manager on farm management decision based on weather forecast at village level a
Lecture 28 - Development of selected weather window for issuing agro advisory - case study from Tamil Nadu
Lecture 29 - Model of agro advisory for 54 selected weather window of Tamil Nadu for rice

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Lecture 30 - Response farming- a type of farm planning being practiced in Australia considering seasonal clim
Lecture 31 - Case study in India on the adoption of weather based crop production - Crop management
Lecture 32 - Case study in India on the adoption of weather based crop production - Pest and disease manageme
Lecture 33 - Case study in India on the adoption of weather based animal production
Lecture 34 - Cost benefit analysis for the case study done on crop management
Lecture 35 - Cost benefit analysis for the case study done on animal management
Lecture 36 - Summary

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NPTEL Video Course - Agriculture - NOC:ICT Basics

Subject Co-ordinator - Prof. T.V. Prabhakar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Highlights Week 0 and 1
Lecture 3 - What is ICT?
Lecture 4 - Architecture of a Computer
Lecture 5 - Architecture of a Phone
Lecture 6 - What is the Internet?
Lecture 7 - What is WWW?
Lecture 8 - Highlights Week 2
Lecture 9 - Phones, Smart Phones, Phablets, Tablets
Lecture 10 - Introduction to Android
Lecture 11 - Network Architectures - Part-1 (Introduction to Computer Networks)
Lecture 12 - Network Architectures - Part-2 (Overview of Network Architecture)
Lecture 13 - Network Architectures - Part-3 (Architecture of Internet)
Lecture 14 - Mobile Wireless Communications - Introduction (Module-1)
Lecture 15 - Mobile Wireless Communication (Module-2)
Lecture 16 - Highlights Week 3
Lecture 17 - Adaptive and Responsive Websites
Lecture 18 - Data management
Lecture 19 - Knowledge Representation
Lecture 20 - Knowledge Representation Techniques
Lecture 21 - Expert Systems
Lecture 22 - Highlights Week - 4
Lecture 23 - Speech Recognition
Lecture 24 - Speech Synthesis
Lecture 25 - Identity Management - Part 1
Lecture 26 - Identity Management - Part 2
Lecture 27 - Location Recognition - Part 1
Lecture 28 - Location Recognition - Part 2
Lecture 29 - Parameter Sensing

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Lecture 30 - Highlights Week-5
Lecture 31 - Social Networking - Part 1
Lecture 32 - Social Networking - Part 2
Lecture 33 - Blogs
Lecture 34 - Facebook
Lecture 35 - Twitter
Lecture 36 - 3G WCDMA (Module- 3)
Lecture 37 - 4G Mobile Wireless WiMAX (Module-4)
Lecture 38 - Advanced Wireless Technologies (Module-5)
Lecture 39 - LTE, WLAN, Bluetooth and Future
Lecture 40 - Highlights Week-6
Lecture 41 - Introduction to Cloud Computing
Lecture 42 - Introduction to Cloud Services
Lecture 43 - Cloud Service Providers
Lecture 44 - GIS Application in Agriculture - Part 1
Lecture 45 - GIS Application in Agriculture - Part 2

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NPTEL Video Course - Agriculture - NOC:Momentum Transfer in Process Engineering

Subject Co-ordinator - Prof. Tridib Kumar Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11 - Application of Navier Stokeâ s equation for finding out viscosity - Part 2
Lecture 12 - Application of Navier Stokeâ s equation for finding out viscosity - Part 3
Lecture 13 - Flow through pipes
Lecture 14 - Hagen-poiseuille equation from Navier stokes equation
Lecture 15 - Fanning friction factor
Lecture 16 - Moodyâ s chart
Lecture 17 - Laminar and turbulent flow in a pipe
Lecture 18 - Flow through flat and parallel plates
Lecture 19 - Flow of film or film flow
Lecture 20 - Problems and solution of falling film
Lecture 21 - Flow through annulus - Part 1
Lecture 22 - Flow through annulus - Part 2
Lecture 23 - Stokeâ s law
Lecture 24 - Flow through flat plates or slits
Lecture 25 - Problems and solution for flow through flat plates or slits
Lecture 26 - Compressible fluid flow
Lecture 27 - Flow through nozzle - I
Lecture 28 - Flow through nozzle - II
Lecture 29 - Flow through nozzle - problems and solutions

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Lecture 30 - Nozzle flow- problems and solutions
Lecture 31 - Sonic velocity
Lecture 32 - Sonic velocity - Mach number
Lecture 33 - Variable fluid flow
Lecture 34 - Variable fluid flow - problems and solutions
Lecture 35 - Variable fluid flow - problems and solutions (Continued...)
Lecture 36 - Pneumatic conveying
Lecture 37 - Problem on Pneumatic conveying - Part 1
Lecture 38 - Problem on Pneumatic conveying - Part 2
Lecture 39 - Non Newtonian fluid flow - Part 1
Lecture 40 - Non Newtonian fluid flow - Part 2
Lecture 41 - Velocity profile for Non Newtonian fluid
Lecture 42 - Average velocity for Non Newtonian fluid
Lecture 43 - Problems and solution of Non Newtonian fluid - Part 1
Lecture 44 - Problems and solution of Non Newtonian fluid - Part 2
Lecture 45 - Flow of Non Newtonian fluid through slit
Lecture 46 - Generalized coefficient of Reynolds number
Lecture 47 - Flow through packed beds
Lecture 48 - Ergunâ s equation- derivation - Part 1
Lecture 49 - Ergunâ s equation- derivation - Part 2
Lecture 50 - Solving problems on Ergunâ s equation
Lecture 51 - Solving problems on Ergunâ s equation
Lecture 52 - Fluidization
Lecture 53 - Fluidized bed flow
Lecture 54 - Problem of Fluidized bed condition - Part 1
Lecture 55 - Problem of Fluidized bed condition - Part 2
Lecture 56 - Problem and solution
Lecture 57 - Problem and solution
Lecture 58 - Problem and solution
Lecture 59 - Problem and solution
Lecture 60 - Problem and solution with comprehension of course

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NPTEL Video Course - Agriculture - NOC:Farm Machinery

Subject Co-ordinator - Prof. VK Tewari

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of Farm Machines in the Contest of Enhance Production, Multiple Cropping, Labour Scarc
Lecture 2 - Ploughing and first opening of the soil, the design and component details
Lecture 3 - Tractor, implement and soil force consideration for tillage implement design
Lecture 4 - Tractor, implement and soil force consideration for tillage implement design
Lecture 5 - Mechanics of rotavoator or rotary tillers
Lecture 6 - Design of a tractor PTO operated rotavator
Lecture 7 - Tractor implement hitching systems
Lecture 8 - Mechanics of tractor implement hitch system and traction prediction models
Lecture 9 - Laboratory class on traction and tire testing
Lecture 10 - Combination tillage implements for efficient land preparation
Lecture 11 - LASER guided land laveller
Lecture 12 - Introduction of seeding operation
Lecture 13 - Types of seed metering devices and their operation
Lecture 14 - Types of fertilizer metering, furrow opening and soil covering devices
Lecture 15 - Equipment for seeding and planting
Lecture 16 - Equipment for precision planting
Lecture 17 - Equipment for Paddy Transplanting
Lecture 18 - Microcontroller based uniform seed rate application system
Lecture 19 - GPS based automatic Variable rate fertilizer applicator
Lecture 20 - Embedded GPS integrated Variable Rate Fertilizer Applicator
Lecture 21 - Design of a seeding equipment - PART 1
Lecture 22 - Design of a seeding equipment - PART 2
Lecture 23 - Design of a seeding equipment - PART 3
Lecture 24 - Design a tractor drawn seed drill for a 40 hp tractor - I
Lecture 25 - Design a tractor drawn seed drill for a 40 hp tractor - II
Lecture 26 - Testing of tractor operated seeding equipment
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32 - Farm machines for interculture operation
Lecture 33 - Performance of weeding blades of a push-pull weeder
Lecture 34 - Advanced level machinery for inter and intra row weeding
Lecture 35 - Tractor mounted contact type microcontroller based improved variable rate herbicide applicator
Lecture 36 - Design of manually operated weeding equipment
Lecture 37 - Plant protection equipment/machinery
Lecture 38 - Selection and design of plant protection equipment/machinery
Lecture 39 - Manually operated knapsack-cum-boom sprayer
Lecture 40 - Performance evaluation of sprayer
Lecture 41 - Testing and certification of spraying equipment
Lecture 42 - Problems based on the design and selection of spraying equipment - I
Lecture 43 - Problems based on the design and selection of spraying equipment - II
Lecture 44 - Advanced level spraying equipment
Lecture 45 - Advanced level spraying equipment
Lecture 46 - Harvesting equipment
Lecture 47 - Machines for harvesting cereal crops, root and fruit crops
Lecture 48 - Combine Harvester
Lecture 49 - Advanced technology approach for cotton harvesting
Lecture 50 - hreshing operation and equipment
Lecture 51 - Design of threshing equipment
Lecture 52 - Performance evaluation and testing of thresher
Lecture 53 - Conservation Agriculture
Lecture 54 - Materials for construction of farm machinery
Lecture 55 - Machinery for Land Drainage, Land Reclamation and Estate Maintenance Part - I
Lecture 56 - Machinery for Land Drainage, Land Reclamation and Estate Maintenance Part - II
Lecture 57 - Machinery for Land Drainage, Land Reclamation and Estate Maintenance Part - III
Lecture 58 - Machinery Selection and Management - Part 1
Lecture 59 - Machinery Selection and Management - Part 2
Lecture 60 - Epilogue

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NPTEL Video Course - Agriculture - NOC:Irrigation and Drainage

Subject Co-ordinator - Prof. Damodhara Rao Mailapallli

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6 - Field water balance
Lecture 7 - Evapotranspiration
Lecture 8 - Crop water requirement
Lecture 9 - Irrigation Scheduling
Lecture 10 - Introduction
Lecture 11 - Irrigation Water Conveyance
Lecture 12 - Irrigation channel design
Lecture 13 - Measurement of Irrigation Water
Lecture 14 - Measurement of Irrigation Water
Lecture 15 - Tutorial
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26 - Irrigation Wells
Lecture 27 - Aquifer Properties
Lecture 28 - Well Hydraulics - 1
Lecture 29 - Well Hydraulics - 2

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Lecture 30 - Tutorial
Lecture 31 - Introduction
Lecture 32 - Centrifugal Pump
Lecture 33 - Centrifugal Pumps
Lecture 34 - Pump Characteristic Curves
Lecture 35 - Tutorial
Lecture 36 - Management of salt affected soils
Lecture 37 - Management of salt affected soils
Lecture 38 - Agricultural Drainage
Lecture 39 - Agricultural Drainage
Lecture 40 - Tutorial
Lecture 41
Lecture 42
Lecture 43
Lecture 44
Lecture 45
Lecture 46 - Subsurface Drainage Design - 1
Lecture 47 - Subsurface Drainage Design - 2
Lecture 48 - Subsurface Drainage Design - 3
Lecture 49 - Subsurface Drainage Design - 4
Lecture 50 - Tutorial
Lecture 51 - Surface drainage system design - 1
Lecture 52 - Surface drainage system design - 2
Lecture 53 - Non-conventional drainage
Lecture 54 - Economics of drainage project
Lecture 55 - Tutorial
Lecture 56 - Case study of drainage system
Lecture 57 - Drainage Model
Lecture 58 - Irrigation Efficiency
Lecture 59 - Irrigation Economics
Lecture 60 - Irrigation model

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NPTEL Video Course - Agriculture - NOC:Fundamentals of Food Process Engineering

Subject Co-ordinator - Prof. Jayeeta Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance Of Rheology In Food
Lecture 2 - Food Rheology
Lecture 3 - Food Rheology
Lecture 4 - Food Rheology
Lecture 5 - Food Rheology
Lecture 6 - Measurements of Rheological Properties
Lecture 7 - Measurements of Rheological Properties
Lecture 8 - Rheological Properties of Viscoelastic Food
Lecture 9 - Rheological Properties of Viscoelastic Food
Lecture 10 - Rheological Properties of Viscoelastic Food
Lecture 11 - Thermal Processing And Microbial Death Kinetics
Lecture 12 - Thermal processing and microbial death kinetics
Lecture 13 - Thermal processing and microbial death kinetics (Continued...)
Lecture 14 - Thermal processing and microbial death kinetics (Continued...)
Lecture 15 - Thermal processing and microbial death kinetics (Continued...)
Lecture 16 - Evaporation and concentration
Lecture 17 - Evaporation and concentration
Lecture 18 - Evaporation and concentration
Lecture 19 - Evaporation and concentration
Lecture 20 - Evaporation and concentration
Lecture 21 - Heat Exchangers
Lecture 22 - Heat Exchangers
Lecture 23 - Heat Exchangers
Lecture 24 - Heat Exchangers
Lecture 25 - Heat Exchangers
Lecture 26 - Drying Technology
Lecture 27 - Drying Technology
Lecture 28 - Drying Technology
Lecture 29 - Drying Technology

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Lecture 30 - Drying Technology
Lecture 31 - Freezing and Freeze Drying
Lecture 32 - Freezing and Freeze Drying
Lecture 33 - Freezing and Freeze Drying
Lecture 34 - Freezing and Freeze Drying
Lecture 35 - Freezing and Freeze Drying
Lecture 36 - Size Reduction
Lecture 37 - Size Reduction (Continued...)
Lecture 38 - Size Reduction (Continued...)
Lecture 39 - Size Reduction (Continued...)
Lecture 40 - Size Reduction (Continued...)
Lecture 41 - Mechanical Separation Techniques
Lecture 42 - Mechanical Separation Techniques
Lecture 43 - Mechanical Separation Techniques
Lecture 44 - Mechanical Separation Techniques
Lecture 45 - Mechanical Separation Techniques
Lecture 46 - Mixing and agitation
Lecture 47 - Mixing and agitation (Continued...)
Lecture 48 - Mixing and agitation (Continued...)
Lecture 49 - Mixing and agitation (Continued...)
Lecture 50 - Mixing and agitation (Continued...)
Lecture 51 - Leaching and Extraction
Lecture 52 - Leaching and Extraction (Continued...)
Lecture 53 - Leaching and Extraction (Continued...)
Lecture 54 - Leaching and Extraction (Continued...)
Lecture 55 - Leaching and Extraction (Continued...)
Lecture 56 - Non Thermal Processing
Lecture 57 - Non Thermal Processing (Continued...)
Lecture 58 - Non Thermal Processing (Continued...)
Lecture 59 - Non Thermal Processing (Continued...)
Lecture 60 - Non Thermal Processing (Continued...)

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NPTEL Video Course - Agriculture - NOC:Soil and Water Conservation Engineering

Subject Co-ordinator - Prof. Rajendra Singh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Soilerosion causes and types
Lecture 3 - Factors affecting soil erosion and effects of soil erosion
Lecture 4 - Soil erosion - Mechanics
Lecture 5 - Water erosion control measures
Lecture 6 - Soil loss estimation
Lecture 7 - Erosivity and Erodibility
Lecture 8 - Modification in Universal soil loss equcation - Part I
Lecture 9 - Modification in Universal soil loss equcation - Part II
Lecture 10 - Soil loss measurement
Lecture 11 - Bunds - Introduction
Lecture 12 - Contour Bunds
Lecture 13 - Problems on Contour Bunds
Lecture 14 - Graded Bunds
Lecture 15 - Problems on Graded Bunds
Lecture 16 - Terrace - Introduction
Lecture 17 - Bench Terraces
Lecture 18 - Problems on Bench Terraces
Lecture 19 - Broad-base Terraces
Lecture 20 - Problems on Broad-base Terraces
Lecture 21 - Grassed Waterways
Lecture 22 - Problems on Grassed Waterways
Lecture 23 - Parabolic Grassed Waterways
Lecture 24 - GATE Questions on Various Topics Covered
Lecture 25 - Introduction-Gully Control Measures
Lecture 26 - Gully Control Measures (Permanent Structures)
Lecture 27 - Design Considerations- Permanent Gully Control Structures
Lecture 28 - Basics of Open Channel Hydraulics - 1
Lecture 29 - Basics of Open Channel Hydraulics - 2

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Lecture 30 - Hydraulic Design of Drop Spillway
Lecture 31 - Hydraulic Design of drop Spillway in different Flow Conditions
Lecture 32 - Hydraulic Design Components
Lecture 33 - Structural Design of Drop Spillway - 1
Lecture 34 - Structural Design of Drop Spillway - 2
Lecture 35 - Structural Design of Drop Spillway - 3
Lecture 36 - Structural Design of Drop Spillway - 4
Lecture 37 - GATE Question
Lecture 38 - Drop Inlet Spillway
Lecture 39 - Drop Inlet Spillway (Continued...)
Lecture 40 - Introduction-Drop Inlet Spillway
Lecture 41 - Drop Inlet Spillway Design - I
Lecture 42 - Numerical Problems
Lecture 43 - Ogee Spillway
Lecture 44 - Chute Spillway
Lecture 45 - Chute Spillway Design - I
Lecture 46 - Chute Spillway Design - II
Lecture 47 - Energy Dissipation
Lecture 48 - Wind Erosion and Control Basics
Lecture 49 - Design of Wind Breaks
Lecture 50 - Design of Shelterbelts
Lecture 51 - Formation of Sand Dunes
Lecture 52 - Stabilization of Sand Dunes
Lecture 53 - Land Capability Classes
Lecture 54 - Improving Land Capability
Lecture 55 - Sediment and Its Transportation
Lecture 56 - Sediment Sampling

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NPTEL Video Course - Agriculture - NOC:Dairy and Food Process and Products Technology

Subject Co-ordinator - Prof. Tridib Kumar Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preamble of the Subject
Lecture 2 - What is Food and Nutrients
Lecture 3 - Nutritional Value of the Nutrients
Lecture 4 - Best Way of Storage of Food Materials
Lecture 5 - Preservation Techniques
Lecture 6 - Temperature Quotient and Its Impact
Lecture 7 - Food Additives
Lecture 8 - Quality of Food
Lecture 9 - Quality of Food (Continued...)
Lecture 10 - Emerging Technology
Lecture 11 - Emerging Technology (Continued...)
Lecture 12 - Food Laws - Why?
Lecture 13 - Food Laws of India
Lecture 14 - Standards in India
Lecture 15 - Hygiene and Other Controls in India
Lecture 16 - Physico-Chemical Properties of Milk
Lecture 17 - Milk - What is it
Lecture 18 - Milk - How it looks?
Lecture 19 - Milk - Constituents
Lecture 20 - Constituents of Milk
Lecture 21 - Milk Fat
Lecture 22 - Milk Fat (Continued...)
Lecture 23 - Milk Fat (Continued...)
Lecture 24 - Milk Fat (Continued...)
Lecture 25 - Protein
Lecture 26 - Protein (Continued...)
Lecture 27 - Amino Acids
Lecture 28 - Amino Acids (Continued...)
Lecture 29 - Milk Protein

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Lecture 30 - Casein Micelle
Lecture 31 - Whey Protein
Lecture 32 - Whey Protein (Continued...)
Lecture 33 - Lactoferrin
Lecture 34 - Carbohydrates in Milk
Lecture 35 - Small Constituents of Milk
Lecture 36 - Enzymes in Milk
Lecture 37 - Chemical and Microbial Spoilage of Milk and Milk Products
Lecture 38 - Extrinsic Factors for Microbial Growth
Lecture 39 - Natural or Other Type of Spoilage
Lecture 40 - Packaging
Lecture 41 - Milk Pasteurization
Lecture 42 - Thermal Death Time
Lecture 43 - Pasteurization Effectiveness
Lecture 44 - Milk Pasteurization and Homogenization
Lecture 45 - Milk Pasteurization and Homogenization (Continued...)
Lecture 46 - Milk Homogenization
Lecture 47 - Milk Centrifugation
Lecture 48 - Types of Available Milk
Lecture 49 - Types of Available Milk in the Market
Lecture 50 - New Technologies in Dairy Industries
Lecture 51 - Cheese
Lecture 52 - Chedder Cheese
Lecture 53 - Ice Cream
Lecture 54 - Process of Ice Cream Preparation
Lecture 55 - Ice Cream Lolies
Lecture 56 - Over Run and Calculation for Preparing Ice Cream Mix
Lecture 57 - Transportation of Ice Cream vis a vis Frozen Foods
Lecture 58 - Packaging of Food Materials
Lecture 59 - Modified Atmosphere Packaging
Lecture 60 - Flow Chart for Manufacturing Some Dairy and Food Products

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NPTEL Video Course - Agriculture - NOC:Organic Farming for Sustainable Agricultural Production

Subject Co-ordinator - Prof. Dilip Kumar Swain

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Organic Farming
Lecture 2 - Organic Farming
Lecture 3 - Organic Farming and its Components
Lecture 4 - Organic Farming Concepts and Principles
Lecture 5 - Organic Farming Concepts and Principles (Continued...)
Lecture 6 - SWOT Analysis of Organic Farming
Lecture 7 - Sustainable Agriculture
Lecture 8 - Key Indicators of Sustainable Agriculture
Lecture 9 - Organic Farming and Climate Change
Lecture 10 - Organic Farming and Climate Change (Continued...)
Lecture 11 - Principles of Compost Production
Lecture 12 - Vermicompost Production Technology
Lecture 13 - Vermicompost Production Technology (Continued...)
Lecture 14 - Vermicompost Production Technology (Continued...)
Lecture 15 - Enriched Vermicompost Production Technology
Lecture 16 - Vermicompost Quality and Marketing
Lecture 17 - Introduction to Pest and Disease Management
Lecture 18 - Pest and Disease Management in Organic Farming
Lecture 19 - Level C Pest and Disease Management
Lecture 20 - Level C Pest and Disease Management (Continued...)
Lecture 21 - Introduction to Organic Crop Management
Lecture 22 - Introduction to Organic Crop Management (Continued...)
Lecture 23 - Organic Vegetable Crop Management
Lecture 24 - Organic Vegetable Crop Management (Cereals)
Lecture 25 - Organic Vegetable Crop Management (Cereals) (Continued...)
Lecture 26 - Organic Field Crop Management (Pulse and Oilseed Crop)
Lecture 27 - Organic Plantation Crop Management
Lecture 28 - Organic Meat Production
Lecture 29 - Introduction on transition to organic crop production

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Lecture 30 - Crop planning and rotation design in organic system
Lecture 31 - Crop planning and rotation design in organic system (Continued...)
Lecture 32 - Integrated Farming System and Urban Agriculture
Lecture 33 - Quality of Organic Food
Lecture 34 - Natural Sources of Antioxidants for Health Defense
Lecture 35 - Antioxidant Capacity of fruits and vegetables
Lecture 36 - Organic Food and Human Health
Lecture 37 - Organic Standard
Lecture 38 - Organic Certification Process
Lecture 39 - Operational Structure of Organic Certification
Lecture 40 - Marketing of Organic Products

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NPTEL Video Course - Agriculture - NOC:Novel Technologies for Food Processing and Shelf Life Extension

Subject Co-ordinator - Prof. Hari Niwas Mishra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction; Food Constituents and Functions
Lecture 2 - Quality and Safety Aspects of Food
Lecture 3 - Factors Affecting Quality During Processing and Storage
Lecture 4 - Role of Water in Food and its Shelf Life
Lecture 5 - Gelatinization and Retrogradation of Starch
Lecture 6 - Browning Reactions
Lecture 7 - Food Proteins
Lecture 8 - Principles of Food Preservation
Lecture 9 - Traditional Food Preservation Technologies - Part 1
Lecture 10 - Traditional Food Preservation Technologies - Part 2
Lecture 11 - High Pressure Processing of Food - Part 1
Lecture 12 - High Pressure Processing of Food - Part 2
Lecture 13 - Membrane Technology - Part 1
Lecture 14 - Membrane Technology - Part 2
Lecture 15 - Food Irradiation - Part 1
Lecture 16 - Food Irradiation - Part 2
Lecture 17 - Microwave Heating
Lecture 18 - Radio Frequency Drying
Lecture 19 - Super Critical Fluid Extraction - Part 1
Lecture 20 - Super Critical Fluid Extraction - Part 2
Lecture 21 - Freeze Drying - Part 1
Lecture 22 - Freeze Drying - Part 2
Lecture 23 - Food Extrusion Technology - Part 1
Lecture 24 - Food Extrusion Technology - Part 2
Lecture 25 - Textured Vegetable Protein (TVP)
Lecture 26 - Aseptic Processing and Packaging
Lecture 27 - Hurdle Technology
Lecture 28 - Natural Antimicrobials
Lecture 29 - Food Lipids

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Lecture 30 - Extraction of Oil - Part 1
Lecture 31 - Extraction of Oil - Part 2
Lecture 32 - Refining of Oil - Part 1
Lecture 33 - Refining of Oil - Part 2
Lecture 34 - Modified Fats
Lecture 35 - Rancidity
Lecture 36 - Natural Antioxidants
Lecture 37 - Microencapsulation - Part 1
Lecture 38 - Microencapsulation - Part 2
Lecture 39 - Food nanotechnology
Lecture 40 - Respiration and Ripening
Lecture 41 - Modified Atmospheric Storage (MAP)
Lecture 42 - Active Packaging Technology
Lecture 43 - Edible coating technology
Lecture 44 - Multiproduct CA/MA Storage Unit
Lecture 45 - Grain Storage
Lecture 46 - Ozonation of Food Grains
Lecture 47 - Hyper Spectral Imaging for Quality Analysis of Food Grains
Lecture 48 - Non-Destructive Methods for Analysis of Grain Quality
Lecture 49 - Detection of Spoilage in Grains using Biosensors
Lecture 50 - Food Fortification
Lecture 51 - Iron Fortified Rice (IFR)
Lecture 52 - Nutri Dal and Fortified Noodles
Lecture 53 - High Energy RTE Food Paste - Part 1
Lecture 54 - High Energy RTE Food Paste - Part 2
Lecture 55 - Functional Foods and Nutraceuticals
Lecture 56 - Algae Based Health Foods
Lecture 57 - Gluten Free Bread and Pasta
Lecture 58 - Food Powder and Premixes
Lecture 59 - GMP/GHP in Food Industry
Lecture 60 - FCTL R&D and Course Summary

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NPTEL Video Course - Agriculture - NOC:Soil Science and Technology

Subject Co-ordinator - Prof. Somsubhra Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Overview of Soil
Lecture 2 - Weathering and Soil Formation
Lecture 3 - Weathering and Soil Formation (Continued...)
Lecture 4 - Weathering and Soil Formation (Continued...)
Lecture 5 - Weathering and Soil Formation (Continued...)
Lecture 6 - Oil Taxonomy and Classification
Lecture 7 - Soil Taxonomy and Classification (Continued...)
Lecture 8 - Soil Taxonomy and Classification (Continued...)
Lecture 9 - Soil Orders, Soil Colour and Texture
Lecture 10 - Soil Texture and Structure
Lecture 11 - Soil Tillage and Soil Density
Lecture 12 - Soil Porosity and Consistency
Lecture 13 - Soil Consistency and Soil Water
Lecture 14 - Soil Water
Lecture 15 - Tutorial
Lecture 16 - Soil Water Movement
Lecture 17 - Qualitative Description of Soil Wetness
Lecture 18 - Soil Air
Lecture 19 - Soil Temperature
Lecture 20 - Tutorial
Lecture 21 - Silicate Clays
Lecture 22 - Silicate Clays (Continued...)
Lecture 23 - Sources of Charges in Soil
Lecture 24 - Cation Exchange Capacity (CEC)
Lecture 25 - Sorption of Pesticides
Lecture 26 - Diffuse Double Layer
Lecture 27 - Adsorption Isotherms
Lecture 28 - Soil Acidity
Lecture 29 - Soil Salinity and Alkalining

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Lecture 30 - Submerged Soils
Lecture 31 - Essential Plant Nutrients
Lecture 32 - Soil N
Lecture 33 - Biological N Fixation
Lecture 34 - Soil P and K
Lecture 35 - Fertilizers
Lecture 36 - Soil Testing - I
Lecture 37 - Soil Testing - II
Lecture 38 - Soil Organic Matter
Lecture 39 - Soil Organisms
Lecture 40 - Compost
Lecture 41 - Land Degradation and Soil Erosion
Lecture 42 - Universal Soil Loss Equation
Lecture 43 - Conservation Tillage
Lecture 44 - Wind Erosion and Tillage Erosion
Lecture 45 - Organic Pollutants in Soil
Lecture 46 - Remediation of Organic Pollutant
Lecture 47 - Toxic Inorganic Substances in Soil
Lecture 48 - Removal of Toxic Inorganic Substances
Lecture 49 - Soil Survey
Lecture 50 - Remote Sensing in Soil Survey
Lecture 51 - GIS and GPS
Lecture 52 - Geostatistics
Lecture 53 - Basics of VisNIR - DRS
Lecture 54 - VisNIR-DRS Applications for Soil
Lecture 55 - PXRF Soil Applications
Lecture 56 - Basic Overview of DSM
Lecture 57 - Modeling Continuous Variables
Lecture 58 - Modeling Continuous Variables (Continued...)
Lecture 59 - Modeling Categorical Variables
Lecture 60 - Pedotransfer Functions and Uncertainty of DSM

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NPTEL Video Course - Agriculture - NOC:Thermal Operations in Food Process Engineering: Theory and Applicatior

Subject Co-ordinator - Prof. Tridib Kumar Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Food Processing and Preservation
Lecture 2 - Fundamentals of Food Processing and Preservation (Continued...)
Lecture 3 - Preservation Techniques
Lecture 4 - Fundamentals of Food Processing and Preservation (Continued...)
Lecture 5 - Fundamentals of Food Processing and Preservation (Continued...)
Lecture 6 - Fundamentals of Food Processing and Preservation why and how do food spoil
Lecture 7 - One Dimentional Conduction Heat Transfer in Cortesian Coordinate
Lecture 8 - One Dimentional Conduction Heat Transfer in Cortesian Coordinate (Continued...)
Lecture 9 - One Dimentional Steady State Heat Conduction
Lecture 10 - One Dimentional Steady State Heat Conduction (Continued...)
Lecture 11 - One Dimensional Heat Transfer Through Cylinders
Lecture 12 - One Dimensional Heat Transfer Through Cylinders (Continued...)
Lecture 13 - One Dimensional Heat Transfer Through Cylinders (Continued...)
Lecture 14 - One Dimensinal Heat Transfer
Lecture 15 - Thermal Resistance
Lecture 16 - Thermal contact Resistance and Finned Surface
Lecture 17 - Finned Surface
Lecture 18 - Finned Surface (Continued...)
Lecture 19 - Finned Surface (Continued...)
Lecture 20 - Heat Transfer in Finned Surfaces
Lecture 21 - Transient Heat Transfer
Lecture 22 - Transient Heat Transfer (Continued...)
Lecture 23 - Transient Heat Transfer (Continued...)
Lecture 24 - Transient Heat Transfer (Continued...)
Lecture 25 - Heister Chart
Lecture 26 - Heister Chart (Continued...)
Lecture 27 - Heat Transfer by Convection
Lecture 28 - Heat Transfer by Convection(Continued...)
Lecture 29 - Heat Transfer by Convection(Continued...)

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Lecture 30 - Heat Transfer by Convection(Continued...)
Lecture 31 - Heat Transfer by Convection(Continued...)
Lecture 32 - Heat Transfer by Convection(Continued...)
Lecture 33 - Heat Transfer by Convection(Continued...)
Lecture 34 - Heat Transfer by Radiation
Lecture 35 - Heat Transfer by Radiation (Continued...)
Lecture 36 - Heat Transfer by Convection (Continued...)
Lecture 37 - Heat Transfer by Radiation (Continued...)
Lecture 38 - Heat Transfer by Radiation (Continued...)
Lecture 39 - Boiling and Condensation
Lecture 40 - Boiling (Continued...)
Lecture 41 - Condensation
Lecture 42 - Condensation (Continued...)
Lecture 43 - Heat Exchangers
Lecture 44 - Heat Exchangers (Continued...)
Lecture 45 - Heat Exchangers (Continued...)
Lecture 46 - Heat Exchangers (Continued...)
Lecture 47 - Log mean Temperature Difference
Lecture 48 - Heat Exchangers (Continued...)
Lecture 49 - Heat Exchangers (Continued...)
Lecture 50 - Heat Exchangers (Continued...)
Lecture 51 - Heat Exchangers (Continued...)
Lecture 52 - Heat Exchangers (Continued...)
Lecture 53 - Heat Exchangers (Continued...)
Lecture 54 - Thermal Death Reaction Kinecties
Lecture 55 - Preservation by High Temparature Processing
Lecture 56 - Preservation by High Temparature Processing (Continued...)
Lecture 57 - Distillation
Lecture 58 - Distillation (Continued...)
Lecture 59 - Distillation (Continued...)
Lecture 60 - Drying and Multiple Effect Evaporator

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NPTEL Video Course - Agriculture - NOC:Micro Irrigation Engineering

Subject Co-ordinator - Prof. Kamlesh Narayan Tiwari

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Micro-Irrigation: Introduction and Scope
Lecture 2 - Fundamentals of Fluid Mechanics and its Application in MI
Lecture 3 - Soil Water Concept
Lecture 4 - Soil Water Constants and Infiltration
Lecture 5 - Tutorial 1 - Numerical Examples on Fluid Mechanics and Soil water
Lecture 6 - Evapotranspiration
Lecture 7 - Determination of Evapotranspiration
Lecture 8 - Crop Coefficients and Crop Water Requirement
Lecture 9 - Demonstration of Agro Metrological Instruments
Lecture 10 - Demonstration of Lysimeter
Lecture 11 - Tutorial 2 - Numerical Examples on Crop Water Requirement
Lecture 12 - Irrigation Scheduling
Lecture 13 - Soil and Plant Water Monitoring Instruments
Lecture 14 - Measurement of Irrigation Water
Lecture 15 - Irrigation Efficiency
Lecture 16 - Tutorial 3 - Numerical Examples on Irrigation water Management
Lecture 17 - Introduction of Water Lifts and Pumps
Lecture 18 - Variable Displacement Pumps
Lecture 19 - Irrigation Water Quality
Lecture 20 - Tutorial 4 - Numerical Examples on Water Measurements and Pumps
Lecture 21 - Irrigation methods
Lecture 22 - Micro Irrigation System: Concept and Types
Lecture 23 - Drip Irrigation: Introduction and Types
Lecture 24 - Drip Irrigation: Design Considerations and System Layout
Lecture 25 - Types and Selection of Emission Devices
Lecture 26 - Hydraulics Drip Irrigation System Pipe Network
Lecture 27 - Tutorial 5 - Numerical Example on Design of Drip Irrigation System
Lecture 28 - Fertigation
Lecture 29 - Fertigation Application Methods

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Lecture 30 - Drip Irrigation: Filtration System
Lecture 31 - Tutorial 6 - Numerical Examples on Emission Devices and Fertigation
Lecture 32 - Installation and Operation of Drip Irrigation System
Lecture 33 - Maintenance of Drip Irrigation System
Lecture 34 - Demonstration of Drip Irrigation Components and Evaluation of Drip Emitter
Lecture 35 - Soil Water Movement under Drip Emitter
Lecture 36 - Design and Development of Drip Emitter
Lecture 37 - Tutorial 7- Numerical Examples on Drip Irrigation System
Lecture 38 - Micro Sprinkler Irrigation System
Lecture 39 - Bubbler Irrigation System
Lecture 40 - Sprinkler Irrigation System
Lecture 41 - Sprinkler Irrigation System Design
Lecture 42 - Performance Evaluation of Sprinkler Irrigation System
Lecture 43 - Tutorial 8 - Numerical Examples on Sprinkler Irrigation System
Lecture 44 - Tutorial 9 - Numerical Examples on Design of Sprinkler Irrigation System
Lecture 45 - Sprinkler Irrigation System: Layout, Installation, Operation and Maintenance
Lecture 46 - Standards and Quality Assurance of MIS Components
Lecture 47 - Standards and Quality Assurance of Sprinkler Irrigation System Components
Lecture 48 - Solar Photovoltaic System for Irrigation - Part 1
Lecture 49 - Solar Photovoltaic System for Irrigation - Part 2
Lecture 50 - Tutorial 10 - Numerical Examples on Solar PV Irrigation System
Lecture 51 - Automation of Micro Irrigation System - Part 1
Lecture 52 - Automation of Micro Irrigation System - Part 2
Lecture 53 - Automation of Micro Irrigation System - Part 3
Lecture 54 - Automation of Micro Irrigation System - Part 4
Lecture 55 - Economic Analysis of Micro Irrigation System - Part 1
Lecture 56 - Economic Analysis of MIS - Part 2
Lecture 57 - Economic Analysis of MIS - Part 3
Lecture 58 - Tutorial 11- Numerical Examples on Economics of Micro Irrigation System
Lecture 59 - Precision Agriculture
Lecture 60 - Micro Irrigation Engineering: Epilogue

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NPTEL Video Course - Agriculture - NOC:Instrumentation and Process Control in Food Industry

Subject Co-ordinator - Prof. Ashis Kumar Datta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Process Control
Lecture 2 - Laplace Transform Review - I
Lecture 3 - Laplace Transform Review - II
Lecture 4 - Zero and First Order Instruments
Lecture 5 - First Order Instruments
Lecture 6 - Second Order Instruments - I
Lecture 7 - Second Order Instruments - II
Lecture 8 - Food Instrumentation
Lecture 9 - Chromatography
Lecture 10 - Mass Spectrometry - I
Lecture 11 - Mass Spectrometry - II
Lecture 12 - Model Development
Lecture 13 - PID Controller Response Analysis
Lecture 14 - Block Diagram Representation of CSTR Systems
Lecture 15 - Transient Response of Controlled Systems/Solved Examples
Lecture 16 - Solved Examples on Controlled System
Lecture 17 - Complex Variables as Roots of Characteristic Equation
Lecture 18 - Routh Tests for Stability of Systems
Lecture 19 - Poles and Zeros of the OLTF
Lecture 20 - Plotting of Root Loci
Lecture 21 - Root Loci of PI Controlled Systems
Lecture 22 - Root Loci of PID Controlled Systems
Lecture 23 - First and Second Order Systems Responses
Lecture 24 - A Control Problem
Lecture 25 - PI/PD/PID Controllers and Worked Out Example 1
Lecture 26 - Linear Lag/Transportation Systems/First Order/Second Order Systems- Sinusoidal Input
Lecture 27 - PI/PD/PID Controllers
Lecture 28 - Linear Lag/Transportation system/ Firts order/ Second order system
Lecture 29 - Worked Out Example 2

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Lecture 30 - Concepts of Gain Margin and Phase Margins
Lecture 31 - Worked Out Examples
Lecture 32 - Z-Transforms of Sampled Functions
Lecture 33 - Functions Reconstruction and Manipulation
Lecture 34 - Open Loop Z-Transfer Functions
Lecture 35 - Neuro - Fuzzy Logic Controller
Lecture 36 - Auto - Pilot Control Algorithm
Lecture 37 - Fuzzy logic controller algorithm for Soan Papri Manufacture
Lecture 38 - Appendices - Set Theory
Lecture 39 - Fuzzy Sets Theory
Lecture 40 - Worked Out Examples
Lecture 41 - Temperature Standards, Calibration and senssor
Lecture 42 - Vacuum Measurement
Lecture 43 - Viscometer and Cream Separator
Lecture 44 - Spray Dryer and Plate Freezer

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NPTEL Video Course - Agriculture - NOC:Machine Learning for Soil and Crop Management

Subject Co-ordinator - Prof. Somsubhra Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Overview of ML and DL Applications in Agriculture
Lecture 2 - General Overview of ML and DL Applications in Agriculture (Continued...)
Lecture 3 - General Overview of ML and DL Applications in Agriculture (Continued...)
Lecture 4 - General Overview of ML and DL Applications in Agriculture (Continued...)
Lecture 5 - General Overview of ML and DL Applications in Agriculture (Continued...)
Lecture 6 - Basics of Multivariate Data Analytics
Lecture 7 - Basics of Multivariate Data Analytics (Continued...)
Lecture 8 - Basics of Multivariate Data Analytics (Continued...)
Lecture 9 - Basics of Multivariate Data Analytics (Continued...)
Lecture 10 - Basics of Multivariate Data Analytics (Continued...)
Lecture 11 - Principal Component Analysis and Regression Applications in Agriculture
Lecture 12 - Principal Component Analysis and Regression Applications in Agriculture (Continued...)
Lecture 13 - Principal Component Analysis and Regression Applications in Agriculture (Continued...)
Lecture 14 - Principal Component Analysis and Regression Applications in Agriculture (Continued...)
Lecture 15 - Principal Component Analysis and Regression Applications in Agriculture (Continued...)
Lecture 16 - Applications of Classification and Clustering Methods in Agriculture
Lecture 17 - Applications of Classification and Clustering Methods in Agriculture (Continued...)
Lecture 18 - Applications of Classification and Clustering Methods in Agriculture (Continued...)
Lecture 19 - Applications of Classification and Clustering Methods in Agriculture (Continued...)
Lecture 20 - Applications of Classification and Clustering Methods in Agriculture (Continued...)
Lecture 21 - Diffuse Reflectance Spectroscopy: Basics and Applications for Crop and Soil
Lecture 22 - Diffuse Reflectance Spectroscopy: Basics and Applications for Crop and Soil (Continued...)
Lecture 23 - Diffuse Reflectance Spectroscopy: Basics and Applications for Crop and Soil (Continued...)
Lecture 24 - Diffuse Reflectance Spectroscopy: Basics and Applications for Crop and Soil (Continued...)
Lecture 25 - Diffuse Reflectance Spectroscopy: Basics and Applications for Crop and Soil (Continued...)
Lecture 26 - Use of ML for Portable Proximal Soil and Crop Sensors
Lecture 27 - Use of ML for Portable Proximal Soil and Crop Sensors (Continued...)
Lecture 28 - Use of ML for Portable Proximal Soil and Crop Sensors (Continued...)
Lecture 29 - Use of ML for Portable Proximal Soil and Crop Sensors (Continued...)

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Lecture 30 - Use of ML for Portable Proximal Soil and Crop Sensors (Continued...)
Lecture 31 - ML and DL for Soil and Crop Image Processing
Lecture 32 - ML and DL for Soil and Crop Image Processing (Continued...)
Lecture 33 - ML and DL for Soil and Crop Image Processing (Continued...)
Lecture 34 - ML and DL for Soil and Crop Image Processing (Continued...)
Lecture 35 - ML and DL for Soil and Crop Image Processing (Continued...)
Lecture 36 - UAV and ML Applications in Agriculture
Lecture 37 - UAV and ML Applications in Agriculture (Continued...)
Lecture 38 - UAV and ML Applications in Agriculture (Continued...)
Lecture 39 - UAV and ML Applications in Agriculture (Continued...)
Lecture 40 - UAV and ML Applications in Agriculture (Continued...)
Lecture 41 - Hyperspectral Remote Sensing and ML Applications in Agriculture
Lecture 42 - Hyperspectral Remote Sensing and ML Applications in Agriculture (Continued...)
Lecture 43 - Hyperspectral Remote Sensing and ML Applications in Agriculture (Continued...)
Lecture 44 - Hyperspectral Remote Sensing and ML Applications in Agriculture (Continued...)
Lecture 45 - Hyperspectral Remote Sensing and ML Applications in Agriculture (Continued...)
Lecture 46 - Digital Soil Mapping - General Overview
Lecture 47 - Digital Soil Mapping - General Overview (Continued...)
Lecture 48 - Digital Soil Mapping - General Overview (Continued...)
Lecture 49 - Digital Soil Mapping - General Overview (Continued...)
Lecture 50 - Digital Soil Mapping - General Overview (Continued...)
Lecture 51 - Digital Soil Mapping With Continuous Variables
Lecture 52 - Digital Soil Mapping With Continuous Variables (Continued...)
Lecture 53 - Digital Soil Mapping With Continuous Variables (Continued...)
Lecture 54 - Digital Soil Mapping With Continuous Variables (Continued...)
Lecture 55 - Digital Soil Mapping With Continuous Variables (Continued...)
Lecture 56 - Digital Soil Mapping With Categorical Variables
Lecture 57 - Digital Soil Mapping With Categorical Variables (Continued...)
Lecture 58 - Digital Soil Mapping With Categorical Variables (Continued...)
Lecture 59 - Digital Soil Mapping With Categorical Variables (Continued...)
Lecture 60 - Digital Soil Mapping With Categorical Variables (Continued...)

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NPTEL Video Course - Agriculture - NOC:Advanced Aquaculture Technology

Subject Co-ordinator - Prof. Gourav Dhar Bhowmick

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Aquaculture systems and input factors
Lecture 3 - Important species in aquaculture
Lecture 4 - Propagation; Water budget
Lecture 5 - Conservation strategies
Lecture 6 - Transformation of open culture to closed high-tech technologies
Lecture 7 - Intensive farming in high-tech tanks
Lecture 8 - Re-circulatory system
Lecture 9 - Flow-through system
Lecture 10 - Raceway culture
Lecture 11 - Polyculture, IMTA
Lecture 12 - Coastal aquaculture
Lecture 13 - Mariculture
Lecture 14 - Algal Culture
Lecture 15 - Seaweed Culture; Pearl Culture
Lecture 16 - Introduction to freshwater prawn culture
Lecture 17 - Introduction to shrimp culture
Lecture 18 - Introduction to shrimp culture (Continued...)
Lecture 19 - Introduction to crab culture
Lecture 20 - Introduction to crab culture (Continued...)
Lecture 21 - Larval rearing and hatcheries
Lecture 22 - Design of hatchery for Carps
Lecture 23 - Design of prawn hatchery
Lecture 24 - Design of Shrimp hatchery
Lecture 25 - Maintenance of optimum conditions
Lecture 26 - Balanced diet
Lecture 27 - Balanced diet and Feed formulation
Lecture 28 - Feed formulation: Linear Programming
Lecture 29 - Feed additives

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Lecture 30 - Feed additives, Food conversion ratio (FCR)
Lecture 31 - Important water quality parameters and criteria
Lecture 32 - Aeration
Lecture 33 - Aerator performance
Lecture 34 - Important calculations on aerators
Lecture 35 - Chemical treatment
Lecture 36 - Overview of Wastewater Treatment Methods
Lecture 37 - Overview of Wastewater Treatment Methods (Continued...)
Lecture 38 - Bio-electrochemical system based wastewater treatment
Lecture 39 - Bio-electrochemical system-based wastewater treatment (Continued...)
Lecture 40 - Bio-electrochemical system-based wastewater treatment (Continued...)
Lecture 41 - Organic Aquaculture Standards
Lecture 42 - Wastewater-fed aquaculture
Lecture 43 - Integrated farming
Lecture 44 - Integrated farming (Continued...)
Lecture 45 - Bio-floc Technology
Lecture 46 - Green aquaculture
Lecture 47 - Smart Aquaponic system
Lecture 48 - Bioremediation
Lecture 49 - Biofiltration
Lecture 50 - Eco-labelling
Lecture 51 - Fish and fish products preservation
Lecture 52 - Fish and fish products preservation (Continued...)
Lecture 53 - Fish by-products
Lecture 54 - Fish by-products (Continued...)
Lecture 55 - Zero waste recycling
Lecture 56 - Impact of Climate Change on aquaculture
Lecture 57 - Impact of Climate Change on aquaculture (Continued...)
Lecture 58 - Mitigation and adaptive strategies
Lecture 59 - Mitigation and adaptive strategies (Continued...)
Lecture 60 - Mitigation and adaptive strategies (Continued...)
Lecture 61 - Opportunities in Aquaculture sectors for the entrepreneurs from the coastal regions

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NPTEL Video Course - Agriculture - NOC:Post Harvest Operations and Processing of Fruits, Vegetables, Spices a

Subject Co-ordinator - Prof. Hari Niwas Mishra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Fruits and Vegetables
Lecture 3 - Fruits and Vegetable (Part II : Respiration, Ripening and Senescence)
Lecture 4 - Indian Spices
Lecture 5 - Plantation Crops
Lecture 6 - Post Harvest Losses: Causes and Preventive Measures
Lecture 7 - Post Harvest Operations
Lecture 8 - Handling and Transportation
Lecture 9 - Supply Chain Management and Storage
Lecture 10 - Quality Assurance and Control (QA/QC)
Lecture 11 - Basics of Processing and Preservation
Lecture 12 - Processing by Removal of Water
Lecture 13 - Processing by Addition of Heat
Lecture 14 - Processing by Removal of Heat
Lecture 15 - Irradiation of Fruits, Vegetables and Spices
Lecture 16 - Cleaning and Washing
Lecture 17 - Sorting and Grading
Lecture 18 - Peeling, Coring, Slicing
Lecture 19 - Containers and Packaging Materials for Fresh Produce
Lecture 20 - Packaging Methods and Equipment
Lecture 21 - Minimal Processing
Lecture 22 - Hurdle Technology Concepts
Lecture 23 - Intermediate and High Moisture Fruit Products
Lecture 24 - Cut Fruits and Vegetables - Part I
Lecture 25 - Cut Fruits and Vegetables - Part II
Lecture 26 - Juice Extraction and Clarification
Lecture 27 - Concentrates and Pastes
Lecture 28 - Aseptic processing and packaging
Lecture 29 - RTS and RTD beverages

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Lecture 30 - Quality and Safety Aspects
Lecture 31 - Techniques and Equipment
Lecture 32 - Powders and Premixes - Part I
Lecture 33 - Powders and Premixes - Part II
Lecture 34 - RTE Fruit Products
Lecture 35 - Dehydrated and Instant Cooking Vegetables
Lecture 36 - Tea and Tea Products
Lecture 37 - Coffee Processing
Lecture 38 - Cocoa and Chocolate Technology
Lecture 39 - Processing of Vanilla Beans and Production of Vanilla Flavour
Lecture 40 - Coconut and Cashew Processing
Lecture 41 - Processing of spices
Lecture 42 - Spice powders
Lecture 43 - Spice Pastes, Sauces and Gravies
Lecture 44 - Essential Oil and Oleoresin
Lecture 45 - Condiments Technology
Lecture 46 - Fermentation Technology
Lecture 47 - Fruit Wines and Ciders
Lecture 48 - Probiotic / Fermented Vegetable Products
Lecture 49 - Carbonated Fruit Juices and Premixes
Lecture 50 - Quality Characteristics
Lecture 51 - Packaging Technology
Lecture 52 - Smart Packaging
Lecture 53 - Edible Coatings and Films
Lecture 54 - Modified Atmosphere Packaging
Lecture 55 - Controlled Atmosphere Storage
Lecture 56 - Green Technologies and Near Zero Waste Processing
Lecture 57 - Extraction of Bioactive and Pigments from Processing Waste
Lecture 58 - Valorisation of Waste into Value-added Products
Lecture 59 - FSSAI Regulations and FSMS Guidelines for Fruits, Vegetables, Spices and Plantation Crops
Lecture 60 - Course Summary and Summing-up

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NPTEL Video Course - Agriculture - NOC:Soil Fertility and Fertilizers

Subject Co-ordinator - Prof. Somsubhra Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of Soil Nutrient Management and Basic Soil-Plant Relationship
Lecture 2 - Importance of Soil Nutrient Management and Basic Soil-Plant Relationship (Continued...)
Lecture 3 - Importance of Soil Nutrient Management and Basic Soil-Plant Relationship (Continued...)
Lecture 4 - Importance of Soil Nutrient Management and Basic Soil-Plant Relationship (Continued...)
Lecture 5 - Importance of Soil Nutrient Management and Basic Soil-Plant Relationship (Continued...)
Lecture 6 - Soil Nitrogen for Plant Nutrition
Lecture 7 - Soil Nitrogen for Plant Nutrition (Continued...)
Lecture 8 - Soil Nitrogen for Plant Nutrition (Continued...)
Lecture 9 - Soil Nitrogen for Plant Nutrition (Continued...)
Lecture 10 - Soil Nitrogen For Plant Nutrition (Continued...)
Lecture 11 - Soil P and K for Plant Nutrition
Lecture 12 - Soil P and K for Plant Nutrition (Continued...)
Lecture 13 - Soil P and K for Plant Nutrition (Continued...)
Lecture 14 - Soil P and K for Plant Nutrition (Continued...)
Lecture 15 - Soil P and K for Plant Nutrition (Continued...)
Lecture 16 - Soil Secondary Nutrients and their role in Plant Nutrition
Lecture 17 - Soil Secondary Nutrients and their role in Plant Nutrition (Continued...)
Lecture 18 - Soil Secondary Nutrients and their role in Plant Nutrition (Continued...)
Lecture 19 - Soil Secondary Nutrients and their role in Plant Nutrition (Continued...)
Lecture 20 - Soil Secondary Nutrients and their role in Plant Nutrition (Continued...)
Lecture 21 - Soil Micronutrients and their role in Plant Nutrition
Lecture 22 - Soil Micronutrients and their role in Plant Nutrition (Continued...)
Lecture 23 - Soil Micronutrients and their role in Plant Nutrition (Continued...)
Lecture 24 - Soil Micronutrients and their role in Plant Nutrition (Continued...)
Lecture 25 - Soil Micronutrients and their role in Plant Nutrition (Continued...)
Lecture 26 - Soil Testing and Soil Fertility Evaluation Methods
Lecture 27 - Soil Testing and Soil Fertility Evaluation Methods (Continued...)
Lecture 28 - Soil Testing and Soil Fertility Evaluation Methods (Continued...)
Lecture 29 - Soil Testing and Soil Fertility Evaluation Methods (Continued...)

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Lecture 30 - Soil Testing and Soil Fertility Evaluation Methods (Continued...)
Lecture 31 - Soil Health and Quality, Problem Soil, Land Capability Classification
Lecture 32 - Soil Health and Quality, Problem Soil, Land Capability Classification (Continued...)
Lecture 33 - Soil Health and Quality, Problem Soil, Land Capability Classification (Continued...)
Lecture 34 - Soil Health and Quality, Problem Soil, Land Capability Classification (Continued...)
Lecture 35 - Soil Health and Quality, Problem Soil, Land Capability Classification (Continued...)
Lecture 36 - Organic Manures, Manufacturing, Properties, and fate af N, P, K and Micronutrient .....
Lecture 37 - Organic Manures, Manufacturing, Properties, and fate af N, P, K and Micronutrient (Continued...)
Lecture 38 - Organic Manures, Manufacturing, Properties, and fate af N, P, K and Micronutrient (Continued...)
Lecture 39 - Organic Manures, Manufacturing, Properties, and fate af N, P, K and Micronutrient (Continued...)
Lecture 40 - Organic Manures, Manufacturing, Properties, and fate af N, P, K and Micronutrient (Continued...)
Lecture 41 - Fertilizer Quality Control, Fertilizer Adulteration and Fertilizer Testing
Lecture 42 - Fertilizer Quality Control, Fertilizer Adulteration and Fertilizer Testing (Continued...)
Lecture 43 - Fertilizer Quality Control, Fertilizer Adulteration and Fertilizer Testing (Continued...)
Lecture 44 - Fertilizer Quality Control, Fertilizer Adulteration and Fertilizer Testing (Continued...)
Lecture 45 - Fertilizer Quality Control, Fertilizer Adulteration and Fertilizer Testing (Continued...)
Lecture 46 - Biofertilizers and Management of fertilizers and manures in Soil
Lecture 47 - Biofertilizers and Management of fertilizers and manures in Soil (Continued...)
Lecture 48 - Biofertilizers and Management of fertilizers and manures in Soil (Continued...)
Lecture 49 - Biofertilizers and Management of fertilizers and manures in Soil (Continued...)
Lecture 50 - Biofertilizers and Management of fertilizers and manures in Soil (Continued...)
Lecture 51 - Fertilizer Recommendation Approaches and Integrated Plant Nutrient Management
Lecture 52 - Fertilizer Recommendation Approaches and Integrated Plant Nutrient Management (Continued...)
Lecture 53 - Fertilizer Recommendation Approaches and Integrated Plant Nutrient Management (Continued...)
Lecture 54 - Fertilizer Recommendation Approaches and Integrated Plant Nutrient Management (Continued...)
Lecture 55 - Fertilizer Recommendation Approaches and Integrated Plant Nutrient Management (Continued...)
Lecture 56 - Agricultural Productivity and Environmental Quality
Lecture 57 - Agricultural Productivity and Environmental Quality (Continued...)
Lecture 58 - Agricultural Productivity and Environmental Quality (Continued...)
Lecture 59 - Agricultural Productivity and Environmental Quality (Continued...)
Lecture 60 - Agricultural Productivity and Environmental Quality (Continued...)

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NPTEL Video Course - Agriculture - NOC:Cooling Technology: Why and How utilized in Food Processing and Allied

Subject Co-ordinator - Prof. Tridib Kumar Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cooling
Lecture 2 - Why Cooling is required ?
Lecture 3 - Definitions
Lecture 4 - How to produce Safe Foods
Lecture 5 - How to produce Safe Foods ? (Continued...)
Lecture 6 - Cooling Load Calculation
Lecture 7 - Cooling Load Calculation (Continued...)
Lecture 8 - Cooling Load Calculation (Continued...)
Lecture 9 - Cooling Load Calculation (Continued...)
Lecture 10 - Basics of Thermodynamics
Lecture 11 - Basics of Thermodynamics (Continued...)
Lecture 12 - Basics of Thermodynamics (Continued...)
Lecture 13 - Basics of Thermodynamics (Continued...)
Lecture 14 - Basics of Thermodynamics (Continued...)
Lecture 15 - Basics of Thermodynamics (Continued...)
Lecture 16 - Basics of Thermodynamics (Continued...)
Lecture 17 - Basics of Thermodynamics (Continued...)
Lecture 18 - Psychrometrics
Lecture 19 - Psychrometrics (Continued...)
Lecture 20 - Psychrometrics (Continued...)
Lecture 21 - Psychrometrics (Continued...)
Lecture 22 - Psychrometrics (Continued...)
Lecture 23 - Psychrometrics (Continued...)
Lecture 24 - Psychrometrics (Continued...)
Lecture 25 - The Carnot Cycle
Lecture 26 - Carnot Cycle (Continued...)
Lecture 27 - Carnot Cycle (Continued...)
Lecture 28 - Carnot Cycle (Continued...)
Lecture 29 - Carnot Refrigeration Cycles

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Lecture 30 - Carnot Refrigeration Cycles (Continued...)
Lecture 31 - Practical Difficulties with Carnot Cycle
Lecture 32 - Dry Compression
Lecture 33 - Problem Solving with Carnot System
Lecture 34 - Pure Substance as Refrigerant
Lecture 35 - Pure Substance as Refrigerant (Continued...)
Lecture 36 - Gas as Refrigerant
Lecture 37 - Gas as Refrigerant (Continued...)
Lecture 38 - Gas as Refrigerant (Continued...)
Lecture 39 - Basics of Refrigeration and Air Conditioning
Lecture 40 - Basics of Refrigeration and Air Conditioning (Continued...)
Lecture 41 - Selection of Condenser
Lecture 42 - Compressor
Lecture 43 - Reciprocating Compressor
Lecture 44 - Reciprocating Compressor (Continued...)
Lecture 45 - Reciprocating Compressor (Continued...)
Lecture 46 - Centrifugal Compressor
Lecture 47 - Rotary, Positive Displacement Type Compressors
Lecture 48 - Condenser
Lecture 49 - Condenser (Continued...)
Lecture 50 - Evaporator and Expansion Device
Lecture 51 - Freezing
Lecture 52 - Crystallization in Freezing
Lecture 53 - Freezing Curve
Lecture 54 - Freezers
Lecture 55 - Control Atmosphere Storage
Lecture 56 - Use of Phase Change Materials (PCM)
Lecture 57 - Cold Chain and Cold Storage
Lecture 58 - Cold Storage
Lecture 59 - Ice Cream
Lecture 60 - Ice Cream (Continued...)

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NPTEL Video Course - Agriculture - NOC:Traction Engineering

Subject Co-ordinator - Prof. Hifjur Raheman

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Traction and Traction Devices
Lecture 2 - Classification of wheels, Forces and moments acting on wheel
Lecture 3 - Tyre constructions and its specification
Lecture 4 - Tractive performance parameters
Lecture 5 - Tutorial 1
Lecture 6 - Mechanics of wheel and its tractive performance
Lecture 7 - Measurement of soil strength, cohesion and angle of internal friction
Lecture 8 - Measurement and characterization of terrain response
Lecture 9 - Characterization of shear stress and shear strength in different soil conditions
Lecture 10 - Tutorial 2 - Measurement of shear strength, modulus of sinkage and cone index
Lecture 11 - Rolling resistance of a rigid towed wheel
Lecture 12 - Rolling resistance of a pneumatic wheel
Lecture 13 - Motion resistance of a track
Lecture 14 - Tractive effort and slip of a powered rigid wheel
Lecture 15 - Tutorial 3 - Computation of rolling resistance of rigid wheel and pneumatic wheel
Lecture 16 - Tractive effort and slip of a track
Lecture 17 - Tractive effort and slip of a pneumatic wheel
Lecture 18 - Tractive performance prediction models - Wismer and Luth
Lecture 19 - Tractive performance prediction models - Brixius
Lecture 20 - Tutorial 4 - Tractive Performance Estimation Using Brixius Model
Lecture 21 - Effect of tyre parameters on tractive performance of tyre
Lecture 22 - Selection of tyre
Lecture 23 - Comparison of single tyre with dual tyres
Lecture 24 - Performance evaluation of a walking tractor fitted with track
Lecture 25 - Tutorial 5
Lecture 26 - Measurement of Cone Index
Lecture 27 - Pressure Sinkage Relationship in a Sandy Clay Loam Soil
Lecture 28 - Measurement of Theoretical Velocity, Actual Velocity and Slip for a Pneumatic Wheel
Lecture 29 - Measurement of Contact Area of a Pneumatic Tyre on a Hard Surface

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Lecture 30 - Measurement of Tractice Efficiency
Lecture 31 - Performance comparison of track with wheel
Lecture 32 - Traction Aids for Tractors
Lecture 33 - Ballasting of Wheeled Tractors to achieve Maximum Power Output in Frictional-Cohesive soils
Lecture 34 - Optimum ballasting of a front wheel assisted tractor
Lecture 35 - Tutorial 7
Lecture 36 - Cornering Properties of tyres
Lecture 37 - Lateral force developed by an unpowered tractor wheel
Lecture 38 - Steering of wheeled vechiles and steady state handling of front wheel steered vechiles
Lecture 39 - Classification of steady state handling characteristics and handling diagram
Lecture 40 - Tutorial 8

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NPTEL Video Course - Agriculture - NOC:Food Oils and Fats : Chemistry and Technology

Subject Co-ordinator - Prof. Hari. Niwas Mishra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Oil and Fats Processing Industry - Current Status, Issues and Challenges
Lecture 2 - Plant Sources of Edible Oils and Fats
Lecture 3 - Composition, Nutrition and Health Values of Plant Oils
Lecture 4 - Animal Sources of Edible Oils and Fats
Lecture 5 - Composition, Nutrition and Health Values of Animal Fats and Oils
Lecture 6 - Lipids and Their Classification
Lecture 7 - Fatty acids and their types
Lecture 8 - Glycerides - Type, Structure and Function
Lecture 9 - Triglycerides - Function in Nutrition and Food Processing
Lecture 10 - Phospholipids and Sterols
Lecture 11 - Engineering Properties of Edible Oils
Lecture 12 - Chemical Properties of Edible Oils
Lecture 13 - Rancidity and Reversion
Lecture 14 - Oxidative Rancidity
Lecture 15 - Antioxidants in Edible Oil
Lecture 16 - Pre-Treatment Techniques
Lecture 17 - Physical Methods for Oil Extraction - Concept and Mechanism
Lecture 18 - Expression - Pressing
Lecture 19 - Screw Expelling
Lecture 20 - Recent Developments in Oil Expression Technology
Lecture 21 - Extraction principles and mechanisms
Lecture 22 - Factors affecting extraction process
Lecture 23 - Solvent Extraction Technology and Equipment
Lecture 24 - Miscella Distillation and Meal Desolventization
Lecture 25 - Novel techniques of oil extraction
Lecture 26 - Crude Oil Characteristics and Processing
Lecture 27 - Clarification and Degumming
Lecture 28 - Chemical Refining and Neutralization
Lecture 29 - Bleaching

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Lecture 30 - Physical Refining and Deodorization
Lecture 31 - Hydrogenation
Lecture 32 - Interesterification and Winterization
Lecture 33 - Fractionation and Plasticization
Lecture 34 - Margarine and Shortenings
Lecture 35 - Trans-free modifications
Lecture 36 - Animal fats
Lecture 37 - Fish oil and Algal oil
Lecture 38 - Dairy Cream
Lecture 39 - Butter
Lecture 40 - Ghee (Butter Oil)
Lecture 41 - Characteristics and specifications
Lecture 42 - Frying Technology
Lecture 43 - Seed Oils
Lecture 44 - Fruit and Nut Oils
Lecture 45 - Rice Bran Oil
Lecture 46 - Tree Nut Oils
Lecture 47 - Tropical Exotic Oils and Butter
Lecture 48 - Essential Oil
Lecture 49 - Cocoa/Shea Butter and Structured Triacylglycerols
Lecture 50 - Oil powder and liposomes
Lecture 51 - Major by-Products, Their Composition and Uses
Lecture 52 - By-Products Utilization - I
Lecture 53 - By-Products Utilization - II
Lecture 54 - Lecithin Production
Lecture 55 - Biodiesel Production from Waste Cooking Oil
Lecture 56 - Edible Oil Blending and Fortification
Lecture 57 - Packaging materials and methods
Lecture 58 - Handling and Storage
Lecture 59 - Quality Analysis and Control
Lecture 60 - Regulatory Requirements and Course summary

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NPTEL Video Course - Agriculture - NOC:Watershed Hydrology

Subject Co-ordinator - Prof. Rajendra Singh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Precipitation
Lecture 3 - Rainfall data analysis - I
Lecture 4 - Rainfall data analysis - II
Lecture 5 - Rainfall Frequency Analysis
Lecture 6 - Hydrological Abstractions
Lecture 7 - Evaporation
Lecture 8 - Evapotranspiration
Lecture 9 - Infiltration - I
Lecture 10 - Infiltration - II
Lecture 11 - Streamflow Processes
Lecture 12 - Streamflow Measurement - 1
Lecture 13 - Streamflow Measurement - 2
Lecture 14 - Streamflow Measurement - 3
Lecture 15 - Flow Duration Curve and Flow Mass Curve
Lecture 16 - Runoff
Lecture 17 - Estimation of Runoff
Lecture 18 - Estimation of Runoff - Rational Method
Lecture 19 - Estimation of Runoff - SCS-Curve Number Method
Lecture 20 - Numerical on Estimation of Runoff
Lecture 21 - Hydrograph - I
Lecture 22 - Hydrograph - II
Lecture 23 - Derivation of Unit Hydrograph - I
Lecture 24 - Derivation of Unit Hydrograph - II
Lecture 25 - Numerical on Hydrograph
Lecture 26 - Synthetic Unit Hydrograph - I
Lecture 27 - Synthetic Unit Hydrograph - II
Lecture 28 - IUH and Distribution Graph
Lecture 29 - Numerical on Synthetic UH, IUH and Distribution Graph - I

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Lecture 30 - Numerical on Synthetic UH, IUH and Distribution Graph - II
Lecture 31 - Drainage Basin Characteristics
Lecture 32 - Drainage Basin Geomorphology
Lecture 33 - Morphometric analysis using RS and GIS
Lecture 34 - Watershed Management - I
Lecture 35 - Watershed Management - II
Lecture 36 - Hydrological Modelling: Introduction and Protocol
Lecture 37 - Hydrological Models: Classification
Lecture 38 - Hydrological Model: Calibration, Validation and Evaluation
Lecture 39 - Sensitivity Analysis and Machine Learning in Hydrology
Lecture 40 - Machine Learning in Hydrology - II
Lecture 41 - Floods
Lecture 42 - Design Flood
Lecture 43 - Flood Frequency Analysis
Lecture 44 - Flood Control and Management
Lecture 45 - Floodplain Zoning and Numerical on Floods
Lecture 46 - Flood Routing: Introduction
Lecture 47 - Hydrologic Reservoir Routing
Lecture 48 - Hydrologic Channel Routing
Lecture 49 - Hydraulic Channel Routing - Hydraulic routing
Lecture 50 - Numerical on Flood Routing
Lecture 51 - Drought: Introduction
Lecture 52 - Classification of Drought
Lecture 53 - Agricultural Drought - I
Lecture 54 - Agricultural Drought - II
Lecture 55 - Drought Management
Lecture 56 - Hydrological Model Demonstration
Lecture 57 - Miscellaneous Topics
Lecture 58 - Objectives on Watershed Hydrology
Lecture 59 - Objectives on Watershed Hydrology
Lecture 60 - Solution of Numerical Problems in Assignments

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NPTEL Video Course - Agriculture - NOC:Water Quality Management Practices

Subject Co-ordinator - Prof. Gourav Dhar Bhowmick

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Water Quality
Lecture 2 - Classification of Major Water Pollutants
Lecture 3 - Emerging Concerns in Wastewater Treatment in Global Scenario
Lecture 4 - Environmental Legislation and Regulatory Standards
Lecture 5 - Commonly used terminologies and definitions
Lecture 6 - Collection and Preservation of Samples and the Measurement of pH, Acidity, Alkalinity
Lecture 7 - Measurement of DO and Solids in wastewater (TSS/VSS/TDS), Turbidity
Lecture 8 - Determination of BOD, COD and TOC
Lecture 9 - Modelling of BOD and its relation with COD and TOC
Lecture 10 - Determination of Nitrogen, Phosphorus and Microbial Counts
Lecture 11 - Wastewater Treatment Classification and Plant Analysis
Lecture 12 - Order of Reaction and Types of Reactors Used in Wastewater Treatment
Lecture 13 - Concept of Mass Balance
Lecture 14 - Overview of Sewage Treatment Plant
Lecture 15 - Self-Purification and its Factors
Lecture 16 - Screens
Lecture 17 - Grit Chamber and its Classification - I
Lecture 18 - Grit Chamber and its Classification - II and Skimming Tank
Lecture 19 - Theory of Sedimentation and Introduction to Primary Sedimentation Tank and its Types
Lecture 20 - PST: Performance factors affecting efficiency and design recommendations
Lecture 21 - Equalization
Lecture 22 - Neutralization, Dissolved Air Floatation
Lecture 23 - Coagulation
Lecture 24 - Flocculation
Lecture 25 - Pre-aeration and other advanced primary treatment units
Lecture 26 - Bacterial Metabolism and Their Use in Wastewater
Lecture 27 - Factors Affecting Bacterial Growth and Wastewater Treatment Using Bacteria
Lecture 28 - Role of enzymes and algae in biological wastewater treatment
Lecture 29 - Important nomenclature on aerobic treatment units

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Lecture 30 - Types of aeration used in aerobic treatment units and Analysis of Gas Transfer
Lecture 31 - Activated Sludge Process: Description and Types
Lecture 32 - Bacterial growth kinetics in ASP: Biomass mass balance and substrate mass balance
Lecture 33 - Equalization Estimation of values of other operating parameters in ASP
Lecture 34 - Numericals on ASP
Lecture 35 - Sequencing Batch Reactor
Lecture 36 - Trickling Filter- Physical Overview, Types and Process Description
Lecture 37 - Aerated Lagoon, Fluidised Bed Bioreactor, Biological Active Filter
Lecture 38 - Aerated Lagoons, Fluidized Bed Bioreactors, Biological Active Filters
Lecture 39 - Rotating Biological Contactor and Hanging Sponge Reactor
Lecture 40 - Membrane Bioreactor (MBR)
Lecture 41 - Principles of Anaerobic process for wastewater treatment and Methane Production
Lecture 42 - Types of Anaerobic Treatment Systems
Lecture 43 - Factors Affecting Anaerobic Treatment Systems
Lecture 44 - Designs of Anaerobic Reactors: UASB reactor - I
Lecture 45 - Designs of Anaerobic Reactors: UASB reactor - II
Lecture 46 - Pond System, Components, Factors and Terminologies
Lecture 47 - Constructed Wetlands
Lecture 48 - Bio-electrochemical Systems: Types and Definition
Lecture 49 - Hybrid Bio-electrochemical Systems
Lecture 50 - Modular Designs for Smart Cities
Lecture 51 - Nitrification and Denitrification: Major factors
Lecture 52 - Systems used for Nitrification and Denitrification, Anammox Process
Lecture 53 - Biological Phosphorus Removal and Factors affecting it
Lecture 54 - Advanced Oxidation Processes
Lecture 55 - Other Tertiaty treatment systems
Lecture 56 - Disinfection of Wastewater
Lecture 57 - Sludge Management
Lecture 58 - Life-Cycle Costing
Lecture 59 - Case studies
Lecture 60 - Future of Sustainable Wastewater Treatment Technologies

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NPTEL Video Course - Agriculture - NOC:Modern Food Packaging Technologies: Regulatory Aspects and Global Trer

Subject Co-ordinator - Prof. Prem Prakash Srivastav

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Food Packaging
Lecture 2 - Introduction to Food Packaging (Continued...)
Lecture 3 - Introduction to Food Packaging (Continued...)
Lecture 4 - Introduction to Food Packaging (Continued...)
Lecture 5 - Introduction to Food Packaging (Continued...)
Lecture 6 - Introduction to Food Packaging (Continued...)
Lecture 7 - Type of Packaging Materials (Paper)
Lecture 8 - Type of Packaging Materials (Paper) (Continued...)
Lecture 9 - Type of Packaging Materials (Paper) (Continued...)
Lecture 10 - Testing of Paper and Paperboard
Lecture 11 - Types of Packaging Materials (Glass)
Lecture 12 - Types of Packaging Materials (Glass) (Continued...)
Lecture 13 - Types of Packaging Materials (Glass) (Continued...)
Lecture 14 - Types of Packaging Materials (Glass) (Continued...)
Lecture 15 - Types of Packaging Materials (Plastic 1)
Lecture 16 - Types of Packaging Materials (Plastic 1) (Continued...)
Lecture 17 - Types of Packaging Materials (Plastic 1) (Continued...)
Lecture 18 - Types of Packaging Materials (Plastic 1) (Continued...)
Lecture 19 - Types of Packaging Materials (Plastic 2)
Lecture 20 - Types of Packaging Materials (Plastic 2) (Continued...)
Lecture 21 - Properties of Plastic Polymers
Lecture 22 - Properties of Plastic Polymers (Continued...)
Lecture 23 - Coating, Printing and Labeling of Plastic Films
Lecture 24 - Retort Pouches
Lecture 25 - Metals as a Packaging Material
Lecture 26 - Metals as a Packaging Material (Continued...)
Lecture 27 - Metals as a Packaging Material (Can Making Process)
Lecture 28 - Metals as a Packaging Material (can end making process)
Lecture 29 - Metals as a Packaging Material (Aluminium Container)

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Lecture 30 - Metals as a Packaging Material (Corrosion of Metal Packaging)
Lecture 31 - Testing and Regulatory Aspects of Food Packging
Lecture 32 - Testing and Regulatory Aspects of Food Packging (Continued...)
Lecture 33 - Testing and Regulatory Aspects of Food Packging (Continued...)
Lecture 34 - Special Packging Methods (form-fill-seal machine)
Lecture 35 - Special Packging Methods (controlled atmospheric packaging)
Lecture 36 - Special Packaging Methods (modified atmospheric packaging)
Lecture 37 - Special Packaging Methods (aseptic packaging)
Lecture 38 - Special Packaging Methods (active and intelligent packaging)
Lecture 39 - Packaging of Food Products (meat and poultry products)
Lecture 40 - Packaging of Food Products (meat and poultry products) (Continued...)
Lecture 41 - Packaging of Food Products (meat and poultry products) (Continued...)
Lecture 42 - Packaging of Food Products (dairy and dairy based products)
Lecture 43 - Packaging of Food Products (dairy and dairy based products) (Continued...)
Lecture 44 - Packaging of Food Products (dairy and dairy based products) (Continued...)
Lecture 45 - Packaging of Food Products (fruits and vegetables)
Lecture 46 - Packaging of Food Products (fruits and vegetables) (Continued...)
Lecture 47 - Packaging of Food Products (cereals and flours)
Lecture 48 - Packaging of Food Products (bakery and rte products)
Lecture 49 - Packaging of Food Products (confectionery products)
Lecture 50 - Packaging of Food Products (beverages)
Lecture 51 - Overview to Modern Food Packaging
Lecture 52 - Challenges and Variations in Packaging Industries
Lecture 53 - Recent Trends in Packaging Materials - Biodegradable
Lecture 54 - Recent Trends in Packaging Materials - Edible
Lecture 55 - Recycling and Disposal of Plastic Waste and Environmental Concern
Lecture 56 - Packaging Processes and Machinery
Lecture 57 - Packaging Processes and Machinery (Continued...)
Lecture 58 - Packaging Processes and Machinery (Continued...)
Lecture 59 - Packaging Laws and Regulation
Lecture 60 - FSSAI Regulations on Packaging and Labelling Requirements

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NPTEL Video Course - Agriculture - NOC:Basics of Crop Breeding and Plant Biotechnology

Subject Co-ordinator - Prof. Joydeep Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mendelian Genetics
Lecture 2 - Mendelian Genetics
Lecture 3 - Mendelian Genetics
Lecture 4 - Concept of Gene and Experiments on Plant Hybridization
Lecture 5 - Concept of Gene and Experiments on Plant Hybridization
Lecture 6 - Pureline Selection
Lecture 7 - Pedigree Method
Lecture 8 - Backcross Breeding
Lecture 9 - Back Cross Method (Recessive Gene Transfer)
Lecture 10 - Merits and Demerits of Backcross Breeding and Cytoplasm Transfer Through BB
Lecture 11 - Mass Selection
Lecture 12 - Modifications of Mass Selection
Lecture 13 - Recurrent Selection
Lecture 14 - Reciprocal Recurrent Selection
Lecture 15 - Heterosis and Inbreeding Depression
Lecture 16 - Degree of Inbreeding and Genetic Basis of Heterosis and Inbreeding Depression
Lecture 17 - Genetic Basis of Heterosis and Inbreeding Depression
Lecture 18 - Population Genetics - Part I
Lecture 19 - Population Genetics - Part II
Lecture 20 - Population Genetics - Part III
Lecture 21 - Polyploidy - Introduction
Lecture 22 - Autopolyploidy
Lecture 23 - Features and Limitations of Autopolyploids
Lecture 24 - Allopolyploidy
Lecture 25 - Introduction to Reverse Breeding
Lecture 26 - Applications of Reverse Breeding
Lecture 27 - Introduction to Markers
Lecture 28 - RFLP
Lecture 29 - RAPD

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Lecture 30 - AFLP
Lecture 31 - ISSR, SSR, CAPS
Lecture 32 - Backcross breeding through molecular marker - Part I
Lecture 33 - Backcross breeding through molecular marker - Part II
Lecture 34 - Enzymatic tools used in Molecular Biology
Lecture 35 - Vectors and Plasmids used in Molecular Biology
Lecture 36 - Types of Vectors used in Plant Transformation and Selectable Marker Gene
Lecture 37 - Scorable Marker Gene and Plant Tissue Culture
Lecture 38 - Gene Cloning
Lecture 39 - Promoters and Preparation of Over expression Construct
Lecture 40 - Preparation of Gene Silencing Construct
Lecture 41 - Unidirectional and Bidirectional Promoter, NumericalQuestion on Promoter Analysis
Lecture 42 - Application of Plant Tissue Culture - Part I
Lecture 43 - Application of Plant Tissue Culture - Part II
Lecture 44 - Haploids and Artificial Seeds
Lecture 45 - Gene Transfer Methods
Lecture 46 - Agrobacterium Mediated Transformation in Tobacco and Rice
Lecture 47 - PCR Screening
Lecture 48 - Southern and Northern Blot
Lecture 49 - Western Blot
Lecture 50 - Microarray and Other Screening Methods
Lecture 51 - Molecular Analysis of Transgenic Plants - I
Lecture 52 - Molecular Analysis of Transgenic Plants - II
Lecture 53 - Double Integration - Part I
Lecture 54 - Double Integration - Part II
Lecture 55 - Golden Rice, Bt Cotton, FLAVR SAVR
Lecture 56 - Characterisation of OsGLP1 Gene from Rice - Part I
Lecture 57 - Characterization of OsGLP1 Gene from Rice - Part II
Lecture 58 - Seed Sterilisation and Transformation (Rice and Tobacco)

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NPTEL Video Course - Agriculture - NOC:Design of Farm Machinery

Subject Co-ordinator - Prof. Hifjur Raheman

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Moldboard plow
Lecture 2 - Forces acting on moldboard plow
Lecture 3 - Draft of moldboard plow
Lecture 4 - Disk plow
Lecture 5 - Disk Harrow
Lecture 6 - Design of Disk Harrow
Lecture 7 - Numericals related to design of tractor drawn disk harrow
Lecture 8 - Design of a Tractor drawn Disk Harrow
Lecture 9 - Design of spike tooth harrow
Lecture 10 - Cultivator
Lecture 11 - Forces and moments acting on the shank and frame of a cultivator
Lecture 12 - Design of tractor drawn cultivator
Lecture 13 - Rotavator
Lecture 14 - Soil resistance and specific work of the rotavator
Lecture 15 - Design of components of a rotavator
Lecture 16 - Design of a tractor drawn rotavator
Lecture 17 - Design of a tractor drawn rotavator (reversed mode)
Lecture 18 - Combination tillage implements
Lecture 19 - Draft and power requirement of combination tillage implements
Lecture 20 - Design of a passive-passive combination tillage implement
Lecture 21 - Design of an active-passive combination tillage implement
Lecture 22 - Computation on design of active-passive tillage implement
Lecture 23 - Performance parameters
Lecture 24 - Performance parameters (Continued...)
Lecture 25 - Tillage performance index
Lecture 26 - Seed drill/planter
Lecture 27 - Components of seed drill and its calibration
Lecture 28 - Performance evaluation of metering unit and design of hopper
Lecture 29 - Designs of fluted roller metering unit and ground wheel

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Lecture 30 - Design of single seed metering unit
Lecture 31 - Designs of feed roll shaft, furrow openers and frame
Lecture 32 - Design calculations for fluted roller metering unit and hopper
Lecture 33 - Seed tube and furrow closer
Lecture 34 - Seed flow sensing in a seed drill
Lecture 35 - Design of drum seeder
Lecture 36 - Design of multi-crop drum seeder
Lecture 37 - Deciding the dimensions of a multi-crop dryland drum seeder
Lecture 38 - Design of a remote controlled drum seeder for wetland
Lecture 39 - Granular chemical applicators
Lecture 40 - Liquid chemical applicators
Lecture 41 - Low pressure liquid chemical applicators
Lecture 42 - Selection of pumps for liquid chemical applicators
Lecture 43 - Atomizers
Lecture 44 - Performance evaluation of sprayers
Lecture 45 - Droplet size determination
Lecture 46 - Factors affecting droplet size
Lecture 47 - Solar Energy operated unmanned sprayer
Lecture 48 - Working principle of harvesters
Lecture 49 - Components of harvesting equipment with shear cutting
Lecture 50 - Geometry of knife section and model for estimating load causing failure of stem
Lecture 51 - Design of a self-propelled vertical conveyor reaper
Lecture 52 - Numericals related to cutting by impact and shear
Lecture 53 - Design of an electric-vertical conveyor reaper (E-VCR)
Lecture 54 - Power requirement and field performance of an electric vertical conveyor reaper
Lecture 55 - Onion topper cum digger
Lecture 56 - Classification, working principle and factors influencing performance of threshing equipment
Lecture 57 - Power requirement of threshing equipment and design informations
Lecture 58 - Performance parameter for evaluation of threshers
Lecture 59 - Design of a spike tooth thresher
Lecture 60 - Solar energy operated thresher

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NPTEL Video Course - Agriculture - NOC:Food Science and Technology

Subject Co-ordinator - Prof. Hari Niwas Mishra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction, Food and Health
Lecture 2 - Food Production and Processing Challenges
Lecture 3 - Energy and Nutritional Value of Foods
Lecture 4 - Balanced Diets
Lecture 5 - Sustainability in Food Industry
Lecture 6 - Food Quality Characteristics
Lecture 7 - Physical Properties of Foods
Lecture 8 - Textural and Rheological Properties of Foods
Lecture 9 - Thermal Properties Relationships
Lecture 10 - Food Structure and Quality Relationships
Lecture 11 - Major Chemical and Biochemical Reactions in Foods
Lecture 12 - Oxidative Reactions in Foods
Lecture 13 - Hydrolytic Reactions in Foods
Lecture 14 - Factors Affecting Chemical Changes in Foods
Lecture 15 - Enzymatic processes in food
Lecture 16 - Significance of Sensory Organs
Lecture 17 - Anatomy and Functions of Taste and Smell
Lecture 18 - Sensory Evaluation Methods
Lecture 19 - Psychophysics of Sensory Perception
Lecture 20 - Novel Techniques in Sensory Evaluation
Lecture 21 - Water and Ice
Lecture 22 - Sugars and Oligosaccharides
Lecture 23 - Starch, Cellulose and Pectin
Lecture 24 - Proteins and Polypeptides
Lecture 25 - Triglycerides and Phospholipids
Lecture 26 - Vitamins
Lecture 27 - Minerals
Lecture 28 - Phytochemicals and Bioactives
Lecture 29 - Pigments and Colours

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Lecture 30 - Flavouring Compounds
Lecture 31 - Food Microorganisms
Lecture 32 - Microbial Growth
Lecture 33 - Microbial Spoilage of Foods
Lecture 34 - Prevention of Food Poisoning and Spoilage
Lecture 35 - Beneficial Microorganisms
Lecture 36 - Chemical Food Additives
Lecture 37 - Functional Food Additives
Lecture 38 - Food Adulteration
Lecture 39 - Toxins and Allergens
Lecture 40 - International Regulations on Food Additives
Lecture 41 - Traditional Food Preservation Technologies
Lecture 42 - Chemical and Bio Preservation of Foods
Lecture 43 - Non-Thermal Technologies for Food Preservation
Lecture 44 - Alternate Thermal Technologies for Food Preservation
Lecture 45 - Low-Temperature Preservation of Foods
Lecture 46 - Food Process Principles and Operations
Lecture 47 - Food Formulation and Design
Lecture 48 - Mathematical Tools for Food Formulation
Lecture 49 - Functional and Designer Foods
Lecture 50 - 3D Printed foods for personalized nutrition
Lecture 51 - Concepts in Food Manufacturing and Industry 4.0
Lecture 52 - AI/ML Applications in Food Processing
Lecture 53 - Advanced Instrumentation and Sensors
Lecture 54 - Process Control and Automation
Lecture 55 - Robotics and Future Trends in Food Manufacturing
Lecture 56 - Concept of Circular Economy
Lecture 57 - Grain Processing by-products and Waste Utilization
Lecture 58 - Fruits and Vegetables Processing Industry Waste utilization
Lecture 59 - Fish, Meat and Poultry Processing Waste Utilization
Lecture 60 - Dairy Industry Waste Utilization and Course Summing-up

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NPTEL Video Course - Agriculture - NOC:Impact of Flow of Fluids in Food Processing and Preservation

Subject Co-ordinator - Prof. Kanishka Bhunia, Prof. Tridib Kumar Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Food Process Engineering
Lecture 2 - Preservation of Food
Lecture 3 - Food Processing Operations
Lecture 4 - Preservation By Removal of Water
Lecture 5 - Introduction to Equation of Continuity
Lecture 6 - Equation of Continuity (Continued...)
Lecture 7 - Equation of Continuity in Different Forms
Lecture 8 - Derivation of Equation of Continuity
Lecture 9 - Equation of Continuity in Cylindrical and Spherical Coordinates
Lecture 10 - Equation of Motion in Cartesian Coordinate
Lecture 11 - Equation of Motion (Continued...)
Lecture 12 - Navier Stokes Equations
Lecture 13 - Navier Stokes Equations (Continued...)
Lecture 14 - Problems and Solutions with the help of Navier Stokes Equation
Lecture 15 - Problems and Solutions with the help of Navier Stokes Equation
Lecture 16 - Problems and Solutions with the help of Navier Stokes Equation
Lecture 17 - Flow Through Pipes
Lecture 18 - Hagen Poiseuille Equation
Lecture 19 - Navier Stokes Equation Using Boundary Conditions
Lecture 20 - Friction Factor
Lecture 21 - Laminar Flow Through Parallel Plates
Lecture 22 - Vertical Flow Through Parallel Plates
Lecture 23 - Flow of Fluid Through inclined Or Horizontal Solid Surface
Lecture 24 - Reynolds Number of Falling Film
Lecture 25 - Flow of Fluid Through Annulur Space
Lecture 26 - Measurement of Viscosity with the help of Drop of A Ball
Lecture 27 - Flow Behaviour Throgh Narrow Slit
Lecture 28 - Problems and Solutions of Moving Surface Flow
Lecture 29 - Problems and Solutions of Moving Surface Flow (Continued...)

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Lecture 30 - Problems and Solutions On Poiseuille Flow and Couette Flow
Lecture 31 - Problems and Solutions On Spinning
Lecture 32 - Compressible Gas Flow
Lecture 33 - Pressure Drop Relation For Compressible Gas
Lecture 34 - Problem and Its Solutions of Pressure Drop For Compressible Gas Flow
Lecture 35 - Use of Trial and Error Method to Find Pressure Drop
Lecture 36 - Flow Through Packed bed
Lecture 37 - Hydraulic Radius
Lecture 38 - Problems and Solutions of Packed Bed
Lecture 39 - Pressure Drop in Pipes For Compressible Liquids
Lecture 40 - Fluidization
Lecture 41 - Problems and Solution of Fluidization
Lecture 42 - Flow Through Nozzles
Lecture 43 - Bernoulliâ s Equation Used in Nozzle Flow
Lecture 44 - Discharge Rate Through Nozzles
Lecture 45 - Adiabatic Flow Through Refrigeration Unit
Lecture 46 - Problems and Solutions of Nozzle Flow
Lecture 47 - Sonic Velocity
Lecture 48 - Diatomic Gas With Sonic Velocity
Lecture 49 - Variable Flow
Lecture 50 - Pneumatic Conveying
Lecture 51 - Non-Newtonian Fluid Flow
Lecture 52 - Non-Newtonian Fluid Flow (Continued...)
Lecture 53 - Non-Newtonian Fluid Flow (Continued...)
Lecture 54 - Non-Newtonian Fluid Flow (Continued...)
Lecture 55 - Non-Newtonian Fluid Flow (Continued...)
Lecture 56 - Flow Through Filter Medium
Lecture 57 - Flow Through Filter Medium (Continued...)
Lecture 58 - Flow Through Filter Medium (Continued...)
Lecture 59 - Flow Through Filter Medium (Continued...)
Lecture 60 - Flow Through Filter Medium (Continued...)

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NPTEL Video Course - Agriculture - NOC:Food Microbiology for Safe and Sustainable Food Systems

Subject Co-ordinator - Prof. Prem Prakash Srivastav

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Development in Food Microbiology and Current Status
Lecture 3 - Classification of Microorganisms
Lecture 4 - Classification of Microorganisms (Eukaryotic cell, algae, fingi and molds)
Lecture 5 - Classification of Microorganisms (Molds, Yeasts, Protozoa and Viruses)
Lecture 6 - Sources of Microorganisms
Lecture 7 - Biochemistry of some beneficial traits
Lecture 8 - Food Fermentation
Lecture 9 - Starter culture
Lecture 10 - Interstinal benefical bacteria (Probiotics)
Lecture 11 - Contamination of foods (Chemical Contaminations)
Lecture 12 - Contamination of foods (Biological Contaminations)
Lecture 13 - Contamination of foods (Physical and crosscontamination Contaminations)
Lecture 14 - Various stages of contamination of foods
Lecture 15 - Minimization of food contamiantion
Lecture 16 - Microbial growth characteristics
Lecture 17 - Nature of microbial growth in food
Lecture 18 - Factors affecting microbial growth (intrinsic factors)
Lecture 19 - Factors affecting microbial growth (extrinsic factors)
Lecture 20 - Measurement of microbial growth
Lecture 21 - Overview
Lecture 22 - Spoilage of fruits and vegetables
Lecture 23 - Spoilage of meat, poultry, egg and sea foods
Lecture 24 - Spoilage of dairy and dairy based product
Lecture 25 - Spoilage of cereal product, beverages and canned based Product
Lecture 26 - Food-borne Illnesses
Lecture 27 - Food-borne Intoxication
Lecture 28 - Food-borne Infection
Lecture 29 - Food-borne Toxicoinfections

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Lecture 30 - Food-borne diseases and food safety in India
Lecture 31 - Thermal Processing of Food (Blanching, Pasteurization and Appertization)
Lecture 32 - Thermal Processing of Food (Sterilization)
Lecture 33 - Thermal Processing of Food (Thermal Death Rate Kinetics)
Lecture 34 - Irradiation
Lecture 35 - Chemical methods
Lecture 36 - Food Sanitation and Safety
Lecture 37 - Food Sanitation and Safety (Continued...)
Lecture 38 - Microbiological Considerations in Food Packaging
Lecture 39 - Microbiological Considerations in Food Packaging (Continued...)
Lecture 40 - Food Laws and Standards

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NPTEL Video Course - Agriculture - NOC:Operations Research

Subject Co-ordinator - Prof. Rajendra Singh

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - OR - Introduction
Lecture 2 - OR and Systems Approach
Lecture 3 - Mathematical Modelling Process and Linear Programming
Lecture 4 - Linear Programming - Problem Formulation
Lecture 5 - Linear Programming - Problem Formulation
Lecture 6 - Linear Programming - Graphical Solution - I
Lecture 7 - Linear Programming - Graphical Solution - II
Lecture 8 - Linear Program in Standard form
Lecture 9 - Linear Programming - Simplex Method - I
Lecture 10 - Linear Programming - Simplex Method - II
Lecture 11 - Linear Programming - Simplex Method
Lecture 12 - Big-M Simplex Method
Lecture 13 - Big_M_Practice Problems
Lecture 14 - Two-Phase Simplex Method
Lecture 15 - Two-Phase_Practice Problems
Lecture 16 - Revised Simplex Method - I
Lecture 17 - Revised Simplex Method - II
Lecture 18 - Duality Theory
Lecture 19 - Dual Simplex Method
Lecture 20 - Practice Problems
Lecture 21 - Sensitivity Analysis - I
Lecture 22 - Sensitivity Analysis - II
Lecture 23 - Sensitivity Analysis Practice Problems
Lecture 24 - Case Studies - I
Lecture 25 - Case Studies - II
Lecture 26 - Goal Programming
Lecture 27 - Weighted Goal Programming
Lecture 28 - Weighted Goal Programming Examples
Lecture 29 - Lexicographic Goal Programming

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Lecture 30 - Example and Case Study
Lecture 31 - Transportation - Introduction and Mathematical Formulation
Lecture 32 - Finding an Initial Basic Feasible Solution
Lecture 33 - Degeneracy and Initial Basic Feasible Solution Examples
Lecture 34 - Practice Problems
Lecture 35 - Finding the Optimal Solution
Lecture 36 - Practice Problems
Lecture 37 - Practice Problems - Solution Demo
Lecture 38 - Practice Problems
Lecture 39 - Case Study Examples
Lecture 40 - Assignment Problem
Lecture 41 - Assignment Problem - Practice Problem and Special Cases
Lecture 42 - Assignment Problem - Special Cases
Lecture 43 - Assignment Case Study and Inventory Control
Lecture 44 - EOQ Models
Lecture 45 - EOQ Practice Problems
Lecture 46 - Replacement Theory
Lecture 47 - Sequencing Problem
Lecture 48 - Queuing Theory - I
Lecture 49 - Queuing Theory - II
Lecture 50 - Case Study
Lecture 51 - Project Management - Introduction to Network Analysis
Lecture 52
Lecture 53 - Solution by Network Analysis
Lecture 54 - CPM: Enumerative method
Lecture 55 - Practice Problems
Lecture 56 - CPM: Mathematical Programming Models - I
Lecture 57 - CPM: Mathematical Programming Models - II
Lecture 58 - Introduction to PERT
Lecture 59 - Problem Examples on PERT and CPM
Lecture 60 - Project Management - Case study

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NPTEL Video Course - Agriculture - NOC:Crop Modeling and Simulation for Agricultural Production Management (C

Subject Co-ordinator - Prof. Dillip Kumar Swain

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to crop production system: Crop Production System and its Components, Objectives of
Lecture 2 - Production Situations, Crop classification and Agroclimatic Zon
Lecture 3 - Crop Ecosystem and Agro-Climatic Zones
Lecture 4 - Crop Growth and Development Phases for Input Management
Lecture 5 - Crop Growth Factors and Growth Laws
Lecture 6 - Effect of Climatic Factors on Crop Growth
Lecture 7 - Solar Radiation Interception Concept for Biomass Production
Lecture 8 - Growing Degree Days Concept for Growth Duration and Yield Prediction
Lecture 9 - Introduction to Crop Modeling and Simulation
Lecture 10 - Decision Support System (DSS) in Agricultural Production
Lecture 11 - Types of Crop Model
Lecture 12 - Type of Experiment and Data Requirement in Crop Modeling
Lecture 13 - Terminologies Used in Crop Modeling and Simulation
Lecture 14 - Hierarchy of Models Used and Goals of Crop Modeling and Simulation
Lecture 15 - Historical Chronology of Crop Yield Prediction System
Lecture 16 - Crop System Model Development
Lecture 17 - Crop Modeling Concepts and Compartment Model Symbols
Lecture 18 - State Variables Working Principle
Lecture 19 - State Variables Working Principle
Lecture 20 - Crop Systems Model For Different Production Situations
Lecture 21 - Potential Production Simulation Input Factors
Lecture 22 - Simulation Flow Chart with State and Rate Variables
Lecture 23 - Crop Biomass and Growth Rate Simulation
Lecture 24 - Crop Yield Simulation
Lecture 25 - DSSAT Model Overview, Application and Crops Involved
Lecture 26 - Modules in DSSAT
Lecture 27 - Description of CERES-Rice of DSSAT
Lecture 28 - Biomass and Yield Simulation Process in CERES-Rice
Lecture 29 - Description of CROP GRO of DSSAT - I

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Lecture 30 - Description of CROP GRO of DSSAT - II
Lecture 31 - Description of SUBSTOR of DSSAT - I
Lecture 32 - Description of SUBSTOR of DSSAT - II
Lecture 33 - File system of DSSAT: Input file, File naming, and Input data
Lecture 34 - Statistical technique for model calibration and validation
Lecture 35 - Model Application for Agricultural Risk Management and Uncertainty Analysis - I
Lecture 36 - Model Application for Agricultural Risk Management and Uncertainty Analysis - II
Lecture 37 - Climate Risk Management (CRM) Tools - I
Lecture 38 - Climate Risk management (CRM) Tools - II
Lecture 39 - Climate Risk management (CRM) Tools - III
Lecture 40 - Climate Risk management (CRM) Tools - IV
Lecture 41 - Crop Modeling Support for Agro-advisory and Insurance Schemes
Lecture 42 - Hands on DSSAT: Experimental and Management Data Inputs
Lecture 43 - Hands on DSSAT: Experimental and Management Data Inputs
Lecture 44 - Hands on DSSAT: Soil Data Inputs
Lecture 45 - Hands on DSSAT: Weather Data Inputs - I
Lecture 46 - Hands on DSSAT: Weather Data Inputs - II
Lecture 47 - Hands on DSSAT: Model Performance and Genotype Coefficient of CERES-Rice
Lecture 48 - Hands on DSSAT: Experimental and Management Data Inputs of SUBSTOR-Potato
Lecture 49 - Hands on Exercises: Rice Yield Simulation for Varying Inputs (Soil and Nutrients)
Lecture 50 - Hands on Exercises: Rice yield simulation for varying inputs (Weather and water management)
Lecture 51 - Hands on Exercises: Potato Yield simulation for varying inputs (Weather and water management)
Lecture 52 - Hands on Exercises: Effect of elevated CO2 and temperature on rice production
Lecture 53 - Hands on Exercises: Effect of elevated CO2 and temperature on potato production
Lecture 54 - Hands on Exercises: Identification of temperature stress sensitive crop growth phases
Lecture 55 - Hands on Exercises: Climatic risk assessment on crop yield
Lecture 56 - Application of Crop Modeling for Management Decision (Input Management and Climate Risk Manageme
Lecture 57 - Errors in Simulation Exercises
Lecture 58 - Hands on Exercises (Assignment Group-A): Climate risk assessment on rice production
Lecture 59 - Hands on Exercises (Assignment Group-B): Optimum planting time for potato production
Lecture 60 - Hands on Exercises (Assignment Group-C): Elevated CO2 and temperature effects on rice productior

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NPTEL Video Course - Agriculture - NOC:Precision Agriculture

Subject Co-ordinator - Prof. Kishore Chandra Swain

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Precision Agriculture
Lecture 2 - Introduction to Precision Agriculture (Continued...)
Lecture 3 - GPS Receiver - I
Lecture 4 - GPS Receiver - II
Lecture 5 - Hands on Handheld GPS Receiver
Lecture 6 - Geographical Information System (GIS)
Lecture 7 - Data structure - I
Lecture 8 - Data structure - II
Lecture 9 - Data Structure - III
Lecture 10 - Open GIS and Internet GIS
Lecture 11 - Introduction to Remote Sensing
Lecture 12 - Earth resource satellites - I
Lecture 13 - Earth resource satellites - II
Lecture 14 - Microwave remote sensing
Lecture 15 - Hyperspectral remote sensing
Lecture 16 - Hands on QGIS
Lecture 17 - Hands on QGIS software - I
Lecture 18 - Hands on QGIS software - II
Lecture 19 - Hands on QGIS software - III
Lecture 20 - Hands on SNAP software
Lecture 21 - Site specific management zone (SSMZ)
Lecture 22 - Crop scouting - I
Lecture 23 - Crop scouting - II
Lecture 24 - Variable rate technology (VRT) - I
Lecture 25 - Variable rate technology (VRT) - II
Lecture 26 - Advance GIS
Lecture 27 - Land Suitability With AHP
Lecture 28 - Artificial Intelligence
Lecture 29 - Machine Learning Application

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Lecture 30 - Handson Google Earth Engine
Lecture 31 - Green Seeker
Lecture 32 - Chlorophyll Meter and Moisture meter
Lecture 33 - Hands on with Moisture meter
Lecture 34 - Hands on with Chlorophyll meter and Green Seeker
Lecture 35 - Wrieless Sensor Network
Lecture 36 - Laser Land Leveller
Lecture 37 - Yield Monitor
Lecture 38 - IOT in Agriculture
Lecture 39 - Farm Robots
Lecture 40 - Drones

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NPTEL Video Course - Architecture - NOC:Landscape Architecture and Site Planning - Basic Fundamentals

Subject Co-ordinator - Prof. Uttam Kumar Bannerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Introduction to Landscape
Lecture 3 - Categories and Materials in Landscape
Lecture 4 - Objective and Professional Scope of Landscape Design
Lecture 5 - Objective and Professional Scope of Landscape Design (Continued...)
Lecture 6 - Introduction to History of Landscape Design
Lecture 7 - Introduction to History of Landscape Design (Continued...)
Lecture 8 - Introduction to History of Landscape Design (Continued...)
Lecture 9 - Introduction to History of Landscape Design (Continued...)
Lecture 10 - Introduction to History of Landscape Design (Continued...)
Lecture 11 - Introduction to History of Landscape Design (Continued...)
Lecture 12 - Introduction to History of Landscape Design (Continued...)
Lecture 13
Lecture 14
Lecture 15
Lecture 16 - Behavioral Principle
Lecture 17 - Behavioral Principle (Continued...)
Lecture 18 - Behavioral Principle (Continued...)
Lecture 19 - Behavioral Principle (Continued...)
Lecture 20 - Behavioral Principle (Continued...)
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31 - Landform Design
Lecture 32 - Landform Design (Continued...)
Lecture 33 - Landform Design (Continued...)
Lecture 34 - Landform Design (Continued...)
Lecture 35 - Landform Design (Continued...)
Lecture 36 - Planting Design
Lecture 37 - Planting Design (Continued...)
Lecture 38 - Planting Design (Continued...)
Lecture 39 - Planting Design (Continued...)
Lecture 40 - Planting Design (Continued...)

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NPTEL Video Course - Architecture - NOC:Architectural Conservation and Historic Preservation

Subject Co-ordinator - Prof. Sanghamitra Basu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Need, Debate and Purpose
Lecture 4 - Heritage Significance and Values
Lecture 5 - Heritage Significance and Values (Continued...)
Lecture 6 - Assessing Heritage Values and Significance
Lecture 7 - Heritage Values and Significance (Continued...)
Lecture 8 - Assessing Heritage Significance Concept and Process
Lecture 9 - Assessing Heritage Significance Concept and Process (Continued...)
Lecture 10 - Divergent Approaches for Managing and Rehabilitating Heritage Properties
Lecture 11 - Divergent Approaches for Managing and Rehabilitating Heritage Properties
Lecture 12 - Divergent Approaches for Managing and Rehabilitating Heritage Properties
Lecture 13 - Ethics of Conservation
Lecture 14 - Evolution of Heritage Conservation
Lecture 15 - Evolution of Heritage Conservation (Continued...)
Lecture 16 - World Heritage Sites - Part 1
Lecture 17 - World heritage Sites - Part 2
Lecture 18 - World Heritage Sites - Part 3
Lecture 19 - World Heritage Sites - Part 4
Lecture 20 - World Heritage Sites - Part 5
Lecture 21 - Causes of decay in cultural property - Part 1
Lecture 22 - Causes of decay - Part 2
Lecture 23 - Causes of decay - Part 3
Lecture 24 - Causes of decay - Part 4
Lecture 25 - Documenting heritage properties
Lecture 26 - Documenting Heritage Properties
Lecture 27 - Investigation and Conservation of Historic Structures
Lecture 28 - Investigation and Conservation of Historic Structures
Lecture 29 - Investigation and Conservation of Historic Structures

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Lecture 30 - Conservation of Historic Structures
Lecture 31 - Conservation of Historic Structures
Lecture 32 - Historic Cities and Heritage Areas
Lecture 33 - Historic Cities and Heritage Areas (Continued...)
Lecture 34 - Historic Cities and Heritage Areas (Continued...)
Lecture 35 - Historic Cities and Heritage Areas (Continued...)
Lecture 36 - Historic Cities and Heritage Zones - India
Lecture 37 - Historic Areas and Heritage Zones - India (Continued...)
Lecture 38 - New Buildings in Historic Settings
Lecture 39 - Heritage Impact Assessment in Historic Settings
Lecture 40 - Adaptive Reuse
Lecture 41 - Legislative and Organizational Policies for India
Lecture 42 - Heritage Regulations and Role of Voluntary Organisations
Lecture 43 - Heritage Conservation - Issues and Potentials

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NPTEL Video Course - Architecture - NOC:Architectural Acoustics

Subject Co-ordinator - Prof. Sumana Gupta, Prof. Sankha Pratim Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Historical Overview
Lecture 2 - Introduction to Acoustical Physics
Lecture 3 - Frequency and Octave
Lecture 4 - Sound Pressure and Intensity Levels
Lecture 5 - Near and Far Field Propagation and Loudness
Lecture 6 - Room Acoustics - I
Lecture 7 - Room Acoustics - II
Lecture 8 - Indoor Acoustics, Reflection and Absorption
Lecture 9 - Concept of Reverberation
Lecture 10 - Application of Reverberation Time
Lecture 11 - Introduction to Acoustical Absorbers
Lecture 12 - Panel Absorbers and Resonators
Lecture 13 - Absorption in spaces of different volumes
Lecture 14 - Acoustical Absorbers
Lecture 15 - Reverberation time and Intelligibility
Lecture 16 - Acoustical Criteria and Space Design
Lecture 17 - Acoustical Criteria and Space Design (Continued...)
Lecture 18 - Acoustical Criteria and Space Design (Continued...)
Lecture 19 - Acoustical Criteria and Space Design (Continued...)
Lecture 20 - Acoustical Criteria and Space Design (Continued...)
Lecture 21 - Introduction to Auditorium Design
Lecture 22 - Introduction to Auditorium Design (Continued...)
Lecture 23 - Introduction to Auditorium Design (Continued...)
Lecture 24 - Introduction to Auditorium Design Balcony and ceiling design
Lecture 25 - Introduction to Auditorium Design
Lecture 26 - Electro Acoustics - I
Lecture 27 - Electro Acoustics - II
Lecture 28 - Meteorological conditions and propagation of sound
Lecture 29 - Topography and sound propagation Historical contexts

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Lecture 30 - Open air Theatre considerations
Lecture 31 - Air Borne Sound Transmission
Lecture 32 - Air Borne Sound Transmission (Continued...)
Lecture 33 - Air Borne Sound Transmission (Continued...)
Lecture 34 - Structure Borne Sound Transmission
Lecture 35 - Structure Borne Sound Transmission (Continued...)
Lecture 36 - Environmental Acoustics - I
Lecture 37 - Environmental Acoustics - II
Lecture 38 - Urban Noise Control
Lecture 39 - Urban Noise Control
Lecture 40 - Urban Noise Control

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NPTEL Video Course - Architecture - NOC:Building Materials and Composites

Subject Co-ordinator - Prof. Sumana Gupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Clay products - 1
Lecture 3 - Clay products - 2
Lecture 4 - Stone
Lecture 5 - Stone (Continued...)
Lecture 6 - Introduction to wood
Lecture 7 - Wood
Lecture 8 - Defects of wood and Wood joinery
Lecture 9 - Engineered wood
Lecture 10 - Bamboo
Lecture 11 - Glass
Lecture 12 - Glass (Continued...)
Lecture 13 - Glass (Continued...)
Lecture 14 - Glass wall and glass insulation
Lecture 15 - Ceramic tiles and vitrified tiles
Lecture 16 - Introduction to concrete
Lecture 17 - Fine Aggregates
Lecture 18 - Coarse Aggregates
Lecture 19 - Cement
Lecture 20 - Water, Plasticizer admixture and tests
Lecture 21 - Introduction to prefabricated items
Lecture 22 - CMU, AAC and Pavement Blocks
Lecture 23 - Precast Wall Panels
Lecture 24 - Floor panels
Lecture 25 - Columns, foundation, ferro-cement
Lecture 26 - Introduction to metals
Lecture 27 - Ferrous Metals 1 - Cast and Wrought Iron
Lecture 28 - Ferrous metals 2 - Steel
Lecture 29 - Ferrous metals 2 - Reinforcement bars, Corrosion, Light Gauge Steel

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Lecture 30 - Non-ferrous metals
Lecture 31 - Damp proofing
Lecture 32 - Damp proofing methods and materials
Lecture 33 - Thermal insulation and sound insulation
Lecture 34 - Insulation, Bitumen and Gypsum
Lecture 35 - Composites
Lecture 36 - Paints
Lecture 37 - Paints (Continued...)
Lecture 38 - Paints (Continued...)
Lecture 39 - Plastics
Lecture 40 - Plastics (Continued...)

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NPTEL Video Course - Architecture - NOC:Environmental Soil Chemistry

Subject Co-ordinator - Prof. Somsubhra Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of Soil Chemistry
Lecture 2 - Evolution of Soil Chemistry (Continued...)
Lecture 3 - Evolution of Soil Chemistry (Continued...)
Lecture 4 - Evolution of Soil Chemistry (Continued...)
Lecture 5 - Evolution of Soil Chemistry (Continued...)
Lecture 6 - Inorganic Soil Components
Lecture 7 - Inorganic Soil Components (Continued...)
Lecture 8 - Inorganic Soil Components (Continued...)
Lecture 9 - Inorganic Soil Components (Continued...)
Lecture 10 - Inorganic Soil Components (Continued...)
Lecture 11 - Chemistry of Soil Organic Matter
Lecture 12 - Chemistry of Soil Organic Matter (Continued...)
Lecture 13 - Chemistry of Soil Organic Matter (Continued...)
Lecture 14 - Chemistry of Soil Organic Matter (Continued...)
Lecture 15 - Chemistry of Soil Organic Matter (Continued...)
Lecture 16 - Soil Solution-Solid Phase Equilibria and Sorption in Solids
Lecture 17 - Soil Solution-Solid Phase Equilibria and Sorption in Solids (Continued...)
Lecture 18 - Soil Solution-Solid Phase Equilibria and Sorption in Solids (Continued...)
Lecture 19 - Soil Solution-Solid Phase Equilibria and Sorption in Solids (Continued...)
Lecture 20 - Soil Solution-Solid Phase Equilibria and Sorption in Solids (Continued...)
Lecture 21 - Ion Exchange Processes
Lecture 22 - Ion Exchange Processes (Continued...)
Lecture 23 - Ion Exchange Processes (Continued...)
Lecture 24 - Ion Exchange Processes (Continued...)
Lecture 25 - Ion Exchange Processes (Continued...)
Lecture 26 - Kinetics of Soil Chemical Processes
Lecture 27 - Kinetics of Soil Chemical Processes (Continued...)
Lecture 28 - Kinetics of Soil Chemical Processes (Continued...)
Lecture 29 - Kinetics of Soil Chemical Processes (Continued...)

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Lecture 30 - Kinetics of Soil Chemical Processes (Continued...)
Lecture 31 - Redox Chemistry of Soils
Lecture 32 - Redox Chemistry of Soils (Continued...)
Lecture 33 - Redox Chemistry of Soils (Continued...)
Lecture 34 - Redox Chemistry of Soils (Continued...)
Lecture 35 - Redox Chemistry of Soils (Continued...)
Lecture 36 - Soil Pollutants
Lecture 37 - Soil Pollutants (Continued...)
Lecture 38 - Soil Pollutants (Continued...)
Lecture 39 - Soil Pollutants (Continued...)
Lecture 40 - Soil Pollutants (Continued...)
Lecture 41 - Pollutant-Soil Solution Interaction
Lecture 42 - Pollutant-Soil Solution Interaction (Continued...)
Lecture 43 - Pollutant-Soil Solution Interaction (Continued...)
Lecture 44 - Pollutant-Soil Solution Interaction (Continued...)
Lecture 45 - Pollutant-Soil Solution Interaction (Continued...)
Lecture 46 - Retention of Pollutants on and within Soil Solid Phases
Lecture 47 - Retention of Pollutants on and within Soil Solid Phases (Continued...)
Lecture 48 - Retention of Pollutants on and within Soil Solid Phases (Continued...)
Lecture 49 - Retention of Pollutants on and within Soil Solid Phases (Continued...)
Lecture 50 - Retention of Pollutants on and within Soil Solid Phases (Continued...)
Lecture 51 - Modeling the Fate of Pollutants in Soil, Risk and Remedies
Lecture 52 - Modeling the Fate of Pollutants in Soil, Risk and Remedies (Continued...)
Lecture 53 - Modeling the Fate of Pollutants in Soil, Risk and Remedies (Continued...)
Lecture 54 - Modeling the Fate of Pollutants in Soil, Risk and Remedies (Continued...)
Lecture 55 - Modeling the Fate of Pollutants in Soil, Risk and Remedies (Continued...)
Lecture 56 - Analytical Techniques for Assessing Soil Pollution
Lecture 57 - Analytical Techniques for Assessing Soil Pollution (Continued...)
Lecture 58 - Analytical Techniques for Assessing Soil Pollution (Continued...)
Lecture 59 - Analytical Techniques for Assessing Soil Pollution (Continued...)
Lecture 60 - Analytical Techniques for Assessing Soil Pollution (Continued...)

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NPTEL Video Course - Architecture - NOC:Structural System in Architecture

Subject Co-ordinator - Prof. Sankha Pratim Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Structural System
Lecture 2 - Force System
Lecture 3 - Moment, Couple and Static Equilibrium
Lecture 4 - Supports and Reactions
Lecture 5 - Structural Loading and Support Reactions
Lecture 6 - Theory of Elasticity - 1
Lecture 7 - Theory of Elasticity - 2
Lecture 8 - Shear Force Diagram
Lecture 9 - Bending Moment Diagram
Lecture 10 - SFD and BMD
Lecture 11 - Bending Stress in Beam - I
Lecture 12 - Bending Stress in Beam - II
Lecture 13 - Bending Stress in Beam - III
Lecture 14 - Shear Stress in Beam
Lecture 15 - Theory of Column
Lecture 16 - Deflection of Beams
Lecture 17 - Indeterminate Beams
Lecture 18 - Analysis of Fixed Beam, BMD and Deflected Shape, Portal Frame
Lecture 19 - Structural Grid and Framing
Lecture 20 - Structural Design
Lecture 21 - Introduction to Truss
Lecture 22 - Analysis of Truss - 1
Lecture 23 - Analysis of Truss - 2
Lecture 24 - Application of Truss in Architecture
Lecture 25 - Space Frame Structures
Lecture 26 - Introduction to Arch
Lecture 27 - Structural Principle and Application of Arch
Lecture 28 - Shell Structures
Lecture 29 - Application of Arch and Shell in Architecture

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Lecture 30 - Structural Concept and Application of Dome in Architecture
Lecture 31 - Cable Supported Structures
Lecture 32 - Membrane Structures
Lecture 33 - Application of Tensile Structures in Architecture
Lecture 34 - Flat Plate and Flate Slab Structures
Lecture 35 - Waffle Slab and Folded Plate Structures
Lecture 36 - Temporary Structures
Lecture 37 - Building Foundation
Lecture 38 - Structural System for High-rise Buildings - I
Lecture 39 - Structural System for High-rise Buildings - II
Lecture 40 - Structural Detailing

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NPTEL Video Course - Architecture - NOC:Urban Landuse and Transportation Planning

Subject Co-ordinator - Prof. Debapratim Pandit

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Landuse transportation planning
Lecture 2 - Plans and planning process
Lecture 3 - Urban landuse planning
Lecture 4 - Comprehensive mobility plan
Lecture 5 - Landuse transport interaction
Lecture 6 - Theoretical foundations - Part 1
Lecture 7 - Theoretical foundations - Part 2
Lecture 8 - Modeling approaches
Lecture 9 - Existing integrated land use transportation models
Lecture 10 - Land use transportation model components and future challenges
Lecture 11 - Sampling Theory - 1
Lecture 12 - Sampling Theory - 2
Lecture 13 - Data and Surveys
Lecture 14 - Transport Planning surveys - Part 1
Lecture 15 - Transport Planning surveys - Part 2
Lecture 16 - Demographic Transition
Lecture 17 - Demographic Models - 1
Lecture 18 - Demographic Models - 2
Lecture 19 - Microsimulation and Population Synthesis - 1
Lecture 20 - Microsimulation and Population Synthesis - 2
Lecture 21 - Urban Growth Assessment
Lecture 22 - Urban land suitability assessment
Lecture 23 - Accessibility - 1
Lecture 24 - Accessibility - 2
Lecture 25 - Land Price Model
Lecture 26 - Discrete choice theory
Lecture 27 - Residential mobility and location choice - 1
Lecture 28 - Residential mobility model using binary logistic regression
Lecture 29 - Residential mobility and location choice - 2

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Lecture 30 - Residential location choice model using multinomial logistic regression
Lecture 31 - Travel demand forecasting and Trip generation
Lecture 32 - Multiple linear regression
Lecture 33 - Trip Production and Attraction - 1
Lecture 34 - Trip Production and Attraction - 2
Lecture 35 - Trip distribution
Lecture 36 - Mode choice theory
Lecture 37 - Mode choice model
Lecture 38 - Hybrid mode choice model - 1 (Factor Analysis)
Lecture 39 - Hybrid mode choice model - 2 (Joint RP SP model)
Lecture 40 - Nested logit model
Lecture 41 - Introduction to Trip Assignment
Lecture 42 - Route Choice
Lecture 43 - Link assignment - 1
Lecture 44 - Link assignment - 2
Lecture 45 - Dynamic traffic assignment
Lecture 46 - Transportation Software
Lecture 47 - CUBE Overview
Lecture 48 - Travel demand modelling using CUBE and VISUM
Lecture 49 - Activity based modelling in CUBE
Lecture 50 - Vehicular emission and pollution modelling
Lecture 51 - Urban Freight Planning
Lecture 52 - Urban Freight Planning
Lecture 53 - Urban Freight Planning
Lecture 54 - Last Mile Logistics - 1
Lecture 55 - Last Mile Logistics - 2
Lecture 56 - Employment location choice and Real estate Development location choice
Lecture 57 - Activity based model - 1
Lecture 58 - Activity based model - 2
Lecture 59 - Mode choice using Machine Learning
Lecture 60 - Shared Mobility

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NPTEL Video Course - Architecture - NOC:Urban utilities Planning : Water Supply, Sanitation and Drainage

Subject Co-ordinator - Prof. Debapratim Pandit

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Urban Utilities Planning Issues
Lecture 2 - Planning Strategies
Lecture 3 - Planning Strategies (Continued...)
Lecture 4 - Urban Utilities
Lecture 5 - Water Sensitive Urban Planning
Lecture 6 - Water Demand Prediction and Management
Lecture 7 - Types of Urban Water Demand
Lecture 8 - Fluctuations in Urban Water Demand
Lecture 9 - Role of Government
Lecture 10 - Cost of water supply
Lecture 11 - Rainfall, Runoff and Ground Water
Lecture 12 - Groundwater Properties and Flow Characteristics
Lecture 13 - Groundwater Intakes and Issues
Lecture 14 - Groundwater Yield
Lecture 15 - Surface Water Intakes
Lecture 16 - Pumping Stations
Lecture 17 - Pumps
Lecture 18 - Sizing of Pumps
Lecture 19 - Service Reservoir - Part I
Lecture 20 - Service Reservoir - Part II
Lecture 21 - Distribution System Layout
Lecture 22 - Conveyance of water - Part I
Lecture 23 - Conveyance of water - Part II
Lecture 24 - Pipes, Joints, Meters and SCADA Systems
Lecture 25 - Distribution Network Design
Lecture 26 - Water quality and testing - Part I
Lecture 27 - Water quality and testing - Part II
Lecture 28 - Water treatment - Part I
Lecture 29 - Water treatment - Part II

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Lecture 30 - Water treatment - Part III
Lecture 31 - Sanitation basics - Part I
Lecture 32 - Sanitation Basics - Part II
Lecture 33 - Sewage Systems - Part I
Lecture 34 - Sewage Systems - Part II
Lecture 35 - Sewage Systems - Part III
Lecture 36 - Water Carriage System and Sewerage Layout
Lecture 37 - Quantity of Sanitary Sewage
Lecture 38 - Storm Water Drainage Planning - Part I
Lecture 39 - Storm Water Drainage Planning - Part II
Lecture 40 - Storm Water Drainage Planning - Part III
Lecture 41 - Sewer Design
Lecture 42 - Runoff estimation - Part 1
Lecture 43 - Runoff estimation - Part 2
Lecture 44 - Sewerage Network Design - Part 1
Lecture 45 - Sewerage Network Design - Part 2
Lecture 46 - Sewer appurtenances - Part 1
Lecture 47 - Sewer appurtenances - Part 2
Lecture 48 - Storm water drains
Lecture 49 - Sewer maintenance and cleaning
Lecture 50 - Laying of sewer and utility corridors
Lecture 51 - Sewage disposal and treatment in India: Introduction
Lecture 52 - Natural methods of sewage treatment
Lecture 53 - Artificial sewage treatment - Part 1: Primary treatment
Lecture 54 - Artificial sewage treatment - Part 2: Secondary treatment
Lecture 55 - Artificial sewage treatment - Part 3: Advanced methods
Lecture 56 - Ground water Recharge - Part 1
Lecture 57 - Ground water Recharge - Part 2
Lecture 58 - Urban flood management and drainage plans - Part 1
Lecture 59 - Urban flood management and drainage plans - Part 2
Lecture 60 - Urban flood management and drainage plans - Part 3

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NPTEL Video Course - Architecture - NOC:Urban Services Planning

Subject Co-ordinator - Prof. Debapratim Pandit

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Strategic Aspects
Lecture 3 - Regulatory Framework
Lecture 4 - Municipal Management and Finance - Part I
Lecture 5 - Municipal Management and Finance - Part II
Lecture 6 - Service Planning Basics - Part I
Lecture 7 - Service Planning Basics - Part II
Lecture 8 - Service Planning Basics - Part III
Lecture 9 - Service Planning Basics - Part IV
Lecture 10 - Service Planning Basics - Part V
Lecture 11 - Solid Waste Management Rules and Guidelines
Lecture 12 - Solid Waste Management Rules 2016
Lecture 13 - MSWM Plan Preparation - Part I
Lecture 14 - MSWM Plan Preparation - Part II
Lecture 15 - MSWM Plan Preparation - Part III
Lecture 16 - Waste Generation - Part I
Lecture 17 - Waste generation - Part II
Lecture 18 - Waste quantification and characteristics
Lecture 19 - Waste composition
Lecture 20 - Waste storage
Lecture 21 - Primary and Secondary waste collection - Part I
Lecture 22 - Primary and Secondary waste collection - Part II
Lecture 23 - Primary and Secondary waste collection - Part III
Lecture 24 - Routing and scheduling for solid waste vehicles - Part I
Lecture 25 - Routing and scheduling for solid waste vehicles - Part II
Lecture 26 - Waste processing, recycling and recovery - Part 1
Lecture 27 - Waste processing, recycling and recovery - Part 2
Lecture 28 - Composting - Part 1
Lecture 29 - Composting - Part 2

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Lecture 30 - Composting - Part 3
Lecture 31 - SWM 2016 Specifications for Sanitary Landfills
Lecture 32 - Site selection for Sanitary Landfills
Lecture 33 - Sanitary Landfill Design - Part I
Lecture 34 - Sanitary Landfill Design - Part II
Lecture 35 - Sanitary Landfill design - Part III
Lecture 36 - Waste to Energy - Part I: Biomethanation
Lecture 37 - Waste to Energy - Part II: Refuse Derived Fuel
Lecture 38 - Waste to Energy - Part III: Incineration
Lecture 39 - Waste to Energy - Part IV
Lecture 40 - Life Cycle Assessment
Lecture 41 - Street sweeping and Cleaning of surface drains
Lecture 42 - Construction and demolition waste management - Part I
Lecture 43 - Construction and demolition waste management - Part II
Lecture 44 - Special waste management - Part I
Lecture 45 - Special waste management - Part II
Lecture 46 - Healthcare facility standards - Part I
Lecture 47 - Healthcare facility standards - Part II
Lecture 48 - Urban Health Services - Part I
Lecture 49 - Urban Health Services - Part II
Lecture 50 - Health in Urban Planning
Lecture 51 - Municipal Social Services: Introduction
Lecture 52 - Economic and Social development
Lecture 53 - Urban Poverty Alleviation
Lecture 54 - Education
Lecture 55 - Vulnerable population groups
Lecture 56 - Vector Borne Disease Control
Lecture 57 - Street Lighting
Lecture 58 - Urban Forestry, Parks and Open Spaces
Lecture 59 - Fire Stations
Lecture 60 - Crematoriums and Burial Grounds

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NPTEL Video Course - Architecture - NOC:Building Energy Systems and Auditing

Subject Co-ordinator - Prof. Shankha Pratim Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Thermal Properties of Material - I
Lecture 3 - Thermal Properties of Material - I (Continued...)
Lecture 4 - Ventilation and Air Properties
Lecture 5 - Psychometric Operations
Lecture 6 - HVAC Systems
Lecture 7 - Lighting System
Lecture 8 - Electrical Machines and Appliances System
Lecture 9 - Low Energy Cooling Systems - I
Lecture 10 - Low Energy Cooling Systems - II
Lecture 11 - Building Heat Gain Calculation
Lecture 12 - Cooling Degree Days Method
Lecture 13 - Cooling Load Calculation - I
Lecture 14 - Cooling Load Calculation - II
Lecture 15 - Periodic Cooling Load
Lecture 16 - Envelope Performance Factor
Lecture 17 - EPF - Prescriptive Requirements
Lecture 18 - EPF - Analysis
Lecture 19 - Daylighting Concepts
Lecture 20 - ECBC recommendation for Daylighting
Lecture 21 - Introduction to Eco-Niwas Samhita 2018
Lecture 22 - Overview of Residential Envelope Transmittance Value
Lecture 23 - Computation of Residential Envelope Transmittance Value
Lecture 24 - Thermal Comfort Parameters
Lecture 25 - Thermal Comfort Indices
Lecture 26 - Introduction to Life Cycle Analysis
Lecture 27 - Embodied Energy Calculation
Lecture 28 - Building Life Cycle Analysis
Lecture 29 - Introduction to Energy Audit

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Lecture 30 - Energy Audit: Case Studies
Lecture 31 - Introduction to Energy Performance Index
Lecture 32 - Star Rating for Office Building
Lecture 33 - Star Rating of Shopping Mall and BPO
Lecture 34 - Introduction to Energy Retrofitting of Buildings
Lecture 35 - Energy Retrofitting of buildings: Types System and key phases
Lecture 36 - Solar Energy - I
Lecture 37 - Solar Energy - II
Lecture 38 - BIPV and Solar Thermal
Lecture 39 - Wind and Bio Energy
Lecture 40 - Net Zero Building and Sustainability

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NPTEL Video Course - Architecture - NOC:Inclusive Planning and Universal Design

Subject Co-ordinator - Prof. Haimanti Banerji

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Changing Approach to Disability
Lecture 3 - Principles of Universal Design
Lecture 4 - Inclusive Planning and Universal Design Standards in the World
Lecture 5 - National Guidelines on Inclusive Planning and Universal Design
Lecture 6 - Introduction to Harmonized Guidlines and Standards for Accessibility in India, 2021
Lecture 7 - Good Practices of Universal Design
Lecture 8 - Accessibility Audit and Simulation
Lecture 9 - Strategic Accessibility Audit
Lecture 10 - Where is the Gap ?
Lecture 11 - Able India Framework
Lecture 12 - Design for People with Vision Impairment
Lecture 13 - Inclusive Pedestrian Areas, Footpaths, Crossings
Lecture 14 - Inclusive Transportation 1 - Roadways
Lecture 15 - Inclusive Transportation : Mass Rapid Transit System (MRTS)
Lecture 16 - Inclusive Tourism
Lecture 17 - Age Friendly Cities
Lecture 18 - Child Friendly Cities
Lecture 19 - Inclusive City Framework
Lecture 20 - Digital Inclusion and Inclusive Product Design
Lecture 21 - Overview and Feedback

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NPTEL Video Course - Architecture - NOC:Urban Informatics

Subject Co-ordinator - Prof. Debapratim Pandit

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Data Driven Governance and Digital - Participation - Part 1
Lecture 4 - Data Driven Governance and Digital - Participation - Part 2
Lecture 5 - Open Data Platforms
Lecture 6 - Types of Data and Data format
Lecture 7 - Types of Database
Lecture 8 - Database Normalization - Part 1
Lecture 9 - Database Normalization - Part 2
Lecture 10 - NoSQL and Non-Relational Databases
Lecture 11 - Querying Databases
Lecture 12 - SQL - Part 1
Lecture 13 - SQL - Part 2
Lecture 14 - SQL - Part 3
Lecture 15 - Data Access and APIs
Lecture 16 - Introduction to Python
Lecture 17 - Python - Part 1
Lecture 18 - Python - Part 2
Lecture 19 - Object Oriented Programming
Lecture 20 - Classes and Instances in Python
Lecture 21 - Data Access and Manipulation - Part 1
Lecture 22 - Data Access and Manipulation - Part 2
Lecture 23 - Data Access and Manipulation - Part 3
Lecture 24 - Data Analysis and Visualization - Part 1
Lecture 25 - Data Analysis and Visualization - Part 2
Lecture 26 - Machine Learning Basics
Lecture 27 - Foundational Theories
Lecture 28 - Machine Learning Typology
Lecture 29 - Data Analysis and Visualization - Part 3

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Lecture 30 - Data Analysis and Visualization - Part 4
Lecture 31 - Introduction to Supervised Learning and Linear Regression
Lecture 32 - MI Workflow via Linear Regression in Python
Lecture 33 - Decision Tree - Part 1
Lecture 34 - Decision Tree - Part 2
Lecture 35 - Decision Tree - Part 3
Lecture 36 - Binary Logistic Regression
Lecture 37 - Multinomial Logistic Regression
Lecture 38 - k-Nearest Neighbours (k-NN)
Lecture 39 - Support Vector Machine (SVM)
Lecture 40 - Semi-Supervised Learning
Lecture 41 - Clustering - Part 1
Lecture 42 - Clustering - Part 2
Lecture 43 - Clustering - Part 3
Lecture 44 - Association Rule Learning
Lecture 45 - Dimensionality reduction and feature extraction
Lecture 46 - Neural Networks
Lecture 47 - Deep Learning
Lecture 48 - Convolutional Neural Networks (CNNs)
Lecture 49 - Recurrent Neural Networks (RNN) and Long Short-Term Memory (LSTM)
Lecture 50 - Reinforcement Learning
Lecture 51 - Introduction to IoT
Lecture 52 - IoT System Architecture - Part 1
Lecture 53 - IoT System Architecture - Part 2
Lecture 54 - Building with Arduino - Part 1
Lecture 55 - Building with Arduino - Part 2
Lecture 56 - IoT Systems
Lecture 57 - Querying with GIS
Lecture 58 - Geospatial Analysis - Part 1
Lecture 59 - Geospatial Analysis - Part 2
Lecture 60 - Geospatial Analysis - Part 3

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NPTEL Video Course - Architecture - NOC:Measures of Green Urbanism

Subject Co-ordinator - Prof. Ankhi Banerjee

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sustainable City Theories - Part 1
Lecture 2 - Sustainable City Theories - Part 2
Lecture 3 - Indicators and Indexes
Lecture 4 - Indicators and Indexes
Lecture 5 - Indicators and Indexes (Continued...)
Lecture 6 - Affordability
Lecture 7 - Affordability (Continued...)
Lecture 8 - Housing Affordability
Lecture 9 - Housing Affordability Measures
Lecture 10 - Housing Affordability Measures (Continued...)
Lecture 11 - Livability
Lecture 12 - Livability Indices
Lecture 13 - Livability Indices (Continued...)
Lecture 14 - Water Resource Management
Lecture 15 - Water Resource Management (Continued...)
Lecture 16 - Open Space
Lecture 17 - Accessibility
Lecture 18 - Connectivity
Lecture 19 - Public Transit
Lecture 20 - Transit Oriented Development

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NPTEL Video Course - Architecture - NOC:Introduction to History of Architecture in India

Subject Co-ordinator - Prof. Pushkar Sohoni

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Early Architecture
Lecture 2 - Buddhist and Early Temple Architecture
Lecture 3 - Sacrificial Altars and Divine Shelters
Lecture 4 - The Great Temple
Lecture 5 - Week-1 Review
Lecture 6 - Delhi Sultanate
Lecture 7 - Regional Sultanas
Lecture 8 - Temple and Mosque
Lecture 9 - Daulatabad Fort
Lecture 10 - Week-2 Review
Lecture 11 - Mughal Architecture - Part 1
Lecture 12 - Mughal Architecture - Part 2
Lecture 13 - Imbrication of Sultanate and Maratha Architecture
Lecture 14 - Maratha Temple
Lecture 15 - Week-3 Review
Lecture 16 - Princely States of India
Lecture 17 - Colonial Architecture In India
Lecture 18 - International, Art Deco, Modern
Lecture 19 - Architecture Today Commerce and Creativity
Lecture 20 - Week-4 Review

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NPTEL Video Course - Architecture - NOC:Strategies for Sustainable Design

Subject Co-ordinator - Prof. Shiva Ji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Strategies for Sustainable Design - Welcome Lecture
Lecture 2 - Various Perspectives around Sustainability
Lecture 3 - Spheres of Energy Efficient/Green/Environmental/Sustainable Designs
Lecture 4 - Environmental Sustainability
Lecture 5 - Social Sustainability
Lecture 6 - Economic Sustainabilty
Lecture 7 - Climate Change Mitigation and the Way Forward
Lecture 8 - Future of Human Habitation Design
Lecture 9 - Relevance of Sustainable Design in Contemporary Context
Lecture 10 - Built Environment and Energy Consumption
Lecture 11 - Reliance and Dependence of Building Design on Energy
Lecture 12 - Current Scenario of Sustainable Design: Indian
Lecture 13 - Current Scenario of Sustainable Design: International
Lecture 14 - Designing Strategically for Preventing pollution: Air, Water, Soil, Noise, Light Radiation, etc
Lecture 15 - Low Environmental Impact
Lecture 16 - Thinking for Alternatives through Systemic Design
Lecture 17 - Consumption and Consumerist Lifestyle
Lecture 18 - Environmental impact Assessment
Lecture 19 - Lifecycle Analysis - Part A
Lecture 20 - Lifecycle Analysis - Part B
Lecture 21 - Growth and Development in Construction and Allied Sectors
Lecture 22 - Policy Push in Real Estate and Manufacturing Sectors
Lecture 23 - Policy Push for Development of the Low Economic Regions
Lecture 24 - Sustainable Building Materials
Lecture 25 - Reduce/Reuse/Recycle
Lecture 26 - National Building Code 2016 - Part 11 and Energy Conservation Building Code
Lecture 27 - Guidelines for Building Design by SA Methods: GRIHA
Lecture 28 - UN SDG for Sustainable Development
Lecture 29 - LeNS Design Method and Tools such as SPSS, MSDS, DE

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Lecture 30 - Vernacular Design Case Example
Lecture 31 - Climate Responsiveness
Lecture 32 - Thinking the Unthinkable: Need for Innovation in Design Process
Lecture 33 - Design for Net-Zero Energy, Lighting, Ventilation, Views and Human Comfort
Lecture 34 - D4S with Inspiration from Nature
Lecture 35 - D4S for Optimization of Manufacturing
Lecture 36 - International Conventions, Laws and Emerging Technologies for SD
Lecture 37 - Environmental Laws
Lecture 38 - Emerging Technologies and their Possible Intervention in Design
Lecture 39 - Case 1 - Campus Planning and Design of IIT Gandhinagar
Lecture 40 - Case 2 - A Comparative Analysis of Product Designs
Lecture 41 - Case 3 - Design of First Net-Zero Building of India
Lecture 42 - Case 4 - A Comparative Analysis of Internatonal Design Projects
Lecture 43 - Summary

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NPTEL Video Course - Architecture - NOC:Architectural Approaches to Decarbonization of Buildings

Subject Co-ordinator - Prof. Iyer Vijayalaxmi Kasinath

Co-ordinating Institute - School of Planning and Architecture Vijayawada

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to GHG and the role of buildings in its reduction
Lecture 2 - Strategies to reduce GHG in Building Industry
Lecture 3 - Policies, initiatives and future trends to reduce GHG in the Building Industry
Lecture 4 - India's stand on Carbon Neutrality
Lecture 5 - India's approach to long term low Low Carbon Development - Part 1
Lecture 6 - India's approach to long term low Low Carbon Development - Part 2
Lecture 7 - Embodied energy and Embodied Carbon
Lecture 8 - Basics of Embodied and Operational Carbon - Part 1
Lecture 9 - Basics of Embodied and Operational Carbon - Part 2
Lecture 10 - Factors of Embodied energy calculation
Lecture 11 - Operational Energy and Operational Carbon - Part 1
Lecture 12 - Operational Energy and Operational Carbon - Part 2
Lecture 13 - Strategies to reduce Operational Energy
Lecture 14 - Strategies to reduce Operational Energy and Case study
Lecture 15 - Impact of reducing Operational Energy and Operational Carbon
Lecture 16 - Passive Design Strategies in Carbon neutral Architecture
Lecture 17 - Orientation and Form for Passive cooling
Lecture 18 - Appropriate Planning for Passive Architecture
Lecture 19 - Appropriate fenestration for Passive Architecture
Lecture 20 - Appropriate Planning and openings for Passive Architecture
Lecture 21 - Settlement planning principles for carbon neutrality
Lecture 22 - Settlement planning principles for carbon neutrality - case studies
Lecture 23 - Appropriate Openings for reduced Operational Energy - Part 1
Lecture 24 - Appropriate Openings for reduced Operational Energy - Part 2
Lecture 25 - Methods of bringing in natural daylight
Lecture 26 - Role of Landscape and water in Passive Design - Part 1
Lecture 27 - Role of Landscape and water in Passive Design - Part 2
Lecture 28 - Carbon neutrality through strategising building materials
Lecture 29 - Choice of building materials for carbon neutrality - Part 1

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Lecture 30 - Choice of building materials for carbon neutrality - Part 2
Lecture 31 - Strategies to reduce Embodied Carbon through Design and Development
Lecture 32 - Renewable building materials
Lecture 33 - Renewable building materials and technologies
Lecture 34 - Renewable building materials based Case studies
Lecture 35 - High embodied carbon building materials
Lecture 36 - Comparison between conventional and alternate building materials
Lecture 37 - Environmental impacts of building materials and components
Lecture 38 - Building Envelope types
Lecture 39 - Dynamic Envelope - Case Studies Part 1
Lecture 40 - Dynamic Envelope - Case Studies Part 2
Lecture 41 - Low Energy Envelope - Part 1
Lecture 42 - Low Energy Envelope - Part 2
Lecture 43 - Natural Daylighting Strategies
Lecture 44 - Daylighting optimized skylights
Lecture 45 - Daylighting optimized fenestration
Lecture 46 - Daylighting - Case studies 1
Lecture 47 - Daylighting - Case studies 2
Lecture 48 - Recap and Conclusion

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NPTEL Video Course - Architecture - NOC:Building Materials as a Cornerstone to Sustainability

Subject Co-ordinator - Prof. Iyer Vijayalaxmi Kasinath

Co-ordinating Institute - School of Planning and Architecture Vijayawada

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Building materials, their classification, environmental issues
Lecture 2 - Vernacular Materials
Lecture 3 - Mud - Traditional Material
Lecture 4 - Mud as a Building material
Lecture 5 - Stone
Lecture 6 - Thatch
Lecture 7 - Bamboo
Lecture 8 - Binders
Lecture 9 - Strawbale
Lecture 10 - Laterite Quarry Waste
Lecture 11 - Alternate building materials
Lecture 12 - Flyash
Lecture 13 - Furnace Slag
Lecture 14 - Cross Laminated Timber
Lecture 15 - Construction and Demolition waste
Lecture 16 - Hempcrete
Lecture 17 - Phosphogypsum
Lecture 18 - Aerated Concrete
Lecture 19 - Alternate aggregate
Lecture 20 - Innovative Building materials
Lecture 21 - Bioluminiscent paints
Lecture 22 - Milk Paints and Recycled Plastics
Lecture 23 - Agro bricks
Lecture 24 - Light emitting materials - concrete
Lecture 25 - Co2 absorbing concrete
Lecture 26 - Mycelium
Lecture 27 - Fibre Reinforced Concrete
Lecture 28 - Geopolymer concrete
Lecture 29 - Introduction to Advanced Building Materials

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Lecture 30 - Carbon Sequestration
Lecture 31 - Ecobind Tiles
Lecture 32 - Permeable Concrete
Lecture 33 - Introduction to smart materials
Lecture 34 - Types of Smart Materials
Lecture 35 - Facade systems - Smart Windows
Lecture 36 - LCD
Lecture 37 - Photochromics
Lecture 38 - Thermochromic
Lecture 39 - Thermotropic materials
Lecture 40 - Types of Thermotropic materials
Lecture 41 - Phase Change Materials - Part 1
Lecture 42 - Phase Change Materials - Part 2
Lecture 43 - Adhesion changing smart materials
Lecture 44 - Titanium di oxide products
Lecture 45 - Mechanochromic, Chemochromic
Lecture 46 - Electrochromics
Lecture 47 - Nanocellulose and Electroluminiscent
Lecture 48 - Concluding Lectuer

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NPTEL Video Course - Architecture - NOC:Bioclimatic Architecture: Futureproofing with Simple and Advanced Pas

Subject Co-ordinator - Prof. Iyer Vijayalaxmi Kasinath

Co-ordinating Institute - School of Planning and Architecture, Vijayawada

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Bioclimatic Architecture
Lecture 2 - Strategies for Bioclimatic Architecture
Lecture 3 - Simple Passive Strategies - Introduction
Lecture 4 - Principles of Simple Passive Architecture
Lecture 5 - Advanced Passive Strategies - Passive Heating Strategies
Lecture 6 - Advanced Passive Strategies - Cooling Strategies
Lecture 7 - Classification of Climate
Lecture 8 - Climate Zones of India
Lecture 9 - Climate charactesitcis in India - warm-humid, hot dry
Lecture 10 - Climate characterisitc of composite climate
Lecture 11 - Climate characteristics of temperate climate and cold climate
Lecture 12 - Thermal Comfort and Thermal Comfort Models
Lecture 13 - Mahoney's Tables
Lecture 14 - Bioclimatic chart and Psychrometric Chart
Lecture 15 - Simple Graphic tools to understand climate - Climate Consultant
Lecture 16 - Orientation and form
Lecture 17 - Openings - Size, Position, Shading device - Part 1
Lecture 18 - Openings - Size, Position, Shading device - Part 2
Lecture 19 - Urban Heat Island
Lecture 20 - Earth Sheltering
Lecture 21 - Solar Chimney
Lecture 22 - Roof Pond System
Lecture 23 - High Performance Glazing
Lecture 24 - Double Roofing
Lecture 25 - Cool Roof
Lecture 26 - Thermal Mass and Night Flushing
Lecture 27 - Double skin green facade
Lecture 28 - solar air collectors
Lecture 29 - Passive down draught evaporative cooling

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Lecture 30 - Direct Evaporative cooling
Lecture 31 - Root Zone Treatment
Lecture 32 - Trombe Wall and Water Wall
Lecture 33 - Thermosiphon Solar Air Heater
Lecture 34 - Wind towers
Lecture 35 - Cavity walls
Lecture 36 - Sunspace
Lecture 37 - Green Roof
Lecture 38 - PCM with Glazing
Lecture 39 - Earth Air Tunnels
Lecture 40 - Radiant Cooling System
Lecture 41 - Passive Design Strategies for Moderate Climate
Lecture 42 - Case study of Moderate climate
Lecture 43 - Passive Design Strategies for cold climate and case studies
Lecture 44 - Passive Design Strategies for Warm-Humid climate and case studies
Lecture 45 - Passive Design Strategies for Hot-Dry climate
Lecture 46 - Case studies - Hot-dry climate
Lecture 47 - Passive Design Strategies for Composite climate and Case studies
Lecture 48 - Recap and Conclusion

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NPTEL Video Course - Architecture - NOC:Circular Economy for Sustainable Buildings

Subject Co-ordinator - Prof. Iyer Vijayalaxmi Kasinath

Co-ordinating Institute - School of Planning and Architecture Vijayawada

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Resource Conservation in the Construction Sector - Land, Water and Energy
Lecture 2 - Significance of Resource Conservation - Water as a Resource
Lecture 3 - Carrying Capacity, Ecological Footprint, Resource conservation and its relevance to Eco Accesorie
Lecture 4 - Significance of Ecosensitive Accesories - Part 1
Lecture 5 - Significance of Ecosensitive Accesories - Part 2
Lecture 6 - Water as a resource
Lecture 7 - Water Efficiency
Lecture 8 - Waste water - sources and generation
Lecture 9 - Efficent Water Management gadgets - Water Flow Regulator
Lecture 10 - Water Saving Faucets
Lecture 11 - Water Saving Urinals
Lecture 12 - Water Saving Toilets
Lecture 13 - Low Flow Showers and Smart Showers
Lecture 14 - Water Leak detection and BIS
Lecture 15 - Energy as a resource
Lecture 16 - Energy Managment Methods - Part 1
Lecture 17 - Energy Managment Methods - Part 2
Lecture 18 - Eco sensitive lighting accesories
Lecture 19 - Light Sensor
Lecture 20 - Energy Efficient Pumping and Cooling Systems
Lecture 21 - Energy Efficient Fans and Low energy HVAC
Lecture 22 - Energy Efficient HVAC Filters
Lecture 23 - Bureau of Energy Efficiency
Lecture 24 - Solar Cooker
Lecture 25 - Optimizing Efficiency and Sustainability : Building Management System
Lecture 26 - Rain Water Harvesting
Lecture 27 - Innovative Contraptions for water and light for a Circular Economy
Lecture 28 - Comprehensive approach to reduce Embodied Carbon in the Environment - Part 1
Lecture 29 - Comprehensive approach to reduce Embodied Carbon in the Environment - Part 2

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Lecture 30 - Circular Economy - Part 1
Lecture 31 - Circular Economy - Part 2
Lecture 32 - Circular Economy in the Built Environment
Lecture 33 - Circular Economy in the Built Environment and other Sectors
Lecture 34 - Design for Adaptability - Part 1
Lecture 35 - Design for Adaptability - Part 2
Lecture 36 - Design for Disassembly
Lecture 37 - Design for Disassembly - Case Studies
Lecture 38 - Environmental Product Declaration (EPD)
Lecture 39 - Eco Labelling In India (GreenPro, Process, Benefits, Principles)
Lecture 40 - Eco Sensitive Accessories for Muiti Family Residences (Holistic Application and Examples - Part
Lecture 41 - Eco Sensitive Accessories for Multi Family Residences (Holistic Application and Examples) - Kitc
Lecture 42 - Eco Sensitive Accessories for Multi Family Residences (Holistic Application and Examples) Water
Lecture 43 - Eco Sensitive Accessories for Offices (Holistic Application and Examples) - Part 1 Lighting Cont
Lecture 44 - Eco Sensitive Accessories For Offices (Holistic Application and Examples) - Part 2 Site Planning
Lecture 45 - Eco Sensitive Accessories For Offices (Holistic Application and Examples) - Part 3
Lecture 46 - Eco Sensitive Accessories for Small Residences (Holistic Application and Examples) Part 1
Lecture 47 - Eco sensitive Accessories for small houses - Part 2 Smart Lighting System
Lecture 48 - Eco sensitive Accessories for small houses - Part 3 Bathroom Accessories, Outdoor Accessories Re

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NPTEL Video Course - Architecture - NOC:Architectural Thesis

Subject Co-ordinator - Prof. Vishal Chettry

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Architectural Thesis
Lecture 2 - Understanding the Thesis Journey
Lecture 3 - Research Approaches in Architecture
Lecture 4 - Literature Review
Lecture 5 - Topic Selection
Lecture 6 - Preparing Thesis Framework
Lecture 7 - Defining the Problem Statement and Research Objectives
Lecture 8 - Detailing Research Methodology
Lecture 9 - Creating a Design Program
Lecture 10 - Structuring of Design Thesis
Lecture 11 - Data Collection Methods
Lecture 12 - Case Studies
Lecture 13 - Site Selection
Lecture 14 - Site Analysis Techniques
Lecture 15 - Synthesizing Findings for Design
Lecture 16 - Preparing Design Concept
Lecture 17 - Site Planning Principles and Zoning
Lecture 18 - Developing the Site Plan
Lecture 19 - Preparing Single Line Floor Plan
Lecture 20 - Preparing Double Line Floor Plan
Lecture 21 - Preparing Building Elevations
Lecture 22 - Preparing Building Sections
Lecture 23 - Preparing Site Elevations
Lecture 24 - Preparing Site Sections
Lecture 25 - Detailing, Working Drawing and Building Service Layout
Lecture 26 - Principles of Sheet Composition and Layout Design
Lecture 27 - Effective Use of Figures, Charts, and Text
Lecture 28 - Physical Models
Lecture 29 - 3D Views, Renders, and Digital Simulations

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Lecture 30 - Walkthroughs and Final Visual Presentation
Lecture 31 - Structuring the Architectural Thesis Report
Lecture 32 - Writing Key Sections of the Report - Part I
Lecture 33 - Writing Key Sections of the Report - Part II
Lecture 34 - Design Documentation and Supporting Content
Lecture 35 - Visual and Verbal Integration in Thesis
Lecture 36 - Time Management Strategies and Mental Health and Well being
Lecture 37 - Common Challenges in Architectural Thesis and Suggestions
Lecture 38 - Tips for Jury Presentation and Minal Defence
Lecture 39 - Preparing for Life After Thesis
Lecture 40 - Course Summary

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NPTEL Video Course - Architecture - NOC:Housing Policy and Planning

Subject Co-ordinator - Prof. Uttam Kumar Roy

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Housing
Lecture 2 - Housing Classifications
Lecture 3 - Housing Situation
Lecture 4 - Policy and Public intervention - 1
Lecture 5 - Policy and Public intervention - 2
Lecture 6 - Urban Reform
Lecture 7 - Housing Policy
Lecture 8 - Legal and Institutional Framework for Housing
Lecture 9 - Land for Housing - 1
Lecture 10 - Land for Housing - 2
Lecture 11 - Affordability and Housing Finance
Lecture 12 - Technology Systems in Housing Delivery - 1
Lecture 13 - Technology Systems in Housing Delivery - 2
Lecture 14 - Housing for All Mission (PMAY) and Technology Sub-mission
Lecture 15 - Summing up of Part-1 (Policy) and Introduction to Housing Planning
Lecture 16 - Urban and Regional Planning - 1
Lecture 17 - Urban and Regional Planning - 2
Lecture 18 - Development Controls
Lecture 19 - Housing Infrastructure and Services-1
Lecture 20 - Housing Infrastructure and Services-2
Lecture 21 - Housing Infrastructure and Services-3
Lecture 22 - Housing Strategy for City-1
Lecture 23 - Housing Strategy for City-2
Lecture 24 - Housing Strategy for City-3
Lecture 25 - Planning for Plotted Housing
Lecture 26 - Planning for Group Housing
Lecture 27 - Community Development in Housing
Lecture 28 - Cooperative Housing
Lecture 29 - Institutional and rental housing

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Lecture 30 - Working PersonÂ s hostel and Serviced Apartments
Lecture 31 - Informal Housing Typologies
Lecture 32 - Approaches in Improving Slums and Squatters
Lecture 33 - Urban Village and Unauthorized Construction
Lecture 34 - Pavement Dwellers and Night Shelters
Lecture 35 - Old Age Home
Lecture 36 - Disaster Resistant Housing
Lecture 37 - Housing and Real Estate Development
Lecture 38 - Housing Management
Lecture 39 - Housing
Lecture 40 - Course Summary and Conclusion

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NPTEL Video Course - Architecture - NOC:Visual Communication Design for Digital Media

Subject Co-ordinator - Prof. Saptarshi Kolay

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Visual Communication Design for Digital Media
Lecture 2 - Elements of Design - Part 1
Lecture 3 - Elements of Design - Part 2
Lecture 4 - Principles of Design - Part 1
Lecture 5 - Principles of Design - Part 2
Lecture 6 - Types of digital media technology Â an overview of the field
Lecture 7 - Typography - 1
Lecture 8 - Typography - 2
Lecture 9 - Semiotics - 1
Lecture 10 - Semiotics - 2
Lecture 11 - Visual perception
Lecture 12 - Contemporary Visual Language - 1
Lecture 13 - Contemporary Visual Language - 2
Lecture 14 - Technology Advancements in Digital Media
Lecture 15 - Visual Design Methodology - 1_Generic Design
Lecture 16 - Visual Design Methodology - 2_Generic Design
Lecture 17 - Visual Design Methodology - 3_Animation
Lecture 18 - Visual Design Methodology - 4_web design
Lecture 19 - Visual Design Methodology - 5_graphic-design
Lecture 20 - Case Studies of Visual Design on Digital Paradigm

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NPTEL Video Course - Architecture - NOC:Culturally Responsive Built Environments

Subject Co-ordinator - Prof. Ram Sateesh Pasupuleti

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Place
Lecture 2 - Place and Identity
Lecture 3 - Habitus - A Sense of Place
Lecture 4 - A Home - Introduction to Vernacular Architecture
Lecture 5 - The New Vernacular
Lecture 6 - Understanding Vernacular - Towards Anthropology
Lecture 7 - Understanding Rock Shelters
Lecture 8 - The Ecological and Sacred Dimension
Lecture 9 - Winter Landscape and Urbanism
Lecture 10 - Winter Cities
Lecture 11 - Power in Built Form
Lecture 12 - Spatial Analysis
Lecture 13 - The Forbidden Space
Lecture 14 - Religious Architecture
Lecture 15 - Understanding Construction Workers' Housing
Lecture 16 - Culture and Disasters - Towards Method and Framework
Lecture 17 - Understanding Post Tsunami Response (Tamilnadu)
Lecture 18 - Cultural Heritage
Lecture 19 - Understanding the Cultural Context in Disasters and Development
Lecture 20 - Culture, Climate Change Adaptation And Disaster Risk Reduction
Lecture 21 - Conservation
Lecture 22 - Conservation
Lecture 23 - Learning from Vernacular
Lecture 24 - Protection of the World Cultural and Natural Heritage
Lecture 25 - Intangible Cultural Heritage
Lecture 26 - City HRIDAY Plan of Badami
Lecture 27 - Cultural planning Approaches
Lecture 28 - Urban Transformations in Doha
Lecture 29 - How The Other Half Builds?

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Lecture 30 - How To/Not To Relocate Slums?
Lecture 31 - Stone- as a Vernacular Building material
Lecture 32 - Timber as Vernacular Building material
Lecture 33 - Timber Construction (A journey from Advanced to Vernacular)
Lecture 34 - How To Study Vernacular Architecture?
Lecture 35 - Architecture with out Architects
Lecture 36 - Social Change in India (Sanskritisation)
Lecture 37 - Social Change in India (Westernization)
Lecture 38 - Social Change in India (Modernization- Globalization)
Lecture 39 - Pluralism in Built Environment Education
Lecture 40 - Summary and Conclusion

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NPTEL Video Course - Architecture - NOC:Contemporary Architecture and Design

Subject Co-ordinator - Prof. Saptarshi Kolay

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - World Architecture and Design History
Lecture 3 - Industrial Revolution and Beginning of Modern Era
Lecture 4 - Post Industrial Revolution
Lecture 5 - Post Industrial Revolution
Lecture 6 - Post Industrial Revolution
Lecture 7 - Post Industrial Revolution
Lecture 8 - Evolution and Timeline of Modern Architecture and Design
Lecture 9 - Phases of Modern Architecture - Bauhaus
Lecture 10 - Phases of Modern Architecture - De Stijl
Lecture 11 - Phases of Modern Architecture - Chicago School
Lecture 12 - Phases of Modern Architecture - Chicago and Prairie School
Lecture 13 - Phases of Modern Architecture - Prairie School
Lecture 14 - Phases of Modern Architecture - Organic - Part 1
Lecture 15 - Phases of Modern Architecture - Organic - Part 2
Lecture 16 - Phases of Modern Architecture - Art Deco - Part 1
Lecture 17 - Phases of Modern Architecture - Art Deco - Part 2
Lecture 18 - Phases of Modern Architecture - Internationalism - Part 1
Lecture 19 - Phases of Modern Architecture - Internationalism - Part 2
Lecture 20 - Phases of Modern Architecture - Expressionism
Lecture 21 - Phases of Modern Architecture - Monolithic Style
Lecture 22 - Phases of Modern Architecture - Tensile and Steel Structures - Part 1
Lecture 23 - Phases of Modern Architecture - Tensile and Steel Structures - Part 2
Lecture 24 - Phases of Modern Architecture - Brutalism
Lecture 25 - Phases of Modern Architecture - Metabolism
Lecture 26 - Phases of Modern Architecture - Brutalism and Metabolism in India
Lecture 27 - Phases of Modern Art - Part 1
Lecture 28 - Phases of Modern Art - Part 2
Lecture 29 - Phases of Post Modern Architecture - Part I

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Lecture 30 - Phases of Post Modern Architecture - Part II
Lecture 31 - Phases of Post Modern Architecture - Historicism
Lecture 32 - Phases of Post Modern Architecture - High Tech
Lecture 33 - Phases of Post Modern Architecture - Neo Modern
Lecture 34 - Phases of Post Modern Architecture - Critical Regionalism
Lecture 35 - Phases of Post Modern Architecture - Memphis Milano
Lecture 36 - Phases of Post Modern Architecture - Deconstructivism - Part I
Lecture 37 - Phases of Post Modern Architecture - Deconstructivism - Part II
Lecture 38 - Phases of Post Modern Architecture - Pop Art
Lecture 39 - Evolution of Typography in Contemporary Era
Lecture 40 - Phases of Post Modern Architecture - Industrial Design

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NPTEL Video Course - Architecture - NOC:Role of Craft and Technology in Interior-Architecture

Subject Co-ordinator - Prof. Smriti Saraswat

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Interior-Architecture
Lecture 2 - Craft
Lecture 3 - Interior-Architecture and Craft and Technology
Lecture 4 - Interior-Architecture and Craft and Technology
Lecture 5 - Summary and Discourse - I
Lecture 6 - Interior-Architecture
Lecture 7 - Traditional Knowledge Systems and the Ingenious skills of the communities
Lecture 8 - Interior-Architecture
Lecture 9 - Traditional Knowledge Systems and the Indigenous materials; tools and techniques
Lecture 10 - Summary and Discourse - II
Lecture 11 - Creative and Cultural Industries
Lecture 12 - Building Crafts
Lecture 13 - Building Crafts
Lecture 14 - Building Crafts; Craft and Technology and its Role in Creating/Enhancing Interior-Architecture
Lecture 15 - Summary and Discourse - III
Lecture 16 - Best Studies related to the Craft Sector
Lecture 17 - Case Studies from Gujarat
Lecture 18 - Case Studies from Rajasthan
Lecture 19 - Case Studies from Uttarakhand
Lecture 20 - Summary and Discourse - IV
Lecture 21 - Craft and Technology in Interior Architecture
Lecture 22 - Craft and Technology in Interior Architecture; Decoding Systems
Lecture 23 - Craft and Technology in Interior Architecture
Lecture 24 - Craft and Technology in Interior Architecture; Transformation through Time
Lecture 25 - Summary and Discourse - V
Lecture 26 - Overview of the Craft Sector Today
Lecture 27 - Craft Sector
Lecture 28 - Craft Sector
Lecture 29 - Craft Sector

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Lecture 30 - Summary and Discourse - VI
Lecture 31 - Continuity and Revival
Lecture 32 - Continuity and Revival
Lecture 33 - Continuity and Revival
Lecture 34 - Continuity and Revival
Lecture 35 - Summary and Discourse - VII
Lecture 36 - Interventions
Lecture 37 - Interventions
Lecture 38 - Interventions
Lecture 39 - Interventions
Lecture 40 - Summary and Discourse - VIII

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NPTEL Video Course - Architecture - NOC:Urban Governance and Development Management

Subject Co-ordinator - Prof. Uttam Kumar Roy

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Urbanisation
Lecture 2 - Introduction to Urban Governance
Lecture 3 - Constitutional Provision for Urban Local Governance
Lecture 4 - Legislative Provisions
Lecture 5 - Interfaces
Lecture 6 - People & Community - 1
Lecture 7 - People & Community - 2
Lecture 8 - Land as Basic Resource
Lecture 9 - Urban Environment and Ecology
Lecture 10 - Distinctive Features of Non-Municipal Urban (NMU) and Nagar Panchayats
Lecture 11 - Organisation Development
Lecture 12 - Transparency and Accountability
Lecture 13 - Capacity Building - 1
Lecture 14 - Capacity Building - 2
Lecture 15 - Improving Systems and Processes for Urban Governance
Lecture 16 - Urban Reform and Managing Change - 1
Lecture 17 - Urban Reform and Managing Change - 2
Lecture 18 - Visioning for Cities
Lecture 19 - Resolving Conflicts for Managing Change
Lecture 20 - Leadership and Team Building
Lecture 21 - Basic Concepts of Planning and Development
Lecture 22 - Regional and Metropolitan Planning
Lecture 23 - Urban Planning
Lecture 24 - Urban Infrastructure and Services - 1
Lecture 25 - Urban Infrastructure and Services - 2
Lecture 26 - Overview of Municipal Finance
Lecture 27 - Alternate Sources of Municipal Finance
Lecture 28 - Municipal Accounts
Lecture 29 - Value Capture Financing

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Lecture 30 - Public Private Partnership (PPP) in Urban Governance
Lecture 31 - Housing Strategy for Cities
Lecture 32 - Housing & Urban Poverty
Lecture 33 - Real Estate Regulation and Development
Lecture 34 - Urban Land Management
Lecture 35 - Urban Risk and Disaster Management
Lecture 36 - Managing Urban Environment - 1
Lecture 37 - Managing Urban Environment - 2 (Mandates for Blue and Green Infrastructures)
Lecture 38 - Traffic and Transportation Management - 1
Lecture 39 - Traffic and Transportation Management - 2
Lecture 40 - Designing Urban Public Spaces
Lecture 41 - Centrally Sponsored Programmes and Schemes
Lecture 42 - AMRUT
Lecture 43 - Smart City
Lecture 44 - Swachh Bharat Mission and HRIDAY
Lecture 45 - PMAY and NULM
Lecture 46 - Fundamentals of Project Planning
Lecture 47 - Formulation of Projects
Lecture 48 - Project Monitoring and Management
Lecture 49 - Essentials of Infrastructure and Engineering Design
Lecture 50 - Managing Trans-municipal and Large Projects
Lecture 51 - Enhancing City Image
Lecture 52 - Essential Competencies of City Managers
Lecture 53 - Problem Solving and Decision Making
Lecture 54 - Effective Negotiation
Lecture 55 - Communication Skills
Lecture 56 - Time Management
Lecture 57 - Stress Management
Lecture 58 - Best Practices in Urban Management
Lecture 59 - Reflective Learning and Excellence
Lecture 60 - Course Summary, Doubt Clearing and Further Reading

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NPTEL Video Course - Architecture - NOC:User Interface Design

Subject Co-ordinator - Prof. Saptarshi Kolay

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - User Interface Designer
Lecture 3 - Design methods - I
Lecture 4 - Design Methods - II
Lecture 5 - Human Factor in Interaction Design
Lecture 6 - User Research - I
Lecture 7 - User Research - II
Lecture 8 - Low Fidelity Design - I
Lecture 9 - Low Fidelity Design - II
Lecture 10 - High Fidelity Design
Lecture 11 - Visual Cognition
Lecture 12 - Contemporary Visual Language in Design - I
Lecture 13 - Contemporary Visual Language in Design - II
Lecture 14 - Usage of Typography in User Interface Design - I
Lecture 15 - Usage of Typography in User Interface Design - II
Lecture 16 - Design Semiotics and Visual Perception
Lecture 17 - Visual Communication Design
Lecture 18 - User Testing - I
Lecture 19 - User Testing - II
Lecture 20 - Contemporary Interface Design Technology

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NPTEL Video Course - Architecture - NOC:Disaster Recovery and Build Back Better

Subject Co-ordinator - Prof. Subhojyothi Samaddar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Disaster risk
Lecture 2 - Disaster Recovery and Build Back Better
Lecture 3 - Risk Perception and Disaster Risk Preparedness - Part 2
Lecture 4 - Build Back Better - People's Perspectives
Lecture 5 - Architecture at Risk
Lecture 6 - Culture, climate change adaptation and disaster risk reduction
Lecture 7 - Ayutthaya at Risk
Lecture 8 - Disaster vulnerability
Lecture 9 - Cultural Heritage
Lecture 10 - Rock shelters at risk
Lecture 11 - The Built Environment Professions in Disaster Risk Reduction and Response
Lecture 12 - Gadri discussions
Lecture 13 - Community Participation in Disaster Risk Governance
Lecture 14 - Community Participation in Disaster Risk Governance
Lecture 15 - Frameworks
Lecture 16 - Disaster Preparedness from Cognitive and Heuristic Perspectives
Lecture 17 - Information for Disaster Preparedness
Lecture 18 - The Role of Social Networks in Disaster Preparedness
Lecture 19 - Diffusion of Disaster Preparedness Technology
Lecture 20 - Cities and Climate Change
Lecture 21 - Temporary Shelter Construction in India
Lecture 22 - Temporary shelter construction in Kenya
Lecture 23 - Build back better in Nepal recovery
Lecture 24 - Lessons from Peru
Lecture 25 - Progressive Housing in El Salvador
Lecture 26 - Decentralizing (re)construction in Colombia
Lecture 27 - Tsunami reconstruction in Tamilnadu - Part 1 (Approach)
Lecture 28 - Tsunami reconstruction in Tamilnadu - Part 2 (Findings)
Lecture 29 - Culture and (disaster)risk

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Lecture 30 - Cultural theory of risk
Lecture 31 - Guidance to DRR
Lecture 32 - Self-help housing in Turkey
Lecture 33 - The Production of refugee place in time
Lecture 34 - Assessments
Lecture 35 - Designing culturally responsive built environment in disaster context
Lecture 36 - Disaster Risk Communication
Lecture 37 - CAM and CBDRM
Lecture 38 - How to teach disaster recovery and built back better in-built environment education
Lecture 39 - Source, Message and Receiver in Disaster Risk Communication
Lecture 40 - Summary and Conclusion

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NPTEL Video Course - Architecture - NOC:Sustainable Architecture

Subject Co-ordinator - Prof. Avlokita Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Sustainability
Lecture 2 - Buildings, Needs and 'Sustainability'
Lecture 3 - Sustainability and Sustainable Development
Lecture 4 - Historic Origins of Sustainability
Lecture 5 - Pioneers of Sustainable Development
Lecture 6 - Environmental Impacts of Development
Lecture 7 - Environmental Impacts of Development
Lecture 8 - Social and Economic Impacts of Development
Lecture 9 - Agenda 21 and UN Goals
Lecture 10 - Established needs for Sustainability in Building Sector
Lecture 11 - Definition and Characteristics of Sustainability
Lecture 12 - Flavors of Sustainable Architecture
Lecture 13 - Indicators and Terminologies in Sustainable Architecture
Lecture 14 - Process of Designing Green Buildings
Lecture 15 - Green Building Ratings and Components
Lecture 16 - Fundamentals of Thermal Comfort
Lecture 17 - Climatic Considerations, Physiological Objectives of Design
Lecture 18 - Fundamentals of Climate Responsive Buildings - I
Lecture 19 - Fundamentals of Climate Responsive Buildings - II
Lecture 20 - Visual and Acoustic Comfort
Lecture 21 - Sustainable Sites - I
Lecture 22 - Sustainable Sites - II
Lecture 23 - Sustainable Sites - III
Lecture 24 - Sustainable Sites - IV
Lecture 25 - Sustainable Sites - V
Lecture 26 - Water Conservation - I
Lecture 27 - Water Conservation - II
Lecture 28 - Water Conservation - III
Lecture 29 - Water Conservation - IV

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Lecture 30 - Water Conservation - V
Lecture 31 - Materials and Resources - I
Lecture 32 - Materials and Resources - II
Lecture 33 - Materials and Resources - III
Lecture 34 - Materials and Resources - IV
Lecture 35 - Materials and Resources - V
Lecture 36 - Energy Efficiency - I
Lecture 37 - Energy Efficiency - II
Lecture 38 - Energy Efficiency - III
Lecture 39 - Energy Efficiency - IV
Lecture 40 - Energy Efficiency - V
Lecture 41 - Indoor Environmental Quality - I
Lecture 42 - Indoor Environmental Quality - II
Lecture 43 - Indoor Environmental Quality - III
Lecture 44 - Indoor Environmental Quality - IV
Lecture 45 - Indoor Environmental Quality - V
Lecture 46 - Vernacular Architecture - I
Lecture 47 - Vernacular Architecture - II
Lecture 48 - Codes and Standards
Lecture 49 - Introduction to Whole Building Simulation - I
Lecture 50 - Introduction to Whole Building Simulation - II
Lecture 51 - Whole Building Performance - I
Lecture 52 - Whole Building Performance - II
Lecture 53 - Whole Building Performance - III
Lecture 54 - Whole Building Performance - IV
Lecture 55 - Whole Building Performance - V
Lecture 56 - Whole Building Performance - VI
Lecture 57 - Whole Building Performance - VII
Lecture 58 - Whole Building Performance - VIII
Lecture 59 - Whole Building Performance - IX
Lecture 60 - Whole Building Performance - X

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NPTEL Video Course - Architecture - NOC:Structure, Form and Architecture: The Synergy

Subject Co-ordinator - Prof. Shubhajit Sadhukhan

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Structure, Form and Architecture
Lecture 2 - Relationship of Structure to Architectural Buildings - Part I
Lecture 3 - Relationship of Structure to Architectural Buildings - Part II
Lecture 4 - Loads on Structures
Lecture 5 - Synthesis of Architectural and Structural Form
Lecture 6 - Connecting Structure and Architecture - Part I
Lecture 7 - Connecting Structure and Architecture - Part II
Lecture 8 - Structural Transformation in Architectural History
Lecture 9 - Factors affecting the Structural Forms
Lecture 10 - Learning from Animal's Architecture
Lecture 11 - Basic Structural Properties
Lecture 12 - Structural Requirements
Lecture 13 - Structural Arrangement
Lecture 14 - Structural Forms and Shapes
Lecture 15 - Structural Materials
Lecture 16 - Structural Typology
Lecture 17 - Compressive Structures
Lecture 18 - Tensile Structures
Lecture 19 - Load Bearing Structures
Lecture 20 - Temporary Structures
Lecture 21 - Framed Structure
Lecture 22 - Arch Structures
Lecture 23 - Vault Structures
Lecture 24 - Dome Structures
Lecture 25 - Grid Structures
Lecture 26 - Shell Structures
Lecture 27 - Trusses and Space Frames
Lecture 28 - Folded Plate Structures
Lecture 29 - Membrane Structures

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Lecture 30 - Pneumatic Structures
Lecture 31 - Structure and Architectural Forms in Windy Areas
Lecture 32 - Structure and Architectural Forms in Seismic Prone Areas
Lecture 33 - Structure and Architectural Forms in Flood Prone Areas
Lecture 34 - Cost Effective Structure and Architecture
Lecture 35 - Structure and Light in Architecture
Lecture 36 - Evolution of Highrise Structural System
Lecture 37 - Highrise Structural Components - Part I
Lecture 38 - Highrise Structural Components - Part II
Lecture 39 - Mega Structure and Architecture-Case Studies
Lecture 40 - Architecture and Structure - Past, Present and Future

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NPTEL Video Course - Architecture - NOC:Engineering-Architectural Graphics - Part I: Orthographic projection

Subject Co-ordinator - Prof. Avlokita Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Graphics
Lecture 2 - Drawing Instruments
Lecture 3 - Sheet Layout and Fixing Sheet
Lecture 4 - Types of Lines and Graphic Symbols
Lecture 5 - Lettering
Lecture 6 - Dimensioning
Lecture 7 - Basic Geometrical Construction
Lecture 8 - Scales
Lecture 9 - Curves used in Engineering Practice: Conic Sections
Lecture 10 - Curves used in Engineering Practice: Cycloids, Trochoids and Involutes
Lecture 11 - Introduction to Orthographic Projection
Lecture 12 - Orthographic Projections - 1st Quadrant Vs 3rd Quadrant
Lecture 13 - Orthographic Projections - Projection of Points
Lecture 14 - Orthographic Projections - Introduction to Projection of Lines
Lecture 15 - Locus of Points
Lecture 16 - Projection of lines parallel to both the reference planes
Lecture 17 - Projection of line parallel to one and perpendicular to another plane
Lecture 18 - Projection of lines inclined to one plane
Lecture 19 - Projection of lines inclined to both the planes
Lecture 20 - Projection of a point and line on auxiliary plane
Lecture 21 - Projection of a plane perpendicular to both the reference planes
Lecture 22 - Projection of a plane perpendicular to one and parallel to another plane
Lecture 23 - Projection of a plane inclined to one and perpendicular to the other plane
Lecture 24 - Projection of a plane inclined to both the reference planes - I
Lecture 25 - Projection of a plane inclined to both the reference planes - II
Lecture 26 - Introduction to types of solids
Lecture 27 - Projection of solids in simple positions
Lecture 28 - Projection of solids with axis inclined to one of the reference planes and parallel to another
Lecture 29 - Projection of solids with axis inclined to both the reference planes

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Lecture 30 - Projection of spheres
Lecture 31 - Orthographic Projections Introduction to Sections of Solids
Lecture 32 - Orthographic Projections Sections of Prisms
Lecture 33 - Orthographic Projections Sections of Pyramids
Lecture 34 - Orthographic Projections Sections of Cylinders
Lecture 35 - Orthographic Projections Sections of Cones
Lecture 36 - Orthographic Projections Sections of Spheres
Lecture 37 - Development of Surfaces - I
Lecture 38 - Development of Surfaces - II
Lecture 39 - Intersection of Surfaces - I
Lecture 40 - Intersection of Surfaces - II

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NPTEL Video Course - Architecture - NOC:Introduction to Urban Planning

Subject Co-ordinator - Prof. Harshit Sosan Lakra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Conceptual Understanding of the Urban Areas
Lecture 2 - Urbanization and Sustainable Development
Lecture 3 - Urban Planning and 73-74 Constitution Amendment Acts
Lecture 4 - Types and Level of Plans
Lecture 5 - Regional Plan - I
Lecture 6 - Regional Plan - II
Lecture 7 - Development Plan - I
Lecture 8 - Development Plan - II (Case Study- Draft Bhopal Development Plan 2031)
Lecture 9 - Zonal Plan
Lecture 10 - Town Planning Scheme
Lecture 11 - Local Area Plan (Urban Redevelopment Plan)
Lecture 12 - Special Purpose Plan (AMRUT)
Lecture 13 - Special Purpose Plan (HRIDAY)
Lecture 14 - Special Purpose Plan (Smart City)
Lecture 15 - Perspective Plan (Agenda 2030 SDGs)
Lecture 16 - Contextualizing Cities (Egyptian, Mesopotamian, and Indus Valley Civilization)
Lecture 17 - Contextualizing Cities (Vedic Period)
Lecture 18 - Contextualizing Cities (Greek and Roman)
Lecture 19 - Contextualizing Cities (Industrial Revolution)
Lecture 20 - Contextualizing Cities (1900-1939)
Lecture 21 - Contextualizing Cities (1940-1979)
Lecture 22 - Contextualizing Cities (1980-2021)
Lecture 23 - Public Health and Urban Planning - I
Lecture 24 - Public Health and Urban Planning - II
Lecture 25 - Public Health and Urban Planning - III
Lecture 26 - Public Health and Urban Planning - IV
Lecture 27 - Housing Issues in India
Lecture 28 - Culture and Planning of Cities
Lecture 29 - Urbanization and Environmental Problems

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Lecture 30 - Urbanization and Slums
Lecture 31 - Introduction to Planning Legislation
Lecture 32 - Evolution and Growth of Planning Legislation - I
Lecture 33 - Evolution and Growth of Planning Legislation - II (USA)
Lecture 34 - Evolution and Growth of Planning Legislation - III (India)
Lecture 35 - Land Acquisition Act
Lecture 36 - Legal Requirements for Industrial Development
Lecture 37 - National Environmental Legal Requirements
Lecture 38 - Section I - Cantonment Act and Section II - Legal Requirement for Heritage Conservation
Lecture 39 - Zoning Regulation
Lecture 40 - Contemplating Learning Outcomes and Future Direction in Urban Planning

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NPTEL Video Course - Architecture - NOC:Engineering, Architectural Graphics - Part II (Isometric and Axonomet

Subject Co-ordinator - Prof. Avlokita Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to isometric projection and isometric Scale
Lecture 2 - Isometric projection of planar figures - quadrilaterals
Lecture 3 - Isometric projection of planar figures - circles, semi circles and curves
Lecture 4 - Isometric projection of straight prisms
Lecture 5 - Isometric projection of straight pyramids
Lecture 6 - Isometric projection of Straight Cylinders
Lecture 7 - Isometric projection of Cones
Lecture 8 - Isometric projection of Frustums of cones and pyramids
Lecture 9 - Isometric projection of section of solids
Lecture 10 - Isometric projection of spheres
Lecture 11 - Isometric projection of combination of solids
Lecture 12 - Isometric Projection of intersecting solids
Lecture 13 - Converting orthographic views to isometric drawing - 1
Lecture 14 - Converting orthographic views to isometric drawing - 2
Lecture 15 - Converting Isometric drawing to orthographic views
Lecture 16 - Introduction to axonometric projection
Lecture 17 - Axonometric projection of planar figures- quadrilaterals, circles and curves
Lecture 18 - Axonometric projection of prisms and pyramids
Lecture 19 - Axonometric projection of Cylinders, cones and spheres
Lecture 20 - Axonometric projection of intersecting solids and combination of solids

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NPTEL Video Course - Architecture - NOC:Environmental Impact Assessment

Subject Co-ordinator - Prof. Harshit Sosan Lakra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - State of Global Environment (Air)
Lecture 2 - State of Global Environment (Biodiversity)
Lecture 3 - State of Global Environment (Oceans and Coasts)
Lecture 4 - State of Global Environment (Land and Soil)
Lecture 5 - State of Global Environment (Freshwater)
Lecture 6 - Definition, Process and Purpose of EIA
Lecture 7 - EIA Impact Areas, Current and Emerging - Part 1
Lecture 8 - EIA Impact Areas, Current and Emerging - Part II
Lecture 9 - EIA Origin in USA and World-Wide Development
Lecture 10 - EIA in India
Lecture 11 - World Sustainable Development Timeline (1970-1999)
Lecture 12 - World Sustainable Development Timeline (2000-2021)
Lecture 13 - EIA Law, Policy and Institutional arrangements for EIA systems - Part I
Lecture 14 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part II - Air
Lecture 15 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part III - Air
Lecture 16 - EIA Law, Policy and Institutional arrangements for EIA Systems - Part IV - Water and Geology
Lecture 17 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part V - Ecology
Lecture 18 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part VI - Coastal Ecology and G
Lecture 19 - EIA Law, Policy and Institutional arrangements for EIA Systems - Part VII - Noise
Lecture 20 - EIA Law, Policy and Institutional arrangements for EIA Systems - Part VIII - Ecosystem Services
Lecture 21 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part IX - Cultural Heritage and
Lecture 22 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part X
Lecture 23 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part XI
Lecture 24 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part XII
Lecture 25 - EIA Law, Policy and Institutional Arrangements for EIA Systems - Part XIII
Lecture 26 - EIA Process - Starting and Initial Stage
Lecture 27 - EIA Process - Impact Prediction
Lecture 28 - EIA Process - Impact Evaluation, Mitigation and Enhancement
Lecture 29 - EIA Process - Participation, Presentation and Review

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Lecture 30 - EIA Process - Follow-Up (Monitoring and Auditing)
Lecture 31 - EIA Methods - Air Assessment - Part I
Lecture 32 - EIA Methods - Air Assessment - Part II
Lecture 33 - EIA Methods - Water Assessment
Lecture 34 - EIA Methods - Soil, Land and Geology
Lecture 35 - EIA Methods - Climate and Climate Change - Part I
Lecture 36 - EIA Methods - Climate and Climate Change - Part II
Lecture 37 - EIA Methods for Ecology (Definitions and Concepts)
Lecture 38 - EIA Methods for Ecology (Baseline Study)
Lecture 39 - EIA Methods for Ecology (Impact Prediction and Evaluation)
Lecture 40 - EIA Methods - Ecosystem Services - Part I
Lecture 41 - EIA Methods - Ecosystem Services - Part II
Lecture 42 - EIA Methods - Coastal Ecology and Geomorphology - Part I
Lecture 43 - EIA Methods - Coastal Ecology and Geomorphology - Part II
Lecture 44 - EIA Methods - Noise
Lecture 45 - EIA Methods - Transport
Lecture 46 - EIA Methods - Landscape and Visuals
Lecture 47 - EIA Methods - Cultural Heritage
Lecture 48 - EIA Methods - Health
Lecture 49 - EIA Methods - Socio-Economic Impacts (SIA) - Part I
Lecture 50 - EIA Methods - Socio-Economic Impacts (SIA) - Part II
Lecture 51 - EIA Methods - Land Acquisition, Resettlement and Livelihoods
Lecture 52 - EIA Methods - Resource Efficiency
Lecture 53 - EIA Methods - Risk and Risk Assessment
Lecture 54 - EIA Methods - Cumulative Effects
Lecture 55 - EIA - Environmental Management Plans
Lecture 56 - EIA - Widening the scope: Strategic Environmental Assessment
Lecture 57 - EIA - Reporting and Review of EIA Quality
Lecture 58 - EIA Case Study - Mumbai Metro Line 3, Colaba - Bandra - SEEPZ
Lecture 59 - EIA Case Study - Development of Water Aerodrome, Andaman and Nicobar - Part - I
Lecture 60 - EIA Case Study - Development of Water Aerodrome, Andaman and Nicobar - Part - II

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NPTEL Video Course - Architecture - NOC:Modern Indian Architecture

Subject Co-ordinator - Prof. P.S. Chani

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Pre-Independence - Part 1: Indo-Saracenic Architecture
Lecture 4 - Pre-Independence - Part 2: Colonial Architecture and Art Deco
Lecture 5 - Pre-Independence to Independence - Part 1
Lecture 6 - Pre-Independence to Independence - Part 2
Lecture 7 - Revivalism
Lecture 8 - The First Generation (1945-1970) - Part 1
Lecture 9 - The First Generation (1945-1970) - Part 2
Lecture 10 - The First Generation (1945-1970) - Part 3
Lecture 11 - The First Generation (1945-1970) - Part 4
Lecture 12 - The First Generation (1945-1970) - Part 5
Lecture 13 - The First Generation (1945-1970) - Part 6
Lecture 14 - Impact of Western Architects: Le Corbusier - Part 1
Lecture 15 - Impact of Western Architects: Le Corbusier - Part 2
Lecture 16 - Impact of Western Architects: Le Corbusier - Part 3
Lecture 17 - Impact of Western Architects: Le Corbusier - Part 4
Lecture 18 - Impact of Western Architects: Le Corbusier - Part 5
Lecture 19 - Impact of Western Architects: Le Corbusier - Part 6
Lecture 20 - Impact of Western Architects: Walter Gropius - Part 1
Lecture 21 - Impact of Western Architects: Walter Gropius - Part 2
Lecture 22 - Impact of Western Architects: Louis I Kahn - Part 1
Lecture 23 - Impact of Western Architects: Louis I Kahn - Part 2
Lecture 24 - Impact of Western Architects: Louis I Kahn - Part 3
Lecture 25 - Impact of Western Architects: Louis I Kahn - Part 4
Lecture 26 - Introduction to Critical Regionalism - Part 1
Lecture 27 - Introduction to Critical Regionalism - Part 2
Lecture 28 - Critical Regionalism in Indian Architecture - Part 1
Lecture 29 - Critical Regionalism in Indian Architecture - Part 2

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Lecture 30 - Critical Regionalism in Indian Architecture - Part 3
Lecture 31 - Critical Regionalism in Indian Architecture - Part 4
Lecture 32 - Critical Regionalism in Indian Architecture - Part 5
Lecture 33 - Structure: The Works of Mahendra Raj
Lecture 34 - Point-Blocks and High Rises - Part 1
Lecture 35 - Point-Blocks and High Rises - Part 2
Lecture 36 - Search for a new Architecture - Part 1
Lecture 37 - Search for a new Architecture - Part 2
Lecture 38 - Search for a new Architecture - Part 3
Lecture 39 - Search for a new Architecture - Part 4
Lecture 40 - Search for a new Architecture - Part 5

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NPTEL Video Course - Architecture - NOC:International Studies in Vernacular Architecture

Subject Co-ordinator - Prof. Ram Sateesh Pasupuleti

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Culture, Identity and Built Environment
Lecture 2 - Space and Meaning in Balinese Vernacular Architecture
Lecture 3 - Adobe Construction and Religious Structures
Lecture 4 - Social System, Beliefs and its Architecture
Lecture 5 - Anthropology of Shelter-Conclusion
Lecture 6 - Stone as a Vernacular Resource Material
Lecture 7 - Earth as Vernacular Resource Material
Lecture 8 - Bamboo as Vernacular Resource Material
Lecture 9 - Timber as Vernacular Resource Material
Lecture 10 - Advanced Material Adaptations: The conclusion
Lecture 11 - Cultural Geography and Vernacular Architecture
Lecture 12 - Cultural Geography and Small-scale Features in the Landscape
Lecture 13 - Acculturation in Architecture
Lecture 14 - Tradition and Transmission
Lecture 15 - Transformation in Vernacular Context
Lecture 16 - Disasters Vulnerability and Traditions
Lecture 17 - Learning Disaster Mitigation from the Vernacular
Lecture 18 - The Second Birth: Lessons from Disaster Recovery
Lecture 19 - Climate Change and Traditions
Lecture 20 - Yonmenkaigi (Four square table system) Method for Collaborative Knowledge Development

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NPTEL Video Course - Architecture - NOC:Introduction to Interaction Design

Subject Co-ordinator - Dr. Sonal Atreya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Interaction Design
Lecture 2 - Components of Interaction Design
Lecture 3 - Interaction Design Process
Lecture 4 - Understanding User
Lecture 5 - Conceptual Design - Part 1
Lecture 6 - Conceptual Design - Part 2
Lecture 7 - Role of Cognition
Lecture 8 - Role of Social Interaction
Lecture 9 - Designing for Emotional Interaction
Lecture 10 - Interactive Interfaces
Lecture 11 - Data Gathering
Lecture 12 - Data Analysis
Lecture 13 - Discovering Requirements
Lecture 14 - User Personas and Scenarios
Lecture 15 - Design and Prototyping - Part 1
Lecture 16 - Design and Prototyping - Part 2
Lecture 17 - Visual Interface Design
Lecture 18 - Elements of User Interface
Lecture 19 - Affordances and UI Transformations
Lecture 20 - Component-Based Design Systems

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NPTEL Video Course - Architecture - NOC:Understanding and Reducing Ghg Emissions - Focus on Scope 1 and 2 Emi

Subject Co-ordinator - Prof. Avlokita Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Sustainability, And Sustainable Development
Lecture 2 - Sustainable Development And Sustainable Goals
Lecture 3 - Sustainable Development Goals and Climate Change
Lecture 4 - Climate Risk
Lecture 5 - Impact of Development on Climate Natural Components
Lecture 6 - UNFCCC
Lecture 7 - Kyoto Protocol
Lecture 8 - The Paris Agreement
Lecture 9 - Green House Gases
Lecture 10 - Carbon Footprint and Calculation
Lecture 11 - The GHG Protocol
Lecture 12 - ISO International Standards
Lecture 13 - Identification and Determination of Scope 1,2 and 3 GHG Emissions
Lecture 14 - Identification and Determination of Scope 1,2 and 3 GHG Emissions - Part II
Lecture 15 - Identification and Determination of Scope 1,2 and 3 GHG Emissions - Part III
Lecture 16 - India Specific GHG Programs - I
Lecture 17 - India Specific GHG Programs - II
Lecture 18 - Accounting Methods and Data Collection
Lecture 19 - Tools for Calculation of GHG
Lecture 20 - Understanding the Role of Buildings and Related Emissions
Lecture 21 - Understanding Emissions of Airports
Lecture 22 - Understanding Emissions of University Campuses
Lecture 23 - Understanding Emissions of Fuel Supply Companies
Lecture 24 - Understanding Emissions of IT Companies
Lecture 25 - Understanding Emissions of Real Estate Companies
Lecture 26 - Thermal Comfort in Building
Lecture 27 - Passive Design Measures
Lecture 28 - Advanced Passive Design Measures
Lecture 29 - Natural and Mechanical Ventilation

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Lecture 30 - Daylighting and Lighting Design
Lecture 31 - Factors Affecting Material Selection in Building?
Lecture 32 - Material Selection for Emission Reduction
Lecture 33 - Reducing Emission from purchased Electricity
Lecture 34 - Strategies of Renovation and Retrofitting for Emission Reduction
Lecture 35 - Case studies of Various Efficient Building Design
Lecture 36 - Calculation of Emissions Reduction from HVAC System
Lecture 37 - Calculation of Emission Reduction from Fenestration
Lecture 38 - Calculation of Emission Reduction from Building Envelope
Lecture 39 - Calculation of Emission Reduction from Source of Energy
Lecture 40 - Course Summary

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NPTEL Video Course - Architecture - NOC:Research Methodology for Planning and Architectural Studies

Subject Co-ordinator - Prof. Shubhajit Sadhukhan

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Types of Research
Lecture 3 - Qualitative vs. Quantitative Research
Lecture 4 - Research Methods vs Research Methodology
Lecture 5 - Issues and Challenges in Planning and Architectural Research
Lecture 6 - Research Process - I
Lecture 7 - Research Process - II
Lecture 8 - Research Process - III
Lecture 9 - Research Writing - I
Lecture 10 - Research Writing - II
Lecture 11 - Basics of Literature Review
Lecture 12 - Bibliometric Analysis
Lecture 13 - Systematic Literature Review
Lecture 14 - Meta Analysis
Lecture 15 - Referencing
Lecture 16 - Types of Data in Research
Lecture 17 - Measurement and Scaling Techniques - I
Lecture 18 - Measurement and Scaling Techniques - II
Lecture 19 - Types of Surveys - I
Lecture 20 - Types of Surveys - II
Lecture 21 - Determining the Sample Size
Lecture 22 - Sampling Techniques - I
Lecture 23 - Sampling Techniques - II
Lecture 24 - Sources of Data
Lecture 25 - Preparation of Survey Questionnaire
Lecture 26 - Methods of Data Collection - I
Lecture 27 - Methods of Data Collection - II
Lecture 28 - Methods of Data Collection - III
Lecture 29 - Ethics in Data Management and Use

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Lecture 30 - Similarity vs. Plagiarism
Lecture 31 - Processing of Data and Database Management
Lecture 32 - Interpreting Data
Lecture 33 - Descriptive Statistics
Lecture 34 - Representation of Data and Inferences - I
Lecture 35 - Representation of Data and Inferences - II
Lecture 36 - Hypothesis Testing
Lecture 37 - Parametric Tests
Lecture 38 - Non-parametric Tests
Lecture 39 - Quantitative Research Approach
Lecture 40 - Quantitative Research - Case Study - I
Lecture 41 - Quantitative Research - Case Study - II
Lecture 42 - Quantitative Research - Case Study - III
Lecture 43 - Quantitative Research - Case Study - IV
Lecture 44 - Quantitative Research - Case Study - V
Lecture 45 - Qualitative Research Approach
Lecture 46 - Qualitative Research - Case Study - I
Lecture 47 - Qualitative Research - Case Study - II
Lecture 48 - Qualitative Research - Case Study - III
Lecture 49 - Qualitative Research - Case Study - IV
Lecture 50 - Qualitative Research - Case Study - V
Lecture 51 - Mixed Method Research Approach
Lecture 52 - Mixed Method Research Approach - Case Study
Lecture 53 - Spatial Methods in Planning Research
Lecture 54 - Spatial Methods in Planning Research - Case Study
Lecture 55 - Research Methods for Behavioral Studies - The Basics
Lecture 56 - Simulation Based Studies in Planning and Architecture
Lecture 57 - Handling Big Data Research - The Basics
Lecture 58 - Role of AI in Architecture and Planning Studies - The Basics
Lecture 59 - Programming Language and Software for Research in Planning and Architecture
Lecture 60 - Emerging Research Potential in Planning and Architecture

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NPTEL Video Course - Architecture - NOC:Modern World Architecture

Subject Co-ordinator - Prof. P. S. Chani

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - The Beginning - Part 1
Lecture 3 - The Beginning - Part 2
Lecture 4 - 19th Century Industrial Revolution and Later Developments - 1
Lecture 5 - 19th Century Industrial Revolution and Later Developments - 2
Lecture 6 - 19th Century - Impact of the Crystal Palace
Lecture 7 - Art Nouveau and Related Developments
Lecture 8 - Late 19th Century - Antoni Gaudi and Form Finding
Lecture 9 - Late 19th Century - CR Mackintosh and the Rise of Modernism
Lecture 10 - Late 19th Century - Chicago School and The Tall Office Building - 1
Lecture 11 - Late 19th Century - Chicago School and The Tall Office Building - 2
Lecture 12 - Evolution of Skyscrapers - 1
Lecture 13 - Evolution of Skyscrapers - 2
Lecture 14 - Evolution of Skyscrapers - 3
Lecture 15 - Evolution of Skyscrapers - 4
Lecture 16 - Structural System of Skyscrapers - 1
Lecture 17 - Structural System of Skyscrapers - 2
Lecture 18 - The Architecture of Frank Lloyd Wright - Part 1
Lecture 19 - The Architecture of Frank Lloyd Wright - Part 2
Lecture 20 - The Architecture of Frank Lloyd Wright - Part 3
Lecture 21 - The Architecture of Frank Lloyd Wright - Part 4
Lecture 22 - The Architecture of Le Corbusier - Part 1
Lecture 23 - The Architecture of Le Corbusier - Part 2
Lecture 24 - The Architecture of Le Corbusier - Part 3
Lecture 25 - The Architecture of Le Corbusier - Part 4
Lecture 26 - Works of Mies Van Der Rohe - 1
Lecture 27 - Works of Mies Van Der Rohe - 2
Lecture 28 - Works of Mies Van Der Rohe - 3
Lecture 29 - Works of Mies Van Der Rohe - 4

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Lecture 30 - Walter Gropius and The Bauhaus - 1
Lecture 31 - Walter Gropius and The Bauhaus - 2
Lecture 32 - Walter Gropius and The Bauhaus - 3
Lecture 33 - Styles and Movements - 1
Lecture 34 - Styles and Movements - 2
Lecture 35 - Styles and Movements - 3
Lecture 36 - Styles and Movements - 4
Lecture 37 - Styles and Movements - 5
Lecture 38 - Styles and Movements - 6
Lecture 39 - Styles and Movements - 7
Lecture 40 - Styles and Movements - 8
Lecture 41 - Styles and Movements - 9
Lecture 42 - Styles and Movements - 10
Lecture 43 - High Tech Architecture - 1
Lecture 44 - High Tech Architecture - 2
Lecture 45 - High Tech Architecture - 3
Lecture 46 - Hi-Tech Aesthetic Basic Rules â 1
Lecture 47 - Hi-Tech Aesthetic Basic Rules â 2
Lecture 48 - High Tech Places to Work - 1
Lecture 49 - High Tech Places to Work - 2
Lecture 50 - Places to Move - 1
Lecture 51 - Places to Move - 2
Lecture 52 - Places to Live - 1
Lecture 53 - Places to Live - 2
Lecture 54 - Places to Live - 3
Lecture 55 - Places to Gather
Lecture 56 - Green Buildings
Lecture 57 - Adaptive Reuse
Lecture 58 - Buildings with Diagrid Frames
Lecture 59 - Modern to Contemporary Architects
Lecture 60 - Contemporary Architecture

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NPTEL Video Course - Architecture - NOC:Urban Ecosystem

Subject Co-ordinator - Prof. Mahua Mukherjee

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Urban Ecosystem
Lecture 2 - Ecosystem Basics Including Ecology
Lecture 3 - Ecosystem Functions
Lecture 4 - Ecosystem Process
Lecture 5 - Examples of Ecosystem Process and Function
Lecture 6 - Ecosystem Types
Lecture 7 - Ecosystem Types - Case Examples
Lecture 8 - Ecosystem Concepts
Lecture 9 - Ecosystem Theories
Lecture 10 - Demonstration of Ecosystem Theory and Concept
Lecture 11 - Urban Ecosystem Components
Lecture 12 - Urban Ecosystem Functions and Processes
Lecture 13 - Urban Metabolism
Lecture 14 - Urban Ecosystem and Water
Lecture 15 - Demonstration of Urban Ecosystem and Water
Lecture 16 - Urban Ecosystem - CO2 and Methane
Lecture 17 - Urban Heat
Lecture 18 - Urban Ecosystem Imbalances and Challenges
Lecture 19 - Urban Ecosystem Balance
Lecture 20 - Carrying Capacity
Lecture 21 - Ecosystem Concepts for Urban Integration
Lecture 22 - City and Ecosystem Theories
Lecture 23 - Case Studies- City and Ecosystem Theories
Lecture 24 - Urban Ecosystem and Biodiversity
Lecture 25 - The IPCC and Biodiversity Conventions
Lecture 26 - Ecosystem Services
Lecture 27 - Types of ESS
Lecture 28 - Evaluation of Ecosystem Services (ESS) - I
Lecture 29 - Evaluation of Ecosystem Services (ESS) - II

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Lecture 30 - Urban Ecosystem Services
Lecture 31 - Effects of Urban Development on Urban Ecosystems
Lecture 32 - Urban Ecology
Lecture 33 - Social Aspects Intertwined with Urban Ecosystems
Lecture 34 - Urban Landscape Ecology As A Planning Strategy
Lecture 35 - Role of Urban Governance for Ecosystem Protection
Lecture 36 - Disaster Risk and Climate Change
Lecture 37 - Mitigation and Adaptation
Lecture 38 - Transformative Solutions-Nature-based Solutions Basics
Lecture 39 - NbS for Climate Adaptation and Urban Resilience
Lecture 40 - Ecosystem-based Adaptation (EbA) and Ecosystem-based Disaster Risk Reduction (Eco-DRR)
Lecture 41 - Blue Green Infrastructure
Lecture 42 - Environmental Engineering (EnvE)
Lecture 43 - Ecological Engineering (EcoE)
Lecture 44 - Application Potential for NbS
Lecture 45 - Policy Framework for Nature-Based Solutions
Lecture 46 - Challenges in Designing and Deploying NbS
Lecture 47 - Urban Ecosystem Assessment
Lecture 48 - Biodiversity - Ecological Footprint
Lecture 49 - Biodiversity - City Biodiversity Index
Lecture 50 - Urban Infrastructure Assessment
Lecture 51 - Science, Engineering, Technology, and Innovation (SETI)
Lecture 52 - Ecology and Future Cities
Lecture 53 - Instrumented Study
Lecture 54 - Case Study on Eco-Engineering Solutions for Waste, Energy, and Water
Lecture 55 - BMP on Eco-Engineering Solutions for Water
Lecture 56 - Risk and BGI Potential Assessment Tool
Lecture 57 - Case Study on BGI Solutions
Lecture 58 - Concept of GeoSM-NatEc
Lecture 59 - Demonstration of GeoSM-NatEc
Lecture 60 - Concluding Remarks

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NPTEL Video Course - Atmospheric Science - Introduction to Atmospheric Science

Subject Co-ordinator - Prof. C. Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Atmosphere-A brief survey (Pressure, Temperature and Chemical composition)
Lecture 3 - Atmosphere-A brief survey (Continued...) (Vertical structure of the atmosphere)
Lecture 4 - Vertical structure of atmosphere (Continued...) and The Earth system - Oceans
Lecture 5 - The Earth system - Oceans (Continued...) and Marine biosphere
Lecture 6 - The Earth system - Hydrological cycle
Lecture 7 - The Earth system - Hydrological cycle (Continued...) and Carbon cycle
Lecture 8 - The Earth system - Carbon cycle (Continued...), and Carbon in the oceans Earth's crust
Lecture 9 - The Earth system - Carbon in the oceans Earth's crust
Lecture 10 - Atmospheric Thermodynamics- Introduction
Lecture 11 - The hydrostatic equation
Lecture 12 - Hypsometric equation and pressure at sea level
Lecture 13 - Basic Thermodynamics
Lecture 14 - Concept of air parcel and dry adiabatic lapse rate
Lecture 15 - Potential temperature
Lecture 16 - Skew-T ln-P chart
Lecture 17 - Problems using Skew-T ln-P chart
Lecture 18 - Problems using Skew-T ln-P chart (Continued...)
Lecture 19 - Problems using Skew-T ln-P chart (Continued...)
Lecture 20 - Lifting Condensation Level (LCL)
Lecture 21 - Lifting Condensation Level (LCL) (Continued...)
Lecture 22 - Saturated Adiabatic and Psuedo-adiabatic processes
Lecture 23 - Equivalent potential temperature and wet bulb potential temperature
Lecture 24 - Normand's rule - Chinook winds
Lecture 25 - Problems on Chinook wind and static stability
Lecture 26 - Static stability-Brunt-Visala frequency
Lecture 27 - Conditional and convective instability
Lecture 28 - Static stability - Problems using radiosonde data and skew T ln P chart
Lecture 29 - The second law of thermodynamics â Clausius Clapeyron relation

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Lecture 30 - Clausius Clapeyron relation (Continued...)
Lecture 31 - Atmospheric radiation â Radiation laws
Lecture 32 - Planck's distribution and Inverse square law
Lecture 33 - Physics of scattering, emmision and absorption
Lecture 34 - Physics of scattering, emmision and absorption (Continued...)
Lecture 35 - Radiative Transfer Equation â Derivation
Lecture 36 - Radiative Transfer Equation (Continued...)
Lecture 37 - Radiative heating profiles of the atmosphere
Lecture 38 - Climate Dynamics â Introduction
Lecture 39 - Climate sensitivity and feedback
Lecture 40 - Climate change
Lecture 41 - Atmospheric dynamics

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NPTEL Video Course - Atmospheric Science - Radiation Heat Transfer

Subject Co-ordinator - Prof. J. Srinivasan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Blackbody radiation
Lecture 3 - Properties of real surfaces
Lecture 4 - Spectral and directional variations
Lecture 5 - Shape factor
Lecture 6 - Triangular enclosure
Lecture 7 - Evaluation of shape factors
Lecture 8 - Radiation in enclosures
Lecture 9 - Electrical analogy
Lecture 10 - Applications
Lecture 11 - Non-gray enclosures
Lecture 12 - Enclosure with Specular surfaces
Lecture 13 - Integral method for enclosures
Lecture 14 - Introduction to gas radiation
Lecture 15 - Plane parallel model
Lecture 16 - Diffusion approximation
Lecture 17 - Radiative equilibrium
Lecture 18 - Optically thick limit
Lecture 19 - Radiation spectroscopy
Lecture 20 - Isothermal gas emissivity
Lecture 21 - Band models
Lecture 22 - Total Emissivity method
Lecture 23 - Isothermal gas enclosures
Lecture 24 - Well-stirred furnace model
Lecture 25 - Gas radiation in complex enclosures
Lecture 26 - Interaction between radiation and other modes of heat transfer
Lecture 27 - Radiation heat transfer during flow over flat plate
Lecture 28 - Radiation and Climate
Lecture 29 - Radiative-convective equilibrium

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Lecture 30 - Radiative equilibrium with scattering
Lecture 31 - Radiation measurement
Lecture 32 - Radiation with internal heat source
Lecture 33 - Particle scattering
Lecture 34 - Scattering in the atmosphere
Lecture 35 - Non-isotropic scattering
Lecture 36 - Approximate methods in scattering
Lecture 37 - Approximate methods in scattering
Lecture 38 - Monte Carlo method

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NPTEL Video Course - Atmospheric Science - The monsoon and its variability

Subject Co-ordinator - Prof. Sulochana Gadgil

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preamble and Introduction to the Indian Monsoon
Lecture 2 - Nature of the variability of the Indian Monsoon
Lecture 3 - Monsoon variability through the eye in the sky, seasonal variation of the surface wind and pressu
Lecture 4 - Background about the atmosphere and rotating systems
Lecture 5 - Rainfall and clouds over the tropics
Lecture 6 - Organization of clouds over mesoscale, synoptic scale and planetary scales
Lecture 7 - The Indian monsoon
Lecture 8 - Monsoons and the seasonal variation of tropical circulation and rainfall
Lecture 9 - Evolution of the ideas about the basic system responsible for the Indian monsoon - Part 1
Lecture 10 - Evolution of the ideas about the basic system responsible for the Indian monsoon - Part 2
Lecture 11 - Tropical Convergence Zones and the Indian monsoon - Part 1
Lecture 12 - Tropical Convergence Zones and the Indian monsoon - Part 2
Lecture 13 - Variability of organized convection over the tropical oceans
Lecture 14 - Heat lows and the TCZ
Lecture 15 - Monsoonal regions of the world
Lecture 16 - Seasonal transitions - Part 1
Lecture 17 - Seasonal transitions - Part 2
Lecture 18 - Seasonal transitions - Part 3
Lecture 19 - Climatic clusters of the Indian region
Lecture 20 - Active-weak spells and breaks in the monsoon - Part 1
Lecture 21 - Active-weak spells and breaks in the monsoon - Part 2
Lecture 22 - Intraseasonal variation and intraseasonal oscillations
Lecture 23 - The tropical oceans
Lecture 24 - El Nino Southern Oscillation (ENSO) - Part 1
Lecture 25 - El Nino Southern Oscillation (ENSO) - Part 2
Lecture 26 - El Nino Southern Oscillation (ENSO) - Part 3
Lecture 27 - El Nino Southern Oscillation (ENSO) - Part 4
Lecture 28 - El Nino Southern Oscillation (ENSO) - Part 5
Lecture 29 - El Nino Southern Oscillation (ENSO) - Part 6

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Lecture 30 - Indian Ocean and the monsoon - Part 1
Lecture 31 - Indian Ocean and the monsoon - Part 2
Lecture 32 - Indian Ocean Dipole - Part 1
Lecture 33 - Indian Ocean Dipole - Part 2
Lecture 34 - Interannual variation of the Indian summer Monsoon rainfall
Lecture 35 - Monsoon Variability and Agriculture - Part 1
Lecture 36 - Monsoon Variability and Agriculture - Part 2
Lecture 37 - Monsoon Variability and Agriculture - Part 3
Lecture 38 - Monsoon Variability and Agriculture - Part 4
Lecture 39 - Indian Summer Monsoon, GDP and Agriculture
Lecture 40 - Monsoon Prediction - Part 1
Lecture 41 - Monsoon Prediction - Part 2
Lecture 42 - Concluding Remarks

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Applied Mechanics

Subject Co-ordinator - Prof. Sanjeev Sanghi, Prof. R.K. Mittal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preliminary Concepts
Lecture 2 - Vector Analysis
Lecture 3 - Analysis of Forces
Lecture 4 - Analysis of Equilibrium
Lecture 5 - Structural Mechanics - Part-1
Lecture 6 - Structural Mechanics - Part-2
Lecture 7 - Friction and its Applications - Part-1
Lecture 8 - Friction and its Applications - Part-2
Lecture 9 - Friction and its Applications - Part-3
Lecture 10 - Properties of Surfaces - Part-1
Lecture 11 - Properties of Surfaces - Part-2
Lecture 12 - Properties of Surfaces - Part-3
Lecture 13 - Moments and Products of Inertia
Lecture 14 - Methods of Virtual Work and Potential Energy - Part-1
Lecture 15 - Methods of Virtual Work and Potential Energy - Part-2
Lecture 16 - Stability of Equilibrium

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Management Science I

Subject Co-ordinator - Prof. Anuradha Sharma

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Motivation
Lecture 3 - Management
Lecture 4 - Work Ethics
Lecture 5 - Comparison Between Theories
Lecture 6 - Job Enrichment
Lecture 7 - Team Building and Participation
Lecture 8 - Other Leadership Styles
Lecture 9 - Empowerment
Lecture 10 - Barriers to Communication
Lecture 11 - Issues in Leadership
Lecture 12 - Participation Management and Team Working Part - 1
Lecture 13 - Participation Management and Team Working Part - 2
Lecture 14 - Participation Management and Team Working Part - 3
Lecture 15 - Participative Management and Team Working Part - 5
Lecture 16 - Organizations
Lecture 17 - Some Management Concepts - Part - 1
Lecture 18 - Some Management Concepts - Part - 2
Lecture 19 - Some Management Concepts - Part - 3
Lecture 20 - Diversity at Work Place and Management Issues
Lecture 21 - Industrial Relations and Conflict Management - Part - 1
Lecture 22 - Industrial Relations and Conflict Management - Part - 2
Lecture 23 - Selection and Training of Employees
Lecture 24 - Performance Management - Part - 1
Lecture 25 - Performance Management - Part - 2
Lecture 26 - Performance Management - Part - 3
Lecture 27 - Management Research
Lecture 28 - Corporate Social Responsibilities
Lecture 29 - Women, Work and Organizations

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Lecture 30 - Women, Work and Organizations
Lecture 31 - Selection, Recruitment and Training
Lecture 32 - Management of Change in Organization
Lecture 33 - Organizational Development
Lecture 34 - Values, Ethics and Corporate Social Responsibilities - Part - 1
Lecture 35 - Values, Ethics and Corporate Social Responsibilities - Part - 2
Lecture 36 - Management
Lecture 37 - Management
Lecture 38 - Management
Lecture 39 - Conclusions

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Materials Science

Subject Co-ordinator - Prof. S.K. Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Internal Energy Enthalpy
Lecture 3 - Crystal Geometry
Lecture 4 - Crystal Geometry
Lecture 5 - Crystal Geometry
Lecture 6 - Crystal Structure
Lecture 7 - Close Packing of Spheres of Equal Size
Lecture 8 - Structure of Solid Materials
Lecture 9 - Non Crystalline Solids
Lecture 10 - Polymers (Continued)
Lecture 11 - Crystal Imperfections
Lecture 12 - Crystal Imperfections
Lecture 13 - Crystal Imperfections
Lecture 14 - Crystal Imperfections
Lecture 15 - Crystal Imperfections
Lecture 16 - Phase Diagrams
Lecture 17 - Phase Diagrams
Lecture 18 - Phase Diagrams
Lecture 19 - Diffusion in Solids
Lecture 20 - Diffusion in Solids
Lecture 21 - Phase Transformations
Lecture 22 - Phase Transformations
Lecture 23 - Phase Transformations
Lecture 24 - Transformations in Steels
Lecture 25 - Phase Transformations; Precipitation Hardening
Lecture 26 - Mechanical Behaviour of Materials
Lecture 27 - Plastic Deformation
Lecture 28 - Plastic Deformation
Lecture 29 - Plastic Deformation

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Lecture 30 - Strengthening Mechanisms Creep
Lecture 31 - Fracture
Lecture 32 - Conductors and Resistors
Lecture 33 - Conductors and Resistors
Lecture 34 - Superconductors
Lecture 35 - Superconductors
Lecture 36 - Semiconductors

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Numerical Methods and Computation

Subject Co-ordinator - Prof. S.R.K. Iyengar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Errors in Computation and Numerical Instability
Lecture 2 - Solution of Nonlinear Algebraic Equations - Part 1
Lecture 3 - Solution of Nonlinear Algebraic Equations - Part 2
Lecture 4 - Solution of Nonlinear Algebraic Equations - Part 3
Lecture 5 - Solution of Nonlinear Algebraic Equations - Part 4
Lecture 6 - Solution of Nonlinear Algebraic Equations - Part 5
Lecture 7 - Solution of Nonlinear Algebraic Equations - Part 6
Lecture 8 - Solution of Nonlinear Algebraic Equations - Part 7
Lecture 9 - Solution of Nonlinear Algebraic Equations - Part 8
Lecture 10 - Solution of Nonlinear Algebraic Equations - Part 9
Lecture 11 - Solution of a System of Linear Algebraic Equations - Part 1
Lecture 12 - Solution of a System of Linear Algebraic Equations - Part 2
Lecture 13 - Solution of a System of Linear Algebraic Equations - Part 3
Lecture 14 - Solution of a System of Linear Algebraic Equations - Part 4
Lecture 15 - Solution of a System of Linear Algebraic Equations - Part 5
Lecture 16 - Solution of a System of Linear Algebraic Equations - Part 6
Lecture 17 - Solution of a System of Linear Algebraic Equations - Part 7
Lecture 18 - Solution of a System of Linear Algebraic Equations - Part 8
Lecture 19 - Solution of a System of Linear Algebraic Equations - Part 9
Lecture 20 - Solution of a System of Linear Algebraic Equations - Part 10
Lecture 21 - Solution of a System of Linear Algebraic Equations - Part 11
Lecture 22 - Solution of a System of Linear Algebraic Equations - Part 12
Lecture 23 - Solution of a System of Linear Algebraic Equations - Part 13
Lecture 24 - Solution of a System of Linear Algebraic Equations - Part 14
Lecture 25 - Interpolation and Approximation - Part 1
Lecture 26 - Interpolation and Approximation - Part 2
Lecture 27 - Interpolation and Approximation - Part 3
Lecture 28 - Interpolation and Approximation - Part 4
Lecture 29 - Interpolation and Approximation - Part 5

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Lecture 30 - Interpolation and Approximation - Part 6
Lecture 31 - Interpolation and Approximation - Part 7
Lecture 32 - Interpolation and Approximation - Part 8
Lecture 33 - Interpolation and Approximation - Part 9
Lecture 34 - Numerical Differentiation and Integration - Part 1
Lecture 35 - Numerical Differentiation and Integration - Part 2
Lecture 36 - Numerical Differentiation and Integration - Part 3
Lecture 37 - Numerical Differentiation and Integration - Part 4
Lecture 38 - Numerical Differentiation and Integration - Part 5
Lecture 39 - Numerical Differentiation and Integration - Part 6
Lecture 40 - Numerical Differentiation and Integration - Part 7
Lecture 41 - Numerical Differentiation and Integration - Part 8

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Engineering Mechanics

Subject Co-ordinator - Prof. Manoj K Harbola

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Engineering Mechanics
Lecture 2 - Equilibrium - I
Lecture 3 - Equilibrium - II
Lecture 4 - Equilibrium - III
Lecture 5 - Plan Trusses - I
Lecture 6 - Plan Trusses - II
Lecture 7 - Friction
Lecture 8 - Properties of Surfaces - I
Lecture 9 - Properties of Surfaces - II
Lecture 10 - Properties of Surfaces - III
Lecture 11 - Method of Virtual Work
Lecture 12 - Motion of Particles Planar Polar Coordinates
Lecture 13 - Motion With Constraints
Lecture 14 - Motion of Particle With Friction
Lecture 15 - Motion of Particles With Drag
Lecture 16 - Momentum
Lecture 17 - Work and Energy - I
Lecture 18 - Work and Energy - II
Lecture 19 - Work and Energy - III
Lecture 20 - Work and Energy - IV
Lecture 21 - Rotational Motion - I
Lecture 22 - Rotational Motion - II
Lecture 23 - Rotational Motion - III
Lecture 24 - Rotational Motion - IV
Lecture 25 - Rotational Motion - V
Lecture 26 - Rotational Motion - VI
Lecture 27 - Simple Harmonic Motion - I
Lecture 28 - Simple Harmonic Motion - II
Lecture 29 - Simple Harmonic Motion - III

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Lecture 30 - Motion in Uniformly Accelerating Frames
Lecture 31 - Motion In Rotating Frame

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Engineering Physics II

Subject Co-ordinator - Prof. V. Ravishankar, Prof. S. Raychaudhuri

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module - 1 lecture - 1
Module - 1 lecture - 2
Module - 1 lecture - 3
Module - 1 lecture - 4
Module - 2 lecture - 1
Module - 2 lecture - 2
Module - 2 lecture - 3
Module - 2 lecture - 4
Module - 2 lecture - 5
Module - 3 lecture - 1
Module - 3 lecture - 2
Module - 3 lecture - 3
Module - 3 lecture - 4
Module - 3 lecture - 5 (Lecture Missing)
Module - 3 lecture - 6
Module - 3 lecture - 7
Module - 3 lecture - 8
Module - 4 lecture - 1
Module - 4 lecture - 2
Module - 4 lecture - 3
Module - 4 lecture - 4
Module - 4 lecture - 5
Module - 4 lecture - 6
Module - 4 lecture - 7
Module - 4 lecture - 8
Module - 4 lecture - 9
Module - 4 lecture - 10
Module - 4 lecture - 11
Module - 4 lecture - 12

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Mathematics I

Subject Co-ordinator - Prof. Swagato K. Ray, Prof. Shobha Madan, Dr. P. Shunmugaraj

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Real Number
Lecture 2 - Sequences I
Lecture 3 - Sequences II
Lecture 4 - Sequences III
Lecture 5 - Continuous Function
Lecture 6 - Properties of Continuous Function
Lecture 7 - Uniform Continuity
Lecture 8 - Differentiable Functions
Lecture 9 - Mean Value Theorem
Lecture 10 - Maxima - Minima
Lecture 11 - Taylor's Theorem
Lecture 12 - Curve Sketching
Lecture 13 - Infinite Series I
Lecture 14 - Infinite Series II
Lecture 15 - Tests of Convergence
Lecture 16 - Power Series
Lecture 17 - Riemann Integral
Lecture 18 - Riemann Integrable Functions
Lecture 19 - Applications of Riemann Integral
Lecture 20 - Length of a curve
Lecture 21 - Line Integrals
Lecture 22 - Functions of Several Variables
Lecture 23 - Differentiation
Lecture 24 - Derivatives
Lecture 25 - Mean Value Theorem
Lecture 26 - Maxima Minima
Lecture 27 - Method of Lagrange Multipliers
Lecture 28 - Multiple Integrals
Lecture 29 - Surface Integrals

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Lecture 30 - Green's Theorem
Lecture 31 - Stokes Theorem
Lecture 32 - Gauss Divergence Theorem

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Human Resource Management-I

Subject Co-ordinator - Prof. Kalyan Chakravarti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Nature and Scope of HRM
Lecture 2 - Analysing and Designing Job - I
Lecture 3 - Analysing and Designing Job - II
Lecture 4 - Human Resource Planning - I
Lecture 5 - Human Resource Planning - II
Lecture 6 - Recruitment and Selection
Lecture 7 - Performance Evaluation and Appraisal - I
Lecture 8 - Performance Evaluation and Appraisal (Continued...)
Lecture 9 - Training and Development
Lecture 10 - Employee Welfare
Lecture 11 - Safety, Health, Environment
Lecture 12 - Industrial Relations
Lecture 13 - Total Quality Management
Lecture 14 - Organization Culture
Lecture 15 - Change Management - Part - I
Lecture 16 - Change Management - Part - II
Lecture 17 - Wage and Salary Administration
Lecture 18 - Career Planning - Part - I
Lecture 19 - Career Planning - Part - II
Lecture 20 - Contemporary Issues in HRM - I
Lecture 21 - Contemporary Issues in HRM - II
Lecture 22 - Contemporary Issues in HRM - III

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Leadership

Subject Co-ordinator - Prof. Kalyan Chakravarti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Leadership
Lecture 2 - Leadership Roles
Lecture 3 - Leadership Styles
Lecture 4 - Leadership Behaviour
Lecture 5 - Leadership Styles
Lecture 6 - Case
Lecture 7 - Leadership Skills
Lecture 8 - Competencies and Skills of Leaders
Lecture 9 - Case
Lecture 10 - Case
Lecture 11 - Case
Lecture 12 - Case
Lecture 13 - Case

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Management Information System

Subject Co-ordinator - Prof. Biswajit Mahanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Introduction - III
Lecture 4 - Concept of Information - I
Lecture 5 - Concept of Information - II
Lecture 6 - Decision Making Process
Lecture 7 - Impact of IS on Management - I
Lecture 8 - Impact of IS on Management - II
Lecture 9 - Hardware Software Overview - I
Lecture 10 - Hardware Software Overview - II
Lecture 11 - Knowledge Management
Lecture 12 - Learning Organization
Lecture 13 - Decision Analysis - I
Lecture 14 - Decision Analysis - II
Lecture 15 - Decision Analysis - III
Lecture 16 - Data Flow Diagrams - I
Lecture 17 - Data Flow Diagrams - II
Lecture 18 - Data Flow Diagrams - III
Lecture 19 - Data Flow Diagrams - IV
Lecture 20 - System Design - I
Lecture 21 - System Design - II
Lecture 22 - DBMS - I
Lecture 23 - DBMS - II
Lecture 24 - DBMS - III
Lecture 25 - DBMS - IV
Lecture 26 - DBMS - V
Lecture 27 - OOAD - I
Lecture 28 - OOAD - II
Lecture 29 - OOAD - III

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Physics I - Oscillations and Waves

Subject Co-ordinator - Prof. S. Bharadwaj

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Simple Harmonic Oscillators
Lecture 2 - Damped Oscillator - I
Lecture 3 - Damped Oscillator - II
Lecture 4 - Oscillator With External Forcing - I
Lecture 5 - Oscillator With External Forcing
Lecture 6 - Resonance
Lecture 7 - Coupled Oscillations
Lecture 8 - Sinusoidal Plane Waves - I
Lecture 9 - Electromagnetic waves - I
Lecture 10 - Electromagnetic Waves - II
Lecture 11 - The Vector Nature of Electromagnetic Waves
Lecture 12 - The Electromagnetic Spectrum
Lecture 13 - The Electromagnetic Spectrum - II
Lecture 14 - Interference - I
Lecture 15 - Interference - II
Lecture 16 - Interference - III
Lecture 17 - Interference - IV
Lecture 18 - Coherence
Lecture 19 - Coherence
Lecture 20 - Diffraction - I
Lecture 21 - Diffraction - II
Lecture 22 - Diffraction - III
Lecture 23 - Diffraction - IV
Lecture 24 - X-Ray Diffraction
Lecture 25 - Beats
Lecture 26 - The Wave Equation
Lecture 27 - Solving the Wave Equation
Lecture 28 - Waves
Lecture 29 - Standing Waves

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Lecture 30 - Standing Waves
Lecture 31 - Polarization
Lecture 32 - Compton Effect
Lecture 33 - Wave - Particle Duality
Lecture 34 - Wave - Particle Duality
Lecture 35 - Probability Amplitude
Lecture 36 - Probability
Lecture 37 - Schrodinger Wave Equation
Lecture 38 - Measurements
Lecture 39 - Particle in a Potential
Lecture 40 - Potential Well
Lecture 41 - Potential Well
Lecture 42 - Potential Well
Lecture 43 - Quantum Tunneling
Lecture 44 - Quantum Tunneling

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Strategic Management

Subject Co-ordinator - Prof. Kalyan Chakravarti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Strategy
Lecture 2 - Strategy
Lecture 3 - Case Study - Group Presentation on Case - I (Baddi`s Solvent)
Lecture 4 - Case Study - Group Presentation on Case - II
Lecture 5 - Case Study - Group Presentation on Case - III
Lecture 6 - Case Study - Group Presentation on Case - IV Form
Lecture 7 - Strategy
Lecture 8 - Strategy
Lecture 9 - Case Study
Lecture 10 - Case Study
Lecture 11 - Group Presentation - II

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Basic Electronics and Lab

Subject Co-ordinator - Prof. T.S. Natarajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Basic Electronics
Lecture 2 - Electronic Devices 1
Lecture 3 - Electronics Devices II Resistor in series and parallel
Lecture 4 - Some Useful Laws in Basic Electronics
Lecture 5 - Some Useful Theorems in Basic Electronics
Lecture 6 - Semi Conductor Diodes
Lecture 7 - Applications of Diodes
Lecture 8 - Wave Shaping using Diodes
Lecture 9 - Zener Diode Characteristics
Lecture 10 - Transistors
Lecture 11 - Transistor Biasing - Common Emitter Circuits, Fixed Bias, Collector to base Bias
Lecture 12 - Transistor Biasing - Emitter Current Bias, Thermal Stability (RC Coupled Amplifier)
Lecture 13 - Basic Characteristic of an Amplifier - Simple Transistor model, Common emitter Amplifier
Lecture 14 - Hybrid Equivalent Circuit, H-Parameters
Lecture 15 - Circuit Analysis using H-Parameters
Lecture 16 - Frequency Response of Amplifiers
Lecture 17 - Frequency Analysis
Lecture 18 - Power Amplifiers
Lecture 19 - Differential Amplifiers Circuit
Lecture 20 - Integrated Chip
Lecture 21 - Typical Characteristic of Operation Amplifier
Lecture 22 - Four Types of Feed Back
Lecture 23 - Four Types of Feed Back
Lecture 24 - Mathematical Operations
Lecture 25 - Mathematical Operations
Lecture 26 - Mathematical Operations
Lecture 27 - Characteristics of Operation Amplifier
Lecture 28 - Characteristics of Operation Amplifier
Lecture 29 - Characteristics of Operation Amplifier

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Lecture 30 - Inverter/Non-Inverter Circuits
Lecture 31 - Applications of Op Amps
Lecture 32 - Non-Linear Op Amp circuits
Lecture 33 - Applications of Op Amps
Lecture 34 - Active Diode Circuits
Lecture 35 - Oscillators
Lecture 36 - Logarithmic and Anti-Logarithmic Amplifier
Lecture 37 - Filters
Lecture 38 - Unit Junction Transistor
Lecture 39 - Silicon Controlled Rectifier
Lecture 40 - Field Effect Transistor

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Classical Physics

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Newtonian mechanics
Lecture 3 - Dynamics in phase space
Lecture 4 - Linear dynamical systems
Lecture 5 - Autonomous dynamical systems (Part 1)
Lecture 6 - Autonomous dynamical systems (Part 2)
Lecture 7 - Lagrangian formalism
Lecture 8 - Summary of classical electromagnetism
Lecture 9 - Charged particle in an electromagnetic fi eld
Lecture 10 - Hamiltonian dynamics (Part 1)
Lecture 11 - Hamiltonian dynamics (Part 2)
Lecture 12 - Hamiltonian dynamics (Part 3)
Lecture 13 - Dynamical symmetry (Part 1)
Lecture 14 - Dynamical symmetry (Part 2)
Lecture 15 - Randomness in phase space; chaos
Lecture 16 - Discrete-time dynamics
Lecture 17 - Discrete-time dynamics
Lecture 18 - Problems and solutions (Part 1)
Lecture 19 - Problems and solutions (Part 2)
Lecture 20 - Classical statistical mechanics
Lecture 21 - Some probability distributions; isolated system
Lecture 22 - The microcanonical emsemble
Lecture 23 - Thermodynamics
Lecture 24 - The canonical ensemble
Lecture 25 - Connection between statistical mechanics and ther-modynamics
Lecture 26 - Probability distributions
Lecture 27 - Probability distributions (concld.). Phase transitions (Part 1)
Lecture 28 - Phase transitions (Part 2)
Lecture 29 - Phase transitions (Part 3)

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Lecture 30 - Phase transitions (Part 4); misc. topics
Lecture 31 - Problems and solutions (Part 3)
Lecture 32 - Continuous groups in physics (Part 1)
Lecture 33 - Continuous groups in physics (Part 2)
Lecture 34 - Continuous groups in physics (Part 3)
Lecture 35 - Noether's Theorem. Special Relativity (Part 1)
Lecture 36 - Special Relativity (Part 2)
Lecture 37 - Special Relativity (Part 3)
Lecture 38 - Special Relativity (Part 4)

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Engineering Chemistry I

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Chemistry & Quantum Chemical Mechanics
Lecture 2 - Particle in a box (one and two dimensions)
Lecture 3 - Particle in a box (One and Two Dimensions) Continued
Lecture 4 - Harmonic Oscillator and Molecular Vibration
Lecture 5 - Harmonic Oscillator (Continued)
Lecture 6 - Hydrogen Atom - Radial Solution
Lecture 7 - Hydrogen Atom Part III Angular Solutions
Lecture 8 - Hydrogen Atom - Angular Solutions (Continued)
Lecture 9 - Hydrogen Atom - Angular Solutions (Continued)
Lecture 10 - Oppenheimer Approximation and Superposition

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Numerical Methods and Programing

Subject Co-ordinator - Prof. P.B. Sunil Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Programing Basics
Lecture 2 - Introduction to Pointers
Lecture 3 - Pointers And Arrays
Lecture 4 - External Functions and Argument Passing
Lecture 5 - Representation of Numbers
Lecture 6 - Numerical Error
Lecture 7 - Error Propagation and Stability
Lecture 8 - Polynomial Interpolation-1
Lecture 9 - Polynomial Interpolation-2
Lecture 10 - Error In Interpolation Polynomial
Lecture 11 - Polynomial Interpolation
Lecture 12 - Cubic Spline Interpolation
Lecture 13 - Data Fitting
Lecture 14 - Data Fitting
Lecture 15 - Data Fitting
Lecture 16 - Matrix Elimination and Solution
Lecture 17 - Solution To Linear Equations
Lecture 18 - Matrix Elimination
Lecture 19 - Eigen Values of A Matrix
Lecture 20 - Eigen Values And Eigen Vectors
Lecture 21 - Solving NonLinear Equations
Lecture 22 - Solving NonLinear Equations Newton Raphson Method
Lecture 23 - Methods For Solving NonLinear Equations
Lecture 24 - System of NonLinear Equations
Lecture 25 - Numerical Derivations
Lecture 26 - High order Derivatives From Difference Formula
Lecture 27 - Numerical Integration - Basic Rules
Lecture 28 - Comparison of Different Basic Rules
Lecture 29 - Gaussian Rules

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Lecture 30 - Comparison of Gaussian Rules
Lecture 31 - Solving Ordinary Differential Equations
Lecture 32 - Solving ordinary differential equations
Lecture 33 - Adaptive step size Runge Kutta scheme
Lecture 34 - Partial Differential Equations
Lecture 35 - Explicit and Implicit Methods
Lecture 36 - The Crank - Nicholson Scheme For Two Spatial
Lecture 37 - Fourier Transforms
Lecture 38 - Fast Fourier Transforms

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Quantum Physics

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Quantum Physics;Heisenberg's uncertainty principle
Lecture 2 - Introduction to linear vector spaces
Lecture 3 - Characteristics of linear vector spaces
Lecture 4 - Functions in a linear vector space
Lecture 5 - Linear operations in a linear vector space and their eigenvalues
Lecture 6 - Classical Vs Quantum Mechanics
Lecture 7 - Quantum Physics
Lecture 8 - Quantum Physics
Lecture 9 - Quantum Physics
Lecture 10 - Quantum Physics
Lecture 11 - Quantum Physics
Lecture 12 - Quantum Physics
Lecture 13 - Quantum Physics
Lecture 14 - Quantum Physics
Lecture 15 - Quantum Physics
Lecture 16 - Quantum Physics
Lecture 17 - Quantum Physics
Lecture 18 - Quantum Physics
Lecture 19 - Quantum Physics
Lecture 20 - Quantum Physics
Lecture 21 - Quantum Physics
Lecture 22 - Quantum Physics
Lecture 23 - Quantum Physics
Lecture 24 - Quantum Physics
Lecture 25 - Quantum Physics
Lecture 26 - Quantum Physics
Lecture 27 - Quantum Physics
Lecture 28 - Quantum Physics
Lecture 29 - Quantum Physics

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Lecture 30 - Quantum Physics
Lecture 31 - Quantum Physics

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Engineering Physics I

Subject Co-ordinator - Prof. Rajdeep Chatterjee, Prof. B.K. Patra, Prof. M.K. Srivastava, Prof. G.D. Verma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Malus law & Superposition of ways
Lecture 3 - Double Refraction
Lecture 4 - Interference of polarized light
Lecture 5 - Optical Activity
Lecture 6 - Introduction
Lecture 7 - Stationary Waves & Reflection, Refraction and Diffraction
Lecture 8 - Ultrasonics
Lecture 9 - Acoustics of Buildings - Part I
Lecture 10 - Acoustics of Buildings - Part II
Lecture 11 - Interference of light Part-1
Lecture 12 - Interference of light Part-2
Lecture 13 - Interference of light Part-3
Lecture 14 - Interference by Division of Wave front
Lecture 15 - Interference by Division of Amplitude
Lecture 16 - Coherence and Application of Interference
Lecture 17 - Diffraction Part-1
Lecture 18 - Diffraction Part-2
Lecture 19 - Diffraction Part-3
Lecture 20 - Diffraction by a circular aperture
Lecture 21 - Kinetic theory of gases - Part-1
Lecture 22 - Kinetic theory of gases - Part-2
Lecture 23 - Maxwellian distribution law of velocity - Part-1
Lecture 24 - Maxwellian distribution law of velocity - Part-2
Lecture 25 - Maxwellian distribution law of velocity - Part-3
Lecture 26 - Vanderwaal's equation of states - Part-1
Lecture 27 - Vanderwaal's equation of states - Part-2
Lecture 28 - Vanderwaal's equation of states - Part-3
Lecture 29 - Fluid Mechanics - Part-1

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Lecture 30 - Fluid Mechanics - Part-2
Lecture 31 - Introduction of special relativity
Lecture 32 - Consequences of special relativity-1
Lecture 33 - Consequences of special relativity-2
Lecture 34 - Consequences of special relativity-3
Lecture 35 - Consequences of special relativity-4
Lecture 36 - Consequences of special relativity-5
Lecture 37 - Introduction
Lecture 38 - Image formation by lenses
Lecture 39 - Lens aberrations - Part I
Lecture 40 - Lens aberrations - Part II

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Mathematics II

Subject Co-ordinator - Dr. Sunita Gakkhar, Prof. H.G. Sharma, Dr. Tanuja Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Complex Integration
Lecture 2 - Contour Integration
Lecture 3 - Cauchy's Integral Theorem
Lecture 4 - Cauchy's Integral Formula
Lecture 5 - Application of Cauchy Integral Formula
Lecture 6 - Zeros, Singularities and Poles
Lecture 7 - Residue Integration Method
Lecture 8 - Residue Theorem
Lecture 9 - Evaluation of Real Integrals
Lecture 10 - Evaluation of Real Improper Integrals-1
Lecture 11 - Evaluation of Real Improper Integrals-2
Lecture 12 - Evaluation of Real Improper Integrals-3
Lecture 13 - Evaluation of Real Improper Integrals-4
Lecture 14 - Evaluation of Real Integrals - Revision
Lecture 15 - Matrix Algebra Part - 1
Lecture 16 - Matrix Algebra Part - 2
Lecture 17 - Determinants Part - 1
Lecture 18 - Determinants Part - 2
Lecture 19 - Solution of System Equation
Lecture 20 - Linear Algebra Part - 1
Lecture 21 - Linear Algebra part - 2
Lecture 22 - Linear Algebra Part - 3
Lecture 23 - Linear Algebra Part - 4
Lecture 24 - Inner Product
Lecture 25 - Linear Transformation Part - 1
Lecture 26 - Linear Transformation Part - 2
Lecture 27 - Eigenvalues Eigenvectors Part - 1
Lecture 28 - Eigenvalues Eigenvectors Part - 2
Lecture 29 - Quadratic Forms

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Lecture 30 - Diagonalization Part - 1
Lecture 31 - Diagonalization Part - 2
Lecture 32 - Solution of System of Linear Equation
Lecture 33 - Functions of Complex Variables Part - 1
Lecture 34 - Functions of Complex Variables Part - 2
Lecture 35 - Taylor Series
Lecture 36 - Laurent Series
Lecture 37 - Rank of a Matrix
Lecture 38 - Complex Numbers Their Geometrical Representation

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Mathematics III

Subject Co-ordinator - Prof. P.N. Agrawal, Dr. Tanuja Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solution of ODE of First Order and First Degree
Lecture 2 - Linear Differential Equations of the First Order
Lecture 3 - Approximate Solution of An Initial Value
Lecture 4 - Series Solution of Homogeneous Linear I
Lecture 5 - Series Solution of Homogeneous Linear II
Lecture 6 - Bessel Functions and Their Properties
Lecture 7 - Bessel Functions And Their Properties (Continued..)
Lecture 8 - Laplace Transformation
Lecture 9 - Laplace Transformation (Continued..)
Lecture 10 - Applications Of Laplace Transformation
Lecture 11 - Applications Of Laplace Transformation (Continued..)
Lecture 12 - One Dimensional Wave Equation
Lecture 13 - One Dimensional Heat Equation
Lecture 14 - Introduction to Differential Equation
Lecture 15 - First Order Differential Equations and Their Geometric Interpretation
Lecture 16 - Differential Equations of First Order Higher Degree
Lecture 17 - Linear Differential Equation of Second Order-Part - 1
Lecture 18 - Linear Differential equation of Second Order-Part - 2
Lecture 19 - Euler-Cauchy Theorem
Lecture 20 - Higher Order Linear Differential Equations
Lecture 21 - Higher Order Non homogeneous Linear Equations
Lecture 22 - Boundary Value Problems
Lecture 23 - Strum Liouville boundary Value Problem
Lecture 24 - Fourier Series-Part - 1
Lecture 25 - Fourier Series-Part - 2
Lecture 26 - Convergence of the Fourier Series
Lecture 27 - Fourier Integrals
Lecture 28 - Fourier Transforms
Lecture 29 - Partial Differential Equation

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Lecture 30 - First Order Partial Differential Equation
Lecture 31 - Second Order Partial Differential Equations - I
Lecture 32 - Second Order Partial Differential Equations - II
Lecture 33 - Solution of One Dimensional Wave Equation
Lecture 34 - Solution of HomogeneousNon Homogeneous Equations
Lecture 35 - Fourier Integral Transform Method for Heat Equation
Lecture 36 - Three Dimensional Laplace Equation
Lecture 37 - Solution of Drichlet Problem
Lecture 38 - Numerical Method for Laplace Poisson equation
Lecture 39 - ADI Method for Laplace and Poisson Equation

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NPTEL Video Course - Basic Courses (Semester 1 and 2) - Concept of Management and Evolution of Management Tho

Subject Co-ordinator - Prof. K.B. Akhilesh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Concept of Management
Lecture 2 - Lecture 2
Lecture 3 - Management By Objectives
Lecture 4 - Organizing & Organization
Lecture 5 - Organizing - II
Lecture 6 - Coordinating
Lecture 7 - Communication - I
Lecture 8 - Communication - II
Lecture 9 - Leadership
Lecture 10 - Controlling
Lecture 11 - Motivation and Organization Culture
Lecture 12 - Japanese Management
Lecture 13 - Comparison of Japanese and American Management
Lecture 14 - Managerial Functions in International Business
Lecture 15 - Marketing Functions
Lecture 16 - Management and Society
Lecture 17 - Social Responsibility and Ethics - II
Lecture 18 - Functions of Personnel Management
Lecture 19 - Manpower Planning
Lecture 20 - Selection - I
Lecture 21 - Selection - II
Lecture 22 - Performance Appraisal - I
Lecture 23 - Performance Appraisal - II
Lecture 24 - Training and Development - I
Lecture 25 - Training and Development - II
Lecture 26 - Job Design and Payment Systems - I
Lecture 27 - Job Design and Compensation Systems
Lecture 28 - Organizational Development - I
Lecture 29 - Organizational Development - II

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Lecture 30 - Organization Theory - I
Lecture 31 - Organization Theory - II
Lecture 32 - Group Dynamics - I
Lecture 33 - Group Dynamics - II
Lecture 34 - Group Dynamics - III
Lecture 35 - Conflict Management - I
Lecture 36 - Conflict Management - II
Lecture 37 - Managing Creativity and Innovation
Lecture 38 - Creativity and Managing Innovation Process - II
Lecture 39 - Stress Management - I
Lecture 40 - Stress Management - II

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NPTEL Video Course - Biotechnology - Biomathematics

Subject Co-ordinator - Dr. Ranjith Padinhateeri

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Graphs and functions - I
Lecture 3 - Graphs and functions - II
Lecture 4 - Functions and derivatives
Lecture 5 - Calculation of derivatives
Lecture 6 - Differentiation and its application in Biology - I
Lecture 7 - Differentiation and its application in Biology - II
Lecture 8 - Differentiation and its application in Biology - III
Lecture 9 - Differentiation and its application in Biology - IV
Lecture 10 - Integration - I
Lecture 11 - Integration - II
Lecture 12 - Differential equations - I
Lecture 13 - Differential equations - II
Lecture 14 - Vectors - I
Lecture 15 - Vectors - II
Lecture 16 - Vectors - III
Lecture 17 - Nernst equation
Lecture 18 - Diffusion - I
Lecture 19 - Diffusion - II
Lecture 20 - Diffusion - III
Lecture 21 - Statistics
Lecture 22 - Statistics
Lecture 23 - Understanding Normal distribution
Lecture 24 - Fitting a function to experimental data
Lecture 25 - Size of a flexible protein
Lecture 26 - Uniform and Poisson distributions; Knudsonâ s analysis
Lecture 27 - Fourier Series - I
Lecture 28 - Fourier Series - II
Lecture 29 - Fourier transform

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Lecture 30 - Master equation
Lecture 31 - Evolution
Lecture 32 - Tutorial - I
Lecture 33 - Tutorial - II
Lecture 34 - Temperature, Energy and Entropy
Lecture 35 - Partition function, Free energy
Lecture 36 - Bending fluctuations of DNA and spring-like proteins
Lecture 37 - Force-extension and looping of DNA
Lecture 38 - Thermodynamics of protein organization along DNA
Lecture 39 - Learning mathematics with the help of a computer

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NPTEL Video Course - Biotechnology - Proteomics and Genomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
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Lecture 16
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Lecture 22
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Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Biotechnology - NOC:Proteins and Gel-Based Proteomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Proteins and Gel-Based Proteomics; Course Introduction
Lecture 1 - Introduction to amino acids
Lecture 2 - Introduction to proteins
Lecture 3 - Protein folding & misfolding
Lecture 4 - Protein purification techniques
Lecture 5 - Introduction to proteomics
Lecture 6 - Systems biology and proteomics
Lecture 7 - Sample preparation and pre-analytical factors
Lecture 8 - Sample preparation
Lecture 9 - Sample preparation
Lecture 10 - One-dimensional electrophoresis
Lecture 11 - 2-DE
Lecture 12 - 2-DE
Lecture 13 - 2-DE
Lecture 14 - 2-DE
Lecture 15 - 2-DE
Lecture 16 - 2D-DIGE
Lecture 17 - 2D-DIGE
Lecture 18 - 2D-DIGE
Lecture 19 - Protein identification using MALDI-TOF/TOF
Lecture 20 - Proteomics experiment data analysis & challenges

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NPTEL Video Course - Biotechnology - NOC:Mass spectrometry based proteomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Introductory lecture
Lecture 1 - Introduction to proteomics
Lecture 2 - Proteomics and sample preparation
Lecture 3 - Bacterial protein extraction
Lecture 4 - In-gel digestion
Lecture 5 - Fundamentals of mass spectrometry
Lecture 6 - Chromatography technologies
Lecture 7 - Liquid chromatography
Lecture 8 - Mass spectrometry
Lecture 9 - Mass spectrometry
Lecture 10 - MALDI sample preparation and analysis
Lecture 11 - Introduction to quantitative proteomics
Lecture 12 - Hybrid mass spectrometry configurations
Lecture 13 - SILAC
Lecture 14 - iTRAQ
Lecture 15 - TMT
Lecture 16 - Quantitative proteomics data analysis
Lecture 17 - Proteomics and Systems biology I
Lecture 18 - Proteomics & Systems biology II
Lecture 19 - Proteomics applications
Lecture 20 - Advances and challenges in proteomics

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NPTEL Video Course - Biotechnology - NOC:Interactomics: Protein Arrays and Label-free Biosensors

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Interactomics
Lecture 2 - An overview of label-free technologies
Lecture 3 - An overview of surface plasmon resonance (SPR)
Lecture 4 - An overview of surface plasmon resonance imaging (SPRi)
Lecture 5 - Basics of SPR
Lecture 6 - Basics of SPR
Lecture 7 - Protein immobilization for protein-protein interaction studies
Lecture 8 - Protein-protein interaction study
Lecture 9 - Protein-protein interaction study
Lecture 10 - Protein-small molecule interaction study
Lecture 11 - Protein-small molecule interaction study
Lecture 12 - SPR
Lecture 13 - SPR
Lecture 14 - An overview of ellipsometry and interferometry techniques
Lecture 15 - An introduction to BioLayer Interferometry (BLI) and its applications in protein research
Lecture 16 - Kinetic analysis of protein-protein interaction using BLI
Lecture 17 - Label-free quantification of proteins using BLI
Lecture 18 - Diffraction-based biosensors - I
Lecture 19 - Diffraction-based biosensors - II
Lecture 20 - Nanotechniques in proteomics - I
Lecture 21 - Nanotechniques in proteomics - II
Lecture 22 - High throughputplatforms of interactomics
Lecture 23 - Conventional label based detection techniques for Protein microarrays
Lecture 24 - Novel detection techniques for Protein microarrays
Lecture 25 - Recombinational cloning and its application for Protein microarrays
Lecture 26 - An introduction to Cell-free protein synthesis
Lecture 27 - Cell-free synthesis based protein microarrays
Lecture 28 - Cell-free synthesis based protein microarrays
Lecture 29 - Digging deeper into NAPPA

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Lecture 30 - Digging deeper into NAPPA
Lecture 31 - Application of cell free expression protein microarrays in biomarker discovery
Lecture 32 - Application of cell free expression protein microarrays in immunological studies
Lecture 33 - Basics of microarray image scanning
Lecture 34 - Software for Image scanning and data processing
Lecture 35 - Microarray Data Analysis - Part I
Lecture 36 - Microarray Data Analysis - Part II
Lecture 37 - Application of protein microarray in biomarker discovery - I
Lecture 38 - Application of protein microarray in biomarker discovery - II
Lecture 39 - Systems biology and networks
Lecture 40 - Challenges in proteomics

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NPTEL Video Course - Biotechnology - NOC:Introduction to Proteomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to amino acids
Lecture 2 - Introduction to proteins
Lecture 3 - Protein folding and misfolding
Lecture 4 - Introduction to proteomics
Lecture 5 - Lab session â Protein-protein interaction using label-free biosensors
Lecture 6 - Sample preparation and pre-analytical factors
Lecture 7 - Sample preparation
Lecture 8 - Sample preparation
Lecture 9 - One-dimensional electrophoresis
Lecture 10 - Introduction to 2-DE
Lecture 11 - 2-DE
Lecture 12 - 2-DE
Lecture 13 - 2-DE Applications
Lecture 14 - 2-DE Applications (Continued...) and Challenges
Lecture 15 - Lab session - Protein/peptide pre-fractionation using OFFGEL FRACTIONATOR and data analysis
Lecture 16 - 2D-DIGE
Lecture 17 - 2D-DIGE
Lecture 18 - 2D-DIGE
Lecture 19 - Systems biology and proteomics - I
Lecture 20 - Systems biology and proteomics - II
Lecture 21 - Fundamentals of mass spectrometry
Lecture 22 - Chromatography technologies
Lecture 23 - Liquid chromatography
Lecture 24 - Mass spectrometry
Lecture 25 - Mass spectrometry
Lecture 26 - MALDI sample preparation and analysis
Lecture 27 - Hybrid mass spectrometry configurations
Lecture 28 - Lab session - Demonstration of Q-TOF MS technology
Lecture 29 - In-gel and in-solution digestion

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Lecture 30 - Lab session - Sample preparation
Lecture 31 - Introduction to quantitative proteomics
Lecture 32 - SILAC
Lecture 33 - iTRAQ
Lecture 34 - TMT
Lecture 35 - Quantitative proteomics data analysis
Lecture 36 - Proteomics applications
Lecture 37 - Challenges in proteomics
Lecture 38 - OMICS and translational research
Lecture 39 - Lab session â Targeted proteomics using triple quadrupole mass spectrometry
Lecture 40 - Lab session â Targeted proteomics

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NPTEL Video Course - Biotechnology - NOC:Introduction to Biostatistics

Subject Co-ordinator - Prof. Shamik Sen

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Data representation and plotting
Lecture 3 - Arithmetic mean
Lecture 4 - Geometric mean
Lecture 5 - Measure of Variability, Standard deviation
Lecture 6 - SME, Z-Score, Box plot
Lecture 7 - Moments, Skewness
Lecture 8 - Kurtosis, R programming
Lecture 9 - R programming
Lecture 10 - Correlation
Lecture 11 - Correlation and Regression - Part-I
Lecture 12 - Correlation and Regression - Part-II
Lecture 13 - Interpolation and extrapolation
Lecture 14 - Nonlinear data fitting
Lecture 15 - Concept of Probability
Lecture 16 - Counting principle, Permutations, and Combinations
Lecture 17 - Conditional probability
Lecture 18 - Conditional probability and Random variables
Lecture 19 - Random variables, Probability mass function, and Probability density function
Lecture 20 - Expectation, Variance and Covariance - Part-I
Lecture 21 - Expectation, Variance and Covariance - Part-II
Lecture 22 - Binomial random variables and Moment generating function
Lecture 23 - Probability distribution
Lecture 24 - Uniform distribution Part-II and Normal distribution Part-I
Lecture 25 - Normal distribution Part-II and Exponential distribution
Lecture 26 - Sampling distributions and Central limit theorem - Part-I
Lecture 27 - Sampling distributions and Central limit theorem - Part-II
Lecture 28 - Central limit theorem - Part-III and Sampling distributions of sample mean
Lecture 29 - Central limit theorem - Part-IV and Confidence intervals

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Lecture 30 - Confidence intervals Part- II
Lecture 31 - Test of Hypothesis - 1
Lecture 32 - Test of Hypothesis - 2 (1 tailed and 2 tailed Test of Hypothesis, p-value)
Lecture 33 - Test of Hypothesis - 3 (1 tailed and 2 tailed Test of Hypothesis, p-value)
Lecture 34 - Test of Hypothesis - 4 (Type -1 and Type -2 error)
Lecture 35 - T-test
Lecture 36 - 1 tailed and 2 tailed T-distribution, Chi-square test
Lecture 37 - ANOVA - 1
Lecture 38 - ANOVA - 2
Lecture 39 - ANOVA - 3
Lecture 40 - ANOVA for linear regression, Block Design

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NPTEL Video Course - Biotechnology - NOC:Introduction to Mechanobiology

Subject Co-ordinator - Prof. Shamik Sen

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Need to Study Mechanobiology
Lecture 2 - Cell as a Tent, Individual Components
Lecture 3 - Cell-ECM Crosstalk
Lecture 4 - ECM Proteins
Lecture 5 - Measuring Properties of Collagen Networks
Lecture 6 - Properties of Collagen Networks
Lecture 7 - Rheology
Lecture 8 - Rheology of Biopolymer Networks
Lecture 9 - Atomic Force Microscopy (AFM)
Lecture 10 - Design of Protein Constructs for AFM
Lecture 11 - Protein Unfolding using AFM
Lecture 12 - Protein Unfolding using AFM
Lecture 13 - Focal Adhesions
Lecture 14 - Focal Adhesion Organization
Lecture 15 - Focal Adhesions
Lecture 16 - Cytoskeleton
Lecture 17 - Force-velocity Relationships of Actin Networks
Lecture 18 - Mesenchymal Cell Migration
Lecture 19 - Actin Dynamics during Mesenchymal Migration
Lecture 20 - Actin Dynamics during Mesenchymal Migration
Lecture 21 - Adhesion Independent Migration
Lecture 22 - Adhesion Independent and Collective Cell Migration
Lecture 23 - Collective Cell Migration
Lecture 24 - Mechanobiology of Stem Cell Fate - I
Lecture 25 - Mechanobiology of Stem Cell Fate - II
Lecture 26 - Mechanobiology of Stem Cell Fate - III
Lecture 27 - Mechanobiology of Diseases
Lecture 28 - Mechanobiology of Diseases
Lecture 29 - Mechanobiology of Diseases

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Lecture 30 - Mechanobiology of Diseases
Lecture 31 - Mechanobiology of Diseases
Lecture 32 - Nuclear Mechanotransduction
Lecture 33 - Nuclear Mechanotransduction
Lecture 34 - Nuclear Mechanotransduction
Lecture 35 - Mechanical Forces and DNA damage
Lecture 36 - Techniques in Mechanobiology
Lecture 37 - Techniques in Mechanobiology
Lecture 38 - Techniques in Mechanobiology
Lecture 39 - Techniques in Mechanobiology
Lecture 40 - Techniques in Mechanobiology

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NPTEL Video Course - Biotechnology - NOC:Introductory Mathematical Methods for Biologists

Subject Co-ordinator - Dr. Ranjith Padinhateeri

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Graphs and Functions
Lecture 3 - Equations as Graphs
Lecture 4 - Graphs
Lecture 5 - Graphs
Lecture 6 - Images as 2D/3D Functions
Lecture 7 - Functions and its Derivatives
Lecture 8 - Computing Derivatives of Curves
Lecture 9 - Rules for Calculating Derivatives
Lecture 10 - Understanding Derivatives
Lecture 11 - Curvature and Second Derivative
Lecture 12 - Plotting Curves
Lecture 13 - Numerical Calculation of Derivatives
Lecture 14 - Function, Derivatives and Series Expansion
Lecture 15 - L'Hopital's Rule and Partial Derivatives
Lecture 16 - Integration
Lecture 17 - Integration
Lecture 18 - Integration
Lecture 19 - Integration
Lecture 20 - Integration
Lecture 21 - Exponential Growth and Decay
Lecture 22 - Scalars and Vectors
Lecture 23 - Vectors
Lecture 24 - Cell Symmetry
Lecture 25 - Gradient, Forces and Flows
Lecture 26 - Gradient, Forces and Flows
Lecture 27 - Understanding Diffusion
Lecture 28 - Diffusion Constant and Einstein Relation 1905
Lecture 29 - Diffusion Equation

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Lecture 30 - Diffusion vs. Active Transport
Lecture 31 - Nernst Equation
Lecture 32 - Fourier Series
Lecture 33 - Fourier Series
Lecture 34 - Fourier Transform
Lecture 35 - Introduction to Statistics
Lecture 36 - Mean, Standard deviation and Distribution
Lecture 37 - Frequency Distribution and Probability Distribution
Lecture 38 - Binomial Distribution
Lecture 39 - Normal Distribution
Lecture 40 - Hypothesis Testing and Mathematical Modeling

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NPTEL Video Course - Biotechnology - NOC:Bioengineering: An Interface with Biology and Medicine

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why biology for engineers - Part I
Lecture 2 - Why biology for engineers - Part II
Lecture 3 - Life processes and Cell
Lecture 4 - Cell and its properties
Lecture 5 - Cliniciană s Perspective - I
Lecture 6 - Nucleic Acid and Central Dogma
Lecture 7 - DNA Tools
Lecture 8 - DNA Tools
Lecture 9 - DNA Tools and Biotechnology - I
Lecture 10 - DNA Tools and Biotechnology - II
Lecture 11 - DNA Tools and Biotechnology - III
Lecture 12 - DNA Tools and Biotechnology - IV
Lecture 13 - DNA Tools and Biotechnology - V
Lecture 14 - DNA Tools and Biotechnology - VI
Lecture 15 - Cliniciană s Perspective - II
Lecture 16 - Genetics - I
Lecture 17 - Genetics - II
Lecture 18 - Genetics - III
Lecture 19 - Genetics - IV
Lecture 20 - Cliniciană s Perspective - III
Lecture 21 - Chromosomal basis of inheritance
Lecture 22 - Linkage, chromosomal disorders
Lecture 23 - Classical Genetics Experiments
Lecture 24 - Bacteria and Viruses
Lecture 25 - Cliniciană s Perspective - IV
Lecture 26 - Cell cycle disregulation and Cancer
Lecture 27 - Developmental Biology
Lecture 28 - Principles and application of Animal Cloning
Lecture 29 - Evolution

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Lecture 30 - Clinicianâ s Perspective - V
Lecture 31 - Amino acids and proteins
Lecture 32 - Proteins and Proteomics
Lecture 33 - Techniques to Study Protein and Proteome - I
Lecture 34 - Techniques to Study Protein and Proteome - II
Lecture 35 - Bioinformatics - I
Lecture 36 - Techniques to Study Protein and Proteome - III
Lecture 37 - Protein Interactions and Microarrays
Lecture 38 - Protein interactions and Systems biology
Lecture 39 - Bioinformatics - II
Lecture 40 - Ethics in Research and Publications

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NPTEL Video Course - Biotechnology - NOC:Applications of Interactomics using Genomics and Proteomics Technolo

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Interactomics and Protein Arrays
Lecture 2 - NAPPA Technology and Protein Arrays - I
Lecture 3 - NAPPA Technology and Protein Arrays - II
Lecture 4 - Biomarkers
Lecture 5 - Biomarkers
Lecture 6 - Biomarkers
Lecture 7 - NAPPA and its applications in study of antibody immune response in disease and in drug Screening
Lecture 8 - NAPPA and its applications in study of antibody immune response in disease and in drug screening
Lecture 9 - NAPPA and its applications in study of antibody immune response in disease and in drug screening
Lecture 10 - Using functional proteomics to identify biomarkers and therapeutic targets - I
Lecture 11 - Using functional proteomics to identify biomarkers and therapeutic targets - II
Lecture 12 - Applications of protein microarrays in Malaria Research - I
Lecture 13 - Applications of protein microarrays in Malaria Research - II
Lecture 14 - Applications of protein microarrays in Cancer Research - I
Lecture 15 - Applications of protein microarrays in Cancer Research - II
Lecture 16 - Introduction to Bioprinting and IrisÃ¢ Optical QC Benefits - I
Lecture 17 - Introduction to Bioprinting and IrisÃ¢ Optical QC Benefits - II
Lecture 18 - Basics and Applications of Reverse Phase Protein Arrays - I
Lecture 19 - Basics and Applications of Reverse Phase Protein Arrays - II
Lecture 20 - Basics and Applications of Reverse Phase Protein Arrays - III
Lecture 21 - Antibody signatures defined by high-content peptide microarray analysis
Lecture 22 - An overview of label-free technologies - I
Lecture 23 - An overview of label-free technologies - II
Lecture 24 - Mass Spectrometry coupled Interactomics - I
Lecture 25 - Mass Spectrometry coupled Interactomics - II
Lecture 26 - Biomolecular interactions using Bio-Layer Interferometry (BLI) - I
Lecture 27 - Biomolecular interactions using Bio-Layer Interferometry (BLI) - II
Lecture 28 - Biomolecular interaction analytics using MicroScale Thermophoresis
Lecture 29 - Surface Plasmon Resonance- Principles and Assays - I

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Lecture 30 - Surface Plasmon Resonance- Principles and Assays - II
Lecture 31 - Use of SPR in unravelling domain motif interactions of proteasomal assembly chaperones
Lecture 32 - Next-Generation Sequencing Technology- Ion TorrentÃ¢
Lecture 33 - NGS Technology- Bioinformatics and data analysis - I
Lecture 34 - NGS Technology- Bioinformatics and data analysis - II
Lecture 35 - Next-Generation Sequencing Technology-MiSeq System
Lecture 36 - NGS target enrichment workflow for exomes, targeted panels and beyond
Lecture 37 - The Human Pathology Atlas
Lecture 38 - The Human Pathology Atlas
Lecture 39 - Conclusions and Overview - I (Statistical analysis - I)
Lecture 40 - Conclusions and overview - II (Statistical analysis - II)

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NPTEL Video Course - Biotechnology - NOC:Introduction to Proteogenomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Proteogenomics overview - I
Lecture 2 - Proteogenomics overview - II
Lecture 3 - Introduction to Genomics - Part I
Lecture 4 - Introduction to Genomics - Part II
Lecture 5 - Introduction to Genomics - Part III
Lecture 6 - Perspectives in Proteogenomics - I
Lecture 7 - Advancement in Cancer Genomics
Lecture 8 - Introduction to Genomics - Part IV
Lecture 9 - Introduction to Genomics - cBioPortal
Lecture 10 - Genotype, Gene expression and Phenotype - I
Lecture 11 - Genotype, Gene expression and Phenotype - II
Lecture 12 - An overview of NGS technology
Lecture 13 - NGS - Sequencing by synthesis - I
Lecture 14 - NGS - Sequencing by synthesis - II
Lecture 15 - Introduction to Proteomics
Lecture 16 - Proteomics
Lecture 17 - Applications of Proteomics
Lecture 18 - Introduction to MS-based Proteomics - I
Lecture 19 - Introduction to MS-based Proteomics - II
Lecture 20 - Applications of NGS - IonTorrent
Lecture 21 - Genomic Analysis using Droplet PCR - I
Lecture 22 - Introduction to MS-based Proteomics - I (Hands-on session)
Lecture 23 - Introduction to MS-based Proteomics - II (Hands-on session)
Lecture 24 - Data analysis
Lecture 25 - Data analysis
Lecture 26 - Data analysis
Lecture 27 - Genomic Analysis using Droplet PCR - II
Lecture 28 - Topics in Proteogenomics
Lecture 29 - Machine learning and Clustering

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Lecture 30 - Hypothesis testing
Lecture 31 - ProTIGY - I
Lecture 32 - ProTIGY - II
Lecture 33 - Proteomics Data Analysis
Lecture 34 - Proteomics Lab Demonstration - I
Lecture 35 - Proteomics Lab Demonstration - II
Lecture 36 - Workflow to Automated Data Processing
Lecture 37 - Introduction to Fire Cloud
Lecture 38 - FireCloud and Data Model
Lecture 39 - Bioinformatics solutions for Big Data Analysis - I
Lecture 40 - Bioinformatics solutions for Big Data Analysis - II
Lecture 41 - Introduction to Targeted Proteomics
Lecture 42 - Data analysis using Skyline
Lecture 43 - Large-scale data Science - I
Lecture 44 - Large-scale data Science - II
Lecture 45 - Large-scale data Science - III
Lecture 46 - DIA-SWATH Atlas - I
Lecture 47 - DIA-SWATH Atlas - II
Lecture 48 - Prediction Analysis
Lecture 49 - Pathway Enrichment and Network Analysis
Lecture 50 - Human Protein Atlas - I
Lecture 51 - Human Protein Atlas - II
Lecture 52 - Affinity based proteomics & HPA
Lecture 53 - Clinical Considerations for OMICS - I
Lecture 54 - Clinical Considerations for OMICS - II
Lecture 55 - Topics in Proteogenomics
Lecture 56 - Integrative Genomics Viewer (IGV)
Lecture 57 - Introduction to Proteogenomics - I
Lecture 58 - Introduction to Proteogenomics - II
Lecture 59 - Sequence centric proteogenomics
Lecture 60 - Variant Analysis
Lecture 61 - Proteomics - Clinical Applications
Lecture 62 - Perspectives in Proteogenomics - II
Lecture 63 - Predictive Analysis - I
Lecture 64 - Predictive Analysis - II
Lecture 65 - Association/ Marker Selection
Lecture 66 - WebGestalt - I
Lecture 67 - WebGestalt - II
Lecture 68 - Perspectives in Proteogenomics - III

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Lecture 69 - Network Analysis - I
Lecture 70 - Network Analysis - II
Lecture 71 - Mutations and Signaling - I
Lecture 72 - Mutations and Signaling - II
Lecture 73 - Pathway Enrichment - I
Lecture 74 - Perspectives in Proteogenomics - IV
Lecture 75 - Pathway Enrichment - II
Lecture 76 - Sequence - GSEA
Lecture 77 - Linked Omics - I
Lecture 78 - Linked Omics - II
Lecture 79 - Proteogenomics - Opportunities and Challenges
Lecture 80 - Perspectives in Proteogenomics - V

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NPTEL Video Course - Biotechnology - NOC:Interactomics: Basics and Applications

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Proteomics
Lecture 2 - Introduction to Interactomics
Lecture 3 - High throughput platforms of interactomics
Lecture 4 - Cell-free expression based protein microarrays
Lecture 5 - NAPPA
Lecture 6 - NAPPA Technology and Protein Arrays - I
Lecture 7 - NAPPA Technology and Protein Arrays - II
Lecture 8 - Biomarkers
Lecture 9 - Biomarkers
Lecture 10 - Biomarkers
Lecture 11 - NAPPA and its applications in study of antibody immune response in disease and in drug screening
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Lecture 13 - NAPPA and its applications in study of antibody immune response in disease and in drug screening
Lecture 14 - Using functional proteomics to identify biomarkers and therapeutic targets - I
Lecture 15 - Using functional proteomics to identify biomarkers and therapeutic targets - II
Lecture 16 - Applications of protein microarrays in Malaria Research - I
Lecture 17 - Applications of protein microarrays in Malaria Research - II
Lecture 18 - Introduction to Bioprinting and IrisOptical QC Benefits - I
Lecture 19 - Introduction to Bioprinting and IrisOptical QC Benefits - II
Lecture 20 - Screening of autoantibody signatures in cancer patients
Lecture 21 - Basics of Image Scanning and data acquisition
Lecture 22 - Applications of protein arrays in identification of autoantibody signatures - I
Lecture 23 - Applications of protein arrays in identification of autoantibody signatures - II
Lecture 24 - Applications of protein microarrays in deciphering PTMs and biological networks
Lecture 25 - Basics and Applications of Reverse Phase Protein Arrays - I
Lecture 26 - Basics and Applications of Reverse Phase Protein Arrays - II
Lecture 27 - Basics and Applications of Reverse Phase Protein Arrays - III
Lecture 28 - An overview of label-free technologies
Lecture 29 - Surface Plasmon Resonance - Principles and Assays - I

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Lecture 30 - Surface Plasmon Resonance - Principles and Assays - II
Lecture 31 - Basics of SPR
Lecture 32 - Basics of SPR
Lecture 33 - Protein immobilization for protein-protein interaction studies
Lecture 34 - Protein-protein interaction study
Lecture 35 - Protein-protein interaction study
Lecture 36 - Use of SPR in unravelling domain motif interactions of proteasomal assembly chaperones
Lecture 37 - Protein-small molecule interaction study
Lecture 38 - Protein-small molecule interaction study
Lecture 39 - An introduction to biolayer interferometry (BLI)and its applications in protein research
Lecture 40 - Biomolecular interactions using Bio-Layer Interferometry (BLI) - I
Lecture 41 - Biomolecular interactions using Bio-Layer Interferometry (BLI) - II
Lecture 42 - Lab session- An introduction to BioLayer Interferometry (BLI) and its applications in protein re
Lecture 43 - Applications of label-free technologies - II
Lecture 44 - Biomolecular interaction analytics using MicroScale Thermophoresis
Lecture 45 - Mass Spectrometry coupled Interactomics - I
Lecture 46 - Mass Spectrometry coupled Interactomics - II
Lecture 47 - Next-Generation Sequencing Technology - Ion Torrent
Lecture 48 - NGS Technology - Bioinformatics and data analysis - I
Lecture 49 - NGS Technology - Bioinformatics and data analysis - II
Lecture 50 - Next-Generation Sequencing Technology- Illumina
Lecture 51 - Agilent complete NGS target enrichment workflow for exomes, targeted panels and beyond
Lecture 52 - The Human Pathology Atlas
Lecture 53 - The Human Pathology Atlas
Lecture 54 - Statistical Analysis - I
Lecture 55 - Statistical Analysis - II
Lecture 56 - Secondary Data Analysis
Lecture 57 - Pathway Enrichment and Network Analysis
Lecture 58 - Data Repositories and Databases
Lecture 59 - Application of multi-omics approach for better understanding of cancers
Lecture 60 - Integrated Omics and Systems Biology- Conclusion

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NPTEL Video Course - Biotechnology - NOC:Maternal Infant Young Child Nutrition

Subject Co-ordinator - Prof. Rupal Dalal

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - NFHS 5 data
Lecture 2 - Evidences from the field
Lecture 3 - MIYCF framework
Lecture 4 - Capacity building
Lecture 5 - The story of urban and rural NGO and the story of Kailash
Lecture 6 - CNNS Nutrition data of children between 5-9 years of age
Lecture 7 - New Learnings - HST Pedagogy
Lecture 8 - Nutrients essential in children - Type 1 and Type 2 nutrients
Lecture 9 - Hidden hunger and types of malnutrition
Lecture 10 - Importance of Protein
Lecture 11 - Importance of Fat
Lecture 12 - Importance of Folate
Lecture 13 - Importance of Vitamin B12
Lecture 14 - Importance of Selenium
Lecture 15 - Importance of Calcium and Calcium rich recipes
Lecture 16 - Importance of Magnesium and Magnesium rich recipes
Lecture 17 - Importance of Potassium and Potassium rich recipes
Lecture 18 - Junk food and reasons for consumption of junk food
Lecture 19 - Importance of Insulin
Lecture 20 - Introduction to macronutrients
Lecture 21 - First 1,000 days LIVE session-Importance of first 1000 days spoken tutorial
Lecture 22 - Essential nutrition actions for pregnant women
Lecture 23 - Importance of Iron-Iron rich veg and non-veg recipes
Lecture 24 - Importance of Vitamin C and vitamin C rich recipes
Lecture 25 - Sulphur Live session-Importance of sulphur-Sulphur rich recipes
Lecture 26 - Science of breastfeeding
Lecture 27 - Golden hour-Importance of golden hour and Colostrum feeding Spoken Tutorial
Lecture 28 - Importance of breastfeeding-Comparsion of breatsmilk with other substitutes
Lecture 29 - Breast crawl during normal delivery and ceasarean delivery

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Lecture 30 - Indian law to protect breastfeeding
Lecture 31 - Spoken tutorials on new born care and how to bathe a baby
Lecture 32 - Spoken tutorials on KMC and KMC bag making
Lecture 33 - Mother's Preparation and Baby's Positioning
Lecture 34 - Holding the Breast and Latching the Baby to the Breast
Lecture 35 - Other Counselling Points
Lecture 36 - Health Spoken Tutorial on Cross Cradle Hold and Latching
Lecture 37 - Solutions to Problems faced while Feeding the Baby in Cross Cradle Hold
Lecture 38 - Live Videos of Positioning and Latching
Lecture 39 - Other breastfeeding holds - Football hold. Cradle hold
Lecture 40 - Sidelying Hold and Laid back Hold
Lecture 41 - Poor weight gain due to breastfeeding factors and other factors
Lecture 42 - Breastfeeding During Covid
Lecture 43 - Manual Expression and storage of Breastmilk and how to feed expressed breastmilk
Lecture 44 - Nipple conditions, complications of nipple shields. Breast conditions
Lecture 45 - Guidelines for complementary feeding. General guidelines
Lecture 46 - Personal Hygiene needed for handling baby food. Safe preparation and storage of baby food
Lecture 47 - Vegetarian and non-vegetarian recipes for 6-month-old babies. Powder recipes for babies
Lecture 48 - Vegetarian and non-vegetarian recipes for 7-month-old and 8 to 11-month-old babies
Lecture 49 - Issues faced during complementary feeding
Lecture 50 - Veg recipes for 12-18 month old babies-Non-veg recipes for 12-18 month old babies
Lecture 51 - Veg recipes for 19-24 month old children-Non-veg recipes for 19-24 month old children
Lecture 52 - Celebration recipes - Delicious recipes for kids parties
Lecture 53 - Vegetarian and Non vegetarian recipes for Adolescents. Pre pregnancy nutrition
Lecture 54 - Nutritious vegetarian and non-vegetarian recipes for pregnant women
Lecture 55 - Nutritious vegetarian and non-vegetarian recipes for lactating women
Lecture 56 - The WHO Multicentre Growth Reference Study (1997-2003)
Lecture 57 - Standard Normal Deviation. WHO Z Score Charts
Lecture 58 - Spoken tutorials on WHO weight-for-age and length-for-age percentile growth charts
Lecture 59 - Anthropometric Measurements
Lecture 60 - Cross Cradle Hold and 45 points - IEC chart - Part 1
Lecture 61 - Cross Cradle Hold and 45 points - IEC chart - Part 2. Breastfeeding assessment form
Lecture 62 - Nutrition Chart
Lecture 63 - Learning Action Protocol - Part 1
Lecture 64 - Learning Action Protocol - Part 2
Lecture 65 - Keypoints of Maternal, Infant and Young Child Nutrition

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NPTEL Video Course - Biotechnology - NOC:Maternal Infant Young Child Nutrition (Hindi)

Subject Co-ordinator - Prof. Rupal Dalal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - à¤ªà¤¹à¤²à¥ à¤²à¥ à¤ à¥•à¤ à¤° : à¤•à¤¨à¤•à¤ à¤•à¤«à¤•à¤¸ 5 à¤¡à¥ à¤ à¥¾
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Lecture 24 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¸à¥•à¤¤à¤¨à¤¤à¤¾à¤¨ à¤ à¤¾ à¤®à¤¹à¤¤à¥•à¤µ
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Lecture 28 - à¤¸à¤¾à¤¤à¤µà¤¾à¤ à¤²à¥ à¤ à¥•à¤ à¤° : à¤ à¤ à¤ à¤¾à¤°à¥ à¤®à¤¦à¤° à¤ à¥ à¤ à¤° - à¤ à¥ à¤ªà¥
Lecture 29 - à¤ªà¤¹à¤²à¤²à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤®à¤¾à¤• à¤ à¥ à¤¤à¥ à¤¤à¤¾à¤°à¥ à¤ à¤° à¤¬à¤¨à¤ à¥•à¤ à¥ à¤

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Lecture 30 - à¤¦à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¸à¥•à¤¤à¤¨ à¤ à¥ à¤ªà¤ à¤¡à¤¼à¤¨à¤¾ à¤ à¤° à¤¬à¤ à¥•à¤ à
Lecture 31 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤ à¤¨à¥•à¤¯ à¤ªà¤°à¤¾à¤®à¤°à¥•à¤¶ à¤¬à¤¿à¤ à¤¦à¥•
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Lecture 33 - à¤ªà¤¾à¤ à¤ à¤µà¤¾ à¤²à¥ à¤ à¥•à¤ à¤°: à¤ à¥•à¤°à¥ à¤¸ à¤ à¥•à¤°à¥ à¤¡à¤² à¤¸à¥•à¤¥à¤¿à¤¤à¤¿ à¤®
Lecture 34 - à¤ à¤ à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¸à¥•à¤¥à¤¿à¤¤à¤¿ à¤ à¤° à¤ à¤¹à¤°à¥ à¤ à¥•à¤¡à¤¼à¤¾à¤µ à¤ à¥
Lecture 35 - à¤ªà¤¹à¤²à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : à¤¸à¥•à¤¤à¤¨à¤ªà¤¾à¤¨ à¤ à¥ à¤²à¤¿à¤• à¤«à¥•à¤ à¤¬à¥ à¤²
Lecture 36 - à¤¦à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : à¤•à¤ à¤¤à¤°à¤« à¤²à¥ à¤ à¤ à¤° à¤¸à¥•à¤¤à¤¨à¤ªà¤¾à¤
Lecture 37 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : à¤¸à¥•à¤¤à¤¨à¤ªà¤¾à¤¨ à¤ à¤¾à¤°à¤ à¥ à¤ à¤ à¤° à¤ à¤¨à
Lecture 38 - à¤ à¥ à¤¥à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤ à¥ à¤µà¤¿à¤¡ - 19 à¤ à¥ à¤¦à¥ à¤°à¤¾à¤¨ à¤¸à¥•à¤¤à¤¨à¤ªà¤¾
Lecture 39 - à¤ªà¤¾à¤ à¤ à¤µà¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : à¤¹à¤¾à¤¥ à¤¸à¥ à¤¸à¥•à¤¤à¤¨ à¤ à¤¾ à¤¦à¥ à¤§ à¤¨à¤
Lecture 40 - à¤ à¤ à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : à¤¸à¥•à¤¤à¤¨à¤ªà¤¾à¤¨ à¤ à¤°à¤¾à¤¤à¥ à¤®à¤¾à¤ à¤ à¤ à¥ à¤
Lecture 41 - à¤ªà¤¹à¤²à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : 6 à¤¸à¥ 24 à¤®à¤¹à¥ à¤¨à¥ à¤ à¥ à¤¶à¤¿à¤¶à¥•à¤ à¤ à¤ à
Lecture 42 - à¤¦à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : à¤¶à¤¿à¤¶à¥• à¤ à¤¾ à¤ à¤¾à¤¨à¤¾ à¤¬à¤¨à¤¾à¤¨à¥ à¤ à¤°
Lecture 43 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : 6 à¤®à¤¹à¥ à¤¨à¥ à¤ à¥ à¤¬à¤ à¥•à¤ à¥ à¤ à¤ à¥ à¤²à
Lecture 44 - à¤ à¥ à¤¥à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : 7 à¤®à¤¹à¥ à¤¨à¥ à¤ à¥ à¤¬à¤ à¥•à¤ à¥ à¤ à¤ à¥ à¤²à¤¿à
Lecture 45 - à¤ªà¤¾à¤ à¤ à¤µà¤¾ à¤²à¥ à¤ à¥•à¤ à¤°-à¤ : 8 à¤¸à¥ 11 à¤®à¤¹à¥ à¤¨à¥ à¤ à¥ à¤¬à¤ à¥•à¤ à¥ à¤
Lecture 46 - à¤ªà¤¹à¤²à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤ªà¥ à¤°à¤ à¤ à¤¹à¤¾à¤° à¤ à¥ à¤¦à¥ à¤°à¤¾à¤¨ à¤¹à¥ à¤¨à¥
Lecture 47 - à¤¦à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : 12 à¤¸à¥ 18 à¤®à¤¹à¥ à¤¨à¥ à¤ à¥ à¤¬à¤ à¥•à¤ à¥ à¤ à¤ à
Lecture 48 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : 19 à¤¸à¥ 24 à¤®à¤¹à¥ à¤¨à¥ à¤ à¥ à¤¬à¤ à¥•à¤ à¥ à¤ à¤ à
Lecture 49 - à¤ à¥ à¤¥à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¬à¤ à¥•à¤ à¥ à¤ à¤ à¥ à¤ªà¤¾à¤°à¥•à¤ à¤¿à¤¯à¥ à¤ à¤ à¥ à
Lecture 50 - à¤ªà¤¹à¤²à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤ à¤¿à¤¶à¥ à¤°à¥ à¤ à¤ à¥ à¤²à¤¿à¤• à¤¶à¤¾à¤ à¤¾à¤¹à¤¾à¤°à¥
Lecture 51 - à¤¦à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤ à¤°à¥•à¤-à¤µà¤¤à¤¿à¤¯à¥ à¤ à¤ à¥ à¤²à¤¿à¤• à¤ªà¥ à¤·à¥
Lecture 52 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¸à¥•à¤¤à¤¨à¤ªà¤¾à¤¨ à¤ à¤°à¤¾à¤¨à¥ à¤µà¤¾à¤²à¥ à¤®à¤¾à¤
Lecture 53 - à¤ªà¤¹à¤²à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¡à¤¬à¥•à¤²à¥•à¤¯à¥ à¤•à¤ à¤ à¤¬à¤¹à¥•à¤ à¥ à¤ à¤¦à¥•à¤°à¥ à
Lecture 54 - à¤¦à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤®à¤¾à¤¨à¤ à¤¸à¤¾à¤®à¤¾à¤¨à¥•à¤¯ à¤µà¤¿à¤ à¤²à¤¨| à¤¡à¤¬
Lecture 55 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤°:à¤¡à¤¬à¥•à¤²à¥•à¤¯à¥ à¤•à¤ à¤ -à¤ à¤®à¥•à¤° à¤ à¥ à¤¹à¤¿à¤¸à
Lecture 56 - à¤ à¥ à¤¥à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤•à¤ à¤¥à¥•à¤°à¥ à¤ªà¥ à¤®à¥ à¤ à¥•à¤°à¤¿à¤ à¤®à¤¾à¤ª
Lecture 57 - à¤ªà¤¹à¤²à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¸à¥•à¤¤à¤¨à¤ªà¤¾à¤¨ à¤ à¥ à¤²à¤¿à¤• à¥ªà¥« à¤ªà¤°à¤¾à¤®à¤°à
Lecture 58 - à¤¦à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤¸à¥•à¤¤à¤¨à¤ªà¤¾à¤¨ à¤ à¥ à¤²à¤¿à¤• à¥ªà¥« à¤ªà¤°à¤¾à¤®à
Lecture 59 - à¤¤à¥ à¤¸à¤°à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤ªà¥ à¤·à¤£ à¤ à¤¾à¤°à¥•à¤
Lecture 60 - à¤ à¥ à¤¥à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤²à¤°à¥•à¤¨à¤¿à¤ à¤ à¤•à¤ à¥•à¤¶à¤¨ à¤ªà¥•à¤°à¥ à¤ à¥ à¤ à¥
Lecture 61 - à¤ªà¤¾à¤ à¤ à¤µà¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤²à¤°à¥•à¤¨à¤¿à¤ à¤ à¤•à¤ à¥•à¤¶à¤¨ à¤ªà¥•à¤°à¥ à¤ à¥
Lecture 62 - à¤ à¤ à¤¾ à¤²à¥ à¤ à¥•à¤ à¤° : à¤®à¤¾à¤¤à¥ , à¤¶à¤¿à¤¶à¥• à¤ à¤° à¤¬à¤¾à¤² à¤ªà¥ à¤·à¤£ à¤ à¥ à

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NPTEL Video Course - Biotechnology - Enzyme Science and Engineering

Subject Co-ordinator - Prof. Subhash Chand

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Scope to Enzyme Science and Engineering
Lecture 2 - Characteristic Features of Enzymes
Lecture 3 - Enzymes as Biocatalysts
Lecture 4 - Enzymatic Catalysis
Lecture 5 - Specificity of Enzyme Action
Lecture 6 - Kinetics of Enzyme Catalyzed Reactions
Lecture 7 - Kinetics of Enzyme Catalyzed Reactions
Lecture 8 - Deviation from Hyperbolic Enzyme Kinetics
Lecture 9 - Role of Effector Molecules in Enzyme Kinetics
Lecture 10 - Reversible Inhibition
Lecture 11 - Effect of PH and Temperature on Enzyme
Lecture 12 - Kinetics of Bi substrate Enzyme
Lecture 13 - Kinetics of Bi substrate Enzyme
Lecture 14 - Immobilized Enzymes - I
Lecture 15 - Immobilized Enzymes - II
Lecture 16 - Immobilized Enzymes - III
Lecture 17 - Immobilization of Enzymes by Entrapment
Lecture 18 - Effect of Immobilization
Lecture 19 - Reactors for Enzyme Catalyzed Reactions
Lecture 20 - Idealized Enzyme Reactor Performance
Lecture 21 - Idealized Enzyme Reactor Performance
Lecture 22 - Kinetic Parameters for IME Systems
Lecture 23 - Steady State Analysis of Mass Transfer
Lecture 24 - Steady State Analysis of Mass Transfer
Lecture 25 - Non Ideal Flow in Continuous Immobilized Enzyme
Lecture 26 - Applications of Immobilized Enzymes in Process
Lecture 27 - Analytical Applications
Lecture 28 - Enzyme Technology Challenges

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NPTEL Video Course - Biotechnology - NOC:Healthcare Entrepreneurship

Subject Co-ordinator - Prof. Arnab Chanda

Co-ordinating Institute - IIT Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 13
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Lecture 30
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NPTEL Video Course - Biotechnology - NOC:Introduction to Dynamical Models in Biology

Subject Co-ordinator - Prof. Biplab Bose

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mathematical modeling in Biology
Lecture 2 - How to Start Modeling
Lecture 3 - Modeling the spread of infectious disease
Lecture 4 - Modeling population growth
Lecture 5 - Numerical solution of ODE-1
Lecture 6 - Numerical solution of ODE-2
Lecture 7 - Simulating ODE-based models
Lecture 8 - Simulating ODE-based models
Lecture 9 - Steady state and stability analysis
Lecture 10 - Steady state and stability analysis
Lecture 11 - Phase Plane Analysis - I
Lecture 12 - Phase Plane Analysis - II
Lecture 13 - Concepts of Bifurcation
Lecture 14 - Concepts of Bifurcation
Lecture 15 - Modeling Molecular Processes in Cell
Lecture 16 - Modeling Molecular Processes in Cell
Lecture 17 - Modeling Molecular Processes in Cell
Lecture 18 - Modeling Molecular Processes in Cell
Lecture 19 - Modeling Cell Signaling
Lecture 20 - Modeling Cell Signaling
Lecture 21 - Modeling Cell Signaling
Lecture 22 - Modeling Transcriptional Circuits-1
Lecture 23 - Modeling Transcriptional Circuits-2
Lecture 24 - Online Resources for Mathematical Modeling in Biology

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NPTEL Video Course - Biotechnology - NOC:Genetic Engineering: Theory and Application

Subject Co-ordinator - Dr. Vishal Trivedi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Cellular Structure - Part I
Lecture 2 - Cellular Structure - Part II
Lecture 3 - Cellular Structure - Part III
Lecture 4 - Metabolic Reactions in Biological System
Lecture 5 - Growth Media For Different Expression System
Lecture 6 - Microbial Growth Kinetics
Lecture 7 - Isolation of a Gene Fragment - Part I
Lecture 8 - Isolation of a Gene Fragment - Part II
Lecture 9 - Isolation of a Gene Fragment - Part III
Lecture 10 - Polymerase Chain Reaction
Lecture 11 - Molecular Tools for Cloning
Lecture 12 - Cloning Vectors - I
Lecture 13 - Cloning Vectors - II
Lecture 14 - DNA Delivery In Host - Part I
Lecture 15 - DNA Delivery In Host - Part II
Lecture 16 - Screening of Recombinant Clones
Lecture 17 - Protein Production in Host - Part 1
Lecture 18 - Protein Production in Host - Part 2
Lecture 19 - Protein Production in Host - Part 3
Lecture 20 - Product Recovery from Host Cells
Lecture 21 - Basics of Chromatography - Part 1
Lecture 22 - Basics of Chromatography - Part 2
Lecture 23 - Ion-exchange Chromatography
Lecture 24 - Hydrophobic Interaction Chromatography
Lecture 25 - Gel Filtration chromatography - Part 1
Lecture 26 - Gel Filtration chromatography - Part 2
Lecture 27 - Affinity Chromatography - Part 1
Lecture 28 - Affinity Chromatography - Part 2
Lecture 29 - Affinity Chromatography - Part 3

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Lecture 30 - Affinity Chromatography - Part 4
Lecture 31 - Electrophoresis - Part 1
Lecture 32 - Electrophoresis - Part 2
Lecture 33 - Electrophoresis - Part 3
Lecture 34 - Protein Sequencing
Lecture 35 - Spectroscopy - Part I
Lecture 36 - Spectroscopy - Part II
Lecture 37 - Biotechnology Applications - Part 1
Lecture 38 - Biotechnology Applications - Part 2
Lecture 39 - Biotechnology Applications - Part 3
Lecture 40 - Summary and Conclusions - Part 1
Lecture 41 - Summary and Conclusions - Part 2

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NPTEL Video Course - Biotechnology - NOC:Experimental Biotechnology

Subject Co-ordinator - Dr. Vishal Trivedi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Good Lab Practices - Part 1
Lecture 2 - Good Lab Practices - Part 2
Lecture 3 - Operation of Laboratory Instruments - Part 1
Lecture 4 - Operation of Laboratory Instruments - Part 2
Lecture 5 - Operation of Laboratory Instruments - Part 3
Lecture 6 - Solution and Buffer Preparation
Lecture 7 - Basics of Electrophoresis - Part 1
Lecture 8 - Basics of Electrophoresis - Part 2
Lecture 9 - Horizontal Gel Electrophoresis
Lecture 10 - Different Varients of Gel Electrophoresis
Lecture 11 - Scientific Questions - Part 1
Lecture 12 - Scientific Questions - Part 2
Lecture 13 - Scientific Questions - Part 3
Lecture 14 - Scientific Questions - Part 4
Lecture 15 - Basics of Chromatography - Part 1
Lecture 16 - Basics of Chromatography - Part 2
Lecture 17 - Ion-Exchange Chromatography - Part 1
Lecture 18 - Ion-Exchange Chromatography - Part 2
Lecture 19 - Hydrophobic Interaction Chromatography
Lecture 20 - Gel Filtration Chromatography - Part 1
Lecture 21 - Gel Filtration Chromatography - Part 2
Lecture 22 - Gel Filtration Chromatography - Part 3
Lecture 23 - Affinity Chromatography - Part 1
Lecture 24 - Affinity Chromatography - Part 2
Lecture 25 - Affinity Chromatography - Part 3
Lecture 26 - Affinity Chromatography - Part 4
Lecture 27 - Antibody Generation
Lecture 28 - Antibody-Antigen Interaction - Part 1
Lecture 29 - Immunoassay

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Lecture 30 - Antibody-Antigen Interaction - Part 2
Lecture 31 - Antibody-Antigen Interaction - Part 3
Lecture 32 - Cell Culture Medium
Lecture 33 - Cell Fractionation
Lecture 34 - Microscopy - Part 1
Lecture 35 - Microscopy - Part 2
Lecture 36 - Cell Biology Experiments
Lecture 37 - Flow Cytometry
Lecture 38 - Polymerase Chain Reaction - Part 1
Lecture 39 - Polymerase Chain Reaction - Part 2
Lecture 40 - Polymerase Chain Reaction - Part 3
Lecture 41 - Polymerase Chain Reaction - Part 4
Lecture 42 - Sequencing Techniques
Lecture 43 - Blotting Techniques - Part 1
Lecture 44 - Blotting Techniques - Part 2
Lecture 45 - Designing Experiments

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NPTEL Video Course - Biotechnology - NOC:Biointerface Engineering

Subject Co-ordinator - Prof. Lalit M. Pandey

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intermolecular Forces
Lecture 2 - Classification of Intermolecular Forces
Lecture 3 - Thermodynamics Aspects of Intermolecular Forces
Lecture 4 - Surface Tension and Energy
Lecture 5 - Wettability
Lecture 6 - Adhesion and Cohesion
Lecture 7 - Methods for Surface Tension Measurement
Lecture 8 - Methods for Contact Angle Measurement
Lecture 9 - Determination of Surface Tension of Solids
Lecture 10 - Protein Adsorption
Lecture 11 - Characterization of Protein Adsorption
Lecture 12 - Kinetics of Protein Adsorption
Lecture 13 - Aggregation of Proteins
Lecture 14 - Kinetics of Protein Aggregation
Lecture 15 - Effect of Surfaces on the Aggregation of Protein
Lecture 16 - Host Responses to Biomaterials
Lecture 17 - Cell Adhesion
Lecture 18 - Biocompatibility of Biomaterials
Lecture 19 - Surface Modification
Lecture 20 - Surface Modification Techniques
Lecture 21 - Coating of Calcium Phosphates on Ti-6Al-4V
Lecture 22 - Surface Characterization
Lecture 23 - Self-Assembled Monolayers
Lecture 24 - Effect of SAMs on Biointerfacial Interactions

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NPTEL Video Course - Biotechnology - NOC:Basics of Biology

Subject Co-ordinator - Prof. Vishal Trivedi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Living Organisms
Lecture 2 - Classification of Living Organisms - Part 1
Lecture 3 - Classification of Living Organisms - Part 2
Lecture 4 - Classification of Living Organisms - Part 3
Lecture 5 - Classification of Living Organisms - Part 4
Lecture 6 - Origin of Life - Part 1
Lecture 7 - Origin of Life - Part 2
Lecture 8 - Evolution - Part 1
Lecture 9 - Evolution - Part 2
Lecture 10 - Evolution - Part 3
Lecture 11 - Basics of Cells - Part 1
Lecture 12 - Basics of Cells - Part 2
Lecture 13 - Basics of Cells - Part 3
Lecture 14 - Cell Division and regulation
Lecture 15 - Nucleic acids
Lecture 16 - Carbohydrates - Part 1
Lecture 17 - Carbohydrates - Part 2
Lecture 18 - Carbohydrates - Part 3
Lecture 19 - Lipids
Lecture 20 - Proteins - Part 1
Lecture 21 - Proteins - Part 2
Lecture 22 - Proteins - Part 3
Lecture 23 - Proteins - Part 4
Lecture 24 - Central Dogma of Life
Lecture 25 - Replication
Lecture 26 - Polymerase chain reaction
Lecture 27 - Transcription - Part 1
Lecture 28 - Transcription - Part 2
Lecture 29 - Translation - Part 1

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Lecture 30 - Translation - Part 2
Lecture 31 - Immune system - Part 1
Lecture 32 - Immune system - Part 2
Lecture 33 - Phagocytosis
Lecture 34 - Cell Death and Apoptosis
Lecture 35 - Vesicular Transport
Lecture 36 - Digestion - Part 1
Lecture 37 - Digestion - Part 2
Lecture 38 - Digestion - Part 3
Lecture 39 - Circulatory System - Part 1
Lecture 40 - Circulatory System - Part 2
Lecture 41 - Muscular System - Part 1
Lecture 42 - Muscular System - Part 2
Lecture 43 - Nervous System - Part 1
Lecture 44 - Nervous System - Part 2
Lecture 45 - Nervous System - Part 3
Lecture 46 - Homeostasis - Part 1
Lecture 47 - Homeostasis - Part 2
Lecture 48 - Homeostasis - Part 3
Lecture 49 - Summary and Conclusions - Part 1
Lecture 50 - Summary and Conclusions - Part 2

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NPTEL Video Course - Biotechnology - NOC:Data Analysis for Biologists

Subject Co-ordinator - Prof. Biplab Bose

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rules of probability
Lecture 2 - Discrete probability distribution
Lecture 3 - Continuous probability distribution
Lecture 4 - Moments: mean and variance
Lecture 5 - Moments: variance and covariance
Lecture 6 - Bayes theorem and likelihood
Lecture 7 - Concept of statistical tests
Lecture 8 - Vector and vector operations
Lecture 9 - Matrix and matrix operations
Lecture 10 - Determinant and Inverse of a matrix
Lecture 11 - Eigenvalue and eigenvector
Lecture 12 - Linear system of equations
Lecture 13 - Singular value decomposition
Lecture 14 - Getting ready with R
Lecture 15 - Algebraic and logical operations in R
Lecture 16 - Reading and writing data
Lecture 17 - Statistics using R - descriptive statistics
Lecture 18 - Statistics using R - t-test and ANOVA
Lecture 19 - Linear algebra using R
Lecture 20 - Scatter plot, Line plot and Bar plot
Lecture 21 - Histogram and Box plot
Lecture 22 - Heatmap and Volcano plot
Lecture 23 - Network visualization
Lecture 24 - Data visualization using ggplot2 - I
Lecture 25 - Data visualization using ggplot2 - II
Lecture 26 - Correlations
Lecture 27 - Linear regression - I
Lecture 28 - Linear regression - II
Lecture 29 - Linear regression using R

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Lecture 30 - Multiple linear regression
Lecture 31 - Multiple linear regression using R
Lecture 32 - Nonlinear regression
Lecture 33 - Nonlinear regression using R
Lecture 34 - Clustering and classification
Lecture 35 - Logistic regression
Lecture 36 - Logistic regression using R
Lecture 37 - Distance mesaures for clustering
Lecture 38 - k-means clustering
Lecture 39 - k-means clustering using R
Lecture 40 - Hierarchical clustering
Lecture 41 - Hierarchical clustering using R
Lecture 42 - Decision tree classifier
Lecture 43 - Support vector machines
Lecture 44 - Higher-dimensional data in biology
Lecture 45 - Principle component analysis
Lecture 46 - Principle component analysis using R
Lecture 47 - t-SNE
Lecture 48 - t-SNE using R
Lecture 49 - Diffusion maps

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NPTEL Video Course - Biotechnology - NOC:Genome Editing and Engineering

Subject Co-ordinator - Prof. Utpal Bora

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Genes and Genome Organization
Lecture 2 - History and Basics of Genetic Engineering
Lecture 3 - Advantages and Limitations of Genetic Engineering
Lecture 4 - Breakage of Genomic DNA
Lecture 5 - Repair of Genomic DNA
Lecture 6 - Homologous and non homologous recombination
Lecture 7 - Site specific recombination
Lecture 8 - Targeted genetic modification - I
Lecture 9 - Targeted genetic modification - II
Lecture 10 - Basics of Zinc Finger Nucleases
Lecture 11 - Design of Zinc Finger Nucleases for genome editing
Lecture 12 - Applications of Zinc Finger Nucleases - Part A
Lecture 13 - Applications of Zinc Finger Nucleases - Part B
Lecture 14 - Basics of TALEN - Part A
Lecture 15 - Basics of TALEN - Part B
Lecture 16 - Design of TALEN for genome editing - Part A
Lecture 17 - Design of TALEN for genome editing - Part B
Lecture 18 - Application of TALEN - Part A
Lecture 19 - Application of TALEN - Part B
Lecture 20 - CRISPR system in bacteria - Part A
Lecture 21 - CRISPR system in bacteria - Part B
Lecture 22 - CRISPR/Cas9 in Genome Editing - Part A
Lecture 23 - CRISPR/Cas9 in Genome Editing - Part B
Lecture 24 - Applications of CRISPR/Cas9 - Part A
Lecture 25 - Applications of CRISPR/Cas9 - Part B
Lecture 26 - Computational Resources for CRISPR / Cas - Part A
Lecture 27 - Computational Resources for CRISPR / Cas - Part B
Lecture 28 - Human cell engineering in diseases : Thalassemia - Part A
Lecture 29 - Human cell engineering in diseases : Thalassemia - Part B

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Lecture 30 - Human cell engineering in diseases : Severe combined immunodeficiency (SCID) - Part A
Lecture 31 - Human cell engineering in diseases : Severe combined immunodeficiency (SCID) - Part B
Lecture 32 - Human cell engineering in diseases : Hemophilia - Part A
Lecture 33 - Human cell engineering in diseases : Hemophilia - Part B
Lecture 34 - Animal models - Part A
Lecture 35 - Animal models - Part B
Lecture 36 - iPSc models - Part A
Lecture 37 - iPSc models - Part B
Lecture 38 - Cancer disease models - Part A
Lecture 39 - Cancer disease models - Part B
Lecture 40 - Engineered immune cells for Cancer therapy (I) - Part A
Lecture 41 - Engineered immune cells for Cancer therapy (I) - Part B
Lecture 42 - Engineered immune cells for Cancer therapy (II) - Part A
Lecture 43 - Engineered immune cells for Cancer therapy (II) - Part B
Lecture 44 - History and Basics - Part A
Lecture 45 - History and Basics - Part B
Lecture 46 - Genome editing and personalized therapy
Lecture 47 - Bioethics and Biosafety - Part A
Lecture 48 - Bioethics and Biosafety - Part B
Lecture 49 - Regulatory issues in Genome Editing

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NPTEL Video Course - Biotechnology - NOC:Enzyme Sciences and Technology

Subject Co-ordinator - Prof. Vishal Trivedi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Enzymes
Lecture 2 - Basics of Enzyme
Lecture 3 - Enzyme Classification - Part I
Lecture 4 - Enzyme Classification - Part II
Lecture 5 - Enzyme Nomenclature
Lecture 6 - Primary Structure of Enzyme
Lecture 7 - Determination of Primary Structure
Lecture 8 - Secondary Structure of Protein
Lecture 9 - Tertiary Structure of Enzyme - Part I
Lecture 10 - Tertiary Structure of Enzyme - Part II
Lecture 11 - Molecular Modelling of Enzyme Structure - Part II
Lecture 12 - Identification of Enzyme Gene - Part II
Lecture 13 - Identification of Enzyme Gene - Part II
Lecture 14 - Polymerase Chain Reaction
Lecture 15 - Enzymes in Molecular Cloning
Lecture 16 - Cloning of Enzyme Coding Gene
Lecture 17 - DNA Delivery in host - Part I
Lecture 18 - DNA Delivery in host - Part II
Lecture 19 - Screening of Recombinant Clones
Lecture 20 - Over-expression of Enzyme in host - Part I
Lecture 21 - Over-expression of Enzyme in host - Part II
Lecture 22 - Over-expression of Enzyme in host - Part III
Lecture 23 - Host Cell Disruption Methods
Lecture 24 - Basics of Chromatography
Lecture 25 - Chromatography - Part I
Lecture 26 - Chromatography - Part II
Lecture 27 - Chromatography - Part III
Lecture 28 - Carbohydrate Metabolism
Lecture 29 - Lipid Metabolism

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Lecture 30 - Amino acid Metabolism and Detoxification
Lecture 31 - Enzyme-Substrate Interactions - Part I - Chromatographic Methods
Lecture 32 - Enzyme-Substrate Interactions - Part II - Spectroscopic Methods
Lecture 33 - Enzyme-Substrate Interactions - Part III - ITC
Lecture 34 - Enzyme-Substrate Interactions - Part IV - SPR
Lecture 35 - Enzyme Assay System - Part I
Lecture 36 - Enzyme Assay System - Part II
Lecture 37 - Enzyme Assay System - Part III
Lecture 38 - Enzyme Kinetics
Lecture 39 - Inhibitor Designing - Part I - Traditional Approach
Lecture 40 - Inhibitor Designing - Part II - Modern Approach
Lecture 41 - Inhibitor Designing - Part III - Computational Approach
Lecture 42 - Enzyme Inhibition - Part I
Lecture 43 - Enzyme Inhibition - Part II
Lecture 44 - Application of Enzyme - Part I - Food Industry
Lecture 45 - Application of Enzyme - Part II - Medical Field
Lecture 46 - Enzyme in Drug Discovery
Lecture 47 - Enzymes in Environmental Field

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NPTEL Video Course - Biotechnology - NOC:Molecular Biology

Subject Co-ordinator - Prof. Vishal Trivedi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Cellular Structure (Prokaryotic cells)
Lecture 2 - Cellular Structure (Eukarytotic cells)
Lecture 3 - Cellular Structure (Eukarytotic cells)
Lecture 4 - Cell Fractionation - Part 1
Lecture 5 - Cell Fractionation - Part 2
Lecture 6 - Cellular Metabolism - Part 1
Lecture 7 - Cellular Metabolism - Part 2
Lecture 8 - Cell Cycle and Control - Part 1
Lecture 9 - Cell Cycle and Control - Part 2
Lecture 10 - Program Cell Death
Lecture 11 - Biomolecules - Part 1 : DNA
Lecture 12 - Biomolecules - Part 2 : DNA Sequencing
Lecture 13 - Biomolecules - Part 2 : RNA
Lecture 14 - Amino acids
Lecture 15 - Protein
Lecture 16 - Enzymes
Lecture 17 - Genetic Material - Part 1
Lecture 18 - Genetic Material - Part 2
Lecture 19 - Genetic Material - Part 3
Lecture 20 - Central Dogma of Molecular Biology
Lecture 21 - Replication - Part 1 : Prokaryotic System
Lecture 22 - Replication - Part 2 : Prokaryotic System
Lecture 23 - Replication - Part 2 : Eukaryotic System
Lecture 24 - Mutagenesis and repair Mechanism
Lecture 25 - Transcription in Prokaryotic system
Lecture 26 - Transcription in Eukaryotic System
Lecture 27 - Post Transcriptional modifications
Lecture 28 - Gene Control Mechanism - Part 1
Lecture 29 - Gene Control Mechanism - Part 2

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Lecture 30 - Translation in Prokaryotic system
Lecture 31 - Translation in Eukaryotic System
Lecture 32 - Post Translational modifications
Lecture 33 - Southern Blotting
Lecture 34 - Northern Blotting
Lecture 35 - Western Blotting - Part 1
Lecture 36 - Western Blotting - Part 2
Lecture 37 - Polymerase Chain Reaction - Part 1
Lecture 38 - Polymerase Chain Reaction - Part 2
Lecture 39 - Real-Time PCR
Lecture 40 - Cloning - Part 1
Lecture 41 - Cloning - Part 2
Lecture 42 - Cloning Vectors
Lecture 43 - DNA Delivery - Part 1
Lecture 44 - DNA Delivery - Part 2
Lecture 45 - Screening of Recombinant Clones
Lecture 46 - Protein Over-expression
Lecture 47 - Genome Editing - Part 1
Lecture 48 - Genome Editing - Part 2
Lecture 49 - Applications of Molecular Biology - Part 1
Lecture 50 - Applications of Molecular Biology - Part 2
Lecture 51 - Applications of Molecular Biology - Part 3
Lecture 52 - Applications of Molecular Biology - Part 4

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NPTEL Video Course - Biotechnology - NOC:Microbial Biotechnology

Subject Co-ordinator - Prof. Utpal Bora

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and principles of microbial biotechnology
Lecture 2 - Classification and taxonomy of microbes A
Lecture 3 - Classification and taxonomy of microbes B
Lecture 4 - Techniques for microbial Classification and Identification
Lecture 5 - Structure, life cycle and classification of viruses
Lecture 6 - Structure and life cycle of representative groups of prokaryotic microbes
Lecture 7 - Structure of cyanobacteria and archaea
Lecture 8 - Diversity and Structure of selected eukaryotic microorganisms
Lecture 9 - Life cycle of representative groups of microbes
Lecture 10 - Basic Physiology of Microorganisms
Lecture 11 - Physiology of Extremophiles and adaptation-energy storage, temperature, pH and pressure
Lecture 12 - Physiology of Extremophiles and adaptation-halophiles, xerophiles, radiophiles and mettalophiles
Lecture 13 - Genome structure, transcription, genetic code, translation
Lecture 14 - Regulation of gene expression
Lecture 15 - Microbial growth kinetics
Lecture 16 - Control methods: Physical methods
Lecture 17 - Control methods: Chemical methods
Lecture 18 - Control methods: Biological methods
Lecture 19 - Microorganisms in industry
Lecture 20 - Microorganisms in pharmaceutical industry
Lecture 21 - Microbial Enzymes of Industrial Importance
Lecture 22 - Engineered Microbial Consortia for Industry
Lecture 23 - Microbes in Agriculture
Lecture 24 - Microbial Biocontrol
Lecture 25 - Biopesticides and Integrated Pest Management
Lecture 26 - Microbial ecology, biogeochemical cycles
Lecture 27 - Microbial waste treatment methods
Lecture 28 - Microbial Bioremediation
Lecture 29 - Fermented Food - Foundations and Principles

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Lecture 30 - Health Benefits, Risks and Advances in Food Fermentation
Lecture 31 - Fermented Beverages: Microbial Processes and Biotechnological Innovations
Lecture 32 - Industrial Fermentation and Health Aspects of Fermented Beverages
Lecture 33 - Single Cell Protein production
Lecture 34 - Production of biopharmaceuticals (Enzymes,antibodies and therapeutic proteins) using rDNA techno
Lecture 35 - Production of vaccines
Lecture 36 - Production of Biofuel using microbes
Lecture 37 - Microbial fuel Cells (MFCs) and microbial electrolysis cells (MECs)
Lecture 38 - Introduction to IPR, biotechnology patents, app. process, legal and ethical considerations
Lecture 39 - Patenting in microbial biotechnology, commercialization and future of microbial patenting

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NPTEL Video Course - Biotechnology - NOC:Cell and Molecular Biology

Subject Co-ordinator - Prof. Vishal Trivedi

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Origin of Life - Part 1
Lecture 2 - Origin of Life - Part 2
Lecture 3 - Basics of Evolution
Lecture 4 - Theories of Evolution - Part 1
Lecture 5 - Theories of Evolution - Part 2
Lecture 6 - Prokaryotic Cells
Lecture 7 - Eukaryotic Cells - Part 1
Lecture 8 - Eukaryotic Cells - Part 2
Lecture 9 - Cell Growth and regulation
Lecture 10 - Cell Growth Medium
Lecture 11 - Cell Growth Monitoring
Lecture 12 - Cell Cycle
Lecture 13 - Mitosis and Meiosis
Lecture 14 - Apoptosis and Autophagy
Lecture 15 - Transport in Prokaryotic Cells
Lecture 16 - Transport in Eukaryotic Cells - Part 1
Lecture 17 - Transport in Eukaryotic Cells - Part 2
Lecture 18 - Cellular Communication - Part 1
Lecture 19 - Cellular Communication - Part 2
Lecture 20 - Cellular Communication - Part 3
Lecture 21 - Genetic Material in Organism
Lecture 22 - Organization of Genome - Part 1
Lecture 23 - Organization of Genome - Part 2
Lecture 24 - Genome Damage and Repair Mechanism
Lecture 25 - Law of Inheritance - Part 1
Lecture 26 - Law of Inheritance - Part 2
Lecture 27 - Epigenetics
Lecture 28 - Genetic Recombination
Lecture 29 - Transgenic Organisms

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Lecture 30 - Gene Regulation in Organism
Lecture 31 - Structure of DNA - Part 1
Lecture 32 - Structure of DNA - Part 2
Lecture 33 - Structure of RNA
Lecture 34 - Central Dogma of Molecular Biology
Lecture 35 - Replication - Part 1
Lecture 36 - Replication - Part 2
Lecture 37 - Replication - Part 3
Lecture 38 - Transcription - Part 1
Lecture 39 - Transcription - Part 2
Lecture 40 - Translation
Lecture 41 - Components of Immune System
Lecture 42 - Antibody
Lecture 43 - Vaccines
Lecture 44 - Gene Therapy
Lecture 45 - Cell Factory: Concept and Application
Lecture 46 - Summary and Conclusion

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NPTEL Video Course - Biotechnology - NOC:Fundamentals of Bioprocess Engineering

Subject Co-ordinator - Prof. Lalit Pandey

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Fermentation Process
Lecture 2 - Strain Isolation and Process Flow
Lecture 3 - Metabolic Pathways
Lecture 4 - Cell Nutrients
Lecture 5 - Industrial Important Products
Lecture 6 - Material and mass balance
Lecture 7 - Stoichiometry of cell growth and product formation
Lecture 8 - Stoichiometry of cell growth and product formation
Lecture 9 - Stoichiometry of product formation
Lecture 10 - Metabolic energetics
Lecture 11 - Energy balance
Lecture 12 - Basic of Enzyme catalysis
Lecture 13 - Michaelis Menten Equation
Lecture 14 - Evaluation of kinetic Parameters
Lecture 15 - Enzyme Inhibition - 1
Lecture 16 - Enzyme Inhibition - 2
Lecture 17 - Immobilization of Enzymes
Lecture 18 - External Mass Transfer
Lecture 19 - Internal Mass Transfer
Lecture 20 - Simultaneous External and Internal mass Transfer
Lecture 21 - Application of Immobilized Enzyme
Lecture 22 - Microbial Growth Kinetics
Lecture 23 - Monod Equation
Lecture 24 - Transient Growth Kinetics - 1
Lecture 25 - Transient Growth Kinetics - 2
Lecture 26 - Primary and Secondary Metabolites
Lecture 27 - Structured kinetic model for product formation
Lecture 28 - Structured kinetic model - II
Lecture 29 - Product formation kinetics - I

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Lecture 30 - Product formation kinetics - II
Lecture 31 - Ideal reactor operation - Batch fermentation
Lecture 32 - Ideal reactor operation - fed batch and continuous with free cells
Lecture 33 - Ideal reactor operation - CSTR
Lecture 34 - Special Bioreactors
Lecture 35 - Mass transfer and diffusion related theories
Lecture 36 - Oxygen transfer from bubble to cell
Lecture 37 - Measurement of mass transfer coefficient
Lecture 38 - Role of Agitation
Lecture 39 - Heat transfer in bioprocessing
Lecture 40 - Cell death kinetics
Lecture 41 - Batch and continuous sterilization
Lecture 42 - Heat transfer equipment
Lecture 43 - Scale up
Lecture 44 - Sensors for Bioreactor
Lecture 45 - Measurement of Process Parameter
Lecture 46 - Process Control System
Lecture 47 - Process Dynamic
Lecture 48 - Process Controller
Lecture 49 - Importance of downstream processing
Lecture 50 - Centrifugation, filtration, sedimentation
Lecture 51 - Cell separation and disruption
Lecture 52 - Extraction and chromatography
Lecture 53 - Adsorption
Lecture 54 - Membrane separation
Lecture 55 - Drying
Lecture 56 - Introduction to bioprocess economics

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NPTEL Video Course - Biotechnology - Animal Physiology

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Animal Physiology
Lecture 2 - Animal Physiology
Lecture 3 - Animal Physiology
Lecture 4 - Animal Physiology
Lecture 5 - Animal Physiology
Lecture 6 - Animal Physiology
Lecture 7 - Animal Physiology
Lecture 8 - Animal Physiology
Lecture 9 - Animal Physiology
Lecture 10 - Animal Physiology
Lecture 11 - Animal Physiology
Lecture 12 - Animal Physiology
Lecture 13 - Animal Physiology
Lecture 14 - Animal Physiology
Lecture 15 - Animal Physiology
Lecture 16 - Animal Physiology
Lecture 17 - Animal Physiology
Lecture 18 - Animal Physiology
Lecture 19 - Animal Physiology
Lecture 20 - Animal Physiology
Lecture 21 - Animal Physiology
Lecture 22 - Animal Physiology
Lecture 23 - Animal Physiology
Lecture 24 - Animal Physiology
Lecture 25 - Animal Physiology
Lecture 26 - Animal Physiology
Lecture 27 - Animal Physiology
Lecture 28 - Animal Physiology
Lecture 29 - Animal Physiology

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Lecture 30 - Animal Physiology
Lecture 31 - Animal Physiology
Lecture 32 - Animal Physiology
Lecture 33 - Animal Physiology
Lecture 34 - Animal Physiology
Lecture 35 - Animal Physiology
Lecture 36 - Animal Physiology
Lecture 37 - Animal Physiology
Lecture 38 - Animal Physiology
Lecture 39 - Animal Physiology
Lecture 40 - Animal Physiology

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NPTEL Video Course - Biotechnology - Bio electricity

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Bio electricity
Lecture 2 - Bio electricity
Lecture 3 - Bio electricity
Lecture 4 - Bio electricity
Lecture 5 - Bio electricity
Lecture 6 - Bio electricity
Lecture 7 - Bio electricity
Lecture 8 - Bio electricity
Lecture 9 - Bio electricity
Lecture 10 - Bio electricity
Lecture 11 - Bio electricity
Lecture 12 - Bio electricity
Lecture 13 - Bio electricity
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Lecture 29 - Bio electricity

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Lecture 30 - Bio electricity
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Lecture 37 - Bio electricity
Lecture 38 - Bio electricity
Lecture 39 - Bio electricity
Lecture 40 - Bio electricity

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NPTEL Video Course - Biotechnology - NOC:Human Molecular Genetics

Subject Co-ordinator - Mr.S. Ganesh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of central dogma, Part 1
Lecture 2 - Fundamentals of central dogma, Part 2
Lecture 3 - Fundamentals of central dogma, Part 3
Lecture 4 - Chromosome Structure and Function
Lecture 5 - Pedigree Analysis
Lecture 6 - Complications in Mendelian Pedigree Patterns
Lecture 7 - DNA Cloning and Hybridization Techniques - Part 1
Lecture 8 - DNA Cloning and Hybridization Techniques - Part 2
Lecture 9 - Practice Session 1
Lecture 10 - Practice Session 2
Lecture 11 - Mutations and instability of human DNA (Part 1)
Lecture 12 - Mutations and instability of human DNA (Part 2)
Lecture 13 - Animal Models for Human Diseases
Lecture 14 - Positional cloning of genes for monogenic disorders
Lecture 15 - Human Genome Project and HapMap project

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NPTEL Video Course - Biotechnology - NOC:Functional Genomics

Subject Co-ordinator - S. Ganesh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Functional Genomics
Lecture 2 - The Genomics Era
Lecture 3 - Epigenetics
Lecture 4 - Forward Genetics vs Reverse Genetics
Lecture 5 - Genome Editing Approaches - Part 1
Lecture 6 - Genome Editing Approaches - Part 2
Lecture 7 - Transcriptomics - Part 1
Lecture 8 - Transcriptomics - Part 2
Lecture 9 - Genome Sequence Databases
Lecture 10 - DNA Sequencing Methods - Part 1
Lecture 11 - DNA Sequencing Methods - Part 2
Lecture 12 - Applications of Next-Generation Sequencing (NGS)
Lecture 13 - Tutorial - Session 1
Lecture 14 - Tutorial - Session 2
Lecture 15 - Genomic Insight into Evolution
Lecture 16 - Genome sequence
Lecture 17 - Outcome of Comparative Genomics
Lecture 18 - Laboratory - Session 1
Lecture 19 - Laboratory - Session 2

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NPTEL Video Course - Biotechnology - NOC:Bioenergy

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Oil Economy of the World
Lecture 3 - Unit of Energy and Introduction of Bioenergy
Lecture 4 - How Biomass Formed on the Earth
Lecture 5 - Road Map of Bioenergy
Lecture 6 - Basic Biomass Technology (Resources and Production)
Lecture 7 - Basics of Mechanism of Light Reaction
Lecture 8 - Exploration of Photosynthesis Process
Lecture 9 - In Photosynthesis Oxygen Comes from Water Molecule
Lecture 10 - Hill Reaction
Lecture 11 - Electron Transport Process in Light Reaction
Lecture 12 - How Carbon dioxide converted in Carbohydrate
Lecture 13 - From Carbon dioxide to two Molecules of 3 - Phospho Glycerate by RUBISCO
Lecture 14 - RUBISCO enzyme
Lecture 15 - Photo respiration and Calvin Cycle
Lecture 16 - Efficiency Calculation of Photosynthesis Process
Lecture 17 - C3 and C4 Plant Structure and Photosynthesis Process
Lecture 18 - Biomass production System and their Categorization
Lecture 19 - Important Parameters for Selecting Biomass Crops
Lecture 20 - Factors Determining the Conversion Process - I
Lecture 21 - Factors Determining the Conversion Process - II
Lecture 22 - Factors Determining the Conversion Process - III
Lecture 23 - Conversion Technology
Lecture 24 - Conversion Process- (Combustion Process)
Lecture 25 - Pyrolysis Process
Lecture 26 - Classification of Pyrolysis
Lecture 27 - Bio Oil - (Solution for Thermal Instability and Corrosivity)
Lecture 28 - Spark Ignition Engine
Lecture 29 - Compression Ignition Engine

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Lecture 30 - Carbonization - Graphene like material
Lecture 31 - Introduction of Gasification
Lecture 32 - Thermo Chemical Process of Gasification
Lecture 33 - Feed Stock Treatment of Gasification
Lecture 34 - Feed Stock Property
Lecture 35 - Gasification Types - Up Drift Gasifier
Lecture 36 - Down drift and Cross Flow Gasifier
Lecture 37 - Operation and Performance of Fixed Bed Gasifier
Lecture 38 - Fludized Bed Gasification
Lecture 39 - Operation and Performance of Fluidized Bed Gasifier
Lecture 40 - Biological Root of Gasification and Summary of Course

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NPTEL Video Course - Biotechnology - NOC:Animal Physiology

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to Anatomy and Physiology
Lecture 2 - Organization of living system
Lecture 3 - Homeostasis and system integration
Lecture 4 - Positive feedback loop in homeostasis
Lecture 5 - Chemical basis of organization of the body
Lecture 6 - Integumentary System - I
Lecture 7 - Integumentary system - II
Lecture 8 - Integumentary System - III
Lecture 9 - Bone and Cartilage - I
Lecture 10 - Bone and Cartilage - II
Lecture 11 - Introduction of muscle
Lecture 12 - Skeletal muscle formation
Lecture 13 - Anatomy of skeletal muscle
Lecture 14 - Contraction in muscle
Lecture 15 - Function of actin and myosin
Lecture 16 - Length tension relationship of skeletal muscle
Lecture 17 - Excitation contraction coupling with nervous system
Lecture 18 - Stretch reflex phenomena
Lecture 19 - Nervous system anatomy and signaling
Lecture 20 - Structure and circuit of neurons
Lecture 21 - Origin of biological cell
Lecture 22 - Excitability in cell
Lecture 23 - Ion transportation in the cell
Lecture 24 - Signal propagation in neurons
Lecture 25 - Neurotransmitter and action potential
Lecture 26 - Spatial temporal summation of signal in mesh neurons
Lecture 27 - Anatomy of Hippo-campus
Lecture 28 - Epilepsy and memory
Lecture 29 - Long term potentiation

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Lecture 30 - Long term depression
Lecture 31 - Alzheimers disease
Lecture 32 - Parkinsons disease
Lecture 33 - Amyotrophic lateral sclerosis
Lecture 34 - Spinal cord injury
Lecture 35 - Glial cells
Lecture 36 - Stretch reflex arc circuit - I
Lecture 37 - Stretch reflex arc circuit - II
Lecture 38 - Neuro muscular junction
Lecture 39 - Hearing system
Lecture 40 - Olfaction system
Lecture 41 - Anatomy of eye
Lecture 42 - Eye lens and cataract
Lecture 43 - Structure of Retina
Lecture 44 - Image formation and processing in eyes
Lecture 45 - Mechanism of photo processing by rods
Lecture 46 - Structure and Function of Heart - I
Lecture 47 - Structure and Function of Heart - II
Lecture 48 - Conduction circuit of heart
Lecture 49 - Contractile system and Conducting system
Lecture 50 - EKG and Comparison of action potential between pace make cell and work cell
Lecture 51 - Respiratory Physiology
Lecture 52 - Anatomy and physiology of Blood vessels - I
Lecture 53 - Anatomy and Physiology of Blood vessels - II
Lecture 54 - Anatomy and physiology of blood vessels - III
Lecture 55 - Anatomy and physiology of blood vessels - IV
Lecture 56 - Endocrine system - I
Lecture 57 - Digestive system and Endocrine system - II
Lecture 58 - Blood
Lecture 59 - Kidney and immune system
Lecture 60 - Reproductive system

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NPTEL Video Course - Biotechnology - NOC:Cell Culture Technologies

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Cell Culture Technology
Lecture 2 - Philosophy and complexity in cell culture
Lecture 3 - To grow the cell outside the body
Lecture 4 - Cell cycle concept
Lecture 5 - Dividing cells
Lecture 6 - Biology of cell culture
Lecture 7 - Layout(s) and design(s) of cell culture facility
Lecture 8 - Precautions during designing the lab layout - I
Lecture 9 - Precautions during designing the lab layout - II
Lecture 10 - Precautions during designing the lab layout - III
Lecture 11 - State of the art facility in cell culture lab - I
Lecture 12 - State of the art facility in cell culture lab - II
Lecture 13 - Specialized facility in cell culture lab
Lecture 14 - Interaction of cell and glass/polycorbonate surface - I
Lecture 15 - Interaction of cell and glass/polycorbonate surface - II
Lecture 16 - Poly D lysine deposition
Lecture 17 - Surface chemical analysis
Lecture 18 - Cell growth process
Lecture 19 - Cell surface interface
Lecture 20 - Cell culture substrate patterning
Lecture 21 - Introduction of define system
Lecture 22 - Mechanical dissociation of hippocampal tissue
Lecture 23 - Rules for mechanical dissociation of tissue
Lecture 24 - Drum molecule testing
Lecture 25 - Adult hippocampal neuron dissociation
Lecture 26 - Cell separation and In vitro myelination cell culture mode - I
Lecture 27 - Cell separation and In vitro myelination cell culture mode - II
Lecture 28 - Cell separation and In vitro myelination cell culture mode - III
Lecture 29 - Cell Separation and In vitro myelination cell culture mode - IV

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Lecture 30 - Cell separation and in vitro myelination cell culture mode - V
Lecture 31 - Fluorescent assisted cell sorting
Lecture 32 - Condition for regenerated cells
Lecture 33 - Introduction of skeletal muscle cell culture
Lecture 34 - Skeletal muscle cell culture
Lecture 35 - Cardiac muscle cell culture
Lecture 36 - Advance cell culture modules - I
Lecture 37 - Advance cell culture modules - II
Lecture 38 - Advance cell culture modules - III
Lecture 39 - Advance cell culture modules - IV
Lecture 40 - Advance cell culture modules - V

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NPTEL Video Course - Biotechnology - NOC:Forest Biometry

Subject Co-ordinator - Prof. Mainak Das, Dr. Ankur Awadhiya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Recap of formulae
Lecture 3 - Recap of trigonometry
Lecture 4 - Measurment of central tendency and dispersion
Lecture 5 - Graphical presentation of data
Lecture 6 - Shape of a tree
Lecture 7 - Metzgers theory
Lecture 8 - Form factor and form quotients
Lecture 9 - Taper equations
Lecture 10 - Making the cuts
Lecture 11 - Cross-section of a tree
Lecture 12 - Where to measure the diameter
Lecture 13 - Callipers - Usages and Issues
Lecture 14 - Tape
Lecture 15 - Measurement of bark and growth rings
Lecture 16 - Tree height
Lecture 17 - Method of similar triangles
Lecture 18 - Distance measurements
Lecture 19 - Angular measurement
Lecture 20 - LIDAR
Lecture 21 - Canopy attributes - Part I
Lecture 22 - Canopy attributes - Part II
Lecture 23 - Canopy attributes - Part III
Lecture 24 - Canopy cover and closure
Lecture 25 - Photogrammetry
Lecture 26 - Basal area of a tree and stand
Lecture 27 - Stand basal area, crop diameter and crop age
Lecture 28 - Point sampling - I
Lecture 29 - Point sampling - II

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Lecture 30 - Number density and sample calculations
Lecture 31 - Volume
Lecture 32 - The Quarter - girth formula
Lecture 33 - Volume computations in the field
Lecture 34 - Volume Table
Lecture 35 - Forest Sampling
Lecture 36 - Density and mass measurement
Lecture 37 - Normalized difference vegetation Index (NDVI)
Lecture 38 - Site quality
Lecture 39 - Recap - I
Lecture 40 - Recap - II

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NPTEL Video Course - Biotechnology - NOC:Introduction to Professional and Scientific Communication

Subject Co-ordinator - Mr. S. Ganesh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the topic
Lecture 2 - Where do research ideas come from?
Lecture 3 - Inductive vs Deductive Reasoning
Lecture 4 - Scientific Hypothesis
Lecture 5 - Scientific Hypothesis (Continued...)
Lecture 6 - Testing the Hypothesis
Lecture 7 - Introduction to Scientific Writing
Lecture 8 - Writing an Abstract
Lecture 9 - Title for a Research Paper
Lecture 10 - Title and Keywords
Lecture 11 - Mileposts for the Article Writing
Lecture 12 - Writing the Methods Section
Lecture 13 - Writing the Results Section
Lecture 14 - Writing Results Section (Continued...)
Lecture 15 - How to Prepare Figures
Lecture 16 - How to Prepare Schematics
Lecture 17 - How to write Introduction and Discussion Sections
Lecture 18 - Finalizing the Manuscript and Ethics in Research
Lecture 19 - Writing a Research Proposal and Preparing for a Presentation
Lecture 20 - Tutorial Session

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NPTEL Video Course - Biotechnology - NOC:Bioelectrochemistry

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts - I
Lecture 2 - Basic Concepts - II
Lecture 3 - Key Terms
Lecture 4 - Galvanic Cells - I
Lecture 5 - Galvanic Cells - II
Lecture 6 - Salt Bridge
Lecture 7 - Standard Potentials - I
Lecture 8 - Standard Potentials - II
Lecture 9 - Standard Potentials - III
Lecture 10 - Nernst Equation
Lecture 11 - Relationship between Standard electrode potential (EÂ°) and Equilibrium constant (K)
Lecture 12 - Cell as chemical probe and Biochemist's formal potential
Lecture 13 - Concept of Concentration Cell - I
Lecture 14 - Concept of Concentration Cell - II
Lecture 15 - Bio-electrochemistry of excitable cells (nerve cells)
Lecture 16 - Types of electrodes
Lecture 17 - Critical care profile and metal electrode
Lecture 18 - pH measurement
Lecture 19 - Redox indicators amperometry
Lecture 20 - Redox proteins, Metalloproteins and Cyclic Voltammetry

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NPTEL Video Course - Biotechnology - NOC:Bioenergetics of Life Processes

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Bioenergetics of Life Processes
Lecture 2 - Bioenergetics
Lecture 3 - Iron-Sulfur world
Lecture 4 - Evolution of complex cellular membranes
Lecture 5 - Charge transfer across membrane
Lecture 6 - Biological order and energy - I
Lecture 7 - Biological order and energy - II
Lecture 8 - Biological order and energy - III
Lecture 9 - Summary of thermodynamical parameters - I
Lecture 10 - Summary of thermodynamical parameters - II
Lecture 11 - Photosynthesis - I
Lecture 12 - Photosynthesis - II
Lecture 13 - Photosynthesis - III
Lecture 14 - Photosynthesis - IV
Lecture 15 - Photosynthesis - V
Lecture 16 - Photosynthesis - VI
Lecture 17 - Photosynthesis - VII
Lecture 18 - Photosynthesis - VIII
Lecture 19 - ATP Synthesis
Lecture 20 - Mitochondria and Chemiosmotic hypothesis

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NPTEL Video Course - Biotechnology - NOC:WildLife Conservation

Subject Co-ordinator - Dr. Ankur Awadhiya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preliminaries
Lecture 2 - A closer look at Biodiversity
Lecture 3 - Economics Valuation of Biodiversity
Lecture 4 - Threats to Biodiversity
Lecture 5 - Preliminaries
Lecture 6 - Basics of Sampling
Lecture 7 - Distance Sampling - I
Lecture 8 - Distance Sampling - II
Lecture 9 - Radio-telemetry
Lecture 10 - Behavioural monitoring
Lecture 11 - What is a habitat
Lecture 12 - Habitat degradation, loss, fragmentation and displacement
Lecture 13 - Reserve selection and design
Lecture 14 - Habitat management and improvement
Lecture 15 - Some terminologies
Lecture 16 - Some common wildlife diseases
Lecture 17 - Principles of disease management
Lecture 18 - Preliminaries
Lecture 19 - Mechanical capture
Lecture 20 - Chemical capture
Lecture 21 - Capture myopathy
Lecture 22 - Care of immobilised animal
Lecture 23 - Legal aspects of capture and restraint
Lecture 24 - Other topics in capture and restraint
Lecture 25 - Preliminaries and introduction to genetics
Lecture 26 - Population genetics
Lecture 27 - Chromosomal and genetic disorders, inbreeding
Lecture 28 - Population viability analysis
Lecture 29 - Reintroductions and outbreeding

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Lecture 30 - Fundamentals
Lecture 31 - Zoos and their management
Lecture 32 - Botanical gardens
Lecture 33 - Other aspects
Lecture 34 - Impacts of climate change
Lecture 35 - Plastics and biodiversity
Lecture 36 - Oil spills
Lecture 37 - Crisis and learnings
Lecture 38 - Revision - I
Lecture 39 - Revision - II
Lecture 40 - Revision - III

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NPTEL Video Course - Biotechnology - NOC:Nanotechnology in Agriculture

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - What is Nanotechnology
Lecture 3 - An outline
Lecture 4 - Agriculture
Lecture 5 - Modern Agriculture
Lecture 6 - A Restart
Lecture 7 - Classifying nanomaterials Based on Shape and Geometry
Lecture 8 - Classifying Nanomaterials Based on Chemical Nature
Lecture 9 - Physical Approaches to Nanomaterial Synthesis
Lecture 10 - Biological and Chemical Approaches to Nanomaterial Synthesis
Lecture 11 - Detailed Physical Techniques - I
Lecture 12 - Detailed Physical Techniques - II
Lecture 13 - Detailed Chemical Techniques
Lecture 14 - Detailed Biological Techniques
Lecture 15 - Basic Characterisation Techniques of Nanomaterials
Lecture 16 - Characterisation techniques for physical and chemical surface properties of a material
Lecture 17 - Nanomaterials in Agriculture
Lecture 18 - Iron pyrite and seed pre-treatment
Lecture 19 - nano-Pyrite and its lab trial with chickpea
Lecture 20 - nano-Pyrite field trial with spinach and its mechanistic details
Lecture 21 - Mechanistic details of the action of Pyrite nano-particle
Lecture 22 - Application of Pyrite nano-particle in different crops
Lecture 23 - Application of different nano-particles in Agriculture - I
Lecture 24 - Benefits of nanoparticles in Agriculture
Lecture 25 - Nanotechnology in animal production
Lecture 26 - Antioxidant nanomaterial in animal production - I
Lecture 27 - Antioxidant nanomaterial in animal production - II
Lecture 28 - Antioxidant nanomaterial in animal production - III
Lecture 29 - Antioxidant nanomaterial in skeletal muscle development - I

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Lecture 30 - Antioxidant nanomaterial in skeletal muscle development - II
Lecture 31 - Skeletal muscle development and nanomaterial intervention
Lecture 32 - Fabrication of nano-micro devices to study force generation in muscles
Lecture 33 - Summarising role of nanomaterials in animal production
Lecture 34 - Nanomaterials in food processing and preservation - I
Lecture 35 - Nanomaterials in food processing and preservation - II
Lecture 36 - Multifunctionality of nanomaterial
Lecture 37 - Futuristic multifunctional, sustainable and green nanomaterial
Lecture 38 - Case study of Titanium dioxide - I
Lecture 39 - Case study of Titanium dioxide - II
Lecture 40 - The future

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NPTEL Video Course - Biotechnology - NOC:Wild Life Ecology

Subject Co-ordinator - Dr. Ankur Awadhiya, Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - A historical overview of Ecology
Lecture 3 - Ecology and Evolution
Lecture 4 - The levels of organisation
Lecture 5 - Species abundance and composition
Lecture 6 - Biodiversity - II
Lecture 7 - Positive Interactions
Lecture 8 - Negative Interactions
Lecture 9 - Study of Behaviour and Behavioral Ecology
Lecture 10 - Food chains, Food webs and trophic levels
Lecture 11 - Primary Production
Lecture 12 - Nutrient Cycles
Lecture 13 - Population parameters and demographic techniques
Lecture 14 - Population growth and regulation
Lecture 15 - Population studies and applications
Lecture 16 - Community nature and parameters
Lecture 17 - Community changes and ecological succession
Lecture 18 - Community organisation
Lecture 19 - Biography
Lecture 20 - Why are things where they are?
Lecture 21 - Some push and pull factors in greater detail
Lecture 22 - Threats to species
Lecture 23 - In-situ conservation
Lecture 24 - Ex-situ conservation
Lecture 25 - Introduction and impacts
Lecture 26 - Human population growth and food requirements
Lecture 27 - Sustainable development
Lecture 28 - Oil spills
Lecture 29 - Plastic and biodiversity

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Lecture 30 - Impacts of climate change
Lecture 31 - Optimum yield problem
Lecture 32 - Biological control
Lecture 33 - Ecotoxicology and pollution management, Restoration ecology
Lecture 34 - Revision
Lecture 35 - Revision
Lecture 36 - Revision

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NPTEL Video Course - Biotechnology - NOC:Forests and their Management

Subject Co-ordinator - Dr. Ankur Awadhiya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is a forest ?
Lecture 2 - Classification of forests
Lecture 3 - Value of forests
Lecture 4 - What is Silviculture ?
Lecture 5 - Plant Growth Factors
Lecture 6 - Ecological Succession
Lecture 7 - Soil and Soil Profile
Lecture 8 - Major Soil Types
Lecture 9 - Nutrient Cycles
Lecture 10 - Tree Form
Lecture 11 - Measurement of Tree attributes - I
Lecture 12 - Measurement of Tree attributes - II
Lecture 13 - Classical Tools
Lecture 14 - Photogrammetry
Lecture 15 - LiDAR
Lecture 16 - Kinds of Threats
Lecture 17 - Forest Fire
Lecture 18 - Forest Law
Lecture 19 - Regeneration
Lecture 20 - Silvicultureal Systems
Lecture 21 - Clear Felling System
Lecture 22 - Shelterwood System - I
Lecture 23 - Shelterwood System - II
Lecture 24 - Selection System and Irregular Shelterwood System
Lecture 25 - Logging and Processing
Lecture 26 - Growing Stock and Increment
Lecture 27 - Yield and Sustained Yield
Lecture 28 - Seed Collection and Treatment
Lecture 29 - Nursery Techniques

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Lecture 30 - Planting and Tending
Lecture 31 - NTFP
Lecture 32 - Social Forestry and Tribal Welfare
Lecture 33 - Conservation of Wild Animals
Lecture 34 - Revision - Part 1
Lecture 35 - Revision - Part 2
Lecture 36 - Revision - Part 3

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NPTEL Video Course - Biotechnology - NOC:Conservation Economics

Subject Co-ordinator - Dr. Ankur Awadhiya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course, Making Decisions - I
Lecture 2 - Making Decisions - II and Interactions - I
Lecture 3 - Intecractions-II and Working of the Economy
Lecture 4 - Conservation in the Anthropocene
Lecture 5 - Human population growth and food requirements
Lecture 6 - Unsustainable development
Lecture 7 - Climate change
Lecture 8 - Plastics
Lecture 9 - Oil spills and mining
Lecture 10 - Push and pull factors: Localisation of species
Lecture 11 - Threats to species
Lecture 12 - Developmental Hazards and Ecotoxicology
Lecture 13 - Need to understand controls
Lecture 14 - Thinking as an Economist
Lecture 15 - Interdependence and gains from trade
Lecture 16 - Demand and supply
Lecture 17 - Elasticity
Lecture 18 - Government policy
Lecture 19 - Surplus and market efficiency
Lecture 20 - Market Efficiency and Cost of Taxation
Lecture 21 - International Trade
Lecture 22 - Externalities
Lecture 23 - Public goods and common resources
Lecture 24 - The design of the tax system
Lecture 25 - The Costs of Production
Lecture 26 - Competition
Lecture 27 - Monopoly
Lecture 28 - Markets for factors of production
Lecture 29 - Earnings and discrimination

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Lecture 30 - Income inequality and poverty
Lecture 31 - Consumer choice
Lecture 32 - Asymmetric information, Politics and Behavioural Economics
Lecture 33 - Valuation of natural resources
Lecture 34 - Economics of Protected Areas
Lecture 35 - Economics of Environmental Disasters - 1
Lecture 36 - Economics of Environmental Disasters - 2

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NPTEL Video Course - Biotechnology - NOC:Conservation Geography

Subject Co-ordinator - Dr. Ankur Awadhiya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The need for conservation
Lecture 2 - Geography and conservation
Lecture 3 - Biogeography
Lecture 4 - Origin and evolution of the earth
Lecture 5 - Structure of the earth
Lecture 6 - Features of the earth
Lecture 7 - Rocks and minerals
Lecture 8 - Geomorphology and processes
Lecture 9 - Evolution of landforms
Lecture 10 - Structure and composition
Lecture 11 - Atmospheric circulation and weather
Lecture 12 - Climate and climate change
Lecture 13 - Structure and composition
Lecture 14 - Oceans and water movement
Lecture 15 - Hydrological cycle
Lecture 16 - Structure and physiography of India
Lecture 17 - Climate and habitats of India
Lecture 18 - Drainage systems
Lecture 19 - Soil
Lecture 20 - Life on Earth
Lecture 21 - Biodiversity
Lecture 22 - Threats to species
Lecture 23 - Ex-situ and in-situ conservation
Lecture 24 - Benefits from conservation
Lecture 25 - Population and population growth - I
Lecture 26 - Population and population growth - II
Lecture 27 - Human development and sustainable development
Lecture 28 - Resources and Conservation
Lecture 29 - Water Resources

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Lecture 30 - Mineral and Energy Resources
Lecture 31 - Economic Geography and Conservation
Lecture 32 - Trade
Lecture 33 - Settlements
Lecture 34 - Special Topics in Geography and Conservation
Lecture 35 - Disasters
Lecture 36 - Valuation of Natural Resources

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NPTEL Video Course - Biotechnology - NOC:Neurobiology

Subject Co-ordinator - Prof. Nitin Gupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - L1 Module 1
Lecture 2 - L1 Module 2
Lecture 3 - L1 Module 3
Lecture 4 - L1 Module 4
Lecture 5 - L1 Module 5
Lecture 6 - L1 Module 6
Lecture 7 - L1 Module 7
Lecture 8 - L1 Module 8
Lecture 9 - L1 Module 9
Lecture 10 - L2 Module 1
Lecture 11 - L2 Module 2
Lecture 12 - L2 Module 3
Lecture 13 - L2 Module 4
Lecture 14 - L2 Module 5
Lecture 15 - L2 Module 6
Lecture 16 - L2 Module 7
Lecture 17 - L2 Module 8
Lecture 18 - L2 Module 9
Lecture 19 - L3 Module 1
Lecture 20 - L3 Module 2
Lecture 21 - L3 Module 3
Lecture 22 - L3 Module 4
Lecture 23 - L3 Module 5
Lecture 24 - L4 Module 1
Lecture 25 - L4 Module 2
Lecture 26 - L4 Module 3
Lecture 27 - L4 Module 4
Lecture 28 - L4 Module 5
Lecture 29 - L5 Module 1

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Lecture 30 - L5 Module 2
Lecture 31 - L5 Module 3
Lecture 32 - L5 Module 4
Lecture 33 - L5 Module 5
Lecture 34 - L5 Module 6

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NPTEL Video Course - Biotechnology - NOC:Design for Biosecurity

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biosecurity and Course Overview
Lecture 2 - Allelopathic Interferences and Case Study
Lecture 3 - U.N.W.H.I.M.A.A.I
Lecture 4 - Livestock Biosecurity and its Preventive Measures
Lecture 5 - Bioterrorist Agents and Modes of Attack
Lecture 6 - History of Bioterrorism : Black Death
Lecture 7 - Bioweapons Used in Warfare and Biological Weapon and Toxin Convention (BWC)
Lecture 8 - Ebola and Marburg Virology in context to Biosensor Development
Lecture 9 - Bacillus Anthrax Bacteriology in context to Biosensor Development
Lecture 10 - Anthrax Types and Preventive Measures
Lecture 11 - Unraveling the Ingenious Bacillus Anthracis Attack and Case Study for Anthrax Sensor
Lecture 12 - Components for Designing Biosensors
Lecture 13 - Principle of Quartz Crystal Microbalance (QCM)
Lecture 14 - Sauerbrey Equation and QCM-D
Lecture 15 - Principle, Setup and Applications of E-QCM-D
Lecture 16 - Use of AFM Tool for Sensing - Part 1
Lecture 17 - AFM for Bio-sensing - Part 2
Lecture 18 - AFM and Recap Raman and IR Spectroscopy
Lecture 19 - Applications of Raman
Lecture 20 - AFM Cum Electrochemistry Workstation
Lecture 21 - Monoclonal Antibody
Lecture 22 - Monoclonal Antibody Production
Lecture 23 - MAB Production Via Hybridomas
Lecture 24 - Recognition Elements scFvs
Lecture 25 - SPR : Surface Plasmon Resonance
Lecture 26 - Design and Fabrication of Lateral-Flow Immunoassays
Lecture 27 - Sandwich (Non-Competitive) Assays
Lecture 28 - Botulism Toxin
Lecture 29 - Botox Therapy

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Lecture 30 - Developing Biosensor for Botulinum Toxin
Lecture 31 - Story of Insulin
Lecture 32 - Setting the Stage for the Discovery of Insulin
Lecture 33 - Insulin Controversy
Lecture 34 - Insulin Chemistry
Lecture 35 - Insulin as Weapon of Murder
Lecture 36 - Electrochemical Biosensors
Lecture 37 - Electrode System in the Glucose Sensor
Lecture 38 - World of Electrochemical Biosensors
Lecture 39 - Glucose Sensor - Part 1
Lecture 40 - Glucose Sensor - Part 2
Lecture 41 - Non Enzymatic Glucose Sensor - Part 1
Lecture 42 - Non Enzymatic Glucose Sensor - Part 2
Lecture 43 - Summarizing Glucose Sensing - Part 1
Lecture 44 - Summarizing Glucose Sensing - Part 2
Lecture 45 - Summarizing Glucose Sensing - Part 3
Lecture 46 - Far-Infrared Spectroscopy
Lecture 47 - Metabolic Heat Conformation
Lecture 48 - Electromagnetic Sensing
Lecture 49 - World of Biohybrid Biosensors
Lecture 50 - Whole Cell Biosensor
Lecture 51 - Action Potential - Part 1
Lecture 52 - Action Potential - Part 2
Lecture 53 - Action Potential - Part 3
Lecture 54 - Action Potential - Part 4
Lecture 55 - Action Potential - Part 5
Lecture 56 - Cell Based Biosensors - Part 1
Lecture 57 - Cell Based Biosensors - Part 2
Lecture 58 - Cell Based Biosensors - Part 3
Lecture 59 - Cell Based Biosensors - Part 4
Lecture 60 - Cell Based Biosensors - Part 5

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NPTEL Video Course - Chemistry and Biochemistry - BioChemistry I

Subject Co-ordinator - Prof. S. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Amino Acids - I
Lecture 2 - Amino Acids - II
Lecture 3 - Protein Structure - I
Lecture 4 - Protein structure - II
Lecture 5 - Protein Structure - III
Lecture 6 - Protein Structure - IV
Lecture 7 - Enzymes - I
Lecture 8 - Enzymes - II
Lecture 9 - Enzymes - III
Lecture 10 - Enzymes Mechanisms - I
Lecture 11 - Enzymes Mechanisms - II
Lecture 12 - Myoglobin and Hemoglobin
Lecture 13 - Lipids and Membranes - I
Lecture 14 - Lipids and Membranes - II
Lecture 15 - Membrane Transport
Lecture 16 - Carbohydrates - I
Lecture 17 - Carbohydrates - II
Lecture 18 - Vitamins and Coenzymes - I
Lecture 19 - Vitamins and Coenzymes - II
Lecture 20 - Nucleic Acids - I
Lecture 21 - Nucleic Acids - II
Lecture 22 - Nucleic Acids - III
Lecture 23 - Bioenergetics - I
Lecture 24 - Bioenergetics - II
Lecture 25 - Metabolism - I
Lecture 26 - Metabolism - II
Lecture 27 - Metabolism - III
Lecture 28 - Overview of the Course

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NPTEL Video Course - Biotechnology - NOC:Industrial Biotechnology

Subject Co-ordinator - Prof. Debabrata Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Industrial Biotechnology
Lecture 2 - Development of industrial strain
Lecture 3 - Medium characteristics and biochemical pathways
Lecture 4 - Chemical reaction kinetics
Lecture 5 - Chemical reaction analysis (Continued...)
Lecture 6 - Different types of reactors
Lecture 7 - Reactor analysis
Lecture 8 - Reactor analysis (Continued...)
Lecture 9 - Stoichiometry of bioprocesses
Lecture 10 - Stoichiometry of bioprocesses (Continued...)
Lecture 11 - Enzymatic reaction Kinetics
Lecture 12 - Enzymatic reaction Kinetics (Continued...)
Lecture 13 - Immobilization techniques
Lecture 14 - Immobilization techniques (Continued...)
Lecture 15 - Life cycle of the microbial cell, Microbial growth kinetics, product formation and substrate deg
Lecture 16 - Microbial growth kinetics, product formation and substrate degradation (Continued...)
Lecture 17 - Microbial growth kinetics, product formation and substrate degradation (Continued...)
Lecture 18 - Overview of the fermenter
Lecture 19 - Flow diagrams and pumps and valves used in fermentation industries
Lecture 20 - Flow diagrams and pumps and valves used in fermentation industries (Continued...)
Lecture 21 - Upstream processing
Lecture 22 - Upstream processing
Lecture 23 - Upstream processing
Lecture 24 - Downstream processing
Lecture 25 - Downstream processing
Lecture 26 - Downstream processing
Lecture 27 - Ethanol fermentation
Lecture 28 - Ethanol fermentation (Continued...)
Lecture 29 - Brewing industry

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Lecture 30 - Brewing industry (Continued...)
Lecture 31 - Wine industry
Lecture 32 - Vinegar production
Lecture 33 - Citric acid production
Lecture 34 - Citric acid production (Continued...)
Lecture 35 - Citric acid production (Continued...)
Lecture 36 - Lactic acid production
Lecture 37 - Lactic acid production (Continued...)
Lecture 38 - Glutamic acid production
Lecture 39 - Penicillin production
Lecture 40 - Penicillin production (Continued...)
Lecture 41 - Cephalosporin production
Lecture 42 - Streptomycin production
Lecture 43 - Bakerâ s yeast fermentation
Lecture 44 - Bakerâ s yeast fermentation (Continued...)
Lecture 45 - Fodder yeast production
Lecture 46 - Spirulina production
Lecture 47 - Alpha amylase production
Lecture 48 - High fructose corn syrup production
Lecture 49 - Metal leaching
Lecture 50 - Cheese production
Lecture 51 - Cheese production (Continued...)
Lecture 52 - Biodiesel production
Lecture 53 - Butanol production
Lecture 54 - Biofertilizer
Lecture 55 - Aerobic effluent treatment process
Lecture 56 - Aerobic effluent treatment process (Continued...)
Lecture 57 - Anaerobic effluent treatment process
Lecture 58 - Anaerobic effluent treatment process
Lecture 59 - 10 m^3 Pilot Plant operation for Biohydrogen production
Lecture 60 - Summary and conclusion

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NPTEL Video Course - Biotechnology - NOC:Aspects Of Biochemical Engineering

Subject Co-ordinator - Prof. Debabrata Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Microbiology - I
Lecture 3 - Microbiology - II
Lecture 4 - Fundamentals of Biochemistry
Lecture 5 - Bioproducts and their market values
Lecture 6 - Stoichiometry of Biochemical Processes - I
Lecture 7 - Stoichiometry of Biochemical Processes - II
Lecture 8 - Stoichiometry of Biochemical Processes - III
Lecture 9 - Reaction Thermodynamics - I
Lecture 10 - Reaction Thermodynamics - II
Lecture 11 - Kinetics of homogeneous chemical reactions - I
Lecture 12 - Kinetics of homogeneous chemical reactions - II
Lecture 13 - Kinetics of homogeneous chemical reactions - III
Lecture 14 - Kinetics of homogeneous chemical reactions - IV
Lecture 15 - Kinetics of homogeneous chemical reactions - V
Lecture 16 - Different types of reactors
Lecture 17 - Reactor analysis - I
Lecture 18 - Reactor analysis - II
Lecture 19 - Reactor analysis - III
Lecture 20 - Reactor analysis - IV
Lecture 21 - Kinetics of enzyme catalyzed reactions using free enzymes - I
Lecture 22 - Kinetics of enzyme catalyzed reactions using free enzymes - II
Lecture 23 - Kinetics of enzyme catalyzed reactions using free enzymes - III
Lecture 24 - Kinetics of enzyme catalyzed reactions using free enzymes - IV
Lecture 25 - Kinetics of enzyme catalyzed reactions using free enzymes - V
Lecture 26 - Kinetics of enzyme catalyzed reactions using free enzymes - VI
Lecture 27 - Immobilization of Enzymes - I
Lecture 28 - Immobilization of Enzymes - II
Lecture 29 - Kinetics of enzyme catalyzed reactions using immobilized enzymes - I

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Lecture 30 - Kinetics of enzyme catalyzed reactions using immobilized enzymes - II
Lecture 31 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 32 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 33 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 34 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 35 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 36 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 37 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 38 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 39 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 40 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 41 - Kinetics of substrate utilization, product formation and biomass production of microbial cells -
Lecture 42 - Design and analysis of activated sludge process - I
Lecture 43 - Design and analysis of activated sludge process - II
Lecture 44 - Design and analysis of anaerobic digestion process
Lecture 45 - Scale up of Bioreactor - I
Lecture 46 - Scale up of Bioreactor - II
Lecture 47 - Transport Phenomenon in Bioprocess - I
Lecture 48 - Transport Phenomenon in Bioprocess - II
Lecture 49 - Transport Phenomenon in Bioprocess - III
Lecture 50 - Transport Phenomenon in Bioprocess - IV
Lecture 51 - Air sterilization - I
Lecture 52 - Air sterilization - II
Lecture 53 - Medium sterilization - I
Lecture 54 - Medium sterilization - II
Lecture 55 - Operation of industrial fermenter and material analysis
Lecture 56 - Process control of the biochemical processes
Lecture 57 - Downstream processing - I
Lecture 58 - Downstream processing - II
Lecture 59 - Economic analysis of the biochemical processes
Lecture 60 - Summary and Conclusion

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NPTEL Video Course - Biotechnology - NOC:Biomicrofluidics

Subject Co-ordinator - Prof. Tapas Kumar Maiti, Prof. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biomicrofluidics
Lecture 2 - Introduction to Biomicrofluidics (Continued...)
Lecture 3 - Engineers' guide to the cell
Lecture 4 - Fluidics in living systems and mechanobiology
Lecture 5 - Pressure Driven Flows
Lecture 6 - Surface tension driven flows
Lecture 7 - Modulating surface tension
Lecture 8 - Lab on a CD
Lecture 9 - Introduction to Electrokinetics - Part I
Lecture 10 - Introduction to Electrokinetics - Part II
Lecture 11 - Microfluidic cell culture - Part I
Lecture 12 - Microfluidic cell culture - Part II
Lecture 13 - On-chip cellular assay techniques - Part I
Lecture 14 - On-chip cellular assay techniques - Part II
Lecture 15 - Microfluidics for understanding biology
Lecture 16 - Organ-on-a-chip
Lecture 17 - Lab-on-a-chip for genetic analysis
Lecture 18 - Microfluidic technology for monoclonal antibody production
Lecture 19 - Microfluidics for Healthcare
Lecture 20 - Microfluidics for Healthcare

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NPTEL Video Course - Biotechnology - NOC:Immunology

Subject Co-ordinator - Prof. Agneyo Ganguly, Prof. S. K Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts in Immunology
Lecture 2 - Basic Concepts in Immunology (Continued...)
Lecture 3 - Basic Concepts in Immunology (Continued...)
Lecture 4 - Basic Concepts in Immunology (Continued...)
Lecture 5 - Basic Concepts in Immunology (Continued...)
Lecture 6 - Innate Immunity
Lecture 7 - Inflamatory Response
Lecture 8 - Adaptive Immunity
Lecture 9 - Adaptive Immunity (Humoral)
Lecture 10 - Effector Mechanisms
Lecture 11 - Stracture of antibody
Lecture 12 - Stracture of antibody and T-Cell Receptors
Lecture 13 - Generation of diversity (GOD) of lymphocyte antigen receptors (Continued...)
Lecture 14 - Generation of diversity (GOD) of lymphocyte antigen receptors (Continued...)
Lecture 15 - Generation of diversity (GOD) of lymphocyte antigen receptors (Continued...)
Lecture 16 - Generation of diversity (GOD) of lymphocyte antigen receptors (Continued...)
Lecture 17 - Structural variation in immunoglobulin constant regions and isotype switching
Lecture 18 - Structural variation in immunoglobulin constant regions and isotype switching (Continued...)
Lecture 19 - Antigen recognition by T cell
Lecture 20 - Antigen recognition by T cell
Lecture 21 - Antigen Recognition by T cell
Lecture 22 - Antigen Recognition by T cell
Lecture 23 - The Generation of Î±
Lecture 24 - The Generation of Î±
Lecture 25 - Summery of Immune system
Lecture 26 - Tools and Techniques
Lecture 27 - Tools and Techniques (Continued...)
Lecture 28 - Tools and Techniques (Continued...)
Lecture 29 - Tools and Techniques (Continued...)

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Lecture 30 - Flow Cytometry
Lecture 31 - Development of T Lymphocytes
Lecture 32 - Development of T Lymphocytes (Continued...)
Lecture 33 - Development of T Lymphocytes (Continued...)
Lecture 34 - T Cell Mediated Immunity
Lecture 35 - T Cell Mediated Immunity (Continued...)
Lecture 36 - B-Cell Maturation - I
Lecture 37 - B-Cell Maturation - II
Lecture 38 - B-Cell Activation
Lecture 39 - B-Cell Activation and Differentiation
Lecture 40 - Effector T - Cells
Lecture 41 - Complement System Overview
Lecture 42 - Complement System Overview (Continued...)
Lecture 43 - Complement Biological Consequences
Lecture 44 - Complement Biological Consequences (Continued...)
Lecture 45 - Cytokines
Lecture 46 - Cytokines
Lecture 47 - Cytokines in Innate and Adaptive Immunity
Lecture 48 - Interferons
Lecture 49 - Hypersensitivity
Lecture 50 - Hypersensitivity (Continued...)
Lecture 51 - Autoimmunity
Lecture 52 - Autoimmunity (Continued...)
Lecture 53 - Autoimmunity (Continued...)
Lecture 54 - Transplantation or Graft vs. Host Reaction
Lecture 55 - Transplantation or Graft vs. Host Reaction (Continued...)
Lecture 56 - Active and Passive Immunity and Vaccination
Lecture 57 - Active and Passive Immunity and Vaccination (Continued...)
Lecture 58 - Active and Passive Immunity and Vaccination (Continued...)
Lecture 59 - Monoclonal Antibody
Lecture 60 - Monoclonal Antibody (Continued...)

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NPTEL Video Course - Biotechnology - NOC:Metabolic Engineering

Subject Co-ordinator - Prof. Amit Ghosh, Prof. Pinaki Sar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Metabolic Engineering
Lecture 2 - Essence of Metabolic Engineering - Part A
Lecture 3 - Essence of Metabolic Engineering - Part B
Lecture 4 - Essence of Metabolic Engineering - Part C
Lecture 5 - Essence of Metabolic Engineering - Part D
Lecture 6 - Review of Cellular Metabolism - Part A
Lecture 7 - Review of Cellular Metabolism - Part B
Lecture 8 - Review of Cellular Metabolism - Part C
Lecture 9 - Review of Cellular Metabolism - Part D
Lecture 10 - Review of Cellular Metabolism - Part E
Lecture 11 - Review of Cellular Metabolism - Part F
Lecture 12 - Introduction to Metabolic Networks
Lecture 13 - Introduction to Systems Biology
Lecture 14 - Regulatory Networks
Lecture 15 - Reconstruction of Metabolic Networks
Lecture 16 - The Stoichiometric Matrix: Representing Reconstructed Network Mathematically
Lecture 17 - Flux Balance Analysis (FBA)
Lecture 18 - Flux Variability Analysis (FVA) and Flux Coupling (FC)
Lecture 19 - Dynamic Flux Balance Analysis (DFBA) and Gene Deletion Algorithms
Lecture 20 - Optimization in MATLAB
Lecture 21 - Robustness Analysis and Phenotypic Phase Planes
Lecture 22 - Flux Sampling, Optknock and Optstrain
Lecture 23 - Extreme Pathways and Elementary modes
Lecture 24 - 13^C Metabolic Flux Analysis (13^C MFA)
Lecture 25 - 13 C Metabolic Flux Analysis (13C MFA)
Lecture 26 - Advancement in 13 C Metabolic Flux Analysis
Lecture 27 - E.coli core metabolic Network Optimization in MATLAB
Lecture 28 - Application of Metabolic Flux Analysis
Lecture 29 - CRISPR-Cas system and its application in metabolic engineering - Part I

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Lecture 30 - CRISPR-Cas system and its application in metabolic engineering - Part II
Lecture 31 - CRISPR-Cas system and its application in metabolic engineering - Part III
Lecture 32 - CRISPR-Cas system and its application in metabolic engineering - Part IV
Lecture 33 - Examples of pathway manipulations by metabolic engineering - Biofuels
Lecture 34 - Metabolic engineering for biofuel production - Part A
Lecture 35 - Metabolic engineering for biofuel production - Part B
Lecture 36 - Metabolic engineering for biofuel production - Part C
Lecture 37 - Applications of metabolic engineering in amino acids production

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NPTEL Video Course - Biotechnology - NOC:Environmental Chemistry and Microbiology

Subject Co-ordinator - Prof. Sudha Goel, Prof. Anjali Pal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Acids, Bases and Salts - Part I
Lecture 2 - Acids, Bases and Salts - Part II
Lecture 3 - Acids, Bases and Salts - Part III
Lecture 4 - Acids, Bases and Salts - Part IV
Lecture 5 - Acids, Bases and Salts - Part V
Lecture 6 - Chemical Equilibrium - I
Lecture 7 - Chemical Equilibrium - II
Lecture 8 - Chemical Equilibrium - III
Lecture 9 - Chemical Equilibrium - IV
Lecture 10 - Chemical Equilibrium - V
Lecture 11 - Chemical Kinetics - I
Lecture 12 - Chemical Kinetics - II
Lecture 13 - Chemical Kinetics - III
Lecture 14 - Chemical Kinetics - IV
Lecture 15 - Chemical Kinetics - V
Lecture 16 - Chemical Kinetics - Reaction Mechanism - Part A
Lecture 17 - Chemical Kinetics - Reaction Mechanism - Part B
Lecture 18 - Chemical Kinetics - Catalysis - Part A
Lecture 19 - Chemical Kinetics - Catalysis - Part B
Lecture 20 - Chemical Kinetics - Catalysis - Part C
Lecture 21 - Nitrogen chemistry - Part A
Lecture 22 - Nitrogen chemistry - Part B
Lecture 23 - Chlorine chemistry and disinfection - Part A
Lecture 24 - Chlorine chemistry and disinfection - Part B
Lecture 25 - Chlorine chemistry and disinfection - Part C
Lecture 26 - Radioactivity - Part A
Lecture 27 - Radioactivity - Part B
Lecture 28 - Radioactivity - Part C
Lecture 29 - Radioactivity - Part D

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Lecture 30 - Radioactivity - Part E
Lecture 31 - Introduction - I
Lecture 32 - Introduction - II
Lecture 33 - Overview of microbial life - I
Lecture 34 - Overview of microbial life - II
Lecture 35 - Overview of microbial life - III
Lecture 36 - Cell chemistry - I
Lecture 37 - Cell chemistry - II
Lecture 38 - Cell Biology - I
Lecture 39 - Cell Biology - II
Lecture 40 - Cell Biology - III
Lecture 41 - Cell Biology - IV
Lecture 42 - Microscopy - I
Lecture 43 - Microscopy - II
Lecture 44 - Microbial Metabolism - I
Lecture 45 - Microbial Metabolism - II
Lecture 46 - Microbial Metabolism - III
Lecture 47 - Xenobiotics - I
Lecture 48 - Xenobiotics - II
Lecture 49 - Microbial Growth - I
Lecture 50 - Microbial Growth - II
Lecture 51 - Microbial Growth - III
Lecture 52 - Microbial Growth and Control - I
Lecture 53 - Microbial Growth and Control - II
Lecture 54 - Pathogens and diseases - I
Lecture 55 - Pathogens and diseases - II
Lecture 56 - Metabolic Diversity - I
Lecture 57 - Metabolic Diversity - II
Lecture 58 - Metabolic Diversity - III
Lecture 59 - Metabolic Diversity - IV
Lecture 60 - Metabolic Diversity - V
Lecture 61 - Metabolic Diversity - VI
Lecture 62 - Biogeochemical cycles - I
Lecture 63 - Biogeochemical cycles - II

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NPTEL Video Course - Biotechnology - NOC:Environmental Biotechnology

Subject Co-ordinator - Prof. Pinaki Sar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Environmental Biotechnology, Scope and applications of the subject
Lecture 2 - Introduction of Environmental Biotechnology, Scope and applications of the subject
Lecture 3 - Ecosystem : Basic concepts of structure and function
Lecture 4 - Ecosystem : Basic concepts of structure and function (Continued...)
Lecture 5 - Microbial Ecology
Lecture 6 - Microbial Ecology (Continued...)
Lecture 7 - Microbial Ecosystems and Biogeochemical Cycling
Lecture 8 - Biogeochemical Cycles
Lecture 9 - Microbial ecology and environmental biotechnology - Part A
Lecture 10 - Microbial ecology and environmental biotechnology - Part B
Lecture 11 - Microbial ecology and environmental biotechnology - Part B (Continued...)
Lecture 12 - Microbial ecology and environmental biotechnology - Part B (Continued...)
Lecture 13 - Microbial ecology and environmental biotechnology - Part C
Lecture 14 - Microbial ecology and environmental biotechnology - Part C (Continued...)
Lecture 15 - Microbial ecology and environmental biotechnology - Part C (Continued...)
Lecture 16 - Microbial Ecology and Environmental Biotechnology - Part C (Continued...)
Lecture 17 - Microbiology of Environmental Engineering System
Lecture 18 - Microbiology of Environmental Engineering System
Lecture 19 - Microbiology of Environmental Engineering System
Lecture 20 - Microbiology of Environmental Engineering System (Continued...)
Lecture 21 - Physiological Ecology and Resource Exploitation by Microorganisms
Lecture 22 - Physiological ecology and Resource Exploitation by Microorganisms (Continued...)
Lecture 23 - Physiological ecology and Resource Exploitation by Microorganisms (Continued...)
Lecture 24 - Physiological ecology and Resource Exploitation by Microorganisms (Continued...)
Lecture 25 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology
Lecture 26 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 27 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 28 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 29 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)

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Lecture 30 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 31 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 32 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 33 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 34 - Methods in Microbial Ecology with Relevance to Environmental Biotechnology (Continued...)
Lecture 35 - Bioremediation
Lecture 36 - Bioremediation (Continued...)
Lecture 37 - Bioremediation (Continued...)
Lecture 38 - Bioremediation (Continued...)
Lecture 39 - Biodegradation
Lecture 40 - Biodegradation
Lecture 41 - Biodegradation (Continued...)
Lecture 42 - Microbial Interactions with Heavy Metals and Metalloids
Lecture 43 - Microbial Interactions with Heavy Metals and Metalloids - Bioremediation
Lecture 44 - Biohydrometallurgy
Lecture 45 - Enhanced biological phosphorus removal process (EBPR)
Lecture 46 - Biological nitrogen removal
Lecture 47 - Microbially Enhanced Oil Recovery (MEOR)
Lecture 48 - Emerging Pollutants
Lecture 49 - Carbon capture, Carbon Sequestration and Utilization
Lecture 50 - Bioenergy and Environmental Biotechnology
Lecture 51 - Bioremediation case studies
Lecture 52 - Bioremediation case studies (Continued...)

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NPTEL Video Course - Biotechnology - NOC:Fundamentals of Protein Chemistry

Subject Co-ordinator - Prof. Swagata Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Amino Acids - I
Lecture 2 - Amino Acids - II
Lecture 3 - Amino Acids - III
Lecture 4 - The Peptide Bond
Lecture 5 - Discussion Class
Lecture 6 - Primary Structure
Lecture 7 - Secondary Structure
Lecture 8 - Tertiary and Quaternary Structure
Lecture 9 - Protein Interactions
Lecture 10 - Discussion Class
Lecture 11 - Protein folding and structure
Lecture 12 - Thermodynamics of Protein Folding
Lecture 13 - Protein Structure Methods
Lecture 14 - Protein Denaturation
Lecture 15 - Discussion Class
Lecture 16 - Protein Isolation Methods
Lecture 17 - Protein Purification
Lecture 18 - Biophysical Methods - I
Lecture 19 - Biophysical Methods - II
Lecture 20 - Biophysical Methods - III
Lecture 21 - Types of Protein ligand interactions
Lecture 22 - Kinetics and Thermodynamics of protein-ligand binding
Lecture 23 - Experimental methods in protein ligand interactions
Lecture 24 - Protein ligand docking
Lecture 25 - Discussion class
Lecture 26 - Enzymes I - Classification
Lecture 27 - Enzymes - II
Lecture 28 - Enzyme Mechanisms - I
Lecture 29 - Enzyme Mechanisms - II

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Lecture 30 - Enzyme mechanisms - III
Lecture 31 - Enzyme Kinetics - I
Lecture 32 - Enzyme Kinetics - II
Lecture 33 - Enzyme Inhibition - I
Lecture 34 - Enzyme Inhibition - II
Lecture 35 - Discussion class
Lecture 36 - Motor Proteins - I
Lecture 37 - Motor Proteins - II
Lecture 38 - Metalloproteins - I
Lecture 39 - Metalloproteins - II
Lecture 40 - Myoglobin and Hemoglobin
Lecture 41 - Membrane Proteins - I
Lecture 42 - Membrane proteins - II
Lecture 43 - Membrane Transport - I
Lecture 44 - Membrane Transport - II
Lecture 45 - Electron Transport Chain
Lecture 46 - Protein Carbohydrate Interactions - I
Lecture 47 - Protein Carbohydrate Interactions - II
Lecture 48 - Protein Nucleic Acid Interactions - I
Lecture 49 - Protein Nucleic Acid Interactions - II
Lecture 50 - Protein Nucleic Acid Interactions - III
Lecture 51 - Protein Protein Interactions - I
Lecture 52 - Protein Protein Interactions - II
Lecture 53 - Protein Peptide Interactions
Lecture 54 - Chaperone proteins
Lecture 55 - Protein Nanoparticle Interactions
Lecture 56 - Oxidative stress in Proteins
Lecture 57 - Enzyme action and Proteolytic cleavage
Lecture 58 - Intrinsically disordered proteins
Lecture 59 - Viral proteins
Lecture 60 - Overview of Course

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NPTEL Video Course - Biotechnology - NOC:Introduction to Biomedical Imaging Systems

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Introduction - 2
Lecture 3 - Signals and Systems Overview
Lecture 4 - Important Signals
Lecture 5 - System
Lecture 6 - LSI Systems
Lecture 7 - Image Quality
Lecture 8 - Local Contrast
Lecture 9 - Blurring and Noise
Lecture 10 - Physics of Radiography
Lecture 11 - Types of Ionizing Radiations
Lecture 12 - EM Radiation
Lecture 13 - Attenuation Models
Lecture 14 - Radiation Dosimetry
Lecture 15 - PR_Instument
Lecture 16 - PR_Instru_CA
Lecture 17 - PR_Image_formation
Lecture 18 - Imaging Equation_updated
Lecture 19 - Film screen_Optical Density
Lecture 20 - PR_Image Quality
Lecture 21 - CT_Intsru
Lecture 22 - CT_Instru_finish
Lecture 23 - CT Back projection
Lecture 24 - CT_BP_finish
Lecture 25 - Fan beam_IQ
Lecture 26 - CT_IQ_Artifact
Lecture 27 - Nuclear Med_Phys
Lecture 28 - Nuclear_Med_Radiotracers
Lecture 29 - Planar_Scintigraphy_Instru

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Lecture 30 - Planar_Scintigraphy_Im and IQ
Lecture 31 - Spect_Pet
Lecture 32 - Ultrasound_Intro_Phys
Lecture 33 - Ultrasound Phys_Interactions
Lecture 34 - US doppler and Instrumentation
Lecture 35 - US_Beampattern
Lecture 36 - Approximations
Lecture 37 - US_Imaging Equation_modes
Lecture 38 - Parameters of interest
Lecture 39 - Beam Steering : Phased Array
Lecture 40 - MRI_Intro_S1-S9
Lecture 41 - MRI_Phys_S10-S16
Lecture 42 - MRI_Phys_S17-S20
Lecture 43 - MRI_Phys_S21-S28
Lecture 44 - MRI_Phys_S29-S39
Lecture 45 - MRI_Phys_S40-S44
Lecture 46 - MRI_Phys_S45_S52
Lecture 47 - MRI_Instru_S1_S16
Lecture 48 - MRI_Instru_s17_s26
Lecture 49 - MRI_slice sel_S27_S41
Lecture 50 - MRI_Freq_Encode_S42_S60
Lecture 51 - MRI_DAQ_S61_S69
Lecture 52 - MRI_RECON_S70_S82
Lecture 53 - MRI_IQ_S83_S96

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NPTEL Video Course - Biotechnology - NOC:Next Generation Sequencing Technologies: Data Analysis and Applicati

Subject Co-ordinator - Prof. Riddhiman Dhar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Next Generation Sequencing Technologies - 454 Sequencing
Lecture 3 - Illumina Sequencing By Synthesis (SBS)
Lecture 4 - Single Molecule Real Time (SMRT) Sequencing
Lecture 5 - Ion Torrent and Nanopore Sequencing
Lecture 6 - Sequencing Coverage, Quality Score and Experiment Design
Lecture 7 - Data Formats
Lecture 8 - Data Formats (Continued...)
Lecture 9 - Data Quality
Lecture 10 - Data QC and Trimming
Lecture 11 - Hands-on: Setting up the system
Lecture 12 - Basic Shell Commands
Lecture 13 - Data Download and Exploration
Lecture 14 - Hands-on 1 - Data exploration and QC
Lecture 15 - Hands-on 1 - Data QC and Trimming
Lecture 16 - Read Mapping
Lecture 17 - Mapping Algorithms
Lecture 18 - Suffix tree-based mapping algorithm
Lecture 19 - Burrows-Wheeler Transform (BWT)
Lecture 20 - Read Mapping with BWT
Lecture 21 - Bowtie2 tool
Lecture 22 - Mapping reads with Bowtie2
Lecture 23 - Bowtie2 output
Lecture 24 - SAM and BAM format
Lecture 25 - SAM format: Alignment section
Lecture 26 - Variant Calling
Lecture 27 - Calling SNP/SNVs and Indels
Lecture 28 - Hands-on analysis : Variant Calling
Lecture 29 - VCF Files

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Lecture 30 - Variant Annotation
Lecture 31 - Analysis of CNVs and SVs
Lecture 32 - Introduction to RNA sequencing
Lecture 33 - RNA-seq data processing pipeline
Lecture 34 - Transcriptome Assembly and Quantification
Lecture 35 - Transcript Abundance Quantification
Lecture 36 - Biases in RNA-seq experiments
Lecture 37 - Data Normalization Methods
Lecture 38 - Data Normalization Methods (Continued...)
Lecture 39 - Differential Gene Expression (DGE) Analysis
Lecture 40 - DGE analysis results and visualizations
Lecture 41 - Multiple hypothesis testing correction
Lecture 42 - FDR correction and interpretation of DGE analysis results
Lecture 43 - Functional Enrichment Analysis
Lecture 44 - RNA-seq data analysis - Hands-on 2
Lecture 45 - Hands-on 2: Setting up the system
Lecture 46 - Hands-on 2: Preliminary Data Analysis
Lecture 47 - Sample Specific Bias Correction
Lecture 48 - Differential Gene Expression Analysis I
Lecture 49 - DGE Analysis with spike-ins
Lecture 50 - DGE Analysis Results and Functional Enrichment Analysis
Lecture 51 - Genome Assembly
Lecture 52 - Shortest Common Superstring (SCS) assembly
Lecture 53 - Overlap-Layout-Consensus (OLC) approach
Lecture 54 - de Bruijn Graph (DBG) based assembly
Lecture 55 - Assembly and Quality Control
Lecture 56 - Applications of NGS in Epigenomics
Lecture 57 - Detecting DNA Methylations
Lecture 58 - Genome-wide Transcription Factor(TF) Binding Sites
Lecture 59 - Chromatin Accessibility
Lecture 60 - Genome Organization in 3D

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NPTEL Video Course - Biotechnology - NOC:Computational Neuroscience

Subject Co-ordinator - Prof. Sharba Bahdyopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Neuron Structure
Lecture 2 - Networks of Neurons and Synapses
Lecture 3 - Basic Structures in the Brain
Lecture 4 - Systems of neural processing
Lecture 5 - Methods of Recording Neural Activity
Lecture 6 - Membrane Potential and All or None Spike
Lecture 7 - Patch Clamp Measurements
Lecture 8 - Ion channels
Lecture 9 - Current injection: Synapses
Lecture 10 - Single Neuron Acitivity
Lecture 11 - Point and compartmental models of neurons
Lecture 12 - Hodgkin Huxley Equations - I
Lecture 13 - Hodgkin Huxley Equations - II
Lecture 14 - Reducing the HHE and Moris-Lecar Equations (MLE)
Lecture 15 - Properties of MLE
Lecture 16 - Phase Plane Analysis - I
Lecture 17 - Phase Plane Analysis - II
Lecture 18 - Phase Plane Analysis - III
Lecture 19 - Analysing HHE with Phase Plane Analysis - I
Lecture 20 - Analysing HHE with Phase Plane Analysis - II
Lecture 21 - Random variables and random process
Lecture 22 - Spike train statistics and response measure
Lecture 23 - Receptive fields and models of receptive fields
Lecture 24 - Stimulus to Response mapping (Coding) - I
Lecture 25 - Stimulus to Response mapping (Coding) - II
Lecture 26 - Stimulus to Response Mapping (Coding) - III
Lecture 27 - Response to Stimulus Mapping (Decoding)
Lecture 28 - Basics of Information Theory - I
Lecture 29 - Basics of Information Theory - II

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Lecture 30 - Maximally Informative Dimensions
Lecture 31 - Intro to Discrimination based methods
Lecture 32 - Kullback Leibler Distance
Lecture 33 - Measuring Spike Train Distances - I
Lecture 34 - Measuring Spike Train Distances - II
Lecture 35 - Signal and Noise Correlations
Lecture 36 - Statistical Methods in Discrimination
Lecture 37 - Single Cell Decoding - I: Two Alternative Forced Choice task in Monkeys
Lecture 38 - Single Cell Decoding - II: Using ROC Curves for discrimination
Lecture 39 - Single Cell Encoding - I: Operant Conditioning Task in Ferrets
Lecture 40 - Single Cell Encoding - II: Learning in avoidance and approach methods in Ferrets
Lecture 41 - Plasticity - Synaptic Transmission and Synaptic Strength
Lecture 42 - Ways of modification of Synaptic Strength
Lecture 43 - Type of Plasticity
Lecture 44 - Short Term Plasticity - I
Lecture 45 - Short Term Plasticity - II
Lecture 46 - Long Term Plasticity
Lecture 47 - Spike Time Dependent Plasticity
Lecture 48 - Hebbian Plasticity
Lecture 49 - BCM Rule
Lecture 50 - Synaptic Normalization
Lecture 51 - Adaptation
Lecture 52 - Models of Short Term Plasticity
Lecture 53 - Attention - I
Lecture 54 - Attention - II
Lecture 55 - Developmental Cicuits
Lecture 56 - Optimal Coding in Visual System
Lecture 57 - Optimal Coding in Auditory System
Lecture 58 - Optimal Coding of Deviant Stimuli in Development
Lecture 59 - Spike Timing Dependent Plasticity - a theoretical Perspective
Lecture 60 - Important Problems in Neuroscience

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NPTEL Video Course - Biotechnology - NOC:Electrophysiology of Heart

Subject Co-ordinator - Dr. Arijita Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Ionic basis of membrane potential
Lecture 2 - Physiology of voltage gated channels
Lecture 3 - Physiology of voltage gated channels
Lecture 4 - Cardiac muscle physiology
Lecture 5 - Action potential of cardiac muscle - 1
Lecture 6 - Action potential of cardiac muscle - 2
Lecture 7 - Conducting system of heart
Lecture 8 - ECG-Physiological basis
Lecture 9 - ECG-Normal, Technical aspects
Lecture 10 - ECG Interpretation
Lecture 11 - Abnormal ECG - 1
Lecture 12 - Abnormal ECG - 2
Lecture 13 - ECG and Myocardial Infarction
Lecture 14 - Heart rate and Blood pressure - Baroreflex pathway
Lecture 15 - ECG and Hypertension
Lecture 16 - Autonomic regulation of heart
Lecture 17 - Heart rate variability (HRV)
Lecture 18 - Heart rate variability-interpretation and clinical uses, Blood pressure variability
Lecture 19 - Autonomic Function Tests - 1
Lecture 20 - Autonomic Function Tests - 2

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NPTEL Video Course - Biotechnology - NOC:Pharmacognosy and Metabolic Engineering

Subject Co-ordinator - Prof. Adinpunya Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Pharmacognosy and Medicinal Plants
Lecture 2 - Plant Specialized Metabolites: Waste Products or Ecochemicals?
Lecture 3 - Evolution of Specialized Metabolism from Primary Metabolism
Lecture 4 - Production of specialized metabolites through cell and organ culture
Lecture 5 - Eliciting specialized metabolism in culture
Lecture 6 - Analysis of Specialized Metabolites - Tools and Techniques
Lecture 7 - Metabolic phytochemistry-based approaches for studying plant specialized metabolism
Lecture 8 - Metabolic engineering strategies in plants
Lecture 9 - Plant genetic transformation (through natural genetic engineer)
Lecture 10 - Design of vectors for Agrobacterium-mediated gene transfer; Transformed and co-
Lecture 11 - Introduction to alkaloids
Lecture 12 - Biosynthesis of tropane alkaloids
Lecture 13 - Engineering tropane alkaloid pathways in plants - I
Lecture 14 - Engineering tropane alkaloid pathways in plants - II : Engineering tropane alkaloid pathway
Lecture 15 - Isoquinoline alkaloids - Biosynthesis and tissue localization
Lecture 16 - Isoquinoline alkaloids - Late steps of biosynthetic pathway and tissue localization
Lecture 17 - Benzylisoquinoline alkaloids - Induced top1 mutant and natural T mutantEngineering
Lecture 18 - Benzylisoquinoline alkaloids - Metabolic pathway engineering
Lecture 19 - RNAi-mediated replacement of morphine with nornarcotic alkaloid reticuline in opium
Lecture 20 - Isoquinoline alkaloids - biosynthesis and tissue localization
Lecture 21 - Indole alkaloids - Early steps of biosynthesis
Lecture 22 - Indole alkaloids - Metabolic engineering of early steps of indole alkaloid pathway
Lecture 23 - Indole alkaloids - Environmental factors regulating indole alkaloid biosynthesis
Lecture 24 - Indole alkaloids - Role of elicitors in modulating alkaloids accumulation
Lecture 25 - Indole alkaloids - Late steps of indole alkaloid biosynthesis
Lecture 26 - Indole alkaloids - Regulatory roles of transcription factors in light-induced
Lecture 27 - Engineering indole alkaloid pathways in Catharanthus roseus hairy root cultures
Lecture 28 - Missing enzymes of vindoline biosynthetic pathway
Lecture 29 - Monoterpene indole alkaloid pathway cell and tissue localization

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Lecture 30 - Model for biosynthesis and secretion of monoterpenoid indole alkaloids involving
Lecture 31 - Metabolic reprogramming of periwinkle plant culture
Lecture 32 - Engineered yeast brews precursors of anticancer drug vinblastine
Lecture 33 - Recent discovery of strychnine biosynthetic pathway
Lecture 34 - Indole alkaloid biosynthesis - a final overview
Lecture 35 - Recent discovery of colchicine biosynthetic pathway
Lecture 36 - Biosynthesis of terpenoids - an outline
Lecture 37 - Diversity of monoterpenoids
Lecture 38 - Biosynthesis of monoterpenoids
Lecture 39 - Diversity of sesquiterpenes, diterpenes, triterpenes and polyterpenes
Lecture 40 - Oleoresins and polyterpenes - an outline
Lecture 41 - Monoterpenoids as components of floral scent volatiles: Metabolic engineering of
Lecture 42 - Biosynthesis of carotenoids and carotenoid cleavage products
Lecture 43 - Metabolic engineering of carotenoid pathway
Lecture 44 - Metabolic engineering of carotenoid pathway: Golden Rice Story
Lecture 45 - Menthol story: Biosynthesis and pathway manipulation - I
Lecture 46 - Menthol story: Biosynthesis and pathway manipulation - II
Lecture 47 - Artemisinin, hyperforin and taxol - three promising candidates for biotechnological
Lecture 48 - Phenolics: Origin via shikimate pathway
Lecture 49 - Phenolics: Phenylpropanoids, benzenoids, coumarins, tannins
Lecture 50 - Phenolics: Monolignols, lignins and lignans
Lecture 51 - Phenolics: Metabolic engineering of monolignol pathways
Lecture 52 - Phenolics: Biosynthesis of lignans and podophyllotoxin; Caffeic acid esters
Lecture 53 - Phenolics: Flavonoids, Flavones, Isoflavonoids, Proanthocyanidins
Lecture 54 - Phenolics: Biosynthesis of anthocyanins; Metabolic pathway engineering for enhance
Lecture 55 - Phenolics: Metabolic engineering of anthocyanin pathways in flowers
Lecture 56 - Phenolics: Alcohol acetyl transferses and volatile phenolics
Lecture 57 - Phenolics: Biosynthesis of volatile benzenoids
Lecture 58 - Phenolics: Biosynthesis of vanillin in plants
Lecture 59 - Phenolics: Metabolic engineering for vanillin
Lecture 60 - Phenolics: Biosynthesis of shikonin
Lecture 61 - Phenolics: Metabolic engineering of shikonin pathway
Lecture 62 - Molecular Pharming: Transplastomic plants
Lecture 63 - Molecular Pharming: production of human somatotropin in tobacco

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NPTEL Video Course - Biotechnology - NOC:Introduction to Complex Biological Systems

Subject Co-ordinator - Prof. Soumya De, Prof. Dibyendu Samanta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of a Living System
Lecture 2 - Discovery of Genetic Material
Lecture 3 - Chemical and Physical Properties of Nucleic Acids
Lecture 4 - Introduction to DNA Replication
Lecture 5 - Mechanistic Overview of DNA Replication
Lecture 6 - Gene expression and The Central Dogma of Molecular Biology
Lecture 7 - Transcription: Involved Machineries and Processes
Lecture 8 - Translation: Decoding the message of an mRNA
Lecture 9 - Time-space correlation and fidelity of transcription and translation
Lecture 10 - Regulation of gene expression
Lecture 11 - Amino acids, hierarchy of protein structure
Lecture 12 - Protein folding, Folding funnel, Anfinsenâ s experiment
Lecture 13 - Protein-ligand interactions
Lecture 14 - Allosteric regulation of proteins, e.g. haemoglobin
Lecture 15 - Membrane proteins
Lecture 16 - Introduction to enzymes
Lecture 17 - Theory of enzyme catalysis
Lecture 18 - Specificity of enzymes, e.g. Chymotrypsin
Lecture 19 - Enzyme inhibition. Types and mechanism of inhibitors. Design of inhibitors
Lecture 20 - Engineered enzymes and their applications
Lecture 21 - Introduction to cells
Lecture 22 - Visualizing cells
Lecture 23 - Cell division cycle
Lecture 24 - Stem Cells
Lecture 25 - Cancer
Lecture 26 - Overview of the development of multicellular organization
Lecture 27 - Pattern formation and growth
Lecture 28 - Cell division, cell death and tissue homeostasis
Lecture 29 - Cell Junctions and extracellular matrix

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Lecture 30 - Introduction to Neuron and the action potential
Lecture 31 - Vitamins and introduction to bioenergetics
Lecture 32 - Glycolysis, Gluconeogenesis and PPP
Lecture 33 - Citric Acid Cycle and Oxidative Phosphorylation
Lecture 34 - Photosynthesis
Lecture 35 - Photosynthetic carbohydrate synthesis
Lecture 36 - Evolution of life on earth
Lecture 37 - Protein evolution
Lecture 38 - Mechanisms of evolution
Lecture 39 - Evolution of eye
Lecture 40 - Model orgamisms
Lecture 41 - Introduction to microbial world and infectious diseases
Lecture 42 - Cell organization and unique features of bacteria
Lecture 43 - Understanding viruses - The smallest enemy
Lecture 44 - Pathogenicity and infection
Lecture 45 - Antibacterial and Antiviral Drugs
Lecture 46 - Introduction to the immune system
Lecture 47 - Innate immunity: the first lines of defense
Lecture 48 - Adaptive immune response
Lecture 49 - Antibody - structure, function and diversity
Lecture 50 - Vaccines and immunotherapy
Lecture 51 - Visualizing and analyzing nucleic acids: Gel electrophoresis and PCR
Lecture 52 - Visualizing and analyzing nucleic acids: DNA Sequencing
Lecture 53 - Overview of genetic engineering and its impact on society
Lecture 54 - Genetic engineering: Methods and applications
Lecture 55 - Cloning and Gene manipulation
Lecture 56 - Characterization methods
Lecture 57 - Chromatographic methods
Lecture 58 - Protein - ligand interactions
Lecture 59 - Immunoassay techniques
Lecture 60 - Landmark experiments in biology

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NPTEL Video Course - Biotechnology - NOC:Biological Data Analysis and Visualization with R

Subject Co-ordinator - Prof. Riddhiman Dhar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Setting up R
Lecture 3 - Basic functions in R
Lecture 4 - Basic data structures in R
Lecture 5 - Data structures and File I/O
Lecture 6 - Basic statistical tests with R
Lecture 7 - Correlation Analysis
Lecture 8 - Analysis of Variance (ANOVA)
Lecture 9 - Basic data visualization techniques
Lecture 10 - Data visualization
Lecture 11 - Visualization with vioplot and ggplot2
Lecture 12 - R packages for plotting and data organization
Lecture 13 - Data transformation in R
Lecture 14 - Bioconductor packages
Lecture 15 - Flow cytometry data analysis in R/Bioconductor
Lecture 16 - Gene expression analysis and co-expression network
Lecture 17 - WGCNA package and Data Download
Lecture 18 - WGCNA hands-on: Data preprocessing
Lecture 19 - WGCNA hands-on: Soft-threshold
Lecture 20 - WGCNA: Module gene expression
Lecture 21 - Introduction to ChIP-seq
Lecture 22 - ChIP-seq data analysis
Lecture 23 - ChIP-seq data analysis: Peak calling
Lecture 24 - Peak calling and Visualization
Lecture 25 - ChIP-seq data analysis: bigWig/bw files
Lecture 26 - Regression models on Biological data
Lecture 27 - Predictive models with linear regression
Lecture 28 - Multicollinearity
Lecture 29 - Lasso regression

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Lecture 30 - Non-linear regression
Lecture 31 - Dimensionality reduction
Lecture 32 - Principal Component Analysis (PCA)
Lecture 33 - PCA analysis hands-on
Lecture 34 - PCA analysis using â PCAtoolsâ
Lecture 35 - UMAP analysis
Lecture 36 - Classification of biological samples
Lecture 37 - Penalized and Stepwise Logistic regression
Lecture 38 - Decision trees
Lecture 39 - Classification and Regression trees
Lecture 40 - Random Forests

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NPTEL Video Course - Biotechnology - Downstream Processing

Subject Co-ordinator - Prof. Mukesh Doble

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mass balance, Heat Balance, flow sheet
Lecture 3 - Costing
Lecture 4 - Costing (continued), Physical and chemical principles in Downs stream
Lecture 5 - Problems in Mass balance, flow sheet
Lecture 6 - Cell Breakage
Lecture 7 - Cell breakage (Continued...)
Lecture 8 - Solid Liquid Separation
Lecture 9 - Solid Liquid Separation (Continued...)
Lecture 10 - Solid Liquid separation-problems
Lecture 11 - Pre-treatment and Filters
Lecture 12 - Adsorption
Lecture 13 - Adsorption
Lecture 14 - Adsorption
Lecture 15 - Adsorption
Lecture 16 - Liquid-Liquid Extraction
Lecture 17 - Liquid-Liquid Extraction
Lecture 18 - Liquid-Liquid Extraction
Lecture 19 - Liquid liquid extraction
Lecture 20 - Reversed micellar and aqueous two phase extraction
Lecture 21 - Membranes
Lecture 22 - Membranes
Lecture 23 - Membranes
Lecture 24 - Membranes
Lecture 25 - Precipitation
Lecture 26 - Chromatography
Lecture 27 - Chromatography
Lecture 28 - Chromatography
Lecture 29 - Chromatography

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Lecture 30 - Chromatography
Lecture 31 - Chromatography
Lecture 32 - Chromatography
Lecture 33 - Crystallisation
Lecture 34 - Drying
Lecture 35 - Drying and distillation
Lecture 36 - Future trends

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NPTEL Video Course - Biotechnology - Thermodynamics

Subject Co-ordinator - Prof. G.K. Suraishkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Review
Lecture 2 - Need for Analysis Additional Thermodynamic Functions State and Path Variables
Lecture 3 - Equations for a Closed system Chemical Potential Concept Gibbs-Duhem Equation
Lecture 4 - Maxwellâ s relations
Lecture 5 - Inter-Relationships between Thermodynamic Variables
Lecture 6 - Some Useful Mathematical Manipulations
Lecture 7 - Thermodynamic Relations for a Closed System with 1 mole of a pure Substances
Lecture 8 - Maximum Work,Lost Work Review of Closed Systems
Lecture 9 - Open Systems
Lecture 10 - Equations of State - Virial Equations
Lecture 11 - Equations of State - Cubic Equations
Lecture 12 - Volume Estimation
Lecture 13 - Volume Estimation (Continued...) Generalized correlations
Lecture 14 - Generalized correlations (Continued...) Residual Properties
Lecture 15 - Residual Properties (Continued...)
Lecture 16 - Generalized Correlations and Residual Properties
Lecture 17 - Fugacity Coefficient Estimation
Lecture 18 - Review of Module 3
Lecture 19 - Learning Aspects Chemical Potential Formulations
Lecture 20 - Lewis and Randall rule partial Molar Properties
Lecture 21 - Partial Molar Property Estimation from Mixing Experiments
Lecture 22 - Partial Molar Property Estimation (Continued...) Excess Property
Lecture 23 - Activity Coefficient from Excess Property
Lecture 24 - Activity Coefficient from Excess Property (Continued...)
Lecture 25 - Activity Coefficient from Excess Property (Continued...) Models for Activity Coefficient in Bina
Lecture 26 - Models for Activity Coefficient in Binary Systems (Continued...)
Lecture 27 - Review of Module 4
Lecture 28 - Criteria for Phase Equilibrium Phase Rule for Non-reacting Biosystems
Lecture 29 - Clausius - Clayperon Equation

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Lecture 30 - Clausius - Clayperon Equation (Continued...) vapour-Liquid Equilibrium
Lecture 31 - Vapour-Liquid Equilibrium (Continued...) Estimation of Fugacity coefficient from Equilibrium P-V
Lecture 32 - Liquid/Liquid and Solid/Liquid Equilibria
Lecture 33 - Review of Module 5
Lecture 34 - Criteria for Bio-reaction Equilibria
Lecture 35 - Phase rule for Reacting Biosystems Equilibrium constants
Lecture 36 - Effect of Temperature and Pressure on the Equilibrium constants
Lecture 37 - Reaction in Liquid or Solid Phases
Lecture 38 - Free energy Changes for some Bioreactions
Lecture 39 - Electrolytes
Lecture 40 - Course Review

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NPTEL Video Course - Biotechnology - NOC:Principles of Downstream techniques in Bioprocess

Subject Co-ordinator - Prof. Mukesh Doble

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mass balance, Heat Balance, Flow sheet
Lecture 3 - Costing
Lecture 4 - Cell Breakage
Lecture 5 - Solid Liquid Separation
Lecture 6 - Pre-treatment and Filters/centrifuge
Lecture 7 - Liquid-Liquid Extraction
Lecture 8 - Liquid-Liquid extraction (Continued...)
Lecture 9 - Adsorption
Lecture 10 - Reversed micellar and aqueous two phase extraction
Lecture 11 - Membranes
Lecture 12 - Membranes (Continued...)
Lecture 13 - Product stabilization, Drying, Lyophilisation
Lecture 14 - Precipitation and crystallization
Lecture 15 - Electrophoresis / SDS PAGE
Lecture 16 - Chromatography
Lecture 17 - Chromatography (Continued...1)
Lecture 18 - Chromatography (Continued...2)
Lecture 19 - Chromatography (Continued...3)
Lecture 20 - Future trends, Other downstream operations/Summary of the course

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NPTEL Video Course - Biotechnology - NOC:Biostatistics and Design of Experiments

Subject Co-ordinator - Prof. Mukesh Doble

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Experimental Design Strategy
Lecture 3 - Data types
Lecture 4 - Poisson Distribution
Lecture 5 - Normal Distribution
Lecture 6 - Standardized Normal Distribution / t-distribution
Lecture 7 - t-distribution/confidence interval
Lecture 8 - Statistical tests
Lecture 9 - t-Test
Lecture 10 - t-Tests
Lecture 11 - t-test
Lecture 12 - F-tests
Lecture 13 - F-tests
Lecture 14 - ANOVA
Lecture 15 - ANOVA
Lecture 16 - Anova
Lecture 17 - Anova
Lecture 18 - Anova
Lecture 19 - Anova
Lecture 20 - Anova
Lecture 21 - Normality test / Odds ratio
Lecture 22 - Chi square distribution
Lecture 23 - Chi square distribution / test
Lecture 24 - Chi square test
Lecture 25 - Chi square test and Weibull Distribution
Lecture 26 - Weibull Distribution
Lecture 27 - Weibull distribution.
Lecture 28 - Non-parametric test
Lecture 29 - Non parametric test/homogeneity of variance / beta distribution

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Lecture 30 - Exponential / hypergeometric distributions
Lecture 31 - Hypergeometric / Log norma distribution
Lecture 32 - Design of experiments (DOE) - Introduction
Lecture 33 - Factorial Design
Lecture 34 - Full factorial design
Lecture 35 - Fractional factorial design
Lecture 36 - Other designs
Lecture 37 - Second order designs
Lecture 38 - Second order design
Lecture 39 - Regression analysis
Lecture 40 - Control charts

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NPTEL Video Course - Biotechnology - NOC:Bioreactors

Subject Co-ordinator - Prof. G.K. Suraishkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sterilization
Lecture 3 - Solution to PP 1.1
Lecture 4 - Some important concepts
Lecture 5 - Enzyme bioreactors, enzyme kinetics
Lecture 6 - Solution to PP 2.1
Lecture 7 - Inhibited enzyme kinetics
Lecture 8 - Solution to PP 2.2
Lecture 9 - Measurement principles and methods
Lecture 10 - Batch growth kinetics
Lecture 11 - Solution to PP 3.1
Lecture 12 - Bioreactor analysis
Lecture 13 - Solution to PP 3.2
Lecture 14 - Bioreactor environment parameters
Lecture 15 - Bioreactor env. par. (DO)
Lecture 16 - Solution to PP 4.1
Lecture 17 - Shear stress, scale-up, scale-down
Lecture 18 - Cell view
Lecture 19 - Solution to PP 5.1
Lecture 20 - Culture status, metabolic flux analysis
Lecture 21 - Course summary

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NPTEL Video Course - Biotechnology - NOC:Medical Biomaterials

Subject Co-ordinator - Prof. Mukesh Doble

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biomaterials
Lecture 2 - Background history
Lecture 3 - History
Lecture 4 - Properties - Mechanical and Physico-chemical
Lecture 5 - Properties - Mechanical and Physico-chemical
Lecture 6 - Mechanical properties
Lecture 7 - Mechanical Properties (Continued...)
Lecture 8 - Resorbability, biodegradation
Lecture 9 - Resorbability, biodegradation (Continued...)
Lecture 10 - Biofilm
Lecture 11 - Biofilm (Continued...)
Lecture 12 - Biofilm (Continued...)
Lecture 13 - Biofilm (Continued...)
Lecture 14 - Material characterization - Analytical instruments
Lecture 15 - Analytical instruments
Lecture 16 - Analytical instruments (Continued...)
Lecture 17 - Analytical instruments (Continued...)
Lecture 18 - Biological responses, compatibility, cytotoxicity
Lecture 19 - Proteins, Tissue and blood Response
Lecture 20 - Cell-biomaterial interaction
Lecture 21 - Animal trials (in vivo)
Lecture 22 - Animal trials
Lecture 23 - Metals-types, classifications, applications
Lecture 24 - Metals - properties
Lecture 25 - Metals - properties (Continued...)
Lecture 26 - Metals - properties (Continued...)
Lecture 27 - Metals
Lecture 28 - Polymers-types, classifications, applications
Lecture 29 - Polymers

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Lecture 30 - Polymers (Continued...)
Lecture 31 - Polymer blends
Lecture 32 - Natural biopolymers
Lecture 33 - Natural biopolymers - (Continued...)
Lecture 34 - Biopolymers- proteins / hydrogels
Lecture 35 - Hydrogels
Lecture 36 - Experiments
Lecture 37 - surface modification-Demonstration
Lecture 38 - Ceramics
Lecture 39 - Cardiovascular and ocular biomaterials
Lecture 40 - Sterilisation/Device failure

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NPTEL Video Course - Biotechnology - NOC:BioInformatics - Algorithms and Applications

Subject Co-ordinator - Prof. M. Michael Gromiha

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concepts and importance of Bioinformatics
Lecture 2 - Complexities in biological systems
Lecture 3 - DNA sequence analysis
Lecture 4 - Sequence based parameters
Lecture 5 - Database
Lecture 6 - Database categories
Lecture 7 - Protein structure and function - I
Lecture 8 - Protein structure and function - II
Lecture 9 - Protein sequence databases - I
Lecture 10 - Protein sequence databases - II
Lecture 11 - Pairwise alignment - I
Lecture 12 - Pairwise alignment - II
Lecture 13 - Uniprot Demo
Lecture 14 - Sequence alignment - I
Lecture 15 - Sequence alignment - II
Lecture 16 - Sequence alignment
Lecture 17 - Sequence alignment
Lecture 18 - Conservation score - I
Lecture 19 - Conservation score - II
Lecture 20 - Blast Demo
Lecture 21 - Phylogenetic trees - I
Lecture 22 - Phylogenetic trees - II
Lecture 23 - Protein sequence analysis - I
Lecture 24 - Protein sequence analysis - II
Lecture 25 - Hydrophobicity profiles
Lecture 26 - Patterns and PSSM profiles
Lecture 27 - Construction of Non-redundant datasets - I
Lecture 28 - Non-redundant datasets - II
Lecture 29 - Protein secondary structure

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Lecture 30 - Secondary structure prediction - I
Lecture 31 - Secondary structure prediction - II
Lecture 32 - Secondary structure prediction - III
Lecture 33 - Protein tertiary structure - I
Lecture 34 - Protein tertiary structure - II
Lecture 35 - Protein structure analysis - I
Lecture 36 - Protein structure analysis - II
Lecture 37 - Protein structure analysis - III
Lecture 38 - Demo
Lecture 39 - Protein structure analysis - IV
Lecture 40 - Protein structure prediction - I
Lecture 41 - Protein structure prediction - II
Lecture 42 - Protein stability - I
Lecture 43 - Protein stability - II
Lecture 44 - Demo
Lecture 45 - Stabilizing residues
Lecture 46 - Thermodynamic database
Lecture 47 - Stability of proteins upon mutations - I
Lecture 48 - Stability of proteins upon mutations - II
Lecture 49 - Demo
Lecture 50 - Protein folding rate - I
Lecture 51 - Protein folding rate - II
Lecture 52 - Protein interactions - I
Lecture 53 - Protein interactions - II
Lecture 54 - Computer aided drug design - I
Lecture 55 - Computer aided drug design - II
Lecture 56 - Virtual screening - I
Lecture 57 - Virtual screening - II
Lecture 58 - QSAR - I
Lecture 59 - QSAR - II
Lecture 60 - Demo
Lecture 61 - awk programming - I
Lecture 62 - awk programming - II
Lecture 63 - Development of algorithms - I
Lecture 64 - Development of algorithms - II
Lecture 65 - Applications of bioinformatics - I
Lecture 66 - Applications of bioinformatics - II
Lecture 67 - Overview - I
Lecture 68 - Overview - II

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Lecture 69 - Demo

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NPTEL Video Course - Biotechnology - NOC:Demystifying the Brain

Subject Co-ordinator - Dr. V Srinivasa Chakravarthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Whole and Its Parts
Lecture 2 - Understanding Brainâ s Shape - Segment 1 - Brain size and intelligence
Lecture 3 - Understanding Brainâ s Shape - Segment 2 - Save Wire Principle
Lecture 4 - Understanding Brainâ s Shape - Segment 3 - Brain Evolution
Lecture 5 - Neurons and Neural Signaling
Lecture 6 - Neural Signalling
Lecture 7 - Networks that Learn - Segment 1
Lecture 8 - Multilayer Perceptrons Applications in Psychology and Neuroscience
Lecture 9 - Organization of the Central Nervous System-Segment 1 - Cortex
Lecture 10 - Organization of the Central Nervous System-Segment 2 - Subcortical Structures
Lecture 11 - Maps in the Brain - Segment 1
Lecture 12 - Maps in the Brain - Segment 2
Lecture 13 - Emotions in the Brain - Segment 1
Lecture 14 - Emotions in the Brain - Segment 2
Lecture 15 - Memories and Holograms - Segment 1
Lecture 16 - Memories and Holograms - Segment 2
Lecture 17 - Consciousness - Segment 1
Lecture 18 - Consciousness - Segment 2

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NPTEL Video Course - Biotechnology - NOC:Computational Systems Biology

Subject Co-ordinator - Prof. Karthik Raman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Modelling
Lecture 3 - Introduction to Modelling
Lecture 4 - Fundamentals of Mathematical Modelling
Lecture 5 - Fundamentals of Mathematical Modelling
Lecture 6 - Fundamentals of Mathematical Modelling
Lecture 7 - Some Example Models
Lecture 8 - Representation of Biological Networks
Lecture 9 - Lab
Lecture 10 - Lab
Lecture 11 - Lab
Lecture 12 - Lab
Lecture 13 - Introduction to Networks
Lecture 14 - Introduction to Networks
Lecture 15 - Introduction to Network Biology
Lecture 16 - Introduction to Network Biology
Lecture 17 - Introduction to Network Biology
Lecture 18 - Network Biology
Lecture 19 - Network Models
Lecture 20 - Network Models
Lecture 21 - Biological Networks
Lecture 22 - Network Perturbations
Lecture 23 - Community Detection
Lecture 24 - Network Motifs
Lecture 25 - Lab
Lecture 26 - Lab
Lecture 27 - Lab
Lecture 28 - Network Biology
Lecture 29 - Lab

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Lecture 30 - Lab
Lecture 31 - Reconstruction of Gene Regulatory Networks
Lecture 32 - Reconstruction of Protein Networks
Lecture 33 - Reconstruction of Signalling Networks
Lecture 34 - Reconstruction of Signalling Networks
Lecture 35 - Introduction to Dynamic Modelling
Lecture 36 - Introduction to Dynamic Modelling
Lecture 37 - Introduction to Dynamic Modelling
Lecture 38 - Lab
Lecture 39 - Lab
Lecture 40 - Parameter Estimation
Lecture 41 - Parameter Estimation
Lecture 42 - Parameter Estimation
Lecture 43 - Methods for Parameter Estimation
Lecture 44 - Direct Search Methods
Lecture 45 - Genetic Algorithms
Lecture 46 - Genetic Algorithms
Lecture 47 - Other Evolutionary Algorithms
Lecture 48 - PyGMO
Lecture 49 - Dynamic Modelling Recap
Lecture 50 - Lab
Lecture 51 - Guest Lecture
Lecture 52 - Guest Lecture
Lecture 53 - Guest Lecture
Lecture 54 - Guest Lecture
Lecture 55 - Guest Lecture
Lecture 56 - Constraint-based Modelling of Metabolic Networks
Lecture 57 - Flux Balance Analysis
Lecture 58 - Flux Balance Analysis
Lecture 59 - Flux Balance Analysis
Lecture 60 - Other Constraint-Based Approaches
Lecture 61 - Other Constraint-Based Approaches
Lecture 62 - Lab
Lecture 63 - Perturbations to Metabolic Networks
Lecture 64 - Lab
Lecture 65 - Understanding FBA
Lecture 66 - Understanding FBA
Lecture 67 - Perturbations to Metabolic Networks
Lecture 68 - Perturbations to Metabolic Networks

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Lecture 69 - Perturbations to Metabolic Networks
Lecture 70 - Constraint-based Modelling of Metabolic Networks
Lecture 71 - Lab
Lecture 72 - Integrating Regulatory Information into Constraint-Based Models
Lecture 73 - Elementary Modes
Lecture 74 - Elementary Modes
Lecture 75 - Constraint-based Modelling of Metabolic Networks
Lecture 76 - Constraint-based Modelling of Metabolic Networks
Lecture 77 - Constraint-based Modelling of Metabolic Networks
Lecture 78 - Lab
Lecture 79 - Constraint-based Modelling of Metabolic Networks
Lecture 80 - Constraint-based Modelling of Metabolic Networks
Lecture 81 - Constraint-based Modelling of Metabolic Networks
Lecture 82 - ^{13}C-Metabolic Flux Analysis using Mass Spectrometry
Lecture 83 - ^{13}C-Metabolic Flux Analysis using Mass Spectrometry
Lecture 84 - ^{13}C-Metabolic Flux Analysis using Mass Spectrometry
Lecture 85 - Lab
Lecture 86 - Modelling Gene Regulatory Networks
Lecture 87 - Modelling Gene Regulatory Networks
Lecture 88 - Modelling Gene Regulatory Networks
Lecture 89 - Lab
Lecture 90 - Lab
Lecture 91 - Computational Modelling of Host-Pathogen Interactions
Lecture 92 - Computational Modelling of Host-Pathogen Interactions
Lecture 93 - Robustness in Biological Systems
Lecture 94 - Robustness in Biological Systems
Lecture 95 - Robustness in Biological Systems
Lecture 96 - Robustness in Biological Systems
Lecture 97 - Obustness and Evolvability
Lecture 98 - obustness and Evolvability
Lecture 99 - Introduction to Synthetic Biology
Lecture 100 - Advanced Topics
Lecture 101 - Advanced Topics
Lecture 102 - Advanced Topics
Lecture 103 - Course Recap

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NPTEL Video Course - Biotechnology - NOC:Material and Energy Balances

Subject Co-ordinator - Prof.Vignesh Muthuvijayan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Engineering Calculations
Lecture 2 - Process Parameters and Variables
Lecture 3 - Fundamentals of Material Balances
Lecture 4 - Material Balance Calculations for Single Units Without Reactions - Part 1
Lecture 5 - Material Balance Calculations for Single Units Without Reactions - Part 2
Lecture 6 - Material Balance Calculations for Single Units Without Reactions - Part 3
Lecture 7 - Material Balance Calculations for Single Units Without Reactions - Part 4
Lecture 8 - Material Balance Calculations for Multiple Units Without Reactions - Part 1
Lecture 9 - Material Balance Calculations for Multiple Units Without Reactions - Part 2
Lecture 10 - Fundamentals of Reactive Processes
Lecture 11 - Material Balance Calculations For Single Units With A Single Reaction
Lecture 12 - Material Balance Calculations for Single Units with A Single Reaction (Continued...)
Lecture 13 - Material Balance Calculations for Single Units with Multiple Reactions - Part 1
Lecture 14 - Material Balance Calculations for Single Units with Multiple Reactions - Part 2
Lecture 15 - Material Balance Calculations for Single Units with Multiple Reactions - Part 3
Lecture 16 - Material Balance Calculations for Multiple Units with Reactions - Part 1
Lecture 17 - Material Balance Calculations for Multiple Units with Reactions - Part 2
Lecture 18 - Material Balances on Reactive Processes - Tutorials
Lecture 19 - Combustion Reactions
Lecture 20 - Material Balances for Combustion Reactions
Lecture 21 - Biochemical Reactions
Lecture 22 - Biochemical Reactions
Lecture 23 - Recycle Without Reactions
Lecture 24 - Recycle with Reactions
Lecture 25 - Recycle
Lecture 26 - Bypass
Lecture 27 - Purge
Lecture 28 - Material Balance
Lecture 29 - Material Balance

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Lecture 30 - Material Balance
Lecture 31 - The Unreasonable Effectiveness of Material Balance
Lecture 32 - Constraint-based modelling
Lecture 33 - Flux balance analysis - Part 1
Lecture 34 - Flux balance analysis - Part 2
Lecture 35 - Energy Balance Terminologies and Concepts
Lecture 36 - Introduction to Energy Balances - Part 1
Lecture 37 - Introduction to Energy Balances - Part 2
Lecture 38 - Introduction to Energy Balances
Lecture 39 - Mechanical Energy Balances
Lecture 40 - Mechanical Energy Balances
Lecture 41 - Energy Balance Objectives and Procedures
Lecture 42 - Introduction to Nonreactive Processes Without Phase Change
Lecture 43 - Energy Balances on Single-Phase Nonreactive Processes
Lecture 44 - Energy Balances on Single-Phase Nonreactive Processes
Lecture 45 - Fundamentals of Nonreactive Phase Change Processes
Lecture 46 - Estimating Latent Heats
Lecture 47 - Energy Balances on Nonreactive Processes With Phase Change
Lecture 48 - Energy Balances on Nonreactive Processes With Phase Change
Lecture 49 - Energy Balances on Nonreactive Processes With Phase Change
Lecture 50 - Psychrometric Charts
Lecture 51 - Energy Balances Using Psychrometric Charts
Lecture 52 - Mixing and Solution
Lecture 53 - Mixing and Solution
Lecture 54 - Mixing and Solution
Lecture 55 - Fundamentals for Energy Balances on Reactive Processes - Part 1
Lecture 56 - Fundamentals for Energy Balances on Reactive Processes - Part 1 and Part 2
Lecture 57 - Fundamentals for Energy Balances on Reactive Processes - Tutorials
Lecture 58 - Energy Balances on Reactive Processes - Part 1
Lecture 59 - Energy Balances on Reactive Processes - Part 2
Lecture 60 - Energy Balances on Reactive Processes - Part 3
Lecture 61 - Energy Balances on Reactive Processes - Part 4
Lecture 62 - Energy Balances on Reactive Processes - Part 5
Lecture 63 - Energy Balances on Reactive Processes - Part 6
Lecture 64 - Energy Balances
Lecture 65 - Energy Balances
Lecture 66 - Energy Balances
Lecture 67 - Energy Balances
Lecture 68 - Unsteady State Material Balances

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Lecture 69 - Unsteady State Energy Balances

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NPTEL Video Course - Biotechnology - NOC:Computer Aided Drug Design

Subject Co-ordinator - Prof. Mukesh Doble

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Drug Discovery - Issues
Lecture 3 - Target and Lead Identification
Lecture 4 - Drug And Data bases
Lecture 5 - Drug Properties
Lecture 6 - Drug - Properties / SMILES
Lecture 7 - Drug Solubility
Lecture 8 - Drug Solubility / permeability
Lecture 9 - ADME
Lecture 10 - Drug - ADME
Lecture 11 - Drug - ADME
Lecture 12 - Drug - BBB
Lecture 13 - Pgp efflux/Drug Likeness
Lecture 14 - Drug Likeness
Lecture 15 - Molecular Modelling
Lecture 16 - Molecular Mechanics / Force Field
Lecture 17 - Molecular Mechanics / Force Field
Lecture 18 - Molecular Mechanics / Force Field
Lecture 19 - Molecular Mechanics / Force Field
Lecture 20 - ODES and Numerical methods
Lecture 21 - ODES and Numerical methods
Lecture 22 - Conformational Search / MD
Lecture 23 - Quantum Mechanics
Lecture 24 - Quantum Mechanics
Lecture 25 - Quantitative Struture Activity Relationship (QSAR)
Lecture 26 - Quantitative Struture Activity Relationship (QSAR)
Lecture 27 - Quantitative Struture Activity Relationship (QSAR)
Lecture 28 - Quantitative Struture Activity Relationship (QSAR)
Lecture 29 - Quantitative Struture Activity Relationship (QSAR)

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Lecture 30 - Quantitative Struture Activity Relationship (QSAR)
Lecture 31 - 3D QSAR
Lecture 32 - Pharmacophore modelling
Lecture 33 - Target based drug design
Lecture 34 - Target based drug design
Lecture 35 - Target based drug design
Lecture 36 - Target based drug design
Lecture 37 - Docking
Lecture 38 - Docking
Lecture 39 - Pharmacokinetics / pharmacodynamics
Lecture 40 - Pharmacokinetics / pharmacodynamics

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NPTEL Video Course - Biotechnology - NOC:Plant Cell Bioprocessing

Subject Co-ordinator - Prof. Smita Srivastava

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to plant cell technology
Lecture 2 - History of plant cell and tissue culture
Lecture 3 - Anatomy of plant cells
Lecture 4 - Plant tissues and functions
Lecture 5 - Photosynthesis and Photorespiration
Lecture 6 - In-vitro culture initiation
Lecture 7 - Nutritional requirements of plant cells
Lecture 8 - Organogenesis and Regeneration
Lecture 9 - Somaclonal variation and Micropropagation
Lecture 10 - Somatic embryogenesis and Protoplast culture
Lecture 11 - Synthetic seeds, Cryopreservation and Freezing methods
Lecture 12 - Secondary metabolism in plant cells - Part 1
Lecture 13 - Secondary metabolism in plant cells - Part 2
Lecture 14 - Secondary metabolism in plant cells - Part 3
Lecture 15 - Secondary metabolism in plant cells - Part 4
Lecture 16 - Optimization strategies - Part 1
Lecture 17 - Optimization strategies - Part 2
Lecture 18 - Optimization strategies - Part 3
Lecture 19 - Optimization strategies - Part 4
Lecture 20 - Biotransformation in plant cultures
Lecture 21 - Immobilization of plant cells
Lecture 22 - Genetic transformations in plant cells - Part 1
Lecture 23 - Genetic transformations in plant cells - Part 2
Lecture 24 - Genetic transformations in plant cells - Part 3
Lecture 25 - Plant Cell Bioreactors - Part 1
Lecture 26 - Plant Cell Bioreactors - Part 2
Lecture 27 - Bioreactors for Hairy Root cultures
Lecture 28 - Case study - Part 1
Lecture 29 - Case study - Part 2

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NPTEL Video Course - Biotechnology - NOC:Tissue Engineering

Subject Co-ordinator - Prof.Vignesh Muthuvijayan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Tissue Engineering - Part 1
Lecture 2 - Introduction to Tissue Engineering - Part 2
Lecture 3 - Introduction to Tissue Engineering - Part 3
Lecture 4 - Scaffolds
Lecture 5 - Scaffolds
Lecture 6 - Scaffolds
Lecture 7 - Hydrogels - Part 1
Lecture 8 - Hydrogels - Part 2
Lecture 9 - Bioceramics
Lecture 10 - Scaffold fabrication strategies
Lecture 11 - Self Assembly
Lecture 12 - 3D Bioprinting
Lecture 13 - Material Characterization - Part 1
Lecture 14 - Material Characterization - Part 2
Lecture 15 - Material Characterization - Part 3
Lecture 16 - Cell Source
Lecture 17 - Cell Isolation - Part 1
Lecture 18 - Cell Isolation - Part 2
Lecture 19 - Tissue Dynamics
Lecture 20 - Cell Differentiation
Lecture 21 - Cell Adhesion
Lecture 22 - Cell Migration
Lecture 23 - Signaling and biomolecule delivery in Tissue Engineering
Lecture 24 - Bioreactors in Tissue Engineering
Lecture 25 - Challenges in Tissue Engineering
Lecture 26 - Host integration and immune responses - Part 1
Lecture 27 - Host integration and immune responses - Part 2
Lecture 28 - Bioethics of Tissue Engineering - Part 1
Lecture 29 - Bioethics of Tissue Engineering - Part 2

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Lecture 30 - Skin Tissue Engineering - Part 1
Lecture 31 - Skin Tissue Engineering - Part 2
Lecture 32 - Bone Tissue Engineering - Part 1
Lecture 33 - Bone Tissue Engineering - Part 2
Lecture 34 - Bone Tissue Engineering - Part 3
Lecture 35 - Vascular Tissue Engineering
Lecture 36 - Corneal Tissue Engineering - Part 1
Lecture 37 - Corneal Tissue Engineering - Part 2

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NPTEL Video Course - Biotechnology - NOC:Thermodynamics for Biological Systems: Classical and Statistical Asp

Subject Co-ordinator - Prof. G.K. Suraishkumar, Prof. Sanjib Senapati

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and review
Lecture 2 - Review (Continued...)
Lecture 3 - Need for analysis
Lecture 4 - Additional Thermodynamic Functions
Lecture 5 - State and Path Variables
Lecture 6 - Equations for a Closed System
Lecture 7 - Chemical Potential
Lecture 8 - Gibbs Duhem equation
Lecture 9 - Maxwellâ s relations
Lecture 10 - Inter-relationships between thermodynamic variables (Continued...)
Lecture 11 - Some useful mathematical manipulations
Lecture 12 - Thermodynamic relations for a closed system with 1 mole of pure substance
Lecture 13 - Maximum work
Lecture 14 - Open systems
Lecture 15 - Equations of state - Virial equations
Lecture 16 - Equations of state - Cubic equations
Lecture 17 - Volume estimation
Lecture 18 - Volume estimation (Continued...)
Lecture 19 - Generalized correlations
Lecture 20 - Generalized correlations (Continued...)
Lecture 21 - Residual properties
Lecture 22 - Residual properties (Continued...)
Lecture 23 - Generalized correlations and residual properties
Lecture 24 - Fugacity coefficient estimation
Lecture 25 - Review of module 3
Lecture 26 - Learning aspects
Lecture 27 - Chemical potential formulations
Lecture 28 - Lewis and Randall rule
Lecture 29 - Partial molar properties

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Lecture 30 - Partial molar property estimation from mixing experiments
Lecture 31 - Partial molar property estimation (Continued...)
Lecture 32 - Activity coefficient from excess property
Lecture 33 - Activity coefficient from excess property (Continued...)
Lecture 34 - Models for activity coefficient in a binary system
Lecture 35 - Models for activity coefficient for a binary system (Continued...)
Lecture 36 - Review of module 4
Lecture 37 - Criteria for phase equilibrium
Lecture 38 - Phase rule for non-reacting systems
Lecture 39 - Clausius Clayperon equation
Lecture 40 - Clausius Clayperon equation (Continued...)
Lecture 41 - Vapour liquid equilibrium
Lecture 42 - Vapour liquid equilibrium (Continued...)
Lecture 43 - Estimation of fugacity coefficient from P-V-T data at equilibrium
Lecture 44 - Liquid-liquid and solid-liquid equilibria
Lecture 45 - Review of module 5
Lecture 46 - Criteria for bioreaction equilibria
Lecture 47 - Phase rule for reacting biosystems
Lecture 48 - Equilibrium constants
Lecture 49 - Effect of temperature on the equilibrium constants
Lecture 50 - Reaction in liquid or solid phases
Lecture 51 - Free energy changes for some bioreactions
Lecture 52 - Electrolytes
Lecture 53 - Review of the classical thermodynamics part
Lecture 54 - Introduction to Statistical thermodynamics
Lecture 55 - Concepts of macro and microstates
Lecture 56 - Thermodynamic probability
Lecture 57 - Boltzmann distribution law
Lecture 58 - Defining Î² in Boltzmann distribution law
Lecture 59 - Relationship between partition function and thermodynamic quantities
Lecture 60 - Partition function of mono atomic gases
Lecture 61 - Entropy in terms of probablity
Lecture 62 - Gibbs paradox
Lecture 63 - Thermodynamic probability for distinguishable particles
Lecture 64 - Thermodynamic probability for indistinguishable particles
Lecture 65 - Sackur - Tetrode equation
Lecture 66 - Partition function and Helmholtz and Gibbs free energy
Lecture 67 - Ensemble approach
Lecture 68 - Ensemble average, time average, Ergodic hypothesis

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Lecture 69 - Partition function for classical systems
Lecture 70 - Pair potentials for atomic systems
Lecture 71 - Potential for molecular systems
Lecture 72 - Computer code for LJ potential
Lecture 73 - Introduction to computer simulations
Lecture 74 - Computer simulations of macromolecules
Lecture 75 - MD simulation examples
Lecture 76 - Link between theory and experiments
Lecture 77 - MD protocol
Lecture 78 - Computer simulation tricks
Lecture 79 - Understanding force fields
Lecture 80 - Idea of Z-matrix
Lecture 81 - Basics of MD simulations
Lecture 82 - Integration algorithms
Lecture 83 - Calculation of Columbic force
Lecture 84 - Calculation of LJ force
Lecture 85 - Monte Carlo simulations
Lecture 86 - Analysis of MD trajectory
Lecture 87 - Case study (water)

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NPTEL Video Course - Biotechnology - NOC:Transport Phenomena in Biological Systems

Subject Co-ordinator - Prof. G.K. Suraishkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mass Conservation
Lecture 3 - Mass Conservation for a Macroscopic System
Lecture 4 - Mass Conservation for a Microscopic System
Lecture 5 - Useful Derivatives
Lecture 6 - Equation of Continuity
Lecture 7 - Mass Flux
Lecture 8 - Mass and Molar Fluxes
Lecture 9 - Shell Balance Approach
Lecture 10 - Continuity Equation Approach
Lecture 11 - Steady-state Diffusion
Lecture 12 - Steady-state Diffusion across Tubular Walls
Lecture 13 - Steady-state Radial Diffusion
Lecture 14 - Steady-state Diffusion with Reaction
Lecture 15 - Unsteady-state Diffusion
Lecture 16 - Unsteady-state Diffusion (Continued...)
Lecture 17 - Pseudo Steady State Approximation (Continued...)
Lecture 18 - Pseudo Steady State Approximation (Continued...)
Lecture 19 - Review of Mass Flux
Lecture 20 - Momentum Flux - Introduction
Lecture 21 - Rheology
Lecture 22 - Fluid Flow types
Lecture 23 - Shell Momentum Balances
Lecture 24 - Shell Momentum Balances (Continued...)
Lecture 25 - Equation of Motion
Lecture 26 - Equation of Motion (Continued...)
Lecture 27 - Application of Equation of Motion to Flow Over an Inclined Plane
Lecture 28 - Laminar Flow through a Pipe
Lecture 29 - Laminar Flow through a Pipe (Continued...)

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Lecture 30 - Capillary Flow
Lecture 31 - Couette Flow
Lecture 32 - Non-dimensional Analysis
Lecture 33 - Unsteady State Flow
Lecture 34 - Unsteady State Flow (Continued...)
Lecture 35 - Pulsatile Flow
Lecture 36 - Turbulent Flow
Lecture 37 - Macroscopic Aspects
Lecture 38 - Friction Factor for Flow through a Straight Horizontal Pipe
Lecture 39 - Application of the Engineering Bernoulli Equation to a Piping Network
Lecture 40 - Stenosis in an Artery
Lecture 41 - Friction Factor for Relative Motion between a Solid and a Liquid
Lecture 42 - Friction Factor for Packed Beds
Lecture 43 - Review of Momentum Flux
Lecture 44 - Review of Momentum Flux (Continued...)
Lecture 45 - Thermal Energy Flux
Lecture 46 - Equation of Energy
Lecture 47 - Temperature Profile in a Tissue
Lecture 48 - Unsteady-state Heat Conduction
Lecture 49 - Review of Heat Flux
Lecture 50 - Charge Flux
Lecture 51 - Charge Flux - Some Fundamentals
Lecture 52 - Charge Flux - Some More Fundamentals
Lecture 53 - Getting Useful Relationships through Maxwell's Equations
Lecture 54 - Charges/Ions in Solution
Lecture 55 - Charge Flux
Lecture 56 - Fluxes Under Simultaneous, Multiple Driving Forces
Lecture 57 - Simultaneous Concentration Gradient and Electrical Potential Gradient
Lecture 58 - Mobility of Ions Across a Membrane
Lecture 59 - Electrical Circuit Representation of a Membrane
Lecture 60 - Action Potential and Axial Current
Lecture 61 - Electrophoresis
Lecture 62 - Simultaneous Concentration Gradient and Velocity Gradient
Lecture 63 - Simultaneous Concentration Gradient and Velocity Gradient - Bioreactor Kla
Lecture 64 - Gas-Liquid Interphase Transport
Lecture 65 - Gas-Liquid Interphase Transport (Continued...)
Lecture 66 - Bioreactor Kla Estimation
Lecture 67 - Liquid Phase Oxygen-Supply Strategy
Lecture 68 - LPOS and Its Mechanism

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Lecture 69 - LPOS for Mold Cultivations
Lecture 70 - LPOS Optimization and Costs
Lecture 71 - Couette Flow Cultivations
Lecture 72 - Pseudo-Steady State Approximation Applied to Bio-oil Production
Lecture 73 - Pseudo-Steady State Approximation Applied to Cancer Treatment
Lecture 74 - Kinetics of a Process with an Enzyme Immobilized on a Non-porous Slab
Lecture 75 - Simultaneous Temperature Gradient and Velocity Gradient
Lecture 76 - Design of Heat Exchangers
Lecture 77 - Design of Heat Exchangers (Continued...)
Lecture 78 - Course Review - Part 1
Lecture 79 - Course Review - Part 2
Lecture 80 - Course Review - Part 3
Lecture 81 - Course Review - Part 4

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NPTEL Video Course - Biotechnology - NOC:Introduction to Developmental Biology

Subject Co-ordinator - Prof. Subramaniam K

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Life cycles and evolution of developmental patterns
Lecture 3 - Experimental embryology
Lecture 4 - Differential gene expression - Part 1
Lecture 5 - Differential gene expression - Part 2
Lecture 6 - Differential gene expression - Part 3
Lecture 7 - Differential gene expression - Part 4
Lecture 8 - Genetic basis - Part 1
Lecture 9 - Genetic basis - Part 2
Lecture 10 - Genetic basis - Part 3
Lecture 11 - Genetic basis - Part 4
Lecture 12 - Genetic basis - Part 5
Lecture 13 - Cell-cell communication - Part 1
Lecture 14 - Cell-cell communication - Part 2
Lecture 15 - Cell-cell communication - Part 3
Lecture 16 - Cell-cell communication - Part 4
Lecture 17 - Genetics of axis formation in Drosophila - Part 1
Lecture 18 - Genetics of axis formation in Drosophila - Part 2
Lecture 19 - Genetics of axis formation in Drosophila - Part 3
Lecture 20 - Genetics of axis formation in Drosophila - Part 4
Lecture 21 - Plant Development - Part 1
Lecture 22 - Plant Development - Part 2
Lecture 23 - Plant Development - Part 3
Lecture 24 - Early Mammalian Development - Part 1
Lecture 25 - Early Mammalian Development - Part 2
Lecture 26 - Evolutionary Developmental Biology - Part 1
Lecture 27 - Evolutionary Developmental Biology - Part 2
Lecture 28 - Evolutionary Developmental Biology - Part 3

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NPTEL Video Course - Biotechnology - NOC:Bioreactor Design and Analysis

Subject Co-ordinator - Prof. Smita Srivastava

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course - Part 1
Lecture 2 - Introduction to the course - Part 2
Lecture 3 - Design of Batch Bioreactors - Part 1
Lecture 4 - Design of Batch Bioreactors - Part 2
Lecture 5 - Design of Batch Bioreactors - Part 3
Lecture 6 - Design of Batch Bioreactors - Part 4
Lecture 7 - Design of Batch Bioreactors - Practice problems
Lecture 8 - Design of Fed Batch bioreactors - Part 1
Lecture 9 - Design of Fed Batch bioreactors - Part 2
Lecture 10 - Design of Fed Batch bioreactors - Practice problems - Part 1
Lecture 11 - Design of Fed Batch bioreactors - Practice Problems - Part 2
Lecture 12 - Design of Fed Batch bioreactors - Practice Problems - Part 3
Lecture 13 - Design of Continuous Bioreactors - Part 1
Lecture 14 - Design of Continuous Bioreactors - Part 2
Lecture 15 - Design of Continuous Bioreactors - Part 3
Lecture 16 - Design of Continuous bioreactors - Practice Problems - Part 1
Lecture 17 - Design of Continuous bioreactors - Practice Problems - Part 1
Lecture 18 - Design of Continuous bioreactors - Practice Problems - Part 2
Lecture 19 - Mass Transfer in Bioreactors - Part 1
Lecture 20 - Mass Transfer in Bioreactors - Part 2
Lecture 21 - Mass Transfer in Bioreactors - Part 3
Lecture 22 - Rheology of fluids
Lecture 23 - Mass Transfer in Bioreactors - Practice Problems
Lecture 24 - Heterogeneous reactions in Bioreactors - Part 1
Lecture 25 - Heterogeneous reactions in Bioreactors - Part 2
Lecture 26 - Heterogeneous reactions in Bioreactors - Part 3
Lecture 27 - Heterogeneous reactions in Bioreactors - Practice Problems
Lecture 28 - Heat Transfer Operations in Bioreactors - Part 1
Lecture 29 - Heat Transfer Operations in Bioreactors - Part 2

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Lecture 30 - Heat Transfer Operations in Bioreactors - Part 3
Lecture 31 - Heat Transfer Operations in Bioreactors - Part 4
Lecture 32 - Heat Transfer Operations in Bioreactors - Practice Problems
Lecture 33 - Scale up of Bioreactors - Part 1
Lecture 34 - Scale up of Bioreactors - Part 2
Lecture 35 - Scale up of Bioreactors - Part 3
Lecture 36 - Scale up of Bioreactors - Part 4
Lecture 37 - Scale up of Bioreactors - Practice Problems
Lecture 38 - Non-ideal reactors: design and analysis - Part 1
Lecture 39 - Non-ideal reactors: design and analysis - Part 2
Lecture 40 - Non-ideal reactors: design and analysis - Practice Problems

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NPTEL Video Course - Biotechnology - NOC:Biochemistry (IITM)

Subject Co-ordinator - Prof. Subramaniam K

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biomolecules - Part 1
Lecture 2 - Introduction to Biomolecules - Part 2
Lecture 3 - Stereochemistry and Properties of Water - Part 1
Lecture 4 - Properties of Water - Part 2 and Introduction to Proteins
Lecture 5 - Characteristics of Proteins and Chromatography techniques
Lecture 6 - Electrophoresis of Proteins and Protein Sequencing
Lecture 7 - Synthesis of Polypeptides and Enzymes - Part 1
Lecture 8 - Enzymes - Part 2
Lecture 9 - Enzymes - Part 3
Lecture 10 - Enzymes - Part 4
Lecture 11 - Enzymes - Part 5 and Carbohydrates - Part 1
Lecture 12 - Carbohydrates - Part 2 and Lipids - Part 1
Lecture 13 - Lipids - Part 2
Lecture 14 - Lipids - Part 3 and Introduction to Metabolism - Part 1
Lecture 15 - Introduction to metabolism - Part 2
Lecture 16 - Bioenergetics - Part 1
Lecture 17 - Bioenergetics - Part 2
Lecture 18 - Glycolysis - Part 1
Lecture 19 - Glycolysis - Part 2
Lecture 20 - Citric Acid Cycle - Part 1
Lecture 21 - Citric Acid Cycle - Part 2
Lecture 22 - Oxidative Phosphorylation - Part 1
Lecture 23 - Oxidative Phosphorylation - Part 2
Lecture 24 - Photosynthesis and Carbon assimilation - Part 1
Lecture 25 - Photosynthesis and Carbon Assimilation - Part 2
Lecture 26 - Photosynthesis and Carbon assimilation - Part 3
Lecture 27 - Nitrogen Metabolism
Lecture 28 - Catabolism of Amino acids
Lecture 29 - Urea cycle and Fatty acid catabolism - Part 1

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Lecture 30 - Fatty acid catabolism - Part 2
Lecture 31 - Fatty Acid Biosynthesis
Lecture 32 - Cholestrol Biosynthesis and Lipid transport - Part 1
Lecture 33 - Cholestrol Biosynthesis and Lipid transport - Part 2
Lecture 34 - Hormonal Regulation and Integration of Mammalian Metabolism

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NPTEL Video Course - Biotechnology - NOC:Cellular Biophysics: A Framework for Quantitative Biology

Subject Co-ordinator - Prof. R. Chaitanya A. Athale

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Introduction - Part 3
Lecture 4 - Solids vs Fluids
Lecture 5 - Viscosity
Lecture 6 - Measuring Viscosity
Lecture 7 - Tutorial - Part 1
Lecture 8 - Tutorial - Part 2
Lecture 9 - Tutorial - Part 3
Lecture 10 - Macromolecular Nature and Hydrophobicity, Structure of Ice, Pauling-Bernal-Fowler Model of Water
Lecture 11 - Entropy and Probability of Water Conformations,Boltzmann Law of Entropy
Lecture 12 - Reynolds Number
Lecture 13 - Tutorial - Part 1
Lecture 14 - Tutorial - Part 2
Lecture 15 - Tutorial - Part 3
Lecture 16 - Hagen-Poisuielle Equation
Lecture 17 - Tutorial - Part 4
Lecture 18 - Sedimentation and Centrifugation - Part 1
Lecture 19 - Sedimentation and Centrifugation - Part 2
Lecture 20 - Blood Centrifugation
Lecture 21 - Review: Paperfuge for Hematology
Lecture 22 - Biology by Numbers
Lecture 23 - Biology by Numbers: Bomb Yield Solved
Lecture 24 - Order of Magnitude Estimates and Approximations
Lecture 25 - Physical Basis of Life
Lecture 26 - Approximating Cellular and Molecular Size Scales
Lecture 27 - Quantifying DNA and Chromatin
Lecture 28 - Protein Abundance and Spacing
Lecture 29 - Model Gene

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Lecture 30 - Cell-Biology by Numbers
Lecture 31 - Experimental Techniques to Quantify Cells
Lecture 32 - Time-Scales in Cells
Lecture 33 - Energy Scale
Lecture 34 - Energy and Thermodynamics of Life - Part 1
Lecture 35 - Energy and Thermodynamics of Life - Part 2
Lecture 36 - Energy and Life- Osmotic Engine
Lecture 37 - Energy and Life- Interconversion of Energy
Lecture 38 - Random Walk Statistics, Stoke-Einstein - Part 1
Lecture 39 - Random Walk Statistics, Stoke-Einstein - Part 2
Lecture 40 - Demonstration of Diffusion of Micron Sized Particles
Lecture 41 - Macromolecular Crowding - Part 1
Lecture 42 - Macromolecular Crowding - Part 2
Lecture 43 - Cytoskeleton
Lecture 44 - Beam Theory Applied to Biopolymer
Lecture 45 - Understanding Chromosomes as Statistical Polymers - Part 1
Lecture 46 - Understanding Chromosomes as Statistical Polymers - Part 2
Lecture 47 - Brownian Ratchets and Molecular Motors
Lecture 48 - Polymerization Dynamics - Part 1
Lecture 49 - Polymerization Dynamics - Part 2
Lecture 50 - Polymerization Dynamics - Part 3
Lecture 51 - Python Programming - Part 1
Lecture 52 - Python Programming - Part 2
Lecture 53 - Python Programming - Part 3
Lecture 54 - Introduction to Membrane Mechanics
Lecture 55 - Membrane Deformation
Lecture 56 - Developmental Pattern Formation
Lecture 57 - Turing Model
Lecture 58 - Phyllotaxis - Part 1
Lecture 59 - Phyllotaxis - Part 2
Lecture 60 - Phyllotaxis - Part 3

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NPTEL Video Course - Biotechnology - NOC:Medical Image Analysis

Subject Co-ordinator - Prof. Ganapathy Krishnamurthi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Medical Image Analysis - Introduction
Lecture 2 - X-ray imaging
Lecture 3 - MRI Physics
Lecture 4 - Magnetic Resonance Image Acquisition
Lecture 5 - Ultrasound Imaging
Lecture 6 - Radionuclide Imaging
Lecture 7 - Basic Image Processing Methods
Lecture 8 - Contrast Enhancement
Lecture 9 - Histogram Equalization
Lecture 10 - Edge Enhancement - Laplacian
Lecture 11 - Noise Reduction
Lecture 12 - Diffusion Filtering
Lecture 13 - Bayesian Image Restoration
Lecture 14 - Registration Introduction
Lecture 15 - Framework
Lecture 16 - Image Coordinates
Lecture 17 - Transforms
Lecture 18 - Metrics
Lecture 19 - NonRigid Registration
Lecture 20 - Demons part - 1
Lecture 21 - Demons part - 2
Lecture 22 - FFDBSplines
Lecture 23 - Endoscopy - Where are we with AI ?
Lecture 24 - Computer vision and DL in the operating room
Lecture 25 - ML in intraoperative tissue identification
Lecture 26 - Basic Image Processing Techniques Using MATLAB
Lecture 27 - Image Registration Using Matlab
Lecture 28 - Basic Image Processing Techniques Using Python
Lecture 29 - Calculus of variations

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Lecture 30 - Snakes - Active Contour Models
Lecture 31 - Level Sets, Geodesic Active Contours, Mumford-Shah Functional, Chan-Vese
Lecture 32 - Mumford-Shah Functional, Chan-Vese
Lecture 33 - Segmentation Models Demo [Snakes (Active Contours) Chan-Vese segmentation, Geodesic active Cont
Lecture 34 - Active Shape Models
Lecture 35 - Snake tutorial
Lecture 36 - Level Set Method
Lecture 37 - Chan Vese Segmentation
Lecture 38 - Neural Networks Introduction
Lecture 39 - Linear Regression
Lecture 40 - Gradient Descent Formulation
Lecture 41 - Linear Regression Demo
Lecture 42 - Feed forward neural Networks
Lecture 43 - Example with XOR
Lecture 44 - Introduction to CNNs
Lecture 45 - Max Pooling
Lecture 46 - Applications of Cnns
Lecture 47 - CNN Training
Lecture 48 - Semantic Segmentation
Lecture 49 - Classification Demo in Pytorch
Lecture 50 - Generative Models
Lecture 51 - GAN Final Demo

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NPTEL Video Course - Biotechnology - NOC:Organ Printing

Subject Co-ordinator - Prof. Falguni Pati

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organ Printing course and Content Discussion
Lecture 2 - Introduction to 3D Bioprinting
Lecture 3 - Introduction to Inkjet 3D Bioprinting
Lecture 4 - Introduction to Inkjet 3D Bioprinting (Continued...)
Lecture 5 - Introduction to Extrusion Bioprinting
Lecture 6 - Introduction to Extrusion 3D Bioprinting (Continued...)
Lecture 7 - Introduction to Laser-assisted Bioprinting
Lecture 8 - Comparison of Different Bioprinting Techniques - Part 1
Lecture 9 - Comparison of Different Bioprinting Techniques - Part 2
Lecture 10 - 3D Bioprinting in Support Bath
Lecture 11 - Introduction to Bioinks
Lecture 12 - Important material requirement for Bioink development
Lecture 13 - Crosslinking of Hydrogels for Bioprinting
Lecture 14 - Single-Material and Multimaterial Bioink Systems
Lecture 15 - Printability for Extrusion Bioprinting
Lecture 16 - What is required and how to print an organ?
Lecture 17 - Level of complexity in Tissues/Organs for Bioprinting
Lecture 18 - Design approaches in Bioprinting
Lecture 19 - Bioprinting of Vasculature
Lecture 20 - Direct printing of vasculature
Lecture 21 - Indirect printing of vasculature
Lecture 22 - Design of Cornea Tissue-Specific Bioink and 3D Bioprinting of Cornea
Lecture 23 - Design of Cornea Tissue-Specific Bioink and 3D Bioprinting of Cornea (Continued...)
Lecture 24 - Bioprinting of Heart
Lecture 25 - Bioprinting of Liver
Lecture 26 - Bioprinting of Kidney
Lecture 27 - Bioprinting of Lung
Lecture 28 - 4D Bioprinting - Part 1
Lecture 29 - 4D Bioprinting - Part 2

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Lecture 30 - 4D Bioprinting - Part 3
Lecture 31 - In Situ Bioprinting
Lecture 32 - In Situ Bioprinting (Continued...)
Lecture 33 - Medical Modeling for Organ Printing
Lecture 34 - Medical Modeling for Organ Printing (Continued...)
Lecture 35 - Next Step in Bioprinting
Lecture 36 - Next Step in Bioprinting (Continued...)
Lecture 37 - Ethical Issues related to Organ Printing

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NPTEL Video Course - Biotechnology - NOC:Introduction to Cell Biology

Subject Co-ordinator - Prof. Girish Ratnaparkhi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview of Central Dogma of Molecular Biology - Part 1
Lecture 2 - An Overview of Central Dogma of Molecular Biology - Part 2
Lecture 3 - Central Dogma : The DNA Structure - Part 1
Lecture 4 - Central Dogma : The DNA Structure - Part 2
Lecture 5 - Central Dogma : The DNA Structure - Part 3
Lecture 6 - Central Dogma : Replication of DNA - Part 1
Lecture 7 - Central Dogma : Replication of DNA - Part 2
Lecture 8 - Central Dogma : Transcription - Part 1
Lecture 9 - Central Dogma : Transcription - Part 2
Lecture 10 - Central Dogma : Transcription - Part 3
Lecture 11 - Central Dogma : Tranlation - Part 1
Lecture 12 - Central Dogma : Tranlation - Part 2
Lecture 13 - Central Dogma : Tranlation - Part 3
Lecture 14 - Protein Structure, Folding and Function - Part 1
Lecture 15 - Protein Structure, Folding and Function - Part 2
Lecture 16 - Secondary Strcuture of Proteins: Ramachandran Plot - Part 1
Lecture 17 - Secondary Strcuture of Proteins: Ramachandran Plot - Part 2
Lecture 18 - Protein Structure, Folding and Function - Part 3
Lecture 19 - Protein Structure, Folding and Function - Part 4
Lecture 20 - Protein Structure, Folding and Function - Part 5
Lecture 21 - Protein Structure, Folding and Function - Part 6
Lecture 22 - Enzymes, Carbohydrates and Lipids
Lecture 23 - Introduction to Genetics - Part 1
Lecture 24 - Introduction to Genetics - Part 2
Lecture 25 - Introduction to Genetics - Part 3
Lecture 26 - Mendilian and Non-Mendilian Genetics - Part 1
Lecture 27 - Mendilian and Non-Mendilian Genetics - Part 2
Lecture 28 - Mendilian and Non-Mendilian Genetics - Part 3
Lecture 29 - Introduction to Microscopy - Part 1

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Lecture 30 - Introduction to Microscopy - Part 2
Lecture 31 - Introduction to Microscopy - Part 3
Lecture 32 - Biology of Cells - Part 1
Lecture 33 - Biology of Cells - Part 2
Lecture 34 - Complexity and Compartmentalization in Cells - Part 1
Lecture 35 - Complexity and Compartmentalization in Cells - Part 2
Lecture 36 - Endosymbiont Theory
Lecture 37 - Structure of the Cell: Cell Wall and Cell Membrane
Lecture 38 - Structure of the Cell: Discussion Session
Lecture 39 - Plasma Membrane: The Boundaries of Life
Lecture 40 - Plasma Membrane: Discussion Session
Lecture 41 - Introduction to Cytoskeleton - Part 1
Lecture 42 - Cytoskeleton: Discussion Session 1
Lecture 43 - Introduction to Cytoskeleton - Part 2
Lecture 44 - Cytoskeleton: Discussion Session 2
Lecture 45 - Motor Proteins in Cell
Lecture 46 - Motor Proteins in Cell: Discussion Session
Lecture 47 - Discussion on Directionality of Motor Protein
Lecture 48 - Endomembrane System of Cells - Part 1
Lecture 49 - Endomembrane System of Cells: Discussion Session 1
Lecture 50 - Endomembrane System of Cells - Part 2
Lecture 51 - Endomembrane System of Cells: Discussion Session 2
Lecture 52 - Endomembrane System of Cells - Part 3
Lecture 53 - Endomembrane System of Cells: Discussion Session 3
Lecture 54 - Endomembrane System of Cells - Part 4
Lecture 55 - Endomembrane System of Cells: Discussion Session 4
Lecture 56 - Cell Division
Lecture 57 - Cell Division: Discussion session
Lecture 58 - Discussion Session on Organization and Function of a Cell

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NPTEL Video Course - Biotechnology - NOC:RNA Biology

Subject Co-ordinator - Prof. Rajesh Ramachandran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to RNA Biology and RNA World - The Beginning
Lecture 2 - Introduction to RNA Biology and RNA World - Evidences
Lecture 3 - Introduction to RNA Biology and RNA World - Origin of Monomers
Lecture 4 - Introduction to RNA Biology and RNA World - Shift to DNA
Lecture 5 - Introduction to RNA Biology and RNA World - RNA Self Replication
Lecture 6 - Introduction to RNA Biology and RNA World - Origin of RNA Enzymes
Lecture 7 - RNA as Enzymes: The Ribozymes
Lecture 8 - RNA as Enzymes: Structure and Functions
Lecture 9 - RNA as Enzymes: The Present and Future
Lecture 10 - RNA Transcription: The Central Dogma
Lecture 11 - RNA Transcription: Initial Steps
Lecture 12 - RNA Transcription: Different Stages
Lecture 13 - RNA Transcription: Termination and RNA Modification
Lecture 14 - RNA Transcription: Different Polymerases
Lecture 15 - RNA Processing and Life Cycle: RNA Maturation and RNPs
Lecture 16 - RNA Processing and Life Cycle: RNA Splicing
Lecture 17 - RNA Processing and Life Cycle: Post Transcriptional Processing
Lecture 18 - Alternative RNA Processing and Editing: Alternative Splicing
Lecture 19 - Alternative RNA Processing and Editing: Implications of Introns
Lecture 20 - Alternative RNA Processing and Editing: Splicing and Pathology
Lecture 21 - Alternative RNA Processing and Editing: RNA Editing in Detail
Lecture 22 - Alternative RNA Processing and Editing: Relevance of RNA Editing
Lecture 23 - Alternative RNA Processing and Editing: Relevance in Immunology
Lecture 24 - RNA Splicing, Export and Stability: Relevance of Introns
Lecture 25 - RNA Splicing, Export and Stability: Introns in RNA Splicing
Lecture 26 - RNA Splicing, Export and Stability: Different Spliceosomes
Lecture 27 - RNA Splicing, Export and Stability: SMN Complex
Lecture 28 - snRNA, rRNA, miRNA, siRNA Processing, Export and Function: Introns and Link to Splicing
Lecture 29 - snRNA, rRNA, miRNA, siRNA Processing, Export and Function: RNA Helicases

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Lecture 30 - snRNA, rRNA, miRNA, siRNA Processing, Export and Function: Nucleo Cytoplasmic Transport
Lecture 31 - snRNA, rRNA, miRNA, siRNA Processing, Export and Function: Nucleoporins and miRNAs
Lecture 32 - snRNA, rRNA, miRNA, siRNA Processing, Export and Function: RNA Export Mechanisms
Lecture 33 - snRNA, rRNA, miRNA, siRNA Processing, Export and Function: RNA Quality Control
Lecture 34 - Mechanisms of RNA Decay and Non Coding RNAs: Decay Pathways
Lecture 35 - Mechanisms of RNA Decay and Non Coding RNAs: The Exosomes
Lecture 36 - Mechanisms of RNA Decay and Non Coding RNAs: mRNA Surveillance
Lecture 37 - Mechanisms of RNA Decay and Non Coding RNAs: Mechanisms of RNA Decay
Lecture 38 - Mechanisms of RNA Decay and Non Coding RNAs: Autoregulation of RNAs
Lecture 39 - Mechanisms of RNA Decay and Non Coding RNAs: Introduction to Non-Coding RNAs
Lecture 40 - Dosage Compensation and X-Inactivation: SRP and Different Modes of Compensation
Lecture 41 - Dosage Compensation and X-Inactivation: Dosage Compensation of X
Lecture 42 - Dosage Compensation and X-Inactivation: Omprinted vs Random X Inactivation
Lecture 43 - Dosage Compensation and X-Inactivation: Molecular Basis of X-Inactivation
Lecture 44 - Dosage Compensation and X-Inactivation: ES Cells and X-Inactivation
Lecture 45 - Dosage Compensation, Xist and ncRNA in Imprinting: The Roles of YY1
Lecture 46 - Dosage Compensation, Xist and ncRNA in Imprinting: shRNAs and Gene Expression
Lecture 47 - Dosage Compensation, Xist and ncRNA in Imprinting: Mechanism of RNAi in Action
Lecture 48 - Dosage Compensation, Xist and ncRNA in Imprinting: Genomic Imprinting in Action
Lecture 49 - Dosage Compensation, Xist and ncRNA in Imprinting: Different ncRNAs and their Roles
Lecture 50 - Dosage Compensation, Xist and ncRNA in Imprinting: lncRNA-Induced Cancer
Lecture 51 - Dosage Compensation, Xist and ncRNA in Imprinting: Xist and Cancer
Lecture 52 - Telomere, Telomerase and Impact on Genomes: The Importance of Telomeres
Lecture 53 - Telomere, Telomerase and Impact on Genomes: Telomerase and Aging
Lecture 54 - Telomere, Telomerase and Impact on Genomes: Telomere Length as Marker of Aging
Lecture 55 - Telomere, Telomerase and Impact on Genomes: Telomeres and Cancer
Lecture 56 - Telomere, Telomerase and Impact on Genomes: Cell Cycle Arrest
Lecture 57 - Telomere, Telomerase and Impact on Genomes: Maintenance and Manipulation of Telomeres
Lecture 58 - Epitranscriptome and Protein Synthesis: Important RNA Modifications
Lecture 59 - Epitranscriptome and Protein Synthesis: Readers, Writes and Erasers
Lecture 60 - Epitranscriptome and Protein Synthesis: Biological Implications of RNA Modifications
Lecture 61 - Epitranscriptome and Protein Synthesis: Roles of RNAs in Translation
Lecture 62 - Epitranscriptome and Protein Synthesis: Mechanism of Translation

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NPTEL Video Course - Biotechnology - NOC:Biomechanics

Subject Co-ordinator - Prof. Varadhan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to forces - Resolving forces, principle of transmissibility
Lecture 2 - Statics FBD and EOE
Lecture 3 - Example problems on FBD and EOE
Lecture 4 - Joints in human body
Lecture 5 - Machines and mechanical advantage
Lecture 6 - Levers and types of levers
Lecture 7 - Insertion point and torque
Lecture 8 - Practice problem - 1
Lecture 9 - Practice problem - 2
Lecture 10 - Key terminologies
Lecture 11 - Anatomical planes and axis
Lecture 12 - Sagittal plane movements
Lecture 13 - Coronal plane movements
Lecture 14 - Transverse plane movements
Lecture 15 - Muscles - Muscle fascicles
Lecture 16 - Muscle fibers- Pennation angle
Lecture 17 - More on pennation angle
Lecture 18 - Excitation contraction coupling
Lecture 19 - Sliding filament theory
Lecture 20 - Force length relationship
Lecture 21 - Shoulder joints and muscles
Lecture 22 - Shoulder problem - 1
Lecture 23 - Shoulder problem - 2
Lecture 24 - Elbow theory
Lecture 25 - Elbow problem - 1
Lecture 26 - Elbow problem - 2
Lecture 27 - Elbow problem - 3
Lecture 28 - Wrist theory
Lecture 29 - Finger theory

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Lecture 30 - Finger muscles
Lecture 31 - Spine anatomy and movements
Lecture 32 - Spine muscles
Lecture 33 - Spine problem
Lecture 34 - Hip anatomy and movements
Lecture 35 - Hip muscles
Lecture 36 - Hip problem
Lecture 37 - Knee anatomy and movements
Lecture 38 - Knee muscles
Lecture 39 - Knee problem
Lecture 40 - Ankle anatomy and movements
Lecture 41 - Ankle muscles
Lecture 42 - Ankle problem
Lecture 43 - Grasping- reaching- chains
Lecture 44 - D.O.F mobility, open/closed chain
Lecture 45 - Forward kinematics and workspace
Lecture 46 - 2R inverse kinematics
Lecture 47 - 3R kinematics forward and inverse
Lecture 48 - D-H parameters
Lecture 49 - Velocity and jacobian
Lecture 50 - 3R velocity
Lecture 51 - Tissues and types of tissues
Lecture 52 - Bone microstructure and cells
Lecture 53 - Properties of bones
Lecture 54 - Wolffs Law and Hookean behavior
Lecture 55 - Elastic properties and stress strain relations
Lecture 56 - Stress strain curve and mechanical properties of biological materials
Lecture 57 - Bending of Bones
Lecture 58 - Viscolelastic modelling
Lecture 59 - Maxwell Model
Lecture 60 - Voight Model
Lecture 61 - Kelvin model
Lecture 62 - Viscoelasticity in bones
Lecture 63 - Tissues and its constituents
Lecture 64 - Cartilages, ligaments and tendons
Lecture 65 - Stress strain relations in tendons
Lecture 66 - Tendon forces and factors affecting tendon property
Lecture 67 - Gliding resistance, tendon wrapping and friction forces
Lecture 68 - Enslaving - Intertendinuos force transfer and motor units

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Lecture 69 - Introduction to enslavement
Lecture 70 - Enslaving effects in finger force production - 1
Lecture 71 - Enslaving effects in finger force production - 2
Lecture 72 - Wrist posture and finger interdependence - 1
Lecture 73 - Wrist posture and finger interdependence - 2
Lecture 74 - Wrist posture and finger interdependence - 3
Lecture 75 - Measurement of orientation in 3D space - Devices
Lecture 76 - Rotation matrices in 2D and 3D2
Lecture 77 - Animating using rotation matrices- Matlab Examples
Lecture 78 - Composite rotation matrix and relative orientations
Lecture 79 - Complex numbers and quaternions
Lecture 80 - Singularity, Gimbal Lock, Advantages and disadvantages of parameterization methods
Lecture 81 - Single finger kinematics measurement using IMU's
Lecture 82 - IMU based Full hand kinematics measurement system (HKMS)
Lecture 83 - Demonstration of the Hand Kinematics Measurement System (HKMS)
Lecture 84 - Introduction to Gait and running

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NPTEL Video Course - Biotechnology - Introduction to Synthetic Biology

Subject Co-ordinator - Prof. Karthik Raman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Synthetic Biology - Day 1 Part 1
Lecture 2 - Introduction to Synthetic Biology - Day 1 Part 2
Lecture 3 - Introduction to Synthetic Biology - Day 1 Part 3
Lecture 4 - Introduction to Synthetic Biology - Day 1 Part 4
Lecture 5 - Introduction to Synthetic Biology - Day 2 Part 1
Lecture 6 - Introduction to Synthetic Biology - Day 2 Part 2
Lecture 7 - Introduction to Synthetic Biology - Day 2 Part 3
Lecture 8 - Introduction to Synthetic Biology - Day 2 Part 4
Lecture 9 - Introduction to Synthetic Biology - Day 3 Part 1
Lecture 10 - Introduction to Synthetic Biology - Day 3 Part 2
Lecture 11 - Introduction to Synthetic Biology - Day 3 Part 3
Lecture 12 - Introduction to Synthetic Biology - Day 3 Part 4
Lecture 13 - Introduction to Synthetic Biology - Day 4 Part 1
Lecture 14 - Introduction to Synthetic Biology - Day 4 Part 2
Lecture 15 - Introduction to Synthetic Biology - Day 4 Part 3
Lecture 16 - Introduction to Synthetic Biology - Day 5 Part 1
Lecture 17 - Introduction to Synthetic Biology - Day 5 Part 2
Lecture 18 - Introduction to Synthetic Biology - Day 5 Part 3
Lecture 19 - Introduction to Synthetic Biology - Day 5 Part 4
Lecture 20 - Introduction to Synthetic Biology - Day 6 Part 1
Lecture 21 - Introduction to Synthetic Biology - Day 6 Part 2
Lecture 22 - Introduction to Synthetic Biology - Day 6 Part 3
Lecture 23 - Introduction to Synthetic Biology - Day 7 Part 1
Lecture 24 - Introduction to Synthetic Biology - Day 7 Part 2
Lecture 25 - Introduction to Synthetic Biology - Day 7 Part 3
Lecture 26 - Introduction to Synthetic Biology - Day 8 Part 1
Lecture 27 - Introduction to Synthetic Biology - Day 8 Part 2
Lecture 28 - Introduction to Synthetic Biology - Day 9 Part 1
Lecture 29 - Introduction to Synthetic Biology - Day 9 Part 2

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Lecture 30 - Introduction to Synthetic Biology - Day 9 Part 3
Lecture 31 - Introduction to Synthetic Biology - Day 10 Part 1
Lecture 32 - Introduction to Synthetic Biology - Day 10 Part 2
Lecture 33 - Introduction to Synthetic Biology - Day 10 Part 3

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NPTEL Video Course - Biotechnology - NOC:Computational Genomics

Subject Co-ordinator - Prof. Vineet Kumar Sharma

Co-ordinating Institute - IISER Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Different OMICS Approaches and their Applications
Lecture 2 - Genetic Information in Prokaryotic
Lecture 3 - Databases and Web Resources to Store and Access the Biological Data
Lecture 4 - First and Second Generation Sequencing Technologies
Lecture 5 - Long Read Sequencing and Linked Read Sequencing - Part 1
Lecture 6 - Long Read Sequencing and Linked Read Sequencing - Part 2
Lecture 7 - Sequence Formats and Databases for Genomic Analysis
Lecture 8 - Introduction to Linux
Lecture 9 - File Handling and Remote Connectivity in Linux
Lecture 10 - Running Linux Commands and Installation of Genomic Packages
Lecture 11 - Introduction to R and Applications in Genomic Analysis
Lecture 12 - Publicly Available Tools and Need for Workstations for Genomic Analysis
Lecture 13 - Overview of Genomic and Transcriptomic Analysis
Lecture 14 - Genomic and Transcriptomic Analysis of an Organism with Case Studies
Lecture 15 - How to Collect and Confirm Sample of the Species to be Sequenced and Transcriptome Sequencing Ap
Lecture 16 - Estimating the Amount of Sequencing Coverage for a Genome and Hybrid Sequencing Approaches
Lecture 17 - Types of Reads, Quality Filtering, Estimating the Genome Complexity and Heterozygosity
Lecture 18 - Genome Assembly and its Completion Status, Assembly Algorithms
Lecture 19 - Commonly Used Assembly Tools
Lecture 20 - Linked-Read Sequencing and Processing
Lecture 21 - Long Reads Analysis and Assembly Workflow
Lecture 22 - De novo Assembly Using Genomic and Transcriptomic Reads
Lecture 23 - Merging Assemblies to Create Hybrid Assembly and Determining the Quality of Assembly
Lecture 24 - Chromosomal Level Assembly and Case Studies
Lecture 25 - Identification and Annotation of Repeats in Genomes
Lecture 26 - De novo Transcriptome Assembly and Making the Coding Gene Set
Lecture 27 - Prediction of tRNA, rRNA and miRNA in a Genome
Lecture 28 - Functional Annotation and Identification of Metabolic Pathways in a Genome
Lecture 29 - Comprehensive Functional Annotation of Predicted Genes in a Genome

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Lecture 30 - Functional Annotation of Predicted Genes by Alternate Methods
Lecture 31 - Methods and Steps to Perform the Evolutionary Analysis of a Genome
Lecture 32 - Methods for Taxonomic Classification and Phylogeny Econstruction and Analysis
Lecture 33 - Epigenetics, ChIp-seq, Transcriptome and Microarrays for Regulation of Expression
Lecture 34 - Single Cell Genomics, 10X Chromium Linked-reads and Illumina Sequencing, Single Cell Gene Expres
Lecture 35 - Application of Multiomics Approaches in Human Health and Diseases Such as Cancer, Diabetes, etc.
Lecture 36 - Prokaryotic Genome Sequencing and Assembly Approaches
Lecture 37 - Gene Prediction Approaches and Common Methods for Bacterial Gene Prediction
Lecture 38 - Common Methods for Annotation of a Bacterial Genome, t-RNA, rRNA, Operon Prediction and Annotati
Lecture 39 - Phylogenetic Analysis of Bacterial Genomes
Lecture 40 - Metabolic and Comparative Analysis
Lecture 41 - Microbiome and Metagenome, Human, Organismal and Environmental Microbiomes
Lecture 42 - Sequencing and Assembly of Metagenomes, Gene Prediction, Annotation, MAGs - Part 1
Lecture 43 - Sequencing and Assembly of Metagenomes, Gene Prediction, Annotation, MAGs - Part 2
Lecture 44 - Taxonomic Analysis Using Amplicon Sequence Variants, Statistical Analysis

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NPTEL Video Course - Biotechnology - NOC:Human Physiology

Subject Co-ordinator - Prof. Nishikant Subedar

Co-ordinating Institute - IISER Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Homeostasis
Lecture 2 - Mechanisms of Homeostasis - Part 1
Lecture 3 - Mechanisms of Homeostasis - Part 2
Lecture 4 - Physiology of muscle - Part 1
Lecture 5 - Physiology of muscle - Part 2
Lecture 6 - Molecular Mechanism of muscle contractility - Part 1
Lecture 7 - Molecular Mechanism of muscle contractility - Part 2
Lecture 8 - How does the heart muscle work? - Part 1
Lecture 9 - How does the heart muscle work? - Part 2
Lecture 10 - Cardiac system : From stimuli to rhythmic muscle contraction - Part 1
Lecture 11 - Cardiac system : From stimuli to rhythmic muscle contraction - Part 2
Lecture 12 - Cardiac system : From stimuli to rhythmic muscle contraction - Part 3
Lecture 13 - Cardiac system : From stimuli to rhythmic muscle contraction - Part 4
Lecture 14 - Rhythemicity of heart beat - Part 1
Lecture 15 - Rhythemicity of heart beat - Part 2
Lecture 16 - Hemodynamics
Lecture 17 - Hemodynamics and Regulation - Part 1
Lecture 18 - Hemodynamics and Regulation - Part 2
Lecture 19 - Hemodynamics and Regulation - Part 3
Lecture 20 - Hemodynamics and Regulation - Part 4
Lecture 21 - Hemodynamics and Regulation - Part 5
Lecture 22 - Hemodynamics and Regulation - Part 6
Lecture 23 - Lymphatic system
Lecture 24 - Excretory system : Kidney - Part 1
Lecture 25 - Excretory system : Kidney - Part 2
Lecture 26 - Excretory system : Kidney - Part 3
Lecture 27 - Kidney and RBC production
Lecture 28 - Excretory system : Nephron - Part 1
Lecture 29 - Excretory system : Nephron - Part 2

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Lecture 30 - Excretory system : Nephron - Part 2.1
Lecture 31 - Excretory system : Nephron - Part 3
Lecture 32 - Excretory system : Regulation of Osmolarity and counter-current mechanism - Part 1
Lecture 33 - Excretory system : Regulation of Osmolarity and counter-current mechanism - Part 2
Lecture 34 - Excretory system : Regulation of Osmolarity and counter-current mechanism - Part 3
Lecture 35 - Physiology and Introduction of Respiration - Part 1
Lecture 36 - Physiology and Introduction of Respiration - Part 2
Lecture 37 - Respiration - Part 1
Lecture 38 - Respiration - Part 2
Lecture 39 - Respiration - Part 3
Lecture 40 - Respiration - Part 4
Lecture 41 - Physiology of smooth muscles and digestive system - Part 1
Lecture 42 - Physiology of smooth muscles and digestive system - Part 2
Lecture 43 - Physiology of smooth muscles and digestive system - Part 3
Lecture 44 - Physiology of smooth muscles and digestive system - Part 4
Lecture 45 - Secretory functions of alimentary tract - Part 1
Lecture 46 - Secretory functions of alimentary tract - Part 2
Lecture 47 - Secretory functions of alimentary tract and Pancreas - Part 1
Lecture 48 - Secretory functions of alimentary tract and Pancreas - Part 2
Lecture 49 - Secretory functions of Pancreas and liver
Lecture 50 - Secretory functions of Liver and Gallbladder
Lecture 51 - Introduction to Endrocine system
Lecture 52 - Pituitary gland and growth hormone secretion - Part 1
Lecture 53 - Pituitary gland and growth hormone secretion - Part 2
Lecture 54 - Thyroid gland - Part 1
Lecture 55 - Thyroid gland - Part 2
Lecture 56 - Hormones of adrenal cortex - Part 1
Lecture 57 - Hormones of adrenal cortex - Part 2
Lecture 58 - Physiology of Glucocorticoids - Part 1
Lecture 59 - Physiology of Glucocorticoids - Part 2
Lecture 60 - Course Summary

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NPTEL Video Course - Biotechnology - NOC:I Think Biology

Subject Co-ordinator - Prof. Kaustubh Rau, Prof. Sravanti Uppaluri, Prof. Divya Uma, Prof. Jayanti Ray Mukher

Co-ordinating Institute - Azim Premji University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Biology ?
Lecture 2 - Pillars of Biology
Lecture 3 - Biology and the City
Lecture 4 - The Process of Science
Lecture 5 - A Tale of Forgotten Scientists - Part I
Lecture 6 - A Tale of Forgotten Scientists - Part II
Lecture 7 - Numbers and Scales in Biology - Part I
Lecture 8 - Numbers and Scales in Biology - Part II
Lecture 9 - Experimentation vs Theory_Discussion
Lecture 10 - How to Find Reliable Information ?
Lecture 11 - How to Read a Scientific Article ?
Lecture 12 - Biomolecules - Part I
Lecture 13 - Biomolecules - Part II
Lecture 14 - Central Dogma
Lecture 15 - Gene Regulation
Lecture 16 - Non-Coding RNA
Lecture 17 - Introduction to Cells
Lecture 18 - Our Favourite Cells - Part I
Lecture 19 - Our Favourite Cells - Part II
Lecture 20 - Cell Cycle
Lecture 21 - Cell Cycle Control
Lecture 22 - Cancer Biology (Guest Lectuer) - Dr. Ramray Bhat (IISc)
Lecture 23 - Discussion on Cancer Biology - Dr. Ramray Bhat (IISc) and Dr. Divya Uma (Azim Premji University)
Lecture 24 - Genetics - I
Lecture 25 - Genetics - II
Lecture 26 - Genetics - III
Lecture 27 - Gene Mutations and Genetic Disorders (Guest Lectuer) Dr. Antara Das, Azim Premji University
Lecture 28 - Studying Human Genetic Disorders using Transgenic Animals - Research talk (Guest Lectuer)
Lecture 29 - Bead Microscopy (Guest Lectuer) Dr. Procheta Mallik (ISPF and ThinkTac)

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Lecture 30 - Molecular Biology Techniques
Lecture 31 - Bacterial DNA Isolation and PCR - Hands-on (Guest Lectuer) Dr. Beena DB (Azim Premji University)
Lecture 32 - BT Cotton - Part 1 (Case study)
Lecture 33 - Molecular Biology Techniques - BT Cotton - Part 2 (Case study)
Lecture 34 - Introduction to Evolution
Lecture 35 - Evidences of Evolution
Lecture 36 - Mechanism of Evolution
Lecture 37 - Misconceptions about Evolution - Discussion
Lecture 38 - Human Evolution
Lecture 39 - Species, Speciation and Biodiversity - I
Lecture 40 - Species, Speciation and Biodiversity - II
Lecture 41 - Measuring Biodiversity (Tutorial)
Lecture 42 - Speciation
Lecture 43 - Speciation (Case studies)
Lecture 44 - Introduction to Ecological Interactions - Part 1
Lecture 45 - Ecological Interactions - Part 2
Lecture 46 - Ecological Interactions - Part 3
Lecture 47 - Mutualism - Figs (Case Study)
Lecture 48 - Seed Dispersal (Case study)
Lecture 49 - Introduction to Public Health (Guest Lectuer) Dr.Abha Rao (Public Health Foundation of India)
Lecture 50 - Public Health in India (Guest Lectuer) Dr. Abha Rao (Public Health Foundation of India)
Lecture 51 - Discussion on Public Health - Dr. Abha Rao (PHFI) and Mr. Pratush Brahma (University of Florida)
Lecture 52 - Public Health - Rotavirus (Case study)
Lecture 53 - Public Health - Malaria (Case study) - Part 1
Lecture 54 - Public Health - Malaria (Case study) - Part 2
Lecture 55 - Biology and Climate Change - Part 1
Lecture 56 - Biology and Climate Change - Part 2
Lecture 57 - Biology and Climate Change - Part 3
Lecture 58 - Biodiversity Conservation (Guest Lectuer) Dr. Krishnapriya Tamma (Azim Premji University)
Lecture 59 - Discussion on Biology and Society
Lecture 60 - Discussion on Art and Science
Lecture 61 - Biology and Society - Case study on Stray Dogs
Lecture 62 - Nature Relatedness
Lecture 63 - Course Wrap-Up

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NPTEL Video Course - Biotechnology - NOC:Classics in Neuroscience

Subject Co-ordinator - Prof.Varadhan SKM

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Neuroscience - Introduction - Part 1
Lecture 2 - History of Neuroscience - Introduction - Part 2
Lecture 3 - Factors that produce discoveries
Lecture 4 - Importance of the 1950s in Neuroscience
Lecture 5 - Advances in Molecular Biology (Genes to DNA)
Lecture 6 - Discovery of the structure of the DNA
Lecture 7 - How DNA works
Lecture 8 - Molecular biology of the human brain
Lecture 9 - Signaling molecule: The First growth Factor
Lecture 10 - Nerve Growth Factor
Lecture 11 - Organizing the Connections
Lecture 12 - Axonal Transport
Lecture 13 - Signaling molecules: The First Neurotransmitter in the brain
Lecture 14 - The concept of Lock and Key
Lecture 15 - The Soup vs Sparks Debate
Lecture 16 - Intracellular Electrode, Neurotransmitter in the Brain, Dales Law
Lecture 17 - Early evidence of Acetylcholine and Glutamate
Lecture 18 - Early evidence of GABA and Serotonin
Lecture 19 - Catecholamine and Hormones
Lecture 20 - Second messengers and Hormones
Lecture 21 - Pheromones
Lecture 22 - Revolution in Cytology
Lecture 23 - Synapse and the 'Neuronism vs Reticularism' debate
Lecture 24 - Contributions by Rene Couteaux and George Koelle
Lecture 25 - Chemical Synapse
Lecture 26 - Synapse and the Neuromuscular Junction
Lecture 27 - The Electrical Synapse and Myelin
Lecture 28 - Physiology: The Action Potential - Part 1

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Lecture 29 - Recording nerve impulses and single action potentials
Lecture 30 - Recording from nerve and plant cells
Lecture 31 - Recording Local circuits, Hodgkin and Huxely contributions - Part 1
Lecture 32 - Hodgkin and Huxely model - Part 2 and Kenneth Cole Contributions
Lecture 33 - GHK equation and HH action potentials
Lecture 34 - First Electrophysiological Evidence for Synaptic Transmission
Lecture 35 - Bernard Katz
Lecture 36 - End-Plate Potential and Synaptic Quanta
Lecture 37 - Eccles and Spinal motor neuron
Lecture 38 - Invertebrate simple systems: Aplysia
Lecture 39 - Other studies of sensory responses
Lecture 40 - Legacy of Golgi and Ramo`n y Cajal
Lecture 41 - Dynamic polarization of Neuron
Lecture 42 - Modern Research
Lecture 43 - Synaptic Integration and Action Potential Initiation
Lecture 44 - Active properties of dendrites
Lecture 45 - Dendritic dominance
Lecture 46 - Dendritic spines
Lecture 47 - Rethinking the concept of Neuron Doctrine
Lecture 48 - Muscle spindles
Lecture 49 - Spinal cord pathways
Lecture 50 - Retinal Processing
Lecture 51 - Keffler Hartline
Lecture 52 - Stephen Kuffler and Horace Barlow
Lecture 53 - Expansion of the Reflex concept
Lecture 54 - Central Pattern generators
Lecture 55 - The cortical column
Lecture 56 - Vernon Mountcastle
Lecture 57 - Central Visual Processing
Lecture 58 - Central Visual Processing and Feature Detectors
Lecture 59 - Intracellular recordings from the brain - Part 1
Lecture 60 - Intracellular recordings from the brain - Part 2
Lecture 61 - Two motor systems
Lecture 62 - Auditory cortex and The pattern theory of olfaction
Lecture 63 - Arousal and Reticular activating system
Lecture 64 - Sleep and Rapid Eye Movements
Lecture 65 - Operant Conditioning by brain stimulation
Lecture 66 - Hypothalamus and Feeding Behavior
Lecture 67 - Brain as a gland

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Lecture 68 - Hypothalamic-Neurohypophyseal System
Lecture 69 - Hypothalamic-Adenohypophyseal System
Lecture 70 - Founding Modern Neuroanatomy
Lecture 71 - Psychology and Ethology
Lecture 72 - Karl Lashley
Lecture 73 - Donald Hebb
Lecture 74 - Limbic system-Limbic Lobe and Papez Circuit
Lecture 75 - Limbic system-Kluver-Bucy Syndrome
Lecture 76 - The Limbic system and Amygdala
Lecture 77 - The Hippocampus and Patient H.M
Lecture 78 - Brenda Milner
Lecture 79 - Neurology: Foundations of Brain Imaging
Lecture 80 - The Neurological unit of the Boston City Hospital
Lecture 81 - Derek Denny-Brown, Raymond Adams and C. Miller Fisher
Lecture 82 - Montreal Neurological Institute
Lecture 83 - Cerebral Circulation
Lecture 84 - Spreading depression of Leo and Migraine
Lecture 85 - The Eradication of Polio
Lecture 86 - Origin of Neurosurgery
Lecture 87 - Harvey Cushing
Lecture 88 - Pituitary Surgery
Lecture 89 - Stereotaxy
Lecture 90 - Epilepsy
Lecture 91 - Psychosurgery
Lecture 92 - Antipsychotic Drugs
Lecture 93 - Reserpine
Lecture 94 - Monoamine Oxidase Inhibitors
Lecture 95 - Lithium
Lecture 96 - Benzodiazepines
Lecture 97 - Stress
Lecture 98 - Theoretical Neuroscience: Brain as computer and Computer as Brain
Lecture 99 - John Atanasoff
Lecture 100 - John von Newmann
Lecture 101 - Game and Information theory
Lecture 102 - Cybernetics and Artificial Intelligence
Lecture 103 - Towards Networks of Realistic Neurons: von Newman's Last word
Lecture 104 - Santiago Ramon y Cajal, 'The Peasant Genius'
Lecture 105 - 'Cajal- a giant wakes up'
Lecture 106 - Cajal's modifications to the Golgi method and studies of embryos and various systems

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Lecture 107 - Law of dynamic polarization, support from others studies
Lecture 108 - Santiago Ramon y Cajal - Career turning point and Palm Sunday years
Lecture 109 - Cajalâ s trailblazing discoveries that earned him the Nobel Prize
Lecture 110 - 'Enduring Legacy of Cajal'
Lecture 111 - Robert Barany - Early life and prior work done by other scientists
Lecture 112 - Robert Barany - The serendipitous discovery of the caloric test
Lecture 113 - Robert Barany - Vestibular System and connection to Cerebellum
Lecture 114 - Robert Barany - Modern Applications of Barany's work - Space medicine and Astronaut training
Lecture 115 - Robert Barany - Summary of Contributions
Lecture 116 - Charles Sherrington Personal Background
Lecture 117 - Charles Sherrington - quiet mind expt, Neuroplasiticity, animal locomotion studies
Lecture 118 - Charles Sherrington - Reciprocal innervation, Pain and Emotion, Mind and Body
Lecture 119 - Charles Sherrington's Magnum Opus - The integrative action of the nervous system
Lecture 120 - Charles Sherrington - Insights into life and work by Molnar and Brown
Lecture 121 - Charles Sherrington - Summary of contributions
Lecture 122 - Edgar Adrian, Keith Lucas and Novel instruments used in Neurophysiology
Lecture 123 - Edgar Adrian - Early life, All or none principle in neurons, Key findings with Keith Lucas
Lecture 124 - Edgar Adrian - Work with Alexander Forbes, Gasser and Erlanger (St. Louis connection)
Lecture 125 - Edgar Adrian - 'Failed experiment', Perseverance in science
Lecture 126 - Edgar Adrian - Recording from single sensory and motor neurons
Lecture 127 - Edgar Adrian - Nobel Prize, Admin work, Legacy
Lecture 128 - Edgar Adrian - Adventures with EEG
Lecture 129 - Edgar Adrian - Mapping cerebellar cortex, Cerebral cortex, Brain and Behavior, Olfaction
Lecture 130 - Hodgkin and Huxley - Biographical background, Scientific backdrop and state of Neurophysiology
Lecture 131 - Hodgkin and Huxley - Meeting of great minds and Challenges faced - Part 1
Lecture 132 - Hodgkin and Huxley - Meeting of great minds and Challenges faced - Part 2
Lecture 133 - Bernard Katz - personal background, scientific backdrop, soup vs spark debate
Lecture 134 - Bernard Katz - Quantal nature of synaptic transmission, Vesicle hypothesis, foundational work
Lecture 135 - Bernard Katz - del Castillo model of receptor activation, role of calcium in synapses, sodium
Lecture 136 - Bernard Katz Paper: The fine structure of neuromuscular junction of the frog
Lecture 137 - Roger Sperry - Personal Background, Split brain patients, Hemispheric specialization
Lecture 138 - Roger Sperry: Split Brain patients and Dichotomous consciousness
Lecture 139 - Roger Sperry: Unified consciousness and Behavioural differences in split brain patients,
Lecture 140 - Roger Sperry, Gazzaniga's Interpreter theory, Impact on Psychology and Neuroscience, Nobel Priz
Lecture 141 - Roger Sperry's Chemoaffinity hypothesis paper
Lecture 142 - Roger Sperry paper 'Mentalism: Yes, Dualism:No'
Lecture 143 - Jens Christian Skou Part 1 : The Story of Jens Christian Skou's life in science
Lecture 144 - Jens Christian Skou: Sodium Potassium pump overview and Nobel Prize
Lecture 145 - Jens Christian Skou: Paper - 'The Influence of Some Cations on an Adenosine Triphosphate

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Lecture 146 - Arvid Carlsson - Personal Background, Education and Early Career, Pivot, Nobel prize contributi
Lecture 147 - Arvid Carlsson - History of L Dopa
Lecture 148 - Arvid Carlsson - Antipsychotics, Dopamine hypothesis, Serotonin and SSRIs, Omeprazole
Lecture 149 - Eric Kandel - Early life and nobel prize winning work
Lecture 150 - Eric Kandel - Synaptic Plasticity
Lecture 151 - Eric Kandel - Aplysia work, Short and long term memory and mechanisms
Lecture 152 - Paul Greengard - The Phosphorylation Paradigm
Lecture 153 - David Hubel and Torsten Wiesel - early life, education and collaboration
Lecture 154 - Hubel and Wiesel - Effect of early visual deprivation on cortical function
Lecture 155 - Hubel and Wiesel - Effect of visual misalignment on binocular integration
Lecture 156 - Hubel and Wiesel - Limited capacity for recovery following early visual deprivation

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NPTEL Video Course - Biotechnology - NOC:Advances in Omics

Subject Co-ordinator - Prof. Nagarjun Vijay

Co-ordinating Institute - IISER - Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Genomics - 1
Lecture 2 - Introduction to Genomics - 2
Lecture 3 - Advent of NGS
Lecture 4 - Genome Assembly: Few Concepts and Terminology
Lecture 5 - Genome Assembly Approaches
Lecture 6 - Pyrosequencing
Lecture 7 - Reversible Chain Termination Based Sequencing
Lecture 8 - Ph Sequencing
Lecture 9 - Sequencing by Ligation (Solid)
Lecture 10 - Sequencing by Ligation (Complete Genomics)
Lecture 11 - Other Short-Read Sequencing Technologies - Part 1
Lecture 12 - Other Short-Read Sequencing Technologies - Part 2
Lecture 13 - Long-Read Sequencing
Lecture 14 - Single Molecule Long-Read Sequencing
Lecture 15 - The Omics Data Avalanche
Lecture 16 - Evolutionary Biology and Genomics
Lecture 17 - Ancient Genomics
Lecture 18 - Whole-Genome Duplication
Lecture 19 - Tests of Selection
Lecture 20 - Genomics in Experimental Evolution
Lecture 21 - Making Sense of Genomic Sequences
Lecture 22 - Transcriptomics: New Tools Leading to Deeper Insights
Lecture 23 - Single Cell Transcriptomics and Beyond
Lecture 24 - Proteomics: A Brief Introduction
Lecture 25 - Protein Quantification
Lecture 26 - Introduction to Linux for Omics
Lecture 27 - The Linux Command Line Interface
Lecture 28 - Using the CLI-1: NCBI Datasets
Lecture 29 - Using the CLI-2: Short Read Archive Toolkit

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Lecture 30 - UCSC and IGV genome browsers
Lecture 31 - Mega Omics Projects
Lecture 32 - Genotype-Tissue Expression (GTEx)
Lecture 33 - Encyclopedia of DNA Element (ENCODE)
Lecture 34 - The Cancer Genome Atlas (TCGA)
Lecture 35 - Eukaryotic Genome Sequencing Consortia
Lecture 36 - The Postomics Era
Lecture 37 - RNA-Seq Differential Expression Analysis
Lecture 38 - Gene Loss and its Consequences
Lecture 39 - Establishing Gene loss: Few Examples
Lecture 40 - Course Summary

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NPTEL Video Course - Biotechnology - NOC:Statistics for Biomedical Engineers

Subject Co-ordinator - Prof. Babji Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Statistics - Motivation
Lecture 2 - Statistics - Introduction
Lecture 3 - Statistics: Definition and Terminology - Part I
Lecture 4 - Statistics: Definition and Terminology - Part II
Lecture 5 - Data: Primary vs Secondary
Lecture 6 - Data: Quantitative vs Qualitative
Lecture 7 - Data: Presentation
Lecture 8 - Data: Static vs Dynamic
Lecture 9 - Data: Box Plot and Spyder Graphs
Lecture 10 - Data: Summarising Data
Lecture 11 - Probability: Event and Sample space
Lecture 12 - Probability: Mutually exclusive and Independent Events
Lecture 13 - Probability: Random Variables
Lecture 14 - Probability: Expectation of Random Variable
Lecture 15 - Probability: Variance of Random Variable
Lecture 16 - Probability Distribution: Binomial, Poisson, Bernoulli
Lecture 17 - Probability Distribution: Normal Distribution
Lecture 18 - Central Limit Theorem: Statement
Lecture 19 - Central Limit Theorem: Illustration
Lecture 20 - Confidence Interval
Lecture 21 - Determining Sample Size
Lecture 22 - Hypothesis Test: Introduction
Lecture 23 - Hypothesis Test: Example
Lecture 24 - Hypothesis: P value
Lecture 25 - Hypothesis: Type 2 error
Lecture 26 - Hypothesis: Chi square Distribution - Part 1
Lecture 27 - Hypothesis: Chi square Distribution - Part 2
Lecture 28 - Hypothesis: Probability Plots
Lecture 29 - Hypothesis: Contingency Table Test

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Lecture 30 - Multivariate Hypothesis: Two Sample Test
Lecture 31 - Multivariate Hypothesis: Paired T test
Lecture 32 - Multivariate Hypothesis: Paired vs Unpaired Testing
Lecture 33 - Multivariate Hypothesis: Two population variances
Lecture 34 - Multivariate Hypothesis: Multiple Random Variables - Part 1
Lecture 35 - Multivariate Hypothesis: Multiple Random Variables - Part 2
Lecture 36 - Multivariate Hypothesis: Covariance and Correlation
Lecture 37 - One Way ANOVA: Motivation and Assumptions
Lecture 38 - One Way ANOVA: Fixed and Random effects Model
Lecture 39 - One Way ANOVA: Derivation and Confidence Interval
Lecture 40 - One Way ANOVA: Confidence Interval
Lecture 41 - One Way ANOVA: Unbalanced Experiment and Residuals
Lecture 42 - One Way ANOVA: Interpretation of Results
Lecture 43 - Statistical Modeling: Introduction
Lecture 44 - Statistical Modeling: Linear Regression Derivation
Lecture 45 - Statistical Modeling: Linear Regression - Assumption and Residuals
Lecture 46 - Statistical Modeling: Multi Linear Regression
Lecture 47 - Statistical Modeling: Logistic Regression
Lecture 48 - Statistical Modeling: Cross Entropy Loss
Lecture 49 - Statistical Modeling: Gradient Descent
Lecture 50 - Statistical Modeling: One Way Anova via Linear Regression
Lecture 51 - Design Of Experiments: Randomised Complete Block Design - Part 1
Lecture 52 - Design Of Experiments: Randomised Complete Block Design - Part 2
Lecture 53 - RCBD: Math Formulation and Derivation
Lecture 54 - RCBD: Necessity and Application
Lecture 55 - Latin Square: Introduction
Lecture 56 - Latin Square: Math and Formulation
Lecture 57 - Graeco - Latin Square
Lecture 58 - Interaction Among Variables
Lecture 59 - Two-Way ANOVA: Introduction - Part 1
Lecture 60 - Two-Way ANOVA: Introduction - Part 2
Lecture 61 - Two-Way ANOVA: Math and Formulation
Lecture 62 - Factorial Design: 2^2 Experiments
Lecture 63 - Factorial Design: 2^k Experiments - Part 1
Lecture 64 - Factorial Design: 2^k Experiments - Part 2
Lecture 65 - Factorial Design: Blocking
Lecture 66 - Introduction to Python Programming for Biomedical Engineers

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NPTEL Video Course - Biotechnology - NOC:Advanced Fluorescence Microscopy and Image Processing

Subject Co-ordinator - Prof. Gunjan Mehta

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fluorescence Microscopy
Lecture 2 - Introduction to Optics
Lecture 3 - Design of a fluorescence microscope
Lecture 4 - Fluorescent proteins, organic dyes, and protein labelling strategies
Lecture 5 - LIVE Demonstration of the fluorescence microscope, its design and components
Lecture 6 - 6D imaging, live cell imaging, time lapse imaging
Lecture 7 - Quantifying protein dynamics using FRAP, FLIP, FRET
Lecture 8 - LIVE Demonstration for 6D imaging of live cells on a Leica DMi8 inverted fluorescence microscope
Lecture 9 - Types of Illumination Epi, TIRF, HILO, light sheet, two photon
Lecture 10 - Confocal microscopy
Lecture 11 - LIVE Demonstration of the Nikon N-SPARC confocal microscope
Lecture 12 - Super-Resolution Microscopy (SIM, STED, STORM/PALM)
Lecture 13 - Nanomaterials for fluorescence imaging
Lecture 14 - Immunofluorescence IF and Immunohistochemistry IHC
Lecture 15 - Fluorescence In Situ Hybridization FISH, RNA FISH
Lecture 16 - LIVE Demonstration for immunofluroescence procedure
Lecture 17 - Digital images and camera technologies for microscopy
Lecture 18 - CCD, EMCCD, sCMOS Camera
Lecture 19 - LIVE Demonstration for digital images and adjustments
Lecture 20 - Basic operations of ImageJ/FIJI, montage preparation
Lecture 21 - Image filtering and object segmentation
Lecture 22 - Macros, intensity measurement, scale bar, time stamp, colocalization
Lecture 23 - LIVE Demonstration of ImageJ/Fiji based image processing
Lecture 24 - Single molecule imaging and tracking
Lecture 25 - Optical tweezers and traction force microscopy
Lecture 26 - LIVE Demonstration for single-molecule imaging under HILO illumination
Lecture 27 - Spatial transcriptomics and proteomics RNAscope, MERFISH, CODEX
Lecture 28 - High content imaging
Lecture 29 - Designing a fluorescence microscopy experiment

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NPTEL Video Course - Biotechnology - Cancer Biology

Subject Co-ordinator - Prof. Karunagaran

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Molecular Basis of Cancer
Lecture 2 - Hallmarks of cancer
Lecture 3 - Theories of Carcinogenesis
Lecture 4 - Genes associated with cancer Oncogenes
Lecture 5 - Genes associated with cancer Tumor supressor genes
Lecture 6 - Signal transduction - Part 1
Lecture 7 - Signal transduction - Part 2
Lecture 8 - Aberrations in signaling in cancer
Lecture 9 - Wnt and cytokine signaling in cancer
Lecture 10 - Apoptotic signaling
Lecture 11 - Pro and antiapoptotic factors in cancer
Lecture 12 - NF kB Signaling in cancer
Lecture 13 - Cervical Cancer
Lecture 14 - Cancer Therapy
Lecture 15 - Molecularly targeted therapies for cancer - Part 1
Lecture 16 - Molecularly targeted therapies for cancer - Part 2
Lecture 17 - Epigenetics and cancer - Part 1
Lecture 18 - Epigenetics and cancer - Part 2
Lecture 19 - Role of microRNAs in cancer - Part 1
Lecture 20 - Role of microRNAs in cancer - Part 2
Lecture 21 - Tumor immulogy - Part 1
Lecture 22 - Tumor immulogy - Part 2
Lecture 23 - Immune checkpoint inhibitors in cancer therapy
Lecture 24 - Hypoxia and cancer
Lecture 25 - DNA repair mechanisms and cancer - Part 1
Lecture 26 - DNA repair mechanisms and cancer - Part 2
Lecture 27 - Metastasis and epithelial mesenchymal transition
Lecture 28 - Cancer cell metabolism

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NPTEL Video Course - Biotechnology - Reactive Species in Medical and Related Technologies

Subject Co-ordinator - Prof. GK Suraishkumar

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Reactive Species Introduction - 1
Lecture 3 - RS types; Oxygen in the Earth's Atmosphere
Lecture 4 - Oxygen, antioxidants and RS homeostasis
Lecture 5 - Review on initial concepts; A suitable framework for analysis
Lecture 6 - A suitable framework for analysis (Continued...)
Lecture 7 - Analysis of RS reactions - Thermodynamics
Lecture 8 - Analysis of RS reactions - Thermodynamics
Lecture 9 - Analysis of RS reactions - Kinetics
Lecture 10 - RS initiation reactions - Practical scenarios
Lecture 11 - RS propagation reactions
Lecture 12 - RS reactions - propagation, termination
Lecture 13 - RS reactions rate constants
Lecture 14 - RS measurement introduction
Lecture 15 - RS measurement - fluorescence
Lecture 16 - RS measurement - fluorescence (Continued...)
Lecture 17 - RS measurement - fluorescence (Continued...), chemiluminiscence
Lecture 18 - RS book first view; EPR spectroscopy; Game 1
Lecture 19 - EPR spectroscopy basics
Lecture 20 - EPR spectroscopy (Continued...)
Lecture 21 - Biomarkers and review
Lecture 22 - RS in cell signaling - Introduction
Lecture 23 - RS in cell signaling - Bacterial systems
Lecture 24 - RS in cell signaling - Mammalian systems and systemic effects
Lecture 25 - Game class - 2
Lecture 26 - RS in liquid phase oxygen supply (LPOS)
Lecture 27 - RS in LPOS (Continued...)
Lecture 28 - RS in LPOS discussion (Continued...)
Lecture 29 - RS induction in bioreactor inocula for improved productivity

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Lecture 30 - General discussion; RS and other stresses
Lecture 31 - RS and other stresses (Continued...)
Lecture 32 - RS rhythms in microalgae
Lecture 33 - RS in nano-bio-systems
Lecture 34 - RS in cancer treatment and management
Lecture 35 - Game class - 3
Lecture 36 - RS module
Lecture 37 - RS module discussion
Lecture 38 - Course review - Part 1
Lecture 39 - Course review - Part 2
Lecture 40 - Student presentation - Sujithra
Lecture 41 - Student presentation - Manisha
Lecture 42 - Student presentation - Vikash
Lecture 43 - Student presentation - Jayashree
Lecture 44 - Student presentation - Lakshmanan
Lecture 45 - Student presentation - Swati
Lecture 46 - Student presentation - Ankita
Lecture 47 - Student presentation - Ragavi
Lecture 48 - Student presentation - Abhas, and concluding remarks

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NPTEL Video Course - Biotechnology - NOC:Regeneration Biology

Subject Co-ordinator - Prof. Rajesh Ramachandran

Co-ordinating Institute - IISER Mohali

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Regeneration: Basics and Types
Lecture 2 - Regeneration, Wound Healing and Scar Formation in Different Regenerative Capacity
Lecture 3 - Regeneration: In Normal Life and Implications
Lecture 4 - Tissue Regeneration: Mammalian Context
Lecture 5 - Liver Regeneration: Signaling Events
Lecture 6 - Liver Regeneration: Mechanistic Insights
Lecture 7 - Regeneration: lessons from animal model Hydra
Lecture 8 - Mechanisms of regeneration in Hydra
Lecture 9 - Asexual Reproduction - Fragmentation. Morphallaxis, Epimorphosis, lessons from Hydra
Lecture 10 - Mechanisms of regeneration in Planaria
Lecture 11 - Planaria regeneration-polarity and gradient in regeneration
Lecture 12 - Planaria regeneration: Neoblasts and organ formation and Species type and environment
Lecture 13 - Position control genes and regeneration - Part A
Lecture 14 - Position control genes and regeneration - Part B
Lecture 15 - Progenitor targeting and ectopic organs
Lecture 16 - Tissue dedifferentiation, cellular reprograming into blastema Cellular types in regeneration. Ne
Lecture 17 - Totipotency, pluripotency, multipotency and unipotency, in regeneration context
Lecture 18 - Adult stem cells: Natural and induced and their roles in regeneration-zebrafish
Lecture 19 - Common cellular events during regeneration, embryonic development, and cancer
Lecture 20 - Epithelial to mesenchymal transition (EMT) and mesenchymal to epithelial transition (MET) in reg
Lecture 21 - Organ regeneration: Basics with examples
Lecture 22 - Zebrafish fin regeneration-in a brief
Lecture 23 - Zebrafish heart regeneration-in a brief
Lecture 24 - Zebrafish retina regeneration-in a brief
Lecture 25 - Spinal cord and brain regeneration-Conclusive mechanisms of regeneration
Lecture 26 - Cellular, Molecular and Genetic factors involved in retina regeneration
Lecture 27 - Detailed mechanisms of fin regeneration
Lecture 28 - Retina regeneration-importance of Shh signaling Roles of epigenetic factors and their involvemer
Lecture 29 - Importance of regeneration associated gene induction events-Transcription activators and repress

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Lecture 30 - Roles of different cellular signaling in regeneration: Examples- Wnt signaling
Lecture 31 - Different cellular signaling during regeneration-Overview
Lecture 32 - Different cellular signaling during regeneration. Examples- Jak-STAT and Fgf signaling
Lecture 33 - Different cellular signaling during regeneration-Egf, and Hippo signaling
Lecture 34 - Roles of Delta-Notch signaling during regeneration
Lecture 35 - Tgf-beta signaling during regeneration
Lecture 36 - Organ regeneration: An overview
Lecture 37 - Accessory limb model of regeneration: lessons from Axolotl and newt
Lecture 38 - Nerve-dependent regeneration-Axolotl and Newt
Lecture 39 - Roles of Histone deacetylases in regeneration of vertebrates like fishes and amphibians
Lecture 40 - Dynamics of immune system in organ regeneration
Lecture 41 - Extracellular matrix and its roles in tissue regeneration
Lecture 42 - Induced pluripotency and roles of iPFs during tissue Hox genes and homeotic transformation
Lecture 43 - Animal cloning: implications in regeneration
Lecture 44 - Embryonic stem cells, cord blood stem cells and adult stem cells
Lecture 45 - Ethics of stem cell research in regeneration studies, regenerative medicine and biotechnology
Lecture 46 - Tissue engineering-Why and how?
Lecture 47 - History of tissue engineering
Lecture 48 - Different steps in tissue engineering
Lecture 49 - Different aspects of organ culture
Lecture 50 - Major challenges in tissue engineering in practice
Lecture 51 - Tissue 3D printing and organ culture
Lecture 52 - Importance of scaffolds in tissue engineering
Lecture 53 - Stem cells for tissue engineering-Use of CRISPR-Cas9 for genome targeting
Lecture 54 - Types of adult stem cells and trans-differentiation for tissue engineering
Lecture 55 - Influence of niches and scaffolds on stem cells: An organ culture perspective
Lecture 56 - The basics of regeneration put into practice in vitro
Lecture 57 - Adhesion, migration and aggregation of stem cells
Lecture 58 - Artificial, liver, kidney and urinary bladder for transplantation in patients
Lecture 59 - Limbal stem cells and artificial cornea
Lecture 60 - Xenotransplantation vs organ culture in practice
Lecture 61 - Future implications of regeneration in mammals
Lecture 62 - Future implications of Organ culture in patient care

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NPTEL Video Course - Biotechnology - NOC:Biomedical Instrumentation

Subject Co-ordinator - Prof. Varadhan SKM

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Measurements - Sensors and Transducers
Lecture 2 - Examples and Characteristics of Sensors and Transducers
Lecture 3 - Generalized measurement system - Characteristics of Measurement system - Part 1
Lecture 4 - Generalized measurement system - Characteristics of Measurement system - Part 2
Lecture 5 - Generalized measurement system - Characteristics of Measurement system - Part 3
Lecture 6 - Overview of amplifiers and signal processing techniques
Lecture 7 - Overview of Signal Processing Techniques - Filtering methods
Lecture 8 - Introduction to basic biomedical sensor types and their principles
Lecture 9 - Biomedical Sensor - Resistive sensor - Part 1
Lecture 10 - Biomedical Sensor - Resistive sensor - Part 2
Lecture 11 - Biomedical Sensor - Capacitive sensor - Part 1
Lecture 12 - Biomedical Sensor - Capacitive sensor - Part 2
Lecture 13 - Biomedical Sensor - Inductive sensor
Lecture 14 - Biomedical Sensor - Piezoelectric sensor - Part 1
Lecture 15 - Biomedical Sensor - Piezoelectric sensor - Part 2
Lecture 16 - Biomedical Sensor - Electrochemical sensor
Lecture 17 - Biomedical Sensor - Optical sensor
Lecture 18 - Biomedical Sensor - Hall Effect sensor
Lecture 19 - Introduction to Measurement of Pressure
Lecture 20 - Measurement of Blood Pressure - Direct method - Part 1
Lecture 21 - Measurement of Blood Pressure - Direct method - Part 2
Lecture 22 - Measurement of Blood Pressure - Direct method - Part 3
Lecture 23 - Measurement of Blood Pressure - Direct method - Part 4
Lecture 24 - Measurement of Blood Pressure - Direct method - Part 5
Lecture 25 - Measurement of Blood Pressure - Indirect method - Part 1
Lecture 26 - Measurement of Blood Pressure - Indirect method - Part 2
Lecture 27 - Measurement of Body Temperature - Part 1
Lecture 28 - Measurement of Body Temperature - Part 2
Lecture 29 - Measurement of Body Temperature - Part 3

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Lecture 30 - Introduction to flow and volume measurement
Lecture 31 - Blood Flow Measurement - Ultrasonic method - Part 1
Lecture 32 - Blood Flow Measurement - Ultrasonic method - Part 2
Lecture 33 - Blood Flow Measurement - Ultrasonic method - Part 3
Lecture 34 - Blood Flow Measurement - Ultrasonic method - Part 4
Lecture 35 - Blood Flow Measurement - Ultrasonic method - Part 5
Lecture 36 - Blood Flow Measurement - Thermal method
Lecture 37 - Introduction to respiratory system and measurements - Part 1
Lecture 38 - Introduction to respiratory system and measurements - Part 2
Lecture 39 - Respiratory Volume Measurement - Part 1
Lecture 40 - Respiratory Volume Measurement - Part 2
Lecture 41 - Introduction to Cardiac Output Measurement
Lecture 42 - Cardiac Output Measurement Techniques
Lecture 43 - Origin of Biopotential - Part 1
Lecture 44 - Origin of Biopotential - Part 2
Lecture 45 - Introduction to Biopotential electrode - Part 1
Lecture 46 - Introduction to Biopotential electrode - Part 2
Lecture 47 - Introduction to Biopotential electrode - Part 3
Lecture 48 - Introduction to Biopotential electrode - Part 4
Lecture 49 - Introduction to Biopotential electrode - Part 5
Lecture 50 - Types of Biopotential Electrode - Micro Electrodes
Lecture 51 - Practical Hints and Recording issue in using Electrodes
Lecture 52 - Types of Biopotential Electrode - Body-Surface Recording Electrodes
Lecture 53 - Types of Biopotential Electrode - Internal Electrode
Lecture 54 - Types of Biopotential Electrode - Electrode Array
Lecture 55 - Summary of electrode theory
Lecture 56 - Introduction to Bioelectricity
Lecture 57 - Types of Biosignals - ECG - Part 1
Lecture 58 - Types of Biosignals - ECG - Part 2
Lecture 59 - Types of Biosignals - ECG - Part 3
Lecture 60 - Types of Biosignals - ECG - Part 4
Lecture 61 - Types of Biosignals - ECG - Part 5
Lecture 62 - Introduction to Nervous System
Lecture 63 - Types of Biosignal - EEG - Part 1
Lecture 64 - Types of Biosignal - EEG - Part 2
Lecture 65 - Types of Biosignal - EEG - Part 3
Lecture 66 - Types of Biosignal - EEG - Part 4
Lecture 67 - Types of Biosignal - EEG - Part 5
Lecture 68 - Types of Biosignal - EMG - Part 1

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Lecture 69 - Types of Biosignal - EMG - Part 2
Lecture 70 - Types of Biosignal - EMG - Part 3
Lecture 71 - Types of Biosignal - EMG - Part 4
Lecture 72 - Types of Biosignal - EMG - Part 5
Lecture 73 - Comparison of ECG vs EEG vs EMG
Lecture 74 - Introduction to Physiology of Eye
Lecture 75 - Types of Biosignal - ERG
Lecture 76 - Types of Biosignal - EOG
Lecture 77 - Biofeedback Instrumentation
Lecture 78 - Types of Biosignal - PCG
Lecture 79 - Digital Stethoscope
Lecture 80 - Review of basic respiratory physiology
Lecture 81 - Introduction to Ventilator
Lecture 82 - Classification of Ventilator
Lecture 83 - Operation of Ventilator
Lecture 84 - Control Scheme for Ventilator
Lecture 85 - Breathing Sequences in Ventilator
Lecture 86 - Modes of Ventilation
Lecture 87 - Maneuvers during Ventilation
Lecture 88 - High Frequency Ventilation
Lecture 89 - Circuitry of Ventilator
Lecture 90 - Introduction to Human Heart
Lecture 91 - Cardiac Pacemaker
Lecture 92 - External Pacemaker
Lecture 93 - Implantable Pacemaker - Part 1
Lecture 94 - Implantable Pacemaker - Part 2
Lecture 95 - Leads and Electrodes for Pacemakers
Lecture 96 - Introduction to Cardiac Fibrillation
Lecture 97 - Introduction to Defribillator
Lecture 98 - Defibrillators: Control Variables, Waveforms, and Electrode Placement
Lecture 99 - External Defibrillator- Part 1
Lecture 100 - External Defibrillator- Part 2
Lecture 101 - External Defibrillator- Part 3
Lecture 102 - Implantable Defibrillator - Part 1
Lecture 103 - Implantable Defibrillator - Part 2
Lecture 104 - Introduction to Cardioverter
Lecture 105 - Fundamental Physiology of the Renal system
Lecture 106 - Introduction to Dialysis
Lecture 107 - Hemodialysis

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Lecture 108 - Dialysis - Dialyzing membrane, fluid and types of Dialyzer
Lecture 109 - Hemodialysis Machine
Lecture 110 - Physiology and disorders of oxygen transport
Lecture 111 - Pulse oximeter

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NPTEL Video Course - Biotechnology - NOC:Human Physiology (2025)

Subject Co-ordinator - Prof. Sudip Mukherjee

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Human Physiology
Lecture 2 - Human Anatomy
Lecture 3 - Introduction to Cells, Structure and Functions of Cell
Lecture 4 - Ion and Molecular Transport - I
Lecture 5 - Ion and Molecular Transport - II
Lecture 6 - Homeostasis and Diseases caused due to Malfunction of Cell Organelles
Lecture 7 - Introduction to Hematology, Blood Components and Function
Lecture 8 - Hemostasis
Lecture 9 - Anticoagulation and Blood related diseases
Lecture 10 - Blood grouping and Transfusion
Lecture 11 - Lymph and Lymphatic Circulation
Lecture 12 - Immune Mechanism of Blood and Lymph
Lecture 13 - Anatomy of Heart, Heart Diseases and Electrical Activities
Lecture 14 - Cardiac and Peripheral Circulation
Lecture 15 - Blood Vessels and Capillary
Lecture 16 - Anatomical Parts of Lungs and Function
Lecture 17 - Mechanism of Respiration, Gas Transport
Lecture 18 - Gas Transport and Lung Volume Capacities
Lecture 19 - Carbon Monoxide Poisoning, Oximeter and Lung Diseases
Lecture 20 - Structure and Functions of Endocrine Glands
Lecture 21 - Glucose Homeostasis, Type I and Type II Diabetes
Lecture 22 - Cell Therapy for Diabetes and Artificial Pancreas
Lecture 23 - Blood Glucose Measurement, Therapies for Diabetes
Lecture 24 - Thyroid Synthesis and Functions
Lecture 25 - Disease of the Endocrine Gland
Lecture 26 - Digestive System Anomy and Function
Lecture 27 - Digestion and Absorption of Carbohydate
Lecture 28 - Digestion and Absorptio of Proteins
Lecture 29 - Digestion and Absorption of Lipids

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Lecture 30 - Digestive Disorder
Lecture 31 - Bones
Lecture 32 - Joints and Other Connective Tissues
Lecture 33 - Different Types of Muscles
Lecture 34 - Neuromuscular Transmission
Lecture 35 - Disease Related to Skeletal system
Lecture 36 - Introduction of Excretory System
Lecture 37 - Glomerular Filtration
Lecture 38 - Proximal Convoluted Tubule
Lecture 39 - Loop of Henles and Other Parts of Nephron
Lecture 40 - Renal Control of Blood Pressure and Renal Disorder
Lecture 41 - Male Reproductive Organs
Lecture 42 - Spermatogenesis
Lecture 43 - Female Reproductive Organs
Lecture 44 - Ovarian Cycle - 1
Lecture 45 - Ovarian Cycle - 2
Lecture 46 - Menstrual Cycle and Hormonal Regulation
Lecture 47 - Fertilization and Pregnancy
Lecture 48 - Contraceptive and IVF
Lecture 49 - Male Reproductive Health and Disease
Lecture 50 - Female Reproductive Health and Disease
Lecture 51 - Introduction to Nervous System
Lecture 52 - Brain Structure and Function
Lecture 53 - Structure and Functions of Spinal Cords, Cranial and Spinal Nerves
Lecture 54 - Neuron and Nerve Structure and Function
Lecture 55 - Nerve Injury and Repair
Lecture 56 - Neurotransmission - 1
Lecture 57 - Neurotransmission - 2
Lecture 58 - Glial Cells and Blood Brain Barrier
Lecture 59 - Introduction to Various Sensory Organs and Their Function
Lecture 60 - Neurological Disorders

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NPTEL Video Course - Biotechnology - NOC:Biological Engineering

Subject Co-ordinator - Prof. Abhishek Suresh Dhoble

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Subject and Course Plan
Lecture 2 - Introduction to Microbial World
Lecture 3 - Basic of Microbial Matabolism
Lecture 4 - Importance of Microbes
Lecture 5 - Microbial Products
Lecture 6 - Cell Constiuents and Growth
Lecture 7 - Microbial Growth
Lecture 8 - Microbial Growth Quantification
Lecture 9 - Aerobic vs Anaerobic Cultivation Methods
Lecture 10 - Numerical Practice
Lecture 11 - Microbial Growth Model
Lecture 12 - Microbial Growth Model and Parameters Estimation - Part 1
Lecture 13 - Microbial Growth Model and Parameters Estimation - Part 2
Lecture 14 - Yield and Maintenance Coefficients
Lecture 15 - Tutorial
Lecture 16 - Plant Cell Culture - Part I
Lecture 17 - Plant Cell Culture - Part II
Lecture 18 - Animal Cells
Lecture 19 - Animal Cell Culture
Lecture 20 - Numerical Practice
Lecture 21 - Animal Cells and Cell Lines
Lecture 22 - Cell Sorting Method - Part I
Lecture 23 - Cell Sorting Method - Part II
Lecture 24 - Methods of Transfection
Lecture 25 - Numerical Practice
Lecture 26 - Introductory Immunology
Lecture 27 - Immune Cells and Responses
Lecture 28 - Isolation of Immune Cells
Lecture 29 - Advanced Characterization of Immune Cells

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Lecture 30 - Numerical Practice
Lecture 31 - Principles of Force, Motion and Energy in Biological Systems
Lecture 32 - Static and Dynamic Analysis of Biological Systems
Lecture 33 - Biomechanics of Bacterial Systems
Lecture 34 - Case Study on Human Motion Biomechanics
Lecture 35 - Numerical Practice on Applications of Biomechanics
Lecture 36 - Introduction to Fluid Mechanics
Lecture 37 - Advanced Fluid Machanics in Biological Systems
Lecture 38 - Case Study Blood Flow Through the Cardiovascular System
Lecture 39 - Case Study Flow in the Lungs
Lecture 40 - Numerical on Biological Fluid Machanics
Lecture 41 - Sterilization in Bioprocesses
Lecture 42 - Sterlization Charts
Lecture 43 - Practical Issues in Sterlization
Lecture 44 - Kinetics of Thermal Sterilization
Lecture 45 - Numerical Practice
Lecture 46 - Bioreactor Configurations and Operating Considerations
Lecture 47 - Chemostat with Recycle
Lecture 48 - Multiple Chemostat, Fed batch and Perfusion Systems
Lecture 49 - Gaden and Deindoerfer Classification of Product Formation
Lecture 50 - Numerical on Chemostat with Recycle and Fed Batch Operation
Lecture 51 - Oxygen Uptake in Cell Cultures
Lecture 52 - Oxygen Transfer Rate OTR vs Oxygen Uptake Rate OUR
Lecture 53 - DO Effect
Lecture 54 - Oxygen Supply and Transfer
Lecture 55 - Numerical
Lecture 56 - Mass Transfer Fundamentals
Lecture 57 - Rheology of Biological Fluids
Lecture 58 - Biological Wastewater Treatment Case Study
Lecture 59 - Case Study Related to Hematopoiesis i Bioreactor Systems
Lecture 60 - Numerical on Mass Transfer Coefficient, Rheologic Properties of Fluids and Anaerobic Digestion

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NPTEL Video Course - Biotechnology - NOC:An Introduction to Evolutionary Biology

Subject Co-ordinator - Prof. Sutirth Dey

Co-ordinating Institute - IISER Pune

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Living World and two major questions
Lecture 2 - History of Evolutionary Thought (Pre-Darwin)
Lecture 3 - Making of Darwinism (External Video)
Lecture 4 - Darwinism
Lecture 5 - Beyond Darwinism: Modern Synthesis_EES
Lecture 6 - Tying it all up_Back to the two questions
Lecture 7 - Evidence for evolution 1: Change and Speciation
Lecture 8 - Evidence for evolution 2: Descent with modification - Part 1
Lecture 9 - Evidence for evolution 3: Descent with modification - Part 2
Lecture 10 - Evidence for evolution 4: Objections to evolution
Lecture 11 - Classifying variation
Lecture 12 - Revising Mendel and introducing population genetics
Lecture 13 - From family to the population
Lecture 14 - Solving simple Hardy-Weinberg problems
Lecture 15 - Generating variation
Lecture 16 - Features of Mutations - Part 1
Lecture 17 - Features of Mutations - Part 2
Lecture 18 - Non-genetic Inheritance
Lecture 19 - Introduction to Selection
Lecture 20 - Dynamics of Selection 1: Numerical Simulations
Lecture 21 - Dynamics of Selection 2: Analytical
Lecture 22 - Features of selection: Insights from theory
Lecture 23 - Examples of selection
Lecture 24 - Features of selection: Insights from experiments
Lecture 25 - Finite population: Numerical Simulations
Lecture 26 - Genetic drift: examples and features
Lecture 27 - Effective population size and evolution of mutation rates
Lecture 28 - Non-random mating and inbreeding
Lecture 29 - Migration: Numerical simulations and analysis

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Lecture 30 - Migration: Interactions and examples
Lecture 31 - Introduction to Aging
Lecture 32 - Mechanistic Theories of Aging
Lecture 33 - Evolutionary Theories of Aging - Part 1
Lecture 34 - Evolutionary Theories of Aging - Part 2
Lecture 35 - Why sex?
Lecture 36 - Benefits of sex
Lecture 37 - Sexual Selection - Part 1
Lecture 38 - Sexual Selection - Part 2
Lecture 39 - Kin Selection and Hamilton's Rule
Lecture 40 - Evolutionary Conflicts
Lecture 41 - What is a species?
Lecture 42 - What are the isolation mechanisms?
Lecture 43 - Evolution of reproductive isolation
Lecture 44 - How new genes are born
Lecture 45 - Coping with changing environments
Lecture 46 - Evolutionary patterns in the genome
Lecture 47 - Origin of Life - Part 1
Lecture 48 - Origin of Life - Part 2
Lecture 49 - Human Evolution
Lecture 50 - Applications of Evolution - Part 1
Lecture 51 - Applications of Evolution - Part 2

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NPTEL Video Course - Biotechnology - NOC:Cell Signaling

Subject Co-ordinator - Prof. Ram Kumar Mishra

Co-ordinating Institute - IISER Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Signaling ?
Lecture 2 - Why do we need signaling ?
Lecture 3 - Types of Cell Signaling
Lecture 4 - Signals: Nature and Composition
Lecture 5 - Consequences of Signaling in context of Signal
Lecture 6 - Types of Receptors and their functioning
Lecture 7 - Modes of regulation on signaling (Receptors, Signals, and Effectors)
Lecture 8 - G-proteins, and Kinase activity regulation in Signaling
Lecture 9 - Phosphorylation-dependent regulation in Signaling
Lecture 10 - Kinase activity assessment, Types of Kinases, and Signaling system of Microbial world
Lecture 11 - Signaling by Two-component System
Lecture 12 - Canonical and Hybrid Two-component system in Bacteria Life style cahnges
Lecture 13 - The two-component system coordinates various microbial responses
Lecture 14 - The two-component system coordinates sporulation and quorum sensing responses
Lecture 15 - The two-component Signaling in plants
Lecture 16 - The Cytokinin Signaling, TCS and plant development
Lecture 17 - The two-component Signaling in Ethylene, photomorphogenic, and diurnal responses
Lecture 18 - Receptor Serine-Threonine Kinase Signaling
Lecture 19 - Different modes of RLK Signaling in plants
Lecture 20 - Receptor-Like Kinase (RLK) Signaling shaping plants
Lecture 21 - Signaling in animal world: Receptor Serine/Threonine kianse pathway
Lecture 22 - Receptor Serine/Threonine kianse pathways and Bone morphogenesis
Lecture 23 - Activin and AMH signaling through receptor Serine/Threonine kianse pathway
Lecture 24 - Receptor Tyrosine Kinases (RTK)
Lecture 25 - Activation of Receptor Tyrosine Kinases and their recognition
Lecture 26 - JAK-STAT pathway and Phosphoinositides-dependent Receptor Tyrosine Kinase Signaling
Lecture 27 - Phosphoinositides-dependent Signaling downstream of RTK activation
Lecture 28 - Contact-mediated bidirectional Receptor Tyrosine Kianse Signaling
Lecture 29 - Contact-mediated Eph-Ephrin Signaling shapes tissue organization

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Lecture 30 - Contact-mediated Signaling by Notch-Delta combination
Lecture 31 - Integrin Signaling for cell motility, movement, and growth
Lecture 32 - G-protein coupled receptor (GPCR): the basics and uniqueness
Lecture 33 - G-protein coupled receptor mediated signaling pathways - I
Lecture 34 - G-protein coupled receptor mediated signaling pathways - II
Lecture 35 - G-protein coupled receptor mediated signaling pathways - III
Lecture 36 - Regulation of Signaling at receptor level
Lecture 37 - Signaling by Channel-type receptors
Lecture 38 - Water Channels and nuclear/cytosolic receptors
Lecture 39 - Nuclear receptors with TF activity, and signaling co-receptors
Lecture 40 - A Snapshot and brief summary of the Cell Signaling

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NPTEL Video Course - Biotechnology - NOC:Mass Spectrometry and its Application in Molecular Medicine

Subject Co-ordinator - Prof. Amit Kumar Mandal

Co-ordinating Institute - IISER Kolkata

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to soft ionisation mass spectrometry: ESI-MS and MALDI-MS
Lecture 2 - Isotopic distribution of signals in mass spectra and deconvolution of mass spectra
Lecture 3 - Resolution of mass spectra, accuracy in mass measurement and introduction of molecular medicine
Lecture 4 - Mass spectra of human hemoglobin and glycated hemoglobin, a diagnostic marker of diabetes mellitu
Lecture 5 - Mass spectrometry based quantification of oxidative stress in patients with chronic renal failure
Lecture 6 - Introduction to tandem mass spectrometry and principle of de novo sequencing
Lecture 7 - Chemical modification and enzyme digestion of a peptide: A step towards de novo sequencing
Lecture 8 - De novo sequencing of a peptide from chemical derivatization and tandem mass spectra
Lecture 9 - De novo sequencing: Identification of isobaric amino acid and disulfide connectivity
Lecture 10 - De novo sequencing of a tryptic peptide from tandem mass spectra
Lecture 11 - De novo sequencing from tandem-MS and SPITC derivatization to simplify tandem-MS
Lecture 12 - Routine diagnosis of Hemoglobinopathy: A disease caused by genetic variant of hemoglobin
Lecture 13 - Hemoglobinopathies: Identification and characterisation using bottom up proteomics approach - Pa
Lecture 14 - Hemoglobinopathies: Identification and characterisation using bottom up proteomics approach - Pa
Lecture 15 - A genetic variant of hemoglobin causing false elevation of HbA1c and hence false diagnosis of di
Lecture 16 - Nano-LC-ESI-MS based analysis of a proteome - A bottom up proteomics approach
Lecture 17 - Iron salts as food fortificants to combat Iron Deficiency Anemia
Lecture 18 - Nano ferric pyrophosphate as a food fortificant in a rat model: Bioavailability and toxicity ass
Lecture 19 - Nano ferric pyrophosphate as a food fortificant in a rat model: Toxicity assessment using bioche
Lecture 20 - Nano ferric pyrophosphate as a food fortificant in a rat model: Exploring biomarker of nano part
Lecture 21 - Biomarker of nano particles induced toxicity in a rat model: NanoLC-ESI-MS based plasma proteomi
Lecture 22 - Quantitative proteomics of rat plasma proteins: Absolute quantification of Fetuin B, a biomarker
Lecture 23 - 2D gel electrophoresis based proteomics: principles and methods
Lecture 24 - Differential plasma proteomics: 2D gel electrophoresis based approach
Lecture 25 - Analysis of 2D gel spots followed by in-gel digestion to identify proteins usng MALDI-MS platfor
Lecture 26 - Mass spectrometry based absolute quantification of human plasma proteins
Lecture 27 - Absolute quantification of plasma Apolipoprotein-AIV: A probale biomarker of attempted suicide
Lecture 28 - MALDI-MS based identification of microorganism in clinical samples
Lecture 29 - Native mass spectrometry using nano-ESI-MS platform

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Lecture 30 - Analysis of an array of glycated hemoglobin in patients with poorly controlled diabetes mellitus
Lecture 31 - Molecular mechanism of sickle hemoglobin polymerisation
Lecture 32 - Inhibition of sickle hemoglobin polymerisation upon glutathionylation
Lecture 33 - Structural analysis of desorbed hemoglobin from nano particle surface
Lecture 34 - Functional assay of human hemoglobin and its variants
Lecture 35 - Application of native mas spectrometry to calculate equilibrium constant
Lecture 36 - Bioconjugation of para-benzoquinone of cigarette smoke with human hemoglobin
Lecture 37 - Bioconjugation of human hemoglobin with quinone as airborne enviroment pollutants
Lecture 38 - Ion mobility mass spectrometry
Lecture 39 - Introduction to hydrogen-deuterium-exchange mass spectrometry
Lecture 40 - Rate law of hydrogen-deuterium-exchange kinetics
Lecture 41 - Molecular insights in inhibition of HbS polymerisation upon oxygenation monitored by HDX-MS plat
Lecture 42 - Molecular insights in inhibition of HbS polymerisation upon oxygenation monitored by HDX-MS plat
Lecture 43 - Molecular insights in inhibition of HbS polymerisation upon oxygenation - Part III - and upon gl
Lecture 44 - Molecular insights in inhibition of HbS polymerisation upon glutathionylation - Part II
Lecture 45 - N-acetyl cysteine as an antisickling agent in sickle cell disease
Lecture 46 - Effect of quinones on morphology of human RBC
Lecture 47 - Effect-of-NAC-to neturalise-quinone-and-in-vivo-HDX with human RBCs as a model system
Lecture 48 - Application of HDX-MS in structural analysis of human hemoglobin in vivo
Lecture 49 - Application of HDX-MS in structural analysis of hemoglobin in vivo-and-desorbed-hemoglobin from
Lecture 50 - Application-of-HDX-MS-and -CD-spectroscopy-to-monitor-structural changes-of human hemoglobin fro
Lecture 51 - Structure-function correlation of Hb Beckman, a genetic variant of human hemoglobin, using HDX-M
Lecture 52 - Structure-function correlation of glutathionyl hemoglobin, a posttranslational variant of human
Lecture 53 - Imaging mass spectromery of biological tissue samples using MALDI mass spectrometry platform
Lecture 54 - Kidney tissue imaging in a nano particle exposed rat model
Lecture 55 - Imaging of kidney tissues of NP exposed rats and imaging of human prostate tissue
Lecture 56 - Imaging of human prostate cancer tissue using MALDI-MS
Lecture 57 - Imaging of human prostate cancer tissue using MALDI-MS and analysis of tissue proteomics data
Lecture 58 - Desorption Electrospary Ionisation based Mass Spectrometric Imaging of Prostate Cancer Tissue
Lecture 59 - Fast photochemical oxidation of protein combined to mass spectrometry for prtein footprinting bo
Lecture 60 - Biosimilar-monitored through mass spectrometric techniques

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NPTEL Video Course - Biotechnology - NOC:Introduction to Cardiovascular Mechanics

Subject Co-ordinator - Prof. Anand Mohan

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Basics of Continuum Mechanics
Lecture 3 - Review of Course Overview
Lecture 4 - Review of Continuum Mechanics
Lecture 5 - Heart - Part 1
Lecture 6 - Heart - Part 2
Lecture 7 - Review of Heart - Part 1
Lecture 8 - Review of Heart - Part 2
Lecture 9 - Blood - Part 1
Lecture 10 - Blood - Part 2
Lecture 11 - Review of Blood - Part 1
Lecture 12 - Review of Blood - Part 2
Lecture 13 - Vasculature
Lecture 14 - Review of Vasculature

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NPTEL Video Course - Biotechnology - NOC:Polymeric Biomaterials: Structure, Properties, Function and Performa

Subject Co-ordinator - Prof. Satyavrata Samavedi

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction: Structure, Properties, Function and Performance
Lecture 2 - Biomaterials Over the Years
Lecture 3 - Biocompatibility, Bioactivity, Biodegradation, Biomimicry
Lecture 4 - Biomaterials - A Device Perspective
Lecture 5 - Overview of Polymeric Biomaterials
Lecture 6 - Definition of - mer, Monomer, Oligomer and Polymer
Lecture 7 - Molecular Structure and Configuration
Lecture 8 - Molar Mass and Dispersity
Lecture 9 - Chain Conformation and Structural Characteristics
Lecture 10 - Polymer Architecture and Organization
Lecture 11 - Polymer Synthesis
Lecture 12 - Polymer Crystallinity and Melting
Lecture 13 - Amorphous State and Glass Transition
Lecture 14 - Polymer Solutions
Lecture 15 - Solution Thermodynamics
Lecture 16 - Overview of Flory-Huggins Theory
Lecture 17 - Synthetic Biomedical Polymers - 1
Lecture 18 - Synthetic Biomedical Polymers - 2
Lecture 19 - Natural Biomedical Polymers - 1
Lecture 20 - Natural Biomedical Polymers - 2
Lecture 21 - Hydrogels
Lecture 22 - Mechanical Properties and Responses - 1
Lecture 23 - Mechanical Properties and Responses - 2
Lecture 24 - Viscoelastic Responses
Lecture 25 - Overview of Linear Viscoelastic Models
Lecture 26 - Degradation of Polymeric Biomaterials
Lecture 27 - Biomaterial Processing Methods and Design Considerations
Lecture 28 - Polymer Electrospinning - Concepts
Lecture 29 - Polymer Electrospinning - Lab Demonstration

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Lecture 30 - Biomaterial Surfaces, ECM Interactions and Surface Modification
Lecture 31 - Protein Adsorption on Biomaterial Surfaces
Lecture 32 - Blood Interactions with Biomaterial Surfaces
Lecture 33 - Biomaterial Implantation and the Host Response
Lecture 34 - Biocompatibility, Medical Devices, Translation and Regulation

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NPTEL Video Course - Biotechnology - NOC:Animal Transgenesis: Principles and Methods

Subject Co-ordinator - Prof. Himanshu Kumar

Co-ordinating Institute - IISER Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Common terms used in the course
Lecture 2 - Why transgenesis is needed ?
Lecture 3 - Model organisms for transgenesis
Lecture 4 - 3R Repalace Reduce Refine
Lecture 5 - History of transgenesis - I
Lecture 6 - History of transgenesis - II
Lecture 7 - General Principles of Transgenesis in Mouse
Lecture 8 - History of Cell culture
Lecture 9 - Cell culture Types and Basic Requirements
Lecture 10 - Culture medium and Challenges with cell culture
Lecture 11 - Methods for internalization of transgene, and Cell Preservation and Generation of transgene over
Lecture 12 - Cell for transgenesis and Homologus recombination
Lecture 13 - Targeting vector
Lecture 14 - ES cells, Electroporation, Screening, and Founder or Chimera mice
Lecture 15 - Germline transmission and Conditional knockout mice
Lecture 16 - Example of conditional knockout mice and Temporal control of gene expression
Lecture 17 - Discovery, origin and Types of CRISPR-Cas9 System
Lecture 18 - CRISPR-Cas9 sgRNA and itâ s modifications for gene editing
Lecture 19 - CRISPR-Cas9 version and itâ s application
Lecture 20 - Genome-wide CRISPR-Cas9 screening and its variants application
Lecture 21 - CRISPR-Cas9 in therapeutics

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NPTEL Video Course - Biotechnology - Analytical Technologies in Biotechnology

Subject Co-ordinator - Dr. Ashwani K. Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts in microscopy - 1
Lecture 2 - Basic concepts in microscopy - 2
Lecture 3 - Dark-field and phase contrast microscopy
Lecture 4 - Differential interference contrast and polarization
Lecture 5 - Fluorescence and confocal microscopy
Lecture 6 - Transmission electron microscopy
Lecture 7 - Transmission electron microscopy cont. and scanning electron microscopy
Lecture 8 - Basic concepts - 1
Lecture 9 - Basic concepts - 2
Lecture 10 - GM counting and Scintillation counting
Lecture 11 - Scintillation counting continued
Lecture 12 - Autoradiography and RIA
Lecture 13 - Safety aspects and applications
Lecture 14 - Introduction and Basic concepts in chromatography - 1
Lecture 15 - Basic concepts in chromatography - 2
Lecture 16 - Low-pressure liquid chromatography (LPLC) and high performance liquid chromatography (HPLC)
Lecture 17 - Ion-exchange chromatography
Lecture 18 - Gel-filtration chromatography
Lecture 19 - Affinity chromatography
Lecture 20 - Gas-liquid chromatography
Lecture 21 - Basic concepts in electrophoresis
Lecture 22 - Horizontal and vertical gel electrophoresis
Lecture 23 - Native gel electrophoresis and SDS-PAGE
Lecture 24 - Isoelectric focusing (IEF), 2-D gel electrophoresis and protein detection methods
Lecture 25 - Electrophoresis of nucleic acids
Lecture 26 - Immunoelectrophoresis and capillary electrophoresis
Lecture 27 - Introduction and Basic Concepts - 1
Lecture 28 - Basic concepts - 2
Lecture 29 - Types of centrifuges and analytical ultracentrifugation method

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Lecture 30 - Separation methods in preparative ultracentrifuges
Lecture 31 - Types of rotors
Lecture 32 - Types of rotors cont. and care of rotors
Lecture 33 - Introduction and basic concepts
Lecture 34 - UV-Visible spectroscopy
Lecture 35 - Infrared and fluorescence spectroscopy
Lecture 36 - Circular dichroism (CD) spectroscopy
Lecture 37 - Nuclear magnetic resonance (NMR) spectroscopy and X-ray crystallography
Lecture 38 - Atomic spectroscopy and mass spectrometry
Lecture 39 - Polymerase chain reaction(PCR)
Lecture 40 - DNA sequencing methods
Lecture 41 - Enzyme linked immunosorbent assay (ELISA)

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NPTEL Video Course - Biotechnology - NOC:Biomedical Nanotechnology

Subject Co-ordinator - Prof. P.Gopinath

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Nano
Lecture 2 - Nano-Biomimicry
Lecture 3 - Synthesis of nanomaterials by Physical and Chemical Methods
Lecture 4 - Synthesis of nanomaterials by Biological Methods
Lecture 5 - Characterisation of Nanomaterials
Lecture 6 - DNA Nanotechnology
Lecture 7 - Protein and Glyco Nanotechnology
Lecture 8 - Lipid Nanotechnology
Lecture 9 - Bio-Nanomachines
Lecture 10 - Carbon nanotubes and Its Bio-Applications
Lecture 11 - Nanomaterials for Cancer Diagnosis
Lecture 12 - Nanomaterials for Cancer therapy
Lecture 13 - Nanotechnology in Tissue Engineering
Lecture 14 - Nano artificial cells
Lecture 15 - Nanotechnology in Organ Printing
Lecture 16 - Nanotechnology in Point-of-Care Diagnostics
Lecture 17 - Nano-Pharmacology and Drug Targeting
Lecture 18 - Cellular uptake mechanisms of nanomaterials
Lecture 19 - In vitro Methods to study antibacterial and anticancer properties of nanomaterials
Lecture 20 - Nanotoxicology

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NPTEL Video Course - Biotechnology - NOC:Plant Developmental Biology

Subject Co-ordinator - Prof. Shri Ram Yadav

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Life Cycle of an Angiosperm
Lecture 2 - Characteristics of Plant Growth and Development - I
Lecture 3 - Characteristics of Plant Growth and Development - II
Lecture 4 - Molecular Genetics of Plant Development - I
Lecture 5 - Molecular Genetics of Plant Development - II
Lecture 6 - Molecular Genetics of Plant Development - III
Lecture 7 - Molecular Genetics of Plant Development - IV
Lecture 8 - Molecular Genetics of Plant Development (Continued...) - I
Lecture 9 - Molecular Genetics of Plant Development (Continued...) - II
Lecture 10 - Molecular Genetics of Plant Development (Continued...) - III
Lecture 11 - Root Development
Lecture 12 - Root Development (Continued...)
Lecture 13 - Root Development (Vascular Development)
Lecture 14 - Root Branching
Lecture 15 - Shoot Development
Lecture 16 - Shoot Development
Lecture 17 - Shoot Development
Lecture 18 - Shoot Development
Lecture 19 - Cell-Cell Communication During Plant Development
Lecture 20 - Techniques Used in Lab

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NPTEL Video Course - Biotechnology - NOC:Structural Biology

Subject Co-ordinator - Prof. Saugata Hazra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Why to Study Structural Biology
Lecture 2 - Introduction to Biological Macromolecules
Lecture 3 - Introduction: Decoding Biological Macromolecules
Lecture 4 - Introduction: Genome Sequencing
Lecture 5 - Introduction: Post Genomic Era
Lecture 6 - Amino acids and their properties
Lecture 7 - Protein: Protein Chemistry, Chirality, Peptide bond and Levels of protein structures
Lecture 8 - Protein: Dihedral angles, Peptide bond and Ramachandran Plot
Lecture 9 - Protein: Super Secondary Structures, Motif, Domains, Non-covalent interactions
Lecture 10 - Protein: Folding of Protein, Thermodynamics and Kinetics of protein folding, Characterization of
Lecture 11 - Introduction to Structural Biology Techniques - Part I
Lecture 12 - Introduction to Structural Biology Techniques - Part II
Lecture 13 - X-ray Crystallography: Crystallization - Part I
Lecture 14 - X-ray Crystallography: Crystallization - Part II
Lecture 15 - X-ray Crystallography: Crystal Mounting
Lecture 16 - X-ray Crystallography: Production of X-ray and its properties
Lecture 17 - X-ray Crystallography: Journey to 3D land
Lecture 18 - X-ray Crystallography: Crystal Symmetry
Lecture 19 - X-ray Crystallography: Instrumentation in X-ray Crystallography
Lecture 20 - X-ray Crystallography: Data collection and processing
Lecture 21 - X-ray Crystallography: Data Analysis - Part I
Lecture 22 - X-ray Crystallography: Data Analysis - Part II
Lecture 23 - X-ray Crystallography: Phase Problem - Part I
Lecture 24 - X-ray Crystallography: Phase Problem - Part II
Lecture 25 - X-ray Crystallography: Refinement and Structure deposition to PDB
Lecture 26 - Introduction to Spectroscopy and NMR
Lecture 27 - Basic Principles of NMR and Instrumentation
Lecture 28 - NMR Sample Preparation and Chemical Shift related concepts
Lecture 29 - Factors effecting NMR Spectra (1D and 2D)

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Lecture 30 - 2D and 3D NMR Spectroscopy focusing on protein structure
Lecture 31 - Introduction to Spectroscopy
Lecture 32 - UV-Vis and CD spectroscopy
Lecture 33 - Fluorescence Spectroscopy and Green Fluorescence Protein (GFP)
Lecture 34 - Infrared and Raman Spectroscopy for protein
Lecture 35 - Raman Spectroscopy, Raman Microscopy and Raman Crystallography for studying protein
Lecture 36 - Introduction to Microscopy
Lecture 37 - Functioning details of Cryo Electron Microscopy (Cryo EM)
Lecture 38 - Cryo Electron Microscopy: Data Collection and Analysis
Lecture 39 - A concise story of advancement Cryo-EM
Lecture 40 - Protein Data Bank
Lecture 41 - History of Molecular Visualizations of Biological Macromolecules
Lecture 42 - Description of structure related files (.pdb, .mmcif, .mtz, etc.)
Lecture 43 - Demonstration of COOT
Lecture 44 - 3D visualization using Pymol
Lecture 45 - Demonstration of Pymol
Lecture 46 - Why we need MD Simulation
Lecture 47 - Molecular Dynamic Simulation Process - Part I
Lecture 48 - Molecular Dynamic Simulation Process - Part II
Lecture 49 - Molecular Dynamic Simulation Process - Part III
Lecture 50 - Application of Molecular Dynamic Simulation
Lecture 51 - What, How and Which of Protein Engineering
Lecture 52 - How to make logical Protein Engineering: Process of Rational design
Lecture 53 - Success story of Rational Protein designing: Focusing on De Novo Process
Lecture 54 - Designing Protein by mimicking nature: Process of Directed Evolution
Lecture 55 - Achievement, Challenges, and Future direction in the field of Protein Engineering
Lecture 56 - Introduction to Structure Based Drug Discovery (SBDD)
Lecture 57 - Rational Drug Discovery
Lecture 58 - Docking Based Virtual Screening: Progress, Challenges and Future perspective
Lecture 59 - What makes a small molecule an ideal drug: Developing in silico ADMETox Model
Lecture 60 - Structure Based Drug Discovery: Case study and Conclusion

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NPTEL Video Course - Biotechnology - NOC:Experimental Nanobiotechnology

Subject Co-ordinator - Prof. P. Gopinath

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Synthesis of Nanomaterials Using Ball Milling
Lecture 2 - Synthesis Of Gold Nanoparticles
Lecture 3 - Biological Synthesis of Nanomaterials
Lecture 4 - Synthesis Of Carbon Dots
Lecture 5 - Synthesis Of Polymeric Nanoparticles
Lecture 6 - UV-Visible and Fluorescence Spectroscopy
Lecture 7 - Dynamic Light Scattering and Zeta Potential Analysis
Lecture 8 - Fourier Transform Infrared Spectroscopy
Lecture 9 - X-Ray Diffraction
Lecture 10 - Electron Microscopy
Lecture 11 - Atomic Force Microscopy
Lecture 12 - Electrochemical Nano-Biosensor
Lecture 13 - Fabrication of Nanofibers Using Electrospinning
Lecture 14 - Synthesis of Hydrogel and Nanogel
Lecture 15 - In vitro 3D Cell Culture
Lecture 16 - 3D Bioprinting
Lecture 17 - In vitro Methods to Study Antibacterial Properties of Nanomaterials
Lecture 18 - In vitro Cytotoxicity Analysis
Lecture 19 - In vitro Methods to Study the Apoptotic Potential of Nanomaterials
Lecture 20 - In vitro Hemocompatibility Test
Lecture 21 - In vivo Toxicity Studies Using Zebrafish Embryo

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NPTEL Video Course - Biotechnology - NOC:Learning about Learning: A Course on Neurobiology of Learning and Me

Subject Co-ordinator - Prof. Balaji Jayaprakash

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Learning and Memory - I
Lecture 2 - Introduction to Learning and Memory - II
Lecture 3 - Associative Learning I
Lecture 4 - Associative learning II
Lecture 5 - Introduction to the Rescorla Wagner Model
Lecture 6 - Application of Rescorla Wagner Model - I
Lecture 7 - Application of Rescorla Wagner Model - II
Lecture 8 - Application of Rescorla Wagner Model - III
Lecture 9 - Application of Rescorla Wagner Model - IV
Lecture 10 - Limitations of Rescorla Wagner Model
Lecture 11 - Introduction of Reinforcement Learning - I
Lecture 12 - Introduction of Reinforcement Learning - II
Lecture 13 - Introduction of Reinforcement Learning - III
Lecture 14 - Sign Tracking vs Goal Oriented/Tracking; Linking complex behaviors to simple molecules
Lecture 15 - Sign Tracking vs Goal Oriented; Learning Linking complex behaviors to simple molecules - II
Lecture 16 - Memory in Molecular Terms - I
Lecture 17 - Memory in Molecular Terms - II
Lecture 18 - Memory in Molecular Terms - III
Lecture 19 - Memory in Molecular Terms - IV
Lecture 20 - Memory in Molecular Terms - V

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NPTEL Video Course - Biotechnology - NOC:Drug Delivery: Principles and Engineering

Subject Co-ordinator - Rachit Agarwal

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Drug Delivery Introduction and Pharmacokinetics
Lecture 2 - Pharmacokinetics (Continued...)
Lecture 3 - Pro-drugs and Polymers Introduction
Lecture 4 - Polymers - Synthesis
Lecture 5 - Polymers - Properties
Lecture 6 - Biomedical Polymers
Lecture 7 - Biodegradable Polymers and Polymer Drug Conjugates - I
Lecture 8 - Polymer Drug Conjugates - II
Lecture 9 - Research Paper Discussion and Diffusion Controlled Systems
Lecture 10 - Controlled Release
Lecture 11 - Controlled Release
Lecture 12 - Controlled Release
Lecture 13 - Math Exercise
Lecture 14 - Hydrogels - I
Lecture 15 - Hydrogels - II
Lecture 16 - Hydrogels - III
Lecture 17 - Hydrogels - IV
Lecture 18 - Nano and Micro-particles - I
Lecture 19 - Nano and Micro-particles - II
Lecture 20 - Nano and Micro-particles - III
Lecture 21 - Nano and Micro-particles - IV
Lecture 22 - Nano and Micro-particles - V
Lecture 23 - Nano and Micro-particles - VI
Lecture 24 - Nano and Micro-particles - VII
Lecture 25 - Protein Adsorption - I
Lecture 26 - Protein Adsorption - II
Lecture 27 - Protein Adsorption - III
Lecture 28 - Tissue Engineering - I
Lecture 29 - Tissue Engineering - II

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Lecture 30 - Tissue Engineering - III
Lecture 31 - Drug Delivery in Tissue Engineering - I
Lecture 32 - Drug Delivery in Tissue Engineering - II
Lecture 33 - Implant Associated Infections - I
Lecture 34 - Implant Associated Infections - II
Lecture 35 - Route Specific Delivery
Lecture 36 - Route Specific Delivery
Lecture 37 - Route Specific Delivery
Lecture 38 - Route Specific Delivery
Lecture 39 - Route Specific Delivery
Lecture 40 - Route Specific Delivery
Lecture 41 - Route Specific Delivery
Lecture 42 - Research Paper Discussion
Lecture 43 - Route Specific Delivery
Lecture 44 - Intravenous Administration
Lecture 45 - Immune System - II
Lecture 46 - Complement System and Blood Clotting
Lecture 47 - Blood Clotting and Hemocompatibility of Materials; Adaptive Immune Response
Lecture 48 - Adaptive Immune Response and Vaccine
Lecture 49 - Vaccines
Lecture 50 - Vaccines and Immuno-isolated Cell Therapy
Lecture 51 - Immuno-isolated Cell Therapy
Lecture 52 - Immuno-isolated Cell and Gene Therapy
Lecture 53 - Gene Delivery
Lecture 54 - Gene Delivery
Lecture 55 - Genes as Vaccines
Lecture 56 - Vaccines
Lecture 57 - Cancer Vaccines
Lecture 58 - Cancer Vaccine
Lecture 59 - Responsive Delivery Systems - I
Lecture 60 - Responsive Delivery Systems - II
Lecture 61 - Targeted Drug Delivery System
Lecture 62 - Targeted Drug Delivery System
Lecture 63 - Nanotoxicology and Translation Pathways

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NPTEL Video Course - Biotechnology - NOC:Fundamentals of Micro and Nanofabrication

Subject Co-ordinator - Prof. Shankar Selvaraja

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Substrate
Lecture 3 - Substrate (Continued...)
Lecture 4 - Introduction to cleanroom
Lecture 5 - Contamination and surface cleaning
Lecture 6 - Advanced cleaning techniques
Lecture 7 - Defects
Lecture 8 - Diffusion
Lecture 9 - Diffusion - Advanced Concepts
Lecture 10 - Ion Implantation
Lecture 11 - Ion Implantation (Continued...)
Lecture 12 - Native Films
Lecture 13 - Native Films
Lecture 14 - Native Films
Lecture 15 - Methods and Some Definitions
Lecture 16 - Chemical Vapor Depostion
Lecture 17 - Chemical Vapor Depostion
Lecture 18 - Chemical Vapor Depostion
Lecture 19 - Chemical Vapor Depostion
Lecture 20 - Chemical Vapor Depostion
Lecture 21 - Atomic Layer Depostion
Lecture 22 - Atomic Layer Depostion (Continued...)
Lecture 23 - Physical Vapor Deposition
Lecture 24 - Physical Vapor Deposition
Lecture 25 - Physical Vapor Deposition
Lecture 26 - Mettalization
Lecture 27 - Mettalization
Lecture 28 - Pattern Transfer Bascis
Lecture 29 - Optical lithography basics

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Lecture 30 - Optical lithography basics
Lecture 31 - Optical Lithography
Lecture 32 - Optical Lithography
Lecture 33 - Projection Lithography
Lecture 34 - Projection Lithography
Lecture 35 - Optical lithography
Lecture 36 - Optical Lithography
Lecture 37 - Lithography process technology glossary
Lecture 38 - Optical Lithography
Lecture 39 - Electron beam lithography
Lecture 40 - Electron beam lithography
Lecture 41 - Emerging lithography techniques
Lecture 42 - Etching Figures of Merit
Lecture 43 - Wet etching Basics
Lecture 44 - Wet Ething Recipes
Lecture 45 - Wet Ething Recipes
Lecture 46 - Dry etch
Lecture 47 - Dry etch
Lecture 48 - Dry etch
Lecture 49 - Dry etch
Lecture 50 - Dry etch
Lecture 51 - Chemical Mechanical Polishing (CMP)
Lecture 52 - Chemical Mechanical Polishing (CMP)
Lecture 53 - Design for Manufacturability - 1
Lecture 54 - Design for Manufacturability - 2
Lecture 55 - Design for Manufacturability
Lecture 56 - Process integration
Lecture 57 - PV integration
Lecture 58 - CMOS integration
Lecture 59 - Lab demo
Lecture 60 - Lab demo
Lecture 61 - CMOS process for photonics application

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NPTEL Video Course - Biotechnology - NOC:Optical Spectroscopy and Microscopy: Fundamentals of Optical Measure

Subject Co-ordinator - Prof. Balaji Jayaprakash

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Optical Focus and Localisation of Light
Lecture 2 - Relating Photon's Momentum to Spot Size
Lecture 3 - Shortest Pulse of Light
Lecture 4 - Behaviour of light through polarizers
Lecture 5 - Nature of Light
Lecture 6 - Revisiting Polarisation Through Ket Vectors
Lecture 7 - Light through Polarisers
Lecture 8 - Light through Polarisers
Lecture 9 - Time Dependent Perturbation Theory (TDPT)
Lecture 10 - TDPT in Steps-1
Lecture 11 - TDPT in Steps-2
Lecture 12 - TDPT in Steps-3
Lecture 13 - Fermi's Golden Rule
Lecture 14 - Beer Lambert's Law from TDPT
Lecture 15 - Einstein's Phenomenology
Lecture 16 - Einstein's Coefficients, Fluorescence and Lifetime
Lecture 17 - Fock States and Photonic Treatment of Light
Lecture 18 - Operators in Fock State Space
Lecture 19 - Light Matter Interaction and Rudimentary Feynman Diagrams
Lecture 20 - Emergence of Spontaneous and Stimulated Emission Processes
Lecture 21 - Lecture 21
Lecture 22 - Lecture 22
Lecture 23 - Lecture 23
Lecture 24 - Lecture 24
Lecture 25 - Lecture 25
Lecture 26 - Introduction to LASER
Lecture 27 - LASER population dynamics
Lecture 28 - LASER population dynamics - Part- 2
Lecture 29 - Real world LASER and characteristics of LASER emission

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Lecture 30 - Temporal and Spatial Coherence
Lecture 31 - Transverse and Longitudinal modes of LASER
Lecture 32 - Pulsed LASER
Lecture 33 - Q-switching in detail
Lecture 34 - Q-switching in detail - Part 2
Lecture 35 - Basics of mode locking
Lecture 36 - Basics of mode locking - Part 2
Lecture 37 - Pulse compression
Lecture 38 - Real world system (Mode lock Part-2)
Lecture 39 - TEM mode
Lecture 40 - Alignment basics
Lecture 41 - Non-Linear Optics
Lecture 42 - Confocal Detection
Lecture 43 - Interference Filters
Lecture 44 - Laser Scanning System - 1
Lecture 45 - Laser Scanning System - 2
Lecture 46 - Alignment of Moving Beams
Lecture 47 - Decoding an Objective Lens - 1
Lecture 48 - Decoding an Objective Lens - 2
Lecture 49 - Designing Lens Systems
Lecture 50 - Astigmatism and Field Curvature
Lecture 51 - Intro to Lab Session
Lecture 52 - Optics in LAB
Lecture 53 - Optics in Lab
Lecture 54 - Kinematic Mounts
Lecture 55 - Alignment with out iris
Lecture 56 - Fluorescecne Spectrometer - 1
Lecture 57 - Fluorescecne Spectrometer - 2
Lecture 58 - Ti

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NPTEL Video Course - Biotechnology - NOC:Cell Biology: Cellular Organization, Division and Processes

Subject Co-ordinator - Prof. Shikha Laloraya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cell Biology, Cell components, organization and processes - Part I
Lecture 2 - Introduction to Cell Biology, Cell components, organization and processes - Part II
Lecture 3 - DNA: The genetic material - Part I
Lecture 4 - DNA: The genetic material - Part II
Lecture 5 - Regulation of the cell cycle - Part I
Lecture 6 - Regulation of the cell cycle - Part II
Lecture 7 - Checkpoints: The DNA damage and DNA replication checkpoints
Lecture 8 - The Ubiquitin Proteasome system
Lecture 9 - S-phase: Regulation of entry into S-phase and DNA Replication
Lecture 10 - DNA replication - Part I
Lecture 11 - DNA Replication - Part II
Lecture 12 - DNA Replication - Part III
Lecture 13 - DNA Replication - Part IV
Lecture 14 - Mitosis - Part I
Lecture 15 - Cytokinesis
Lecture 16 - Aging and Senescence
Lecture 17 - Apoptosis - Part I
Lecture 18 - Apoptosis - Part II
Lecture 19 - Meiosis - Part I
Lecture 20 - Meiosis - Part II
Lecture 21 - Nuclear organization
Lecture 22 - SMC proteins and chromosome organization - Real-Time imaging of DNA loop-extrusion by SMC comple
Lecture 23 - The cohesin complex and its functions - The mysterious biological function of chromosome loops
Lecture 24 - Chromatin organization
Lecture 25 - SMC proteins and chromosome organization - Introduction
Lecture 26 - Meiosis - Part III
Lecture 27 - Mitosis - Part II
Lecture 28 - Cell diversity and properties of specialized cells-Budding yeast as a model system
Lecture 29 - The Plant Cell

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Lecture 30 - Stem cells - Part I Intro-SL
Lecture 31 - Stem cells - Part II
Lecture 32 - Nerve cells
Lecture 33 - The Cancer Cell

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NPTEL Video Course - Biotechnology - NOC:Microsensors, Implantable Devices and Rodent Surgeries for Biomedica

Subject Co-ordinator - Prof. Shabari Girishan K V, Prof. Hardik J. Pandya

Co-ordinating Institute - RUAS IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction - I
Lecture 2 - Course Introduction - II
Lecture 3 - Neuro anatomy for Neurosurgery
Lecture 4 - Neural Implant Fabrication: PVD - I
Lecture 5 - Neural Implant Fabrication: PVD - II
Lecture 6 - Rodent Neuroanatomy
Lecture 7 - Basics of BCI and Signal Processing
Lecture 8 - Neural Implant Fabrication: Sputtering and CVD
Lecture 9 - Principles of Stereotactic Rodent MicroNeurosurgery
Lecture 10 - Neural Signal Processing: Demonstrations
Lecture 11 - Neural Implant Fabrication: Photolithography - I
Lecture 12 - Neural Implant Fabrication: Photolithography - II
Lecture 13 - Craniotomy and Stereotactic Implantation Surgeries
Lecture 14 - Lithography Numericals
Lecture 15 - IDE Patterning
Lecture 16 - Etching
Lecture 17 - Introduction to Cleanroom and Gowning
Lecture 18 - E-Beam Evaporation Demonstration
Lecture 19 - Craniotomy and Cranial Window Surgeries
Lecture 20 - Flexible MEA: Introduction and Process Flow
Lecture 21 - Flexible MEA: EIB, Characterization and Analyses
Lecture 22 - Stereotactic Implantation Surgeries
Lecture 23 - Sputtering Demonstration
Lecture 24 - 3D Printing - Part I
Lecture 25 - Bioresorbable Microelectrode Array-based System
Lecture 26 - Fundamentals of Spinal Neuroanatomy
Lecture 27 - 3D Printing - Part II
Lecture 28 - Neural Implant - Microneedle
Lecture 29 - Spinal Cord Structure, and Circuits

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Lecture 30 - Surgical Steps in Spinal Surgeries
Lecture 31 - 3D Printing - Part III
Lecture 32 - 3D Printing - Demonstration
Lecture 33 - Wet Etching Demonstration
Lecture 34 - Neural Implants for Parkinson's Disease
Lecture 35 - Spinal micro neuro Surgery
Lecture 36 - Anesthesia in Rodents
Lecture 37 - Physiological Monitoring in Rodents
Lecture 38 - Lithography Demonstration
Lecture 39 - Electronic System Development for Neural Engineering - I
Lecture 40 - Anesthesia Administration Equipments and Vital Monitoring
Lecture 41 - Standard Safety Practices
Lecture 42 - Euthanasia
Lecture 43 - Euthanaisa in Rodents
Lecture 44 - Electronic System Development for Neural Engineering - II
Lecture 45 - Rodent Brain and Spinal Cord Harvest
Lecture 46 - Rodent Behavioural Setups
Lecture 47 - Study Plan for Behavioural Setups: Stroke Model
Lecture 48 - PCB Design Demonstration for Neural Systems
Lecture 49 - Electronic Systems for Brain Stimulation - I
Lecture 50 - Behavioural Taks in Rodent Models - I
Lecture 51 - Behavioural Taks in Rodent Models - II
Lecture 52 - Behavioural Setup for Rodents: Parkinsonism Model - I
Lecture 53 - Behavioural Setup for Rodents: Parkinsonism Model - II
Lecture 54 - Electronic Systems for Brain Stimulation - II
Lecture 55 - Course Concluding Remarks

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NPTEL Video Course - Biotechnology - NOC:Fundamentals of Cryo-Electron Microscopy (Cryo-EM) and 3D Image Proc

Subject Co-ordinator - Prof. Somnath Dutta

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of the microscope
Lecture 2 - Image formation by glass lenses and its role in wavelength
Lecture 3 - Different components of electron microscope (EM)
Lecture 4 - Electron specimen interaction
Lecture 5 - Elements of TEM: electron gun - I
Lecture 6 - Elements of TEM: electron gun - II
Lecture 7 - Comparison between the various types of electron gun
Lecture 8 - Elements of TEM: electromagnetic lens (EM) - I
Lecture 9 - Trajectory of electrons in EM lens
Lecture 10 - Elements of TEM: electromagnetic lens (EM) - II
Lecture 11 - Image Formation by EM Lenses: Understanding Ray Diagrams
Lecture 12 - Aberrations and Focusing in Cryo-EM imaging
Lecture 13 - Understanding Chromatic, Spherical Aberrations, and Astigmatism in Cryo-EM
Lecture 14 - Aberrations and Practical Imaging in Cryo-EM
Lecture 15 - Electron Dose Control and Beam Optimization in Cryo-EM
Lecture 16 - Introduction to TEM Holders and Grids in Cryo-EM
Lecture 17 - Overfocused and Underfocused Images
Lecture 18 - Elements of TEM: Pumps in EM System
Lecture 19 - Elements of TEM: Detectors in EM System
Lecture 20 - Imaging and Effect of Thermal Drift
Lecture 21 - Wave and its properties
Lecture 22 - Addition/superposition of waves - I
Lecture 23 - Addition/superposition of waves - II
Lecture 24 - Decomposition of complex waves
Lecture 25 - Wave and their transformation
Lecture 26 - Complex 2D Images and Its Diffraction Pattern
Lecture 27 - Sample Preparation and Determination for TEM
Lecture 28 - Biological Sample Purification - I
Lecture 29 - Biological Sample Purification - II

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Lecture 30 - Different Sample Preparation Techniques for TEM Imaging and Different Types of Grids used for Im
Lecture 31 - TEM Grids: Types, Handling and Surface Coatings
Lecture 32 - Carbon Coaters, Glow Discharge and Grid Surface Treatment
Lecture 33 - Negative Staining in TEM: Stains, Grid Preparation and Protocols
Lecture 34 - Carbon Sandwich and Metal Shadowing Techniques in TEM
Lecture 35 - Staining Quality in TEM: Thick, Thin and Positive Staining
Lecture 36 - Negative Staining - Imaging Quality and Artifacts
Lecture 37 - Negative Staining - Particle Distribution and Contrast
Lecture 38 - Applications of Negative Staining in Structural Biology
Lecture 39 - Negative Staining for Complexes and Interactions
Lecture 40 - Ultramicrotomy and Sectioning for Biological Molecules
Lecture 41 - Cryo-EM Grid Preparation and Vitrification
Lecture 42 - Grid Types and Sample Distribution in Cryo-EM
Lecture 43 - Blotting Parameters and Ice Conditions
Lecture 44 - Motion Correction and Defocus in Cryo-EM
Lecture 45 - Microscope Alignment and Imaging Limitations
Lecture 46 - CTF Estimation and Defocus in Cryo-EM
Lecture 47 - Phase Flip and Motion Correction
Lecture 48 - High Pressure and Rapid Freezing Methods
Lecture 49 - Cryo-Ultra Microtomy and FIB-SEM
Lecture 50 - Graphene Oxide Grids in Cryo-EM
Lecture 51 - Motion Correction and 2D Classification Basics
Lecture 52 - Concepts and Methods in 2D/3D Classification
Lecture 53 - 3D Reconstruction and Resolution Assessment
Lecture 54 - Practical: TEM Setup and Negative Staining
Lecture 55 - Practical: Cryo-EM Plunge Freezing
Lecture 56 - Practical: Cryo-EM Grid Clipping
Lecture 57 - Practical: Grid Loading and Imaging Software

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NPTEL Video Course - Chemical Engineering - Advanced Chemical Reaction Engineering (PG)

Subject Co-ordinator - Prof. H.S. Shankar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview - I
Lecture 2 - Course Overview - II
Lecture 3 - Design Equations - I
Lecture 4 - Design Equations - Illustrative Examples
Lecture 5 - Design Equations - II
Lecture 6 - Illustrative Examples
Lecture 7 - Illustrative Examples
Lecture 8 - Multiple Reactions - II
Lecture 9 - Modelling Multiple Reactions in Soil Environment - III
Lecture 10 - Semi Continuous Reactor Operation
Lecture 11 - Catalyst Deactivation - I
Lecture 12 - Catalyst Deactivation - II
Lecture 13 - Illustrative Example
Lecture 14 - Energy Balance - I
Lecture 15 - Energy Balance - II
Lecture 16 - Reacting Fluids as Energy Carrier
Lecture 17 - Illustrative Example
Lecture 18 - Energy Balance - III
Lecture 19 - Energy Balance - IV
Lecture 20 - Energy Balance - V
Lecture 21 - Illustrative Example
Lecture 22 - Energy Balance - VI
Lecture 23 - Illustrative Example
Lecture 24 - Illustrative Example
Lecture 25 - Illustrative Example
Lecture 26 - Residence Time Distribution Methods
Lecture 27 - Residence Time Distribution Models
Lecture 28 - Shrinking core Gas-Solid reactions Model
Lecture 29 - Shrinking core Ash Diffusion Model & Combination of Resistances

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Lecture 30 - 1) Gas Solid Reactions Temperature Effects on Rate & Equilibria 2) Introduction to Population Ba
Lecture 31 - Illustrative Example
Lecture 32 - Population Balance Modelling - II
Lecture 33 - Population Balance Modelling - III
Lecture 34 - Illustrative Examples
Lecture 35 - Introduction to Environmental Reactions
Lecture 36 - Reaction Engineering Examples in Biochemical & Environmental Engineering
Lecture 37 - Illustrative Examples
Lecture 38 - Illustrative Examples
Lecture 39 - Oxygen Sag Analysis in Rivers
Lecture 40 - Illustrative Examples
Lecture 41 - Illustrative Example

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NPTEL Video Course - Chemical Engineering - Advanced Process Control

Subject Co-ordinator - Prof. Sachin C. Patwardhan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation
Lecture 2 - Linearization of Mechanistic Models
Lecture 3 - Linearization of Mechanistic Models (Continued...)
Lecture 4 - Introduction to z-transforms and Development of Grey-box models
Lecture 5 - Introduction to Stability Analysis and Development of Output Error Models
Lecture 6 - Introduction to Stochastic Processes
Lecture 7 - Introduction to Stochastic Processes (Continued...)
Lecture 8 - Development of ARX models
Lecture 9 - Statistical Properties of ARX models and Development of ARMAX models
Lecture 10 - Development of ARMAX models (Continued...) and Issues in Model Development
Lecture 11 - Model Structure Selection and Issues in Model Development (Continued...)
Lecture 12 - Issues in Model Development (Continued...) and State Realizations of Transfer Function Models
Lecture 13 - Stability Analysis of Discrete Time Systems
Lecture 14 - Lyapunov Functions and Interaction Analysis and Multi-loop Control
Lecture 15 - Interaction Analysis and Multi-loop Control (Continued...)
Lecture 16 - Multivariable Decoupling Control and Soft Sensing and State Estimation
Lecture 17 - Development of Luenberger Observer
Lecture 18 - Development of Luenberger Observer (Continued...) and Introduction to Kalman Filtering
Lecture 19 - Kalman Filtering
Lecture 20 - Kalman Filtering (Continued...)
Lecture 21 - Kalman Filtering (Continued...)
Lecture 22 - Pole Placement State Feedback Control Design and Introduction to Linear Quadratic Gaussian (LQG)
Lecture 23 - Linear Quadratic Gaussian (LQG) Regulator Design
Lecture 24 - Linear Quadratic Gaussian (LQG) Controller Design
Lecture 25 - Model Predictive Control (MPC)
Lecture 26 - Model Predictive Control (Continued...)

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NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering II

Subject Co-ordinator - Prof. A.K. Suresh, Prof. Ganesh A. Viswanathan, Prof. Sanjay M. Mahajani

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to catalysts and catalysis
Lecture 2 - Steps in catalytic reaction
Lecture 3 - Derivation of the rate equation
Lecture 4 - Heterogenous data analysis for reactor design - I
Lecture 5 - Heterogenous data analysis for reactor design - II
Lecture 6 - Catalyst deactivation and accounting for it in design - I
Lecture 7 - Catalyst deactivation and accounting for it in design - II
Lecture 8 - Synthesize the rate equation
Lecture 9 - Introduction to intraparticle diffusion
Lecture 10 - Intraparticle diffusion
Lecture 11 - Intraparticle diffusion
Lecture 12 - Intraparticle diffusion
Lecture 13 - Effectiveness factor and Introduction to external mass transfer
Lecture 14 - External Mass Transfer
Lecture 15 - Implications to rate data interpretation and design - I
Lecture 16 - Implications to rate data interpretation and design - II
Lecture 17 - Packed-bed reactor design
Lecture 18 - Fluidized bed reactor design - I
Lecture 19 - Fluidized bed reactor design - II
Lecture 20 - Gas-liquid reactions-1
Lecture 21 - GLR-2
Lecture 22 - GLR-3
Lecture 23 - GLR-4
Lecture 24 - GLR-5
Lecture 25 - GLR-6
Lecture 26 - GLR-7
Lecture 27 - Fluid-solid non-catalytic reactions - I
Lecture 28 - Fluid-solid non-catalytic reactions - II
Lecture 29 - Fluid-solid non-catalytic reactions - III

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Lecture 30 - Distribution of residence time
Lecture 31 - Measurement of residence time distribution
Lecture 32 - Residence time distribution function
Lecture 33 - Reactor diagnostics and troubleshooting
Lecture 34 - Modeling non-ideal reactors
Lecture 35 - Residence time distribution
Lecture 36 - Non-ideal Reactors
Lecture 37 - Non-ideal Reactors
Lecture 38 - Non-ideal Reactors
Lecture 39 - Non-ideal Reactors

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NPTEL Video Course - Chemical Engineering - Advanced Numerical Analysis

Subject Co-ordinator - Prof. Sachin C. Patwardhan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Overview
Lecture 2 - Fundamentals of Vector Spaces
Lecture 3 - Basic Dimension and Sub-space of a Vector Space
Lecture 4 - Introduction to Normed Vector Spaces
Lecture 5 - Examples of Norms,Cauchy Sequence and Convergence, Introduction to Banach Spaces
Lecture 6 - Introduction to Inner Product Spaces
Lecture 7 - Cauchy Schwaz Inequality and Orthogonal Sets
Lecture 8 - Gram-Schmidt Process and Generation of Orthogonal Sets
Lecture 9 - Problem Discretization Using Appropriation Theory
Lecture 10 - Weierstrass Theorem and Polynomial Approximation
Lecture 11 - Taylor Series Approximation and Newton's Method
Lecture 12 - Solving ODE - BVPs Using Firute Difference Method
Lecture 13 - Solving ODE - BVPs and PDEs Using Finite Difference Method
Lecture 14 - Finite Difference Method (Continued...) and Polynomial Interpolations
Lecture 15 - Polynomial and Function Interpolations,Orthogonal Collocations Method for Solving ODE -BVPs
Lecture 16 - Orthogonal Collocations Method for Solving ODE - BVPs and PDEs
Lecture 17 - Least Square Approximations, Necessary and Sufficient Conditions for Unconstrained Optimization
Lecture 18 - Least Square Approximations -Necessary and Sufficient Conditions for Unconstrained Optimization
Lecture 19 - Linear Least Square Estimation and Geometric Interpretation of the Least Square Solution
Lecture 20 - Geometric Interpretation of the Least Square Solution (Continued...) and Projection Theorem in a
Lecture 21 - Projection Theorem in a Hilbert Spaces (Continued...) and Approximation Using Orthogonal Basis
Lecture 22 - Discretization of ODE-BVP using Least Square Approximation
Lecture 23 - Discretization of ODE-BVP using Least Square Approximation and Gelarkin Method
Lecture 24 - Model Parameter Estimation using Gauss-Newton Method
Lecture 25 - Solving Linear Algebraic Equations and Methods of Sparse Linear Systems
Lecture 26 - Methods of Sparse Linear Systems (Continued...) and Iterative Methods for Solving Linear Algebra
Lecture 27 - Iterative Methods for Solving Linear Algebraic Equations
Lecture 28 - Iterative Methods for Solving Linear Algebraic Equations
Lecture 29 - Iterative Methods for Solving Linear Algebraic Equations

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Lecture 30 - Iterative Methods for Solving Linear Algebraic Equations
Lecture 31 - Iterative Methods for Solving Linear Algebraic Equations
Lecture 32 - Optimization Based Methods for Solving Linear Algebraic Equations
Lecture 33 - Conjugate Gradient Method, Matrix Conditioning and Solutions of Linear Algebraic Equations
Lecture 34 - Matrix Conditioning and Solutions and Linear Algebraic Equations (Continued...)
Lecture 35 - Matrix Conditioning (Continued...) and Solving Nonlinear Algebraic Equations
Lecture 36 - Solving Nonlinear Algebraic Equations
Lecture 37 - Solving Nonlinear Algebraic Equations
Lecture 38 - Solving Nonlinear Algebraic Equations
Lecture 39 - Solving Nonlinear Algebraic Equations
Lecture 40 - Solving Ordinary Differential Equations - Initial Value Problems (ODE-IVPs)
Lecture 41 - Solving Ordinary Differential Equations - Initial Value Problems (ODE-IVPs)
Lecture 42 - Solving ODE-IVPs
Lecture 43 - Solving ODE-IVPs
Lecture 44 - Solving ODE-IVPs
Lecture 45 - Solving ODE-IVPs
Lecture 46 - Solving ODE-IVPs
Lecture 47 - Solving ODE-IVPs
Lecture 48 - Methods for Solving System of Differential Algebraic Equations
Lecture 49 - Methods for Solving System of Differential Algebraic Equations (Continued...) and Concluding Rem

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Evolutionary Dynamics

Subject Co-ordinator - Prof. Supreet Saini

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of the theory of Natural Selection - 1
Lecture 2 - History of the theory of Natural Selection - 2
Lecture 3 - Exponential growth models
Lecture 4 - Logistic Growth Models - 1
Lecture 5 - Logistic Growth Models - 2
Lecture 6 - Modelling selection - 1
Lecture 7 - Modelling Selection - 2
Lecture 8 - Modelling Selection - 3
Lecture 9 - Modelling Mutations - 1
Lecture 10 - Modelling Mutations - 2
Lecture 11 - Modelling Mutations - 3
Lecture 12 - Genetic Code and Sequence Spaces
Lecture 13 - Sequence Spaces as Networks
Lecture 14 - Sequence Space to Fitness Landscape
Lecture 15 - Properties of Fitness Landscapes and Quasi-species
Lecture 16 - Integrating Reproduction, Selection and Mutation
Lecture 17 - Obtaining Fitness Landscapes Experimentally
Lecture 18 - NK Model of Fitness Landscape
Lecture 19 - Modelling Evolution on Fitness Landscapes - 1
Lecture 20 - Modelling Evolution on Fitness Landscapes - 2
Lecture 21 - Modelling Evolution on Fitness Landscapes - 3
Lecture 22 - Role of Randomness in Evolution
Lecture 23 - Genetic Drift in Evolution of Microbial Populations
Lecture 24 - Dynamics of a Moran Process without Selection
Lecture 25 - Dynamics of a Moran Process without Selection
Lecture 26 - Evolution, Selection, and Genetic Drift
Lecture 27 - Representing Microbial Evolution
Lecture 28 - Estimating Timescales of Evolution
Lecture 29 - Estimating the Speed of Microbial Evolution

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Lecture 30 - Evolutionary Dynamics when Mutations are Rare
Lecture 31 - Evolutionary Dynamics when Mutations are Rapid - 1
Lecture 32 - Evolutionary Dynamics when Mutations are Rapid - 2
Lecture 33 - Evolutionary Dynamics when Mutations are Rapid - 3
Lecture 34 - Evolutionary Game Theory - 1
Lecture 35 - Evolutionary Game Theory - 2
Lecture 36 - Evolutionary Game Theory - 3
Lecture 37 - Evolutionary Game Theory - 4
Lecture 38 - Evolutionary Game Theory Applied to Moran Process
Lecture 39 - Evolutionary Games During Weak Selection
Lecture 40 - Evolutionary Dynamics of HIV

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NPTEL Video Course - Chemical Engineering - NOC:Heat Transfer

Subject Co-ordinator - Prof. Ganesh A. Viswanathan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Conduction
Lecture 3 - Energy Balance
Lecture 4 - 1D Steadystate Conduction - Resistance Concept
Lecture 5 - Resistances in Composite Wall Case
Lecture 6 - Resistances in Radial Systems
Lecture 7 - Heat Generation - I Plane and Cylindrical Wall
Lecture 8 - Heat Generation - II Problem; Introduction to Extended Surfaces
Lecture 9 - Extended Surfaces I - General Formulation
Lecture 10 - Extended Surfaces II - Fixed Cross-section Area
Lecture 11 - Extended Surfaces III - Varying Cross-section Area
Lecture 12 - 2D Plane Wall
Lecture 13 - Transient Analyses I
Lecture 14 - Transient Analyses II
Lecture 15 - Transient Analyses
Lecture 16 - Introduction to Convective Heat Transfer
Lecture 17 - Heat and Mass Transport Coefficients
Lecture 18 - Boundary Layer
Lecture 19 - Laminar and Turbulent Flows; Momentum Balance
Lecture 20 - Energy and Mass Balances; Boundary Layer Approximations
Lecture 21 - Order of Magnitude Analysis
Lecture 22 - Transport Coefficients
Lecture 23 - Relationship between Momentum, Thermal and Concentration Boundary Layer
Lecture 24 - Reynolds and Chilton-Colburn Analogies
Lecture 25 - Forced Convection
Lecture 26 - Flow Past Flat Plate I - Method of Blasius
Lecture 27 - Flow Past Flat Plate II - Correlations for Heat and Mass Transport
Lecture 28 - Flow Past Cylinders
Lecture 29 - Flow through Pipes - I

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Lecture 30 - Flow through Pipes - II
Lecture 31 - Flow through Pipes - III
Lecture 32 - Flow through Pipes - IV - Mixing-cup Temperature
Lecture 33 - Flow through Pipes - V - Log mean Temperature Difference
Lecture 34 - Flow through Pipes - VI - Correlations for Laminar and Turbulent Conditions
Lecture 35 - Example problems
Lecture 36 - Introduction to Free/Natural Convection
Lecture 37 - Heated Plate in a Quiescent Fluid - I
Lecture 38 - Heated Plate in a Quiescent Fluid - II
Lecture 39 - Boiling - I
Lecture 40 - Boiling - II
Lecture 41 - Condensation - I
Lecture 42 - Condensation - II
Lecture 43 - Radiation
Lecture 44 - Spectral Intensity
Lecture 45 - Radiation
Lecture 46 - Properties of a Blackbody
Lecture 47 - Surface Adsorption
Lecture 48 - Kirchoffâ s Law
Lecture 49 - Radiation Exchange - View Factor
Lecture 50 - View Factor Examples
Lecture 51 - View Factor - Inside Sphere Method, Blackbody Radiation Exchange
Lecture 52 - Diffuse, Gray Surfaces in an Enclosure
Lecture 53 - Resistances - Oppenheim Matrix Method
Lecture 54 - Resistances - Examples
Lecture 55 - More Examples
Lecture 56 - Introduction and Examples
Lecture 57 - Parallel Flow Heat Exchangers
Lecture 58 - LMTD I
Lecture 59 - Shell and Tube Heat Exchangers
Lecture 60 - Epsilon-NTU Method

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Reaction Engineering-II

Subject Co-ordinator - Prof. Ganesh Vishwanathan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to catalysis and catalytic processes
Lecture 3 - Catalyst properties and classification
Lecture 4 - Steps in catalysis
Lecture 5 - Adsorption isotherm
Lecture 6 - Surface reaction
Lecture 7 - Rate controlling steps and Rate law
Lecture 8 - Rate law
Lecture 9 - Heterogeneous data analysis for reactor design - I
Lecture 10 - Heterogeneous data analysis for reactor design - II
Lecture 11 - Design of reactors
Lecture 12 - Case study
Lecture 13 - Catalyst deactivation - I
Lecture 14 - Catalyst deactivation - II
Lecture 15 - Catalyst deactivation - III
Lecture 16 - Catalyst deactivation - IV
Lecture 17 - Diffusional effects
Lecture 18 - Internal diffusion effects
Lecture 19 - Non-dimensionalization
Lecture 20 - Concentration profile
Lecture 21 - Internal effectiveness factor - I
Lecture 22 - Internal effectiveness factor - II
Lecture 23 - Internal effectiveness factor - III
Lecture 24 - Falsification of kinetics
Lecture 25 - External mass transport limitations
Lecture 26 - Estimation of mass transfer coefficient
Lecture 27 - Mass transfer to a single particle with reaction
Lecture 28 - Packed-bed reactor design
Lecture 29 - Mass transfer coefficient in Packed-beds

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Lecture 30 - Estimation of conversion in Packed-bed reactor
Lecture 31 - Overall effectiveness factor - I
Lecture 32 - Overall effectiveness factor - II
Lecture 33 - Identification of internal diffusion and reaction-limited regimes
Lecture 34 - Packed-bed reactor design
Lecture 35 - Generalized criterion for diffusion and reaction-limited conditions
Lecture 36 - Network of first order reactions
Lecture 37 - Use of experimental data
Lecture 38 - Packed-bed reactor design
Lecture 39 - Fluidized bed reactor design - I
Lecture 40 - Fluidized bed reactor design - II
Lecture 41 - Fluidized bed reactor design - III
Lecture 42 - Fluidized bed reactor design - IV
Lecture 43 - Fluid-solid noncatalytic reactions - I
Lecture 44 - Fluid-solid noncatalytic reactions - II
Lecture 45 - Fluid-solid noncatalytic reactions - III
Lecture 46 - Fluid-solid noncatalytic reactions - IV
Lecture 47 - Fluid-solid noncatalytic reactions - V
Lecture 48 - Fluid-solid noncatalytic reactions - VI
Lecture 49 - Residence time distribution (RTD)
Lecture 50 - RTD
Lecture 51 - Measurement of RTD - I
Lecture 52 - Measurement of RTD - II
Lecture 53 - RTD function
Lecture 54 - Properties of RTD function
Lecture 55 - Reactor diagnostics and troubleshooting - I
Lecture 56 - Reactor diagnostics and troubleshooting - II
Lecture 57 - Modeling nonideal reactors - I
Lecture 58 - Modeling nonideal reactors - II
Lecture 59 - Non-ideal reactors
Lecture 60 - Non-ideal reactors

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Control

Subject Co-ordinator - Prof. Sujit Jogwar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation for process control
Lecture 2 - Functions of process control system
Lecture 3 - Common control strategies
Lecture 4 - Components of process control system
Lecture 5 - Introduction to process dynamics
Lecture 6 - First principle dynamic models
Lecture 7 - Empirical and gray box models
Lecture 8 - Degree of freedom analysis
Lecture 9 - Introduction to first order dynamical systems
Lecture 10 - Linearization of process dynamics
Lecture 11 - Response to step input
Lecture 12 - Response to sinusoidal input
Lecture 13 - Introduction to second order dynamical systems
Lecture 14 - Examples of second order dynamical systems
Lecture 15 - Response to step input
Lecture 16 - Effect of damping coefficient
Lecture 17 - Higher order dynamics
Lecture 18 - Approximation as FOPDT model
Lecture 19 - Numerator dynamics
Lecture 20 - Prediction of step response
Lecture 21 - Block diagram representation
Lecture 22 - ON-OFF control
Lecture 23 - Proportional control
Lecture 24 - Proportional-Integral control
Lecture 25 - PID control
Lecture 26 - Limitations of PID controllers
Lecture 27 - Stability of dynamical processes
Lecture 28 - Laplace domain analysis - Part I
Lecture 29 - Laplace domain analysis - Part II

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Lecture 30 - Frequency response
Lecture 31 - Frequency domain analysis
Lecture 32 - Synthesis problem
Lecture 33 - Selection problem
Lecture 34 - Criteria-based controller tuning
Lecture 35 - Heuristics-based controller tuning
Lecture 36 - Direct synthesis-based controller tuning
Lecture 37 - Frequency response-based controller tuning
Lecture 38 - Cascade control
Lecture 39 - Split range control and override control
Lecture 40 - Auctioneering, ratio and inreferential control
Lecture 41 - Openloop control and Internal model control
Lecture 42 - Dynamic Matrix and Model predictive control
Lecture 43 - Introduction to multivariable control
Lecture 44 - Input-output pairing
Lecture 45 - Tuning of multi-loop SISO controller
Lecture 46 - Introduction to batch process control
Lecture 47 - Programmable logic control
Lecture 48 - Batch to batch control

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Interfacial Waves

Subject Co-ordinator - Prof. Ratul Dasgupta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Coupled, linear, spring-mass systems
Lecture 3 - Coupled, linear, spring-mass systems (Continued...)
Lecture 4 - Coupled, linear, spring-mass systems (Continued...)
Lecture 5 - Coupled, linear, spring-mass system: continuum limit
Lecture 6 - Normal modes of a string fixed at both ends
Lecture 7 - Vibrations of clamped membranes
Lecture 8 - Vibrations of clamped membranes (Continued...)
Lecture 9 - Introduction to Jacobian elliptic functions
Lecture 10 - The non-linear pendulum
Lecture 11 - The non-linear pendulum (Continued...)
Lecture 12 - Time period of the non-linear pendulum
Lecture 13 - Introduction to perturbation methods
Lecture 14 - Perturbation methods (Continued...)
Lecture 15 - Non-dimensionalisation
Lecture 16 - Perturbative solution to the projectile equation
Lecture 17 - Perturbative solution to the nonlinear pendulum
Lecture 18 - Lindstedt-Poincare technique
Lecture 19 - Method of multiple scales
Lecture 20 - Method of multiple scales (Continued...)
Lecture 21 - Multiple scale analysis for damped-harmonic oscillator
Lecture 22 - Duffing equation using multiple scales
Lecture 23 - Duffing equation (Continued...)
Lecture 24 - Kapitza pendulum
Lecture 25 - Introduction to Floquet theory
Lecture 26 - Floquet theorem (Continued...)
Lecture 27 - Floquet analysis of the Mathieu equation
Lecture 28 - Introduction to waves on an interface
Lecture 29 - Linearized wave equations in deep water

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Lecture 30 - Linearized wave equations in deep water: dispersion relation
Lecture 31 - Linearised deep-water surface gravity waves (Continued...)
Lecture 32 - Standing and travelling waves in deep water
Lecture 33 - Cauchy-Poisson initial value problem for surface-gravity waves in deep water
Lecture 34 - Cauchy-Poisson problem (Continued...)
Lecture 35 - Cauchy-Poisson problem in cylindrical geometry
Lecture 36 - Cauchy-Poisson problem in cylindrical geometry (Continued...)
Lecture 37 - Group-velocity and the Cauchy-Poisson problem
Lecture 38 - Cauchy-Poisson problem for delta function initial condition
Lecture 39 - Cauchy-Poisson problem for delta function initial condition (Continued...)
Lecture 40 - Capillary-gravity waves
Lecture 41 - Waves on a pool of finite depth
Lecture 42 - Axisymmetric Cauchy-Poisson problem visualisation: the pebble in the deep pond problem
Lecture 43 - Rayleigh-Plateau capillary instability
Lecture 44 - Rayleigh-Plateau capillary instability (Continued...)
Lecture 45 - Rayleigh-Plateau capillary instability on thin film coating a rod
Lecture 46 - Rayleigh-Plateau capillary instability of a cylindrical air column in a liquid
Lecture 47 - Mechanism of the Rayleigh-Plateau instability
Lecture 48 - Shape oscillations of a spherical interface
Lecture 49 - Shape oscillations of a spherical interface (Continued...)
Lecture 50 - Shape oscillations of a spherical interface (Continued...)
Lecture 51 - Analysis of l=0 and l=1 modes for a spherical drop
Lecture 52 - Faraday waves on an interface - stability of time dependent base states
Lecture 53 - Mathieu equation for Faraday waves
Lecture 54 - Applications of Faraday waves - atomisation and spray formation
Lecture 55 - Waves and instability on density stratified shear flows - the KH model
Lecture 56 - Limits of KH dispersion relation: Rayleigh-Taylor instability
Lecture 57 - KH dispersion relation : model of wind wave generation
Lecture 58 - Helmholtz instability of a vortex sheet and summary
Lecture 59 - Derivation of the Stokes travelling wave
Lecture 60 - Derivation of the Stokes travelling wave (Continued...)
Lecture 61 - Derivation of the Stokes travelling wave (Continued...)

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NPTEL Video Course - Chemical Engineering - NOC:Hydrogen Energy: Production, Storage, Transportation and Safe

Subject Co-ordinator - Prof. Pratibha Sharma

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Properties of Hydrogen
Lecture 2 - Status of Hydrogen Supply and Demand
Lecture 3 - Methods of Hydrogen Production
Lecture 4 - Steam Methane Reforming - Part 1
Lecture 5 - Steam Methane Reforming - Part 2
Lecture 6 - Steam Reforming of Higher Hydrocarbons
Lecture 7 - Tutorial-1
Lecture 8 - Advanced Methods of Steam Reforming
Lecture 9 - Partial Oxidation Method for Hydrogen Production
Lecture 10 - Autothermal Reforming
Lecture 11 - Combined, Dry, Bi and Tri Reforming
Lecture 12 - Reforming using Alternate Energy Sources
Lecture 13 - Tutorial-2
Lecture 14 - Hydrogen Production by Methane Decomposition
Lecture 15 - Hydrogen Production from Biomass - Part 1
Lecture 16 - Hydrogen Production from Biomass - Part 2
Lecture 17 - Hydrogen Production from Biomass - Part 3
Lecture 18 - Hydrogen Production from Coal
Lecture 19 - Tutorial-3
Lecture 20 - Hydrogen Separation and Purification - Part 1
Lecture 21 - Hydrogen Separation and Purification - Part 2
Lecture 22 - Thermochemical Cycles for Hydrogen Production
Lecture 23 - Electrolysis of Water for Hydrogen Production
Lecture 24 - Fundamental of Electrolysis of Water
Lecture 25 - Electrolytic Cell Components and Electrolyzer stack
Lecture 26 - Different Types of ElectrolyzerTechnologies
Lecture 27 - Photoelectrochemical Hydrogen Production
Lecture 28 - Tutorial-4
Lecture 29 - Technical Comparison of Various Hydrogen Production Routes

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Lecture 30 - Economics and Status of Various Hydrogen Production Routes
Lecture 31 - Introduction to Hydrogen Storage
Lecture 32 - Underground Hydrogen Storage
Lecture 33 - Fundamentals of Hydrogen Compression and Expansion
Lecture 34 - Thermodynamics of Hydrogen Compression - Part 1
Lecture 35 - Thermodynamics of Hydrogen Compression - Part 2
Lecture 36 - Reciprocating and Diaphragm compressors for Hydrogen Compression
Lecture 37 - Linear and Liquid Hydrogen Compressors
Lecture 38 - Cryogenic and Metal Hydride based Hydrogen Compressors
Lecture 39 - Electrochemical and Adsorption based Compressors
Lecture 40 - Compressed Hydrogen Tanks
Lecture 41 - Tutorial-5
Lecture 42 - Hydrogen Liquefaction
Lecture 43 - Liquid State Hydrogen Storage
Lecture 44 - Fundamentals of Adsorption based Materials for Hydrogen Storage
Lecture 45 - Adsorption based Solid State Hydrogen Storage Materials
Lecture 46 - Metal Hydrides for Solid State Hydrogen Storage - Part 1
Lecture 47 - Fundamentals of Metal hydrides for Solid State Hydrogen Storage - Part 1
Lecture 48 - Fundamentals of Metal Hydrides for Solid State Hydrogen Storage - Part 2
Lecture 49 - Different Types of Hydrides for Hydrogen Storage
Lecture 50 - Tailoring Metal Hydrides for Practical Applications: Nanostructure - Part 1
Lecture 51 - Tailoring Metal Hydrides for Practical Applications: Nanostructure - Part 2
Lecture 52 - MH System Design and Experimental Facilities on SolidState Hydrogen Storage
Lecture 53 - Tutorial-6 (MH systems design)
Lecture 54 - Novel Materials and Overall Storage
Lecture 55 - Overview of Storage Methods and Economics
Lecture 56 - Hydrogen Transportation via H2 Pipelines
Lecture 57 - Other Options for Long Distance Hydrogen Transmission
Lecture 58 - Hydrogen Transport via Road
Lecture 59 - Hydrogen Refuelling Stations
Lecture 60 - Use of Hydrogen in Internal Combustion Engines - Part 1
Lecture 61 - Use of Hydrogen in Internal Combustion Engines - Part 2
Lecture 62 - Use of Hydrogen in Fuel Cells
Lecture 63 - Hydrogen Sensing - Part 1
Lecture 64 - Hydrogen Sensing - Part 2
Lecture 65 - Properties of Hydrogen Associated with Accidents
Lecture 66 - Classification of Hydrogen related Hazards
Lecture 67 - Compressed and Liquid Hydrogen Related Hazards
Lecture 68 - Regulations, Codes and Standards

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Lecture 69 - Utilisation in Different Sectors, Global Status and Future Directions

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NPTEL Video Course - Chemical Engineering - NOC:Modeling Stochastic Phenomena for Engineering Applications: P

Subject Co-ordinator - Prof. Yelia Shankaranarayana Mayya

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Stirling's Approximation
Lecture 2 - Fourier Transforms and characteristic function
Lecture 3 - Dirac Delta function
Lecture 4 - Applications of delta function and Generating functions
Lecture 5 - Laplace Transforms and Convolution theorem
Lecture 6 - Generating function for discrete variables and Binomial distribution
Lecture 7 - Bernoulli and Poisson distributions
Lecture 8 - Waiting time distributions; Gaussian approximation to Poisson distribution
Lecture 9 - Introduction to Central Limit Theorem
Lecture 10 - Proof of Central Limit Theorem (CLT)
Lecture 11 - Universality of Normal distribution and Exceptions
Lecture 12 - Introduction to Random Walk: Extension of Central Limit Theorem
Lecture 13 - Random walk and Diffusion coefficient: Conditional and Transition
Lecture 14 - Characteristics of Stochastic Phenomena: Markov Processes
Lecture 15 - Propagating Markov processes via Transition Probability Matrix with
Lecture 16 - Chapman-Kolmogorov Equation for Multistep Transition probability and solution
Lecture 17 - Transient solutions and Continuous time Markov process
Lecture 18 - Exact solution to Symmetric (or unbiased) one-dimensional Random walk (1-D RW)
Lecture 19 - Properties of the solution for 1-D unbiased RW
Lecture 20 - 1-D unbiased RW: Asymptotic form of occupancy probability and transition
Lecture 21 - Solution to the problem of 1-D Random Walk with Bias
Lecture 22 - Generalized Random Walk with Bias and Pausing
Lecture 23 - Effect of Pausing on Mean and Variance of Random walk
Lecture 24 - Random-walk in the presence of reflecting barrier
Lecture 25 - Boundary conditions for reflected Random-Walk and formulating absorbing
Lecture 26 - The survival probability and first-passage time distribution for Random walker
Lecture 27 - Random Walk with Bias and Absorber
Lecture 28 - Drift and Survival probability for Random walk with bias and absorber
Lecture 29 - Introduction to gambler's ruin problem

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Lecture 30 - Solution for ultimate winning probability in Gambler's ruin problem
Lecture 31 - Solution to gambler's ruin problem with site dependent jump probabilities
Lecture 32 - Fourier transform method of solving lattice Random walks
Lecture 33 - Two and higher dimensional Random walks
Lecture 34 - Formulating the problem of Probability of Return to the origin
Lecture 35 - Relationship between occupancy probability and first-time-return probability
Lecture 36 - Proof of PolyaÃ¢â ¬â ¢s theorem on the probability of return
Lecture 37 - Return probability estimates in various dimensions and effect of bias in 1-D
Lecture 38 - Dependence of first time return probability (Fk) on steps
Lecture 39 - Equilibrium solutions in lattice random walk models
Lecture 40 - Equilibrium solution to Ehrenfest's flea model
Lecture 41 - Differential equation formulation of stochastic phenomena
Lecture 42 - Derivation of Fokker-Planck equation
Lecture 43 - Generalized transition probability functions for Fokker-Planck equation
Lecture 44 - Solution to 1-D Fokker-Planck equation for free particle: Method of Fourier
Lecture 45 - General non-gaussian solution to translationally invariant Chapman-Kolmogorov
Lecture 46 - Cauchy distribution, power-law and other non-gaussian solutions
Lecture 47 - Wiener process and solution to absorbing barrier problems from Fokker-Planck
Lecture 48 - Application of Fourier Sine transform for single absorber problem
Lecture 49 - Setting up Langevin equation for velocity fluctuations of Brownian particles
Lecture 50 - Understanding the origin of systematic and random parts of force from kinetic
Lecture 51 - Kinetic derivation of a formula for delta-correlated random force
Lecture 52 - Mean square velocity, thermal equilibrium and relationship between relaxation
Lecture 53 - Velocity autocorrelation in Brownian motion
Lecture 54 - Derivation of Stokes-Einstein relationship between diffusion coefficient and
Lecture 55 - Alternative derivation of Stokes-Einstein relationship and Brownian motion with
Lecture 56 - Numerical simulation of the Langevin equation
Lecture 57 - Derivation of Klein-Kramers equation from Langevin equation for joint
Lecture 58 - Illustrative solutions to the Klein-Kramers equation
Lecture 59 - Numerical simulation: Sampling from general distributions and Central
Lecture 60 - Numerical simulation of Random walk trajectories and method of solving Fokker

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NPTEL Video Course - Chemical Engineering - NOC:Computational Quantum Chemistry

Subject Co-ordinator - Prof. Achintya Kumar Dutta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why Computational Chemistry
Lecture 2 - Revisiting Quantum Mechanics - I
Lecture 3 - Revisiting Quantum Mechanics - II
Lecture 4 - Introduction to ORCA, Quantum Chemistry Package
Lecture 5 - The Hartree-Fock Approximation
Lecture 6 - Introduction to GUI - I
Lecture 7 - Introduction to GUI - II
Lecture 8 - Introduction to GUI - III
Lecture 9 - Open-Shell Systems - I
Lecture 10 - Open-Shell Systems - II
Lecture 11 - Open-Shell Systems - III
Lecture 12 - Solving Homework Problems of HF
Lecture 13 - Solving Homework Problems of Open-Shell
Lecture 14 - Introduction to Basis set - I
Lecture 15 - Introduction to Basis set - II
Lecture 16 - Introduction to Basis set - III
Lecture 17 - Basis Set Superposition Error and Counterpoise Correction
Lecture 18 - Introduction to Electron Correlation
Lecture 19 - MÃ¸ller Plesset Perturbation Theory
Lecture 20 - Configuration Interaction
Lecture 21 - Coupled Cluster Theory
Lecture 22 - Solving Homework Problems of MP2
Lecture 23 - Solving Homework Problems of Coupled Cluster
Lecture 24 - Lower Scaling Approximation - I (Density Fitting and Chain of Sphere)
Lecture 25 - Lower Scaling Approximation - II (Local Orbital and Natural Orbital)
Lecture 26 - Complete Basis Set Extrapolation
Lecture 27 - Exact Density Functional Theory - I
Lecture 28 - Exact Density Functional Theory - II
Lecture 29 - Practical Density Functional Theory - I

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Lecture 30 - Practical Density Functional Theory - II
Lecture 31 - Hybrid Density Functional Theory - I
Lecture 32 - Hybrid Density Functional Theory - II
Lecture 33 - Hybrid Density Functional Theory - III
Lecture 34 - Hybrid Density Functional Theory - IV
Lecture 35 - Homework Problem of DFT
Lecture 36 - Potential Energy Surface - I
Lecture 37 - Potential Energy Surface - II
Lecture 38 - Potential Energy Surface - III
Lecture 39 - IR and Raman Spectroscopy - I
Lecture 40 - IR and Raman Spectroscopy - II
Lecture 41 - Homework problem of Potential Energy Surface
Lecture 42 - Thermochemistry - I
Lecture 43 - Thermochemistry - II
Lecture 44 - Thermochemistry - III
Lecture 45 - Transition state search - I
Lecture 46 - Transition state search - II
Lecture 47 - Transition state search - III
Lecture 48 - Transition state search - IV
Lecture 49 - Homework problem of Transition State Search
Lecture 50 - Multi-layer Modelling - Molecular Mechanics
Lecture 51 - QM/MM - I
Lecture 52 - QM/MM - II
Lecture 53 - QM/MM - III
Lecture 54 - QM/MM - IV
Lecture 55 - QM/MM - V
Lecture 56 - Homework problem of QM/MM
Lecture 57 - Excited state methods - CIS and TDDFT
Lecture 58 - Excited state methods (Continued...)
Lecture 59 - Excited state method - EOMCCSD
Lecture 60 - Charge transfer excitation
Lecture 61 - X-Ray Spectroscopy
Lecture 62 - Homework problem of Excited State Spectra
Lecture 63 - Solvation models - I
Lecture 64 - Solvation models - II
Lecture 65 - Solvation models - III
Lecture 66 - Explicit solvation - I
Lecture 67 - Explicit solvation - II
Lecture 68 - Additional Homework Problem of Week 7

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Lecture 69 - NMR
Lecture 70 - Relativistic Quantum Chemistry
Lecture 71 - CASSCF - I
Lecture 72 - CASSCF - II
Lecture 73 - CASSCF - III

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NPTEL Video Course - Chemical Engineering - NOC:Novel Drug Delivery Systems

Subject Co-ordinator - Prof. Sathish Dyawanapelly

Co-ordinating Institute - Institute of Chemical Technology, Mumbai

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Drug Delivery Systems - I
Lecture 2 - Fundamentals of Drug Delivery Systems - II
Lecture 3 - Polymers used in Drug Delivery Systems
Lecture 4 - Selection of polymers in DDS
Lecture 5 - Commonly used Polymers in DDS
Lecture 6 - Introduction on Nanoparticles as Drug Delivery System - I
Lecture 7 - Introduction on Nanoparticles as Drug Delivery System - II
Lecture 8 - Polymer-based nanocarriers
Lecture 9 - Introduction on Lipid-based nanocarriers - I
Lecture 10 - Introduction on Lipid-based nanocarriers - II
Lecture 11 - Nanostructured Lipid Carriers (NLCs)
Lecture 12 - Vesicular Drug Delivery Systems - I
Lecture 13 - Vesicular Drug Delivery Systems - II
Lecture 14 - Inorganic-Based Nanocarriers
Lecture 15 - Evaluation of Nanocarriers
Lecture 16 - Introduction of Targeted Drug Delivery
Lecture 17 - Targeted Drug Delivery Strategies
Lecture 18 - Stimuli-responsive and Multifunctional Approach in TDDS
Lecture 19 - Tumor Targeted Drug Delivery
Lecture 20 - Brain Targeted Delivery Systems
Lecture 21 - Introduction to Controlled Drug Delivery Systems
Lecture 22 - Approaches to design-controlled release formulations - I
Lecture 23 - Approaches to design-controlled release formulations - II
Lecture 24 - Approaches to design-controlled release formulations - III
Lecture 25 - Approaches to design-controlled release formulations - IV
Lecture 26 - Introduction to Gastroretentive Drug Delivery Systems
Lecture 27 - Types of Gastroretentive Drug Delivery Systems - I
Lecture 28 - Types of Gastroretentive Drug Delivery Systems - II
Lecture 29 - Recent Advancements in Gastroretentive Drug Delivery Systems

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Lecture 30 - Introduction to Microencapsulation
Lecture 31 - Introduction To Mucosal Drug Delivery System
Lecture 32 - Mucoadhesive polymers, principles of mucoadhesion - I
Lecture 33 - Mucoadhesive polymers, principles of mucoadhesion - II
Lecture 34 - Oral Mucosal Drug Delivery Systems
Lecture 35 - Nasopulmonary Drug Delivery
Lecture 36 - Ocular Drug Delivery System
Lecture 37 - Conventional Ocular Drug Delivery Systems
Lecture 38 - Novel Ocular Drug Delivery Systems - I
Lecture 39 - Novel Ocular Drug Delivery Systems - II
Lecture 40 - Evaluation of Ocular Drug Delivery Systems
Lecture 41 - Introduction to Transdermal Drug Delivery Systems
Lecture 42 - Factors Affecting Transdermal Permeation
Lecture 43 - Components of Transdermal Drug Delivery Systems
Lecture 44 - Types of Transdermal Patches and Permeation Enhancement Strategies
Lecture 45 - Evaluation of Transdermal Drug Delivery Systems
Lecture 46 - Introduction to Implantable Drug Delivery Systems
Lecture 47 - Classification of Implantable DDS and Osmotic DDS - I
Lecture 48 - Osmotic Drug Delivery Systems
Lecture 49 - Intrauterine Drug Delivery Systems
Lecture 50 - Classification of IUD based on mechanism
Lecture 51 - Introduction Protein Peptide Delivery Systems
Lecture 52 - Protein Peptide and Nucleic acid Delivery systems
Lecture 53 - Barriers to Protein Peptide Drug Delivery
Lecture 54 - Protein and Peptide Delivery Strategies
Lecture 55 - Nucleic Acid Delivery Systems
Lecture 56 - The NDDS Promise and Paradigm Shift
Lecture 57 - Current Issues of Scalability and Regulatory Aspects
Lecture 58 - Scalable Technologies for Formulating Drug Delivery Systems
Lecture 59 - Regulatory considerations - I
Lecture 60 - Regulatory considerations - II and Future directions on Scalability and Regulatory Aspects

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NPTEL Video Course - Chemical Engineering - NOC:Pharmacognosy and Phytochemistry

Subject Co-ordinator - Prof. Galvina Pereira

Co-ordinating Institute - IIT Bombay and Institute of Chemical Technology, Mumbai

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Pharmacognosy and Phytochemistry
Lecture 2 - Introduction to Drugs of Natural Origin
Lecture 3 - Introduction to Primary, Secondary Metabolites and Biosynthetic building blocks
Lecture 4 - Biosynthesis of Terpenes - Acetate Mevalonate and MEP pathway
Lecture 5 - Shikimic Acid Pathway
Lecture 6 - Introduction and Classification of Lipids
Lecture 7 - Evaluation, Extraction and Refining of Lipids
Lecture 8 - Examples of lipid containing drugs castor oil, sesame oil and coconut oil
Lecture 9 - Examples of lipid containing drugs karanja oil, wool fat, bees wax and carnuba wax
Lecture 10 - Volatile Oils: Properties, Extraction, Evaluation and Examples
Lecture 11 - Carbohydrate based drugs
Lecture 12 - Carbohydrates based drugs : Starch and Pectin
Lecture 13 - Carbohydrates based drugs : Honey, Chitin and Chitosan
Lecture 14 - Carbohydrates based drugs : Sodium alginate, Carrageenan, Guar Gum
Lecture 15 - Soluble and Insoluble fibres
Lecture 16 - Introduction and Classification of Tannins
Lecture 17 - Different sources and evaluation of Tannins
Lecture 18 - Biosynthesis, Distribution of tannins
Lecture 19 - Distribution of tannins - Part 1
Lecture 20 - Distribution of tannins - Part 2
Lecture 21 - Introduction to Alkaloids
Lecture 22 - Classification of Alkaloids
Lecture 23 - Drugs Containing Alkaloids - Part 1
Lecture 24 - Drugs Containing Alkaloids - Part 2
Lecture 25 - Drugs Containing Alkaloids - Part 3
Lecture 26 - Glycosides
Lecture 27 - Anthraquinone Glycosides
Lecture 28 - Cardiac Glycosides
Lecture 29 - Triterpene and Diterpene Glycosides

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Lecture 30 - Cyanogenetic, Isothiocyanate and Phenolic Glycosides
Lecture 31 - Introduction to flavonoids
Lecture 32 - Flavonoids Containing drugs - Part 1 : Orange peel, Buckwheat, Strawberry)
Lecture 33 - Flavonoids Containing drugs - Part 2 : Soy bean, Milk thistle, Grape peel)
Lecture 34 - Lignan Containing drugs (Podophyllum, Linseed, Piper cubeba, Sesame)
Lecture 35 - Coumarin containing drugs (Psorelea, Ammi majus, Aflatoxin)
Lecture 36 - Introduction to Carotenoids
Lecture 37 - Carotenoids containing drugs (Saffron, Annotto, Marigold)
Lecture 38 - Quinones containing drugs
Lecture 39 - Naphthoquinones containing drugs
Lecture 40 - Iridoids containing drugs
Lecture 41 - Introduction to Resins
Lecture 42 - Resins containing drugs
Lecture 43 - Oleo-gum-resins containing drugs
Lecture 44 - Oleo-resins containing drugs
Lecture 45 - Resins containing drugs
Lecture 46 - Introduction to Quality Control of Herbal Drugs
Lecture 47 - Methods of Quality Control of Herbal Drugs
Lecture 48 - Physical Methods of Quality Control of Herbal Drugs - Part 1
Lecture 49 - Physical Methods of Quality Control of Herbal Drugs - Part 2
Lecture 50 - Chemical Methods of Quality Control of Herbal Drugs
Lecture 51 - Quantitative Evaluation of Herbal Drugs Using Spectroscopic Methods
Lecture 52 - Quantitative Evaluation of Herbal Drugs Using Chromatographic Methods - Part 1
Lecture 53 - Quantitative Evaluation of Herbal Drugs Using Chromatographic Methods - Part 2
Lecture 54 - Quantitative Evaluation of Herbal Drugs Using Gas Chromatography Methods
Lecture 55 - Quantitative Evaluation of Herbal Drugs Using Biological Methods
Lecture 56 - Application of Databases for Plant Search
Lecture 57 - Natural Product Databases for Phytochemical Search
Lecture 58 - Natural Product Databases for Studying Phytochemical Properties
Lecture 59 - Databases for Studying Spectral Properties
Lecture 60 - Natural Product Databases for Studying Pharmacokinetic and Pharmacodynamic Properties

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NPTEL Video Course - Chemical Engineering - NOC:Herbal Product Technology and Regulatory Science

Subject Co-ordinator - Prof. Swati Sanjay Patil, Prof. Galvina Ritesh Pereira, Prof. Mandar Bhalchandra Mulik

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Herbs as raw materials
Lecture 2 - Identification and authentication of herbal materials
Lecture 3 - Processing of herbal raw material
Lecture 4 - Adulteration of Herbal raw material
Lecture 5 - Ethnobotanical Foundations and GMP in Herbal Therapeutics
Lecture 6 - Indian Systems of Medicine
Lecture 7 - Preparation of Asavas and Arishtas
Lecture 8 - Preparation of Ghutika and Bhasmas
Lecture 9 - Standardisation of Asavas, Arishtas, Ghutika and Bhasma
Lecture 10 - Phytochemical Screening of active constituents from herbs
Lecture 11 - Introduction to Neutraceuticals: Concepts, Market trends and Growth
Lecture 12 - Nutraceutical products for Diabetes, Cardiovascular diseases and Cancer
Lecture 13 - Nutraceuticals for Skin and hair
Lecture 14 - Herbal Oral Hygiene Products: Types and Ingredients
Lecture 15 - Mechanisms of Action and Bioavailability of Nutraceuticals in Disease Prevention and Wellness
Lecture 16 - Herbal Cosmetics and Excipients
Lecture 17 - Role of Herbal Extracts and Bioactive Compounds in Cosmetic Formulations
Lecture 18 - Raw materials of Herbal Origin: Fixed Oils and Waxes
Lecture 19 - Raw materials of Herbal Origin: Gums and Natural Colours
Lecture 20 - Raw materials: Sweeteners, flavours and perfumes
Lecture 21 - Basics of Herb-Drug/Food/Herb interactions
Lecture 22 - Herb-Drug Interactions
Lecture 23 - Examples of Interactions with Hypericum and Ginseng
Lecture 24 - Examples of Interactions with Black Pepper, Ginkgo, Licorice
Lecture 25 - Examples of Food-Drug/Herb Interactions
Lecture 26 - Herbal Formulations
Lecture 27 - Conventional herbal Formulations
Lecture 28 - Liposomes
Lecture 29 - Phytosomes

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Lecture 30 - Ethosomes
Lecture 31 - Introduction to standardization of Herbal Plant Materials and Products
Lecture 32 - Methods for standardization for HerbaL Plant Material
Lecture 33 - Standardization of Drugs using UV-Vis and Chromatographic method - Vasaka
Lecture 34 - Standardization of Drugs using UV-Vis and Chromatographic method - Haritaki
Lecture 35 - Standardization of Licorice and Ashwagandha
Lecture 36 - Introduction to Pharmacopoeia and Monographs
Lecture 37 - WHO guidelines for quality control of Herbal Materials
Lecture 38 - WHO guidelines for quality control of Herbal Materials and Formulations
Lecture 39 - ICH Guidelines and AYUSH Guidelines for standardization and stability assessment of Herbal Produ
Lecture 40 - Role of Molecular Markers in Quality control of herbs and formulations
Lecture 41 - Need for Herbal Product Regulation
Lecture 42 - Legal Provisions for Herbal Drug Regulations
Lecture 43 - Regulation of D and C act for ASU medicines
Lecture 44 - Schedule Y of D and C act for ASU medicines
Lecture 45 - Intellectual property rights related issues
Lecture 46 - National regulations in Herbal Drugs and Nutraceuticals
Lecture 47 - International regulations in Nutraceuticals and Crude Drugs
Lecture 48 - Introduction to Plant Breederâ s Rights
Lecture 49 - Introduction to Biodiversity
Lecture 50 - Recent case studies in Biopiracy, Biodiversity and Bioprospecting
Lecture 51 - Introduction to Herbal Drug Industry
Lecture 52 - Global Overview of Medicinal Plants
Lecture 53 - Medicinal and Aromatic Plant Sector in India
Lecture 54 - Introduction to Schedule T and GMP of ASU Medicines
Lecture 55 - Legal Basis of GMP for ASU Medicines
Lecture 56 - Concept of Good Manufacturing Practice
Lecture 57 - Basic Principles of GMP
Lecture 58 - Legal Framework under Drugs and Cosmetics Rules, 1945
Lecture 59 - Technical Requirements of Infrastructure - I
Lecture 60 - Technical Requirements of Infrastructure - II
Lecture 61 - Tutorial - 1
Lecture 62 - Tutorial - 2
Lecture 63 - Tutorial - 3
Lecture 64 - Tutorial - 4

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NPTEL Video Course - Chemical Engineering - Heterogeneous Catalysis and Catalytic Processes

Subject Co-ordinator - Dr. K.K. Pant

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Chemical Engineering - Interfacial Engineering

Subject Co-ordinator - Prof. A.N. Bhaskarwar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction Definitions
Lecture 2 - General Introduction, Definitions, Surface Tension
Lecture 3 - Surface Tension Free Energies and Adsorption
Lecture 4 - Properties over Curved Surfaces
Lecture 5 - Total Surface Energy
Lecture 6 - Interfacial Tension Entropy, Cohesion, Adhesion
Lecture 7 - Cohesion, Adhesion and Spreading
Lecture 8 - Spreading from Liquids and Solids
Lecture 9 - Spreading, Interfacial Tensions, Surface Tensions
Lecture 10 - Spreading, Contact Angles Free Energies
Lecture 11 - Spreading/Contact Angles Rough Surfaces, Free Energies
Lecture 12 - Spreading/Contact Angles Work of Adhesion, De-wetting
Lecture 13 - Work of Adhesion, Surface and Interfacial Tensions
Lecture 14 - Surface and Interfacial Tensions
Lecture 15 - Surface and Interfacial Tensions
Lecture 16 - Wetting Balance Method Spreading Coefficient Work of Adhesion Sessile Drop Method, Positive S
Lecture 17 - Indirect and Direct Methods for Positive S, Adhesion Energies Interfacial Potentials
Lecture 18 - Surface and Interfacial Potentials Distribution and Contact Potentials
Lecture 19 - Diffusion Potential Surface and Interfacial Potentials Components of Contact Potential
Lecture 20 - Electrically Charged Monolayers Gouy Theory
Lecture 21 - Equations of State, Cohesion Repulsion, Limiting Area
Lecture 22 - Condensed and Liquid Expanded Monolayers Phase Transformations
Lecture 23 - Films of Polymers Molecular Weight, Surface Viscosity Drag, Canal Method
Lecture 24 - Canal Method Joly's Semi-Empirical Correction Rotational Torsional Surface Viscometer Compressio
Lecture 25 - Magnitudes of Surface Compressional Moduli Surface Waves and Ripples
Lecture 26 - Surface waves and Ripples, Velocity Effect of Surface Tension and Surface Compressional Modulus
Lecture 27 - Surface waves and ripples,velocity effect of surface tension and surface compressional modulus o
Lecture 28 - Shear Elastic Moduli,Yield Stress Fibres from MLs, Surface Reactions
Lecture 29 - Surface Reactions, Comparison with Bulk-Phase Reactions Steric Factors, Inhibition

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Lecture 30 - Hydrolyses of Esters by Alkali Acid or Enzyme Photochemical Reactions in Monolayers Polymerizati
Lecture 31 - Catalytic Effects Reactions in Emulsions Complex Formation
Lecture 32 - Complex Formation Penetration into Monolayers Thermodynamics of Penetration Adsorption from Vapo
Lecture 33 - Introductory Concepts Resistances and their Magnitudes Evaporation and its Retardation
Lecture 34 - Evaporation and its Retardation Resistances and their Analysis Diffusional Resistance in Gas Pha
Lecture 35 - Resistances in Liquid Phase and Interface and Their Importance Some Effects and Applications, Th
Lecture 36 - Surface Instability Theories of Mass Transfer Experiments on static and Dynamic Systems
Lecture 37 - Colloida, Aerosols, Emulsions Foams, Coagulation Smoluchowski's Theory

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NPTEL Video Course - Chemical Engineering - NOC:Fluid Mechanics and its Applications

Subject Co-ordinator - Prof. Vijay Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 (1)
Lecture 2 (1A)
Lecture 3 (2)
Lecture 4 (2A)
Lecture 5 (3)
Lecture 6 (3A)
Lecture 7 (4)
Lecture 8 (4A)
Lecture 9 (5)
Lecture 10 (5A)
Lecture 11 (6)
Lecture 12 (6A)
Lecture 13 (7)
Lecture 14 (7A)
Lecture 15 (8)
Lecture 16 (8A)
Lecture 17 (8B)
Lecture 18 (9)
Lecture 19 (9A)
Lecture 20 (10)
Lecture 21 (10A)
Lecture 22 (10B)
Lecture 23 (11)
Lecture 24 (12)
Lecture 25 (12A)
Lecture 26 (12B)
Lecture 27 (13)
Lecture 28 (13A)
Lecture 29 (14)

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Lecture 30 (14A)
Lecture 31 (15)
Lecture 32 (15A)
Lecture 33 (16)
Lecture 34 (16A)
Lecture 35 (17)
Lecture 36 (17A)
Lecture 37 (18)
Lecture 38 (18A)
Lecture 39 (19)
Lecture 40 (19A)
Lecture 41 (20)
Lecture 42 (20A)
Lecture 43 (20B)
Lecture 44 (21)
Lecture 45 (21A)
Lecture 46 (22)
Lecture 47 (22A)
Lecture 48 (23)
Lecture 49 (23A)
Lecture 50 (24)
Lecture 51 (24A)
Lecture 52 (25)
Lecture 53 (25A)
Lecture 54 (26)
Lecture 55 (26A)
Lecture 56 (25)
Lecture 57 (27)
Lecture 58 (28)
Lecture 59 (28A)
Lecture 60 (29)
Lecture 61 (29A)
Lecture 62 (30)
Lecture 63 (30A)
Lecture 64 (31)
Lecture 65 (31A)

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NPTEL Video Course - Chemical Engineering - NOC:Computational Process Design

Subject Co-ordinator - Prof. Manojkumar Ramteke, Prof. Hariprasad Kodamana

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Flowsheet Synthesis - I
Lecture 2 - Flowsheet Synthesis - II
Lecture 3 - Mass Balance - I
Lecture 4 - Mass Balance - II
Lecture 5 - Mass and Energy Balance of Complete Flowsheet
Lecture 6 - Equipment Sizing and Costing
Lecture 7 - Economic Evaluation
Lecture 8 - Design of Batch Plants
Lecture 9 - Simulations for Process Flowsheet
Lecture 10 - Optimization Methods used for Designing
Lecture 11 - Heat Exchanger Network Design - 1
Lecture 12 - Heat Exchanger Network Design - 2
Lecture 13 - Geometric Methods for Reactor Network Synthesis
Lecture 14 - Optimization Methods for Process Design - 1
Lecture 15 - Optimization Methods for Process Design - 2
Lecture 16 - Quantifying Sustainability for Design
Lecture 17 - Process Network Analysis and Footprint Assessment
Lecture 18 - Energy, Exergy and Emergy
Lecture 19 - Ecosystems in Sustainability Assessment

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NPTEL Video Course - Chemical Engineering - Heat Transfer

Subject Co-ordinator - Prof. A.K. Ghoshal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to heat transfer
Lecture 2 - General heat conduction equation
Lecture 3 - One dimensional steady state conduction in rectangular coordinate
Lecture 4 - One dimensional steady state conduction in cylindrical and spherical coordinate
Lecture 5 - Critical and optimum insulation
Lecture 6 - Extended surface heat transfer - 1
Lecture 7 - Extended surface heat transfer - 2
Lecture 8 - Analysis of lumped parameter model
Lecture 9 - Transient heat flow in semi infinite solid
Lecture 10 - Infinite body subjected to sudden convective
Lecture 11 - Graphical solutions of unsteady state heat conduction problem
Lecture 12 - Dimensional analysis for forced convection
Lecture 13 - Dimensional analysis for free convection
Lecture 14 - Heat transfer co-relations for laminar and internal flows
Lecture 15 - Heat transfer co-relations for turbulent and internal flows
Lecture 16 - Co-relation for turbulent and external flows
Lecture 17 - Heat transfer co-relations for flow across tube banks
Lecture 18 - Momentum and heat transfer analogies
Lecture 19 - Boundary layer heat transfer
Lecture 20 - Boundary layer equations
Lecture 21 - Approximate analysis in boundary layer
Lecture 22 - Theoretical concepts of natural / free convention heat transfer
Lecture 23 - Emperical relations for free convention heat transfer
Lecture 24 - Condensation heat transfer over vertical plate
Lecture 25 - Condensation heat transfer for various conditions and geometries
Lecture 26 - Fundamentals of boiling heat transfer
Lecture 27 - Boiling heat transfer co-relations
Lecture 28 - Classification of heat exchangers
Lecture 29 - Various types of shell and tube heat exchangers

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Lecture 30 - Various types of compact heat exchangers
Lecture 31 - Effectiveness-NTU, method of heat exchanger analysis
Lecture 32 - Design of double pipe heat exchanger
Lecture 33 - Design of shell and tube heat exchanger
Lecture 34 - Introduction to evaporation and evaporators
Lecture 35 - Evaporation principles and evaporator performance
Lecture 36 - Evaporator calculations
Lecture 37 - Introduction to radiation heat transfer
Lecture 38 - Radiation intensity and radiation view factor
Lecture 39 - Radiation heat exchange
Lecture 40 - Radiation shield and gas radiation

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NPTEL Video Course - Chemical Engineering - Mass Transfer Operations I

Subject Co-ordinator - Dr. B. Mandal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mass Transfer
Lecture 2 - Molecular Diffusion
Lecture 3 - Fickâ s Law of Diffusion
Lecture 4 - Steady state molecular diffusion in fluids - Part I
Lecture 5 - Steady state molecular diffusion in fluids - Part II
Lecture 6 - Diffusion coefficient
Lecture 7 - Diffusion Coefficient
Lecture 8 - Multicomponent Diffusion and Diffusivity in Solids
Lecture 9 - Concept of Mass Transfer Coefficient
Lecture 10 - Dimensionless Groups and Co-relations for Convective
Lecture 11 - Mass Transfer co-efficient in Laminar Flow Condition
Lecture 12 - Boundary Layer Theory and Film Theory in Mass Transfer
Lecture 13 - Mass Transfer Coefficients in Terbulant Flow
Lecture 14 - Interphase Mass Transfer and Mass Transfer Theories - Part I
Lecture 15 - Interphase Mass Transfer and Mass Transfer Theories - Part II
Lecture 16 - Interphase Mass Transfer and Mass Transfer Theories - Part III
Lecture 17 - Agitated and Sparged Vassels
Lecture 18 - Tray Column - Part I
Lecture 19 - Tray Column - Part II
Lecture 20 - Packed Tower
Lecture 21 - Introduction to Absorption and Solvent selection
Lecture 22 - Packed Tower Design - Part I
Lecture 23 - Packed Tower Design - Part II
Lecture 24 - Packed Tower Design - Part III
Lecture 25 - Mass Transfer Coefficients Correlation and HETP Concept
Lecture 26 - Tray Tower Design and Introduction to Multicomponent System
Lecture 27 - Introduction to Distillation and Phas diagrams
Lecture 28 - Azeotropes and Enthalpy Concentration Diagrams
Lecture 29 - Flash Distillation

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Lecture 30 - Batch and Steam Distillation
Lecture 31 - Fractional Distillation
Lecture 32 - Fractional Distillation
Lecture 33 - Fractional Distillation
Lecture 34 - Fractional Distillation
Lecture 35 - Fractional Distillation
Lecture 36 - Multistage Batch Distillation with Reflux
Lecture 37 - Fractional Distillation
Lecture 38 - Ponchan and Savarit Method and Packed Tower Distillation
Lecture 39 - Multicomponent Distillation

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NPTEL Video Course - Chemical Engineering - Process Design Decisions and Project Economics

Subject Co-ordinator - Dr. Vijay S. Moholkar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction to the Course and Syllabus
Lecture 2 - Hierarchical Approach to Process Design - I
Lecture 3 - Hierarchical Approach to Process Design - Examples
Lecture 4 - Input Information and Design Aspects of Batch vs. Continuous Process
Lecture 5 - Input / Output Structure of Flowsheet - Part I
Lecture 6 - Input / Output Structure of Flowsheet - Part II
Lecture 7 - Input / Output Structure of Flowsheet - Part III and Recycle Structure of Flowsheet - Part I
Lecture 8 - Recycle Structure of Flowsheet - Part II
Lecture 9 - Recycle Structure of Flowsheet - Part III
Lecture 10 - Recycle Structure of Flowsheet - Part IV and Tutorial - Part I
Lecture 11 - Tutorial - Part II
Lecture 12 - Tutorial - Part III
Lecture 13 - Algorithm and Basic Principles of Reactor Design
Lecture 14 - Reactor Non-ideality, Residence Time Distribution (RTD) and Types of Chemical Reactions & Cataly
Lecture 15 - Types of Reactors and Selection Criteria
Lecture 16 - Tutorial on Reactor Design and Cost Estimation
Lecture 17 - General Introduction (Types of Separation Processes and Criteria for Selection of the Processes)
Lecture 18 - Guidelines for Design of Separation Systems
Lecture 19 - Design of Distillation Columns - Part I (Sequencing of Columns, Energy Integration / Thermal Cou
Lecture 20 - Design of Distillation Columns - Part II (Plate and Packed Towers, Number of Plates, Diameter ar
Lecture 21 - Tutorial - Part I (Design of Absorption Column)
Lecture 22 - Tutorial - Part II (Design of Distillation Column)
Lecture 23 - Concepts and Basic Principles of Energy (or Heat) Integration - Part 1 (Composite Curves and ?Tm
Lecture 24 - Concepts and Basic Principles of Heat Integration - Part 2 (Problem Table Algorithm and Identifi
Lecture 25 - Identification of Area and Cost Targets
Lecture 26 - Pinch Technology for Heat Exchanger Network Design
Lecture 27 - Tutorial - I (Composite Curves, Problem Table Algorithm and Enthalpy Intervals)
Lecture 28 - Tutorial - II (Heat Exchanger Network Synthesis Using Pinch Technology)
Lecture 29 - Selection of Process, Design of Flowsheet and Materials Balance

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Lecture 30 - Energy Balance, Process Alternatives and Design of the Absorber
Lecture 31 - Rules of Thumb & Their Limitations and Tutorial
Lecture 32 - General Concepts & Principles and Cost Allocation Procedure
Lecture 33 - Lumped Cost Diagram and Cost Allocation Diagram (Case Study of Hydro-dealkylation Process)
Lecture 34 - Assessment of Process Alternatives with Cost Allocation Diagram (Case Study of Hydrodealkylation
Lecture 35 - Tutorial on Lumped Cost Diagram and Cost Allocation Diagram
Lecture 36 - Introduction to Chemical Projects and Their Economic Aspects
Lecture 37 - Selection of the Process and Project Site - Part I
Lecture 38 - Selection of the Process and Project Site - Part II
Lecture 39 - Project Cost Estimation - Part I
Lecture 40 - Project Cost Estimation - Part II
Lecture 41 - Simplified Cost Model and Depreciation
Lecture 42 - Time Value of Money
Lecture 43 - Measures of Profitability and Project Evaluation - Part I
Lecture 44 - Measures of Profitability and Project Evaluation - Part II
Lecture 45 - Tutorial on Project Economics - Part I
Lecture 46 - Tutorial on Project Economics - Part II

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NPTEL Video Course - Chemical Engineering - NOC:Fluidization Engineering

Subject Co-ordinator - Dr. S.K. Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Particle properties
Lecture 3 - Particle / Powder Classifications
Lecture 4 - Minimum Fluidization Velocity
Lecture 5 - Minimum Fluidization Velocity
Lecture 6 - Flow regime and its map
Lecture 7 - Flow regime and its map
Lecture 8 - Frictional pressure drop in fluidized bed-fluid-solid system
Lecture 9 - Frictional pressure drop in fluidized Bed-Gas-liquid-solid system
Lecture 10 - Analysis of Frictional Pressure Drop in Fluidized Bed By Different Models
Lecture 11 - Gas Distribution Through Distributor
Lecture 12 - Calculation of gas pumping power consumption in fluidized bed
Lecture 13 - Bubbling Fluidization Part 1
Lecture 14 - Bubbling Fluidization Part 2
Lecture 15 - Bubbling Fluidization Part 3
Lecture 16 - Bubbling Fluidization Part 4
Lecture 17 - Bubbling Fluidization Part 5
Lecture 18 - Bubbling Fluidization Part 6
Lecture 19 - Entrainment Characteristics (Part 1)
Lecture 20 - Entrainment Characteristics (Part 2)
Lecture 21 - Entrainment Characteristics (Part 2)
Lecture 22 - Entrainment Characteristics (Part 2)
Lecture 23 - Attrition in Fluidized Bed (Part 2)
Lecture 24 - Solid movement, mixing
Lecture 25 - Solid segregation
Lecture 26 - Solid mixing and segregation
Lecture 27 - Gas Dispersion and Interchange
Lecture 28 - Mass transfer in fluidized Bed-Gas-solid system
Lecture 29 - Mass transfer in fluidized Bed-Gas-liquid-solid system (Continued...)

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Lecture 30 - Heat transfer Characteristics
Lecture 31 - Fluidized bed reactor design and its performance

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NPTEL Video Course - Chemical Engineering - NOC:An Introduction to Cardiovascular Fluid Mechanics

Subject Co-ordinator - Dr. Raghvendra Gupta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction
Lecture 2 - Fluid Mechanics
Lecture 3 - Solid Mechanics
Lecture 4 - Rheology of blood
Lecture 5 - Blood morphology
Lecture 6 - Blood flow in a channel
Lecture 7 - Viscometers and Rheometers
Lecture 8 - Viscoelasticity
Lecture 9 - Flow Bifurcation
Lecture 10 - Pulsatile Flow 1
Lecture 11 - Pulsatile Flow 2
Lecture 12 - Flow in Elastic Tubes

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NPTEL Video Course - Chemical Engineering - NOC:Multiphase Microfluidics

Subject Co-ordinator - Dr. Raghvendra Gupta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction
Lecture 2 - Interface and Surface Tension
Lecture 3 - Flow Regimes 1
Lecture 4 - Flow Regimes 2
Lecture 5 - Taylor Flow 1
Lecture 6 - Taylor Flow 2
Lecture 7 - Computational Techniques
Lecture 8 - Bubble and Droplet Generation
Lecture 9 - Interface and Surface tension 2
Lecture 10 - Void Fraction and Pressure Drop
Lecture 11 - Liquid-Liquid Flow
Lecture 12 - Ideal annular Flow
Lecture 13 - Taylor Flow
Lecture 14 - Taylor Flow
Lecture 15 - Taylor Flow
Lecture 16 - Taylor Flow
Lecture 17 - Flow boiling in microchannels
Lecture 18 - Flow boiling in microchannels (Continued...)
Lecture 19 - Flow Measurement Techniques
Lecture 20 - Particle image Velocimetry
Lecture 21 - Inertial Microfluidics
Lecture 22 - Microfluidic applications
Lecture 23 - Microfluidic applications (Continued...)
Lecture 24 - Concluding Remarks

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NPTEL Video Course - Chemical Engineering - NOC:Measurement Technique in Multiphase Flows

Subject Co-ordinator - Prof. Rajesh Kumar Upadhyay

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Multiphase flow Measurement Techniques
Lecture 2 - Invasive and Non-invasive Techniques
Lecture 3 - Hot Wire Anemometry
Lecture 4 - Optical Fiber Probe
Lecture 5 - Laser Doppler Anemometry (LDA)
Lecture 6 - LDA Post Processing and Particle Image Velocimetry (PIV)
Lecture 7 - PIV and Positron Emission Particle Tracking
Lecture 8 - Radioactive Particle Tracking - I
Lecture 9 - Radioactive Particle Tracking - II
Lecture 10 - Capacitance Probe, Optical Fiber Probe and ECT
Lecture 11 - Gamma-ray and X-ray Tomography, MRI
Lecture 12 - Summary

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NPTEL Video Course - Chemical Engineering - NOC:Multiphase Flows

Subject Co-ordinator - Prof. Rajesh Kumar Upadhyay

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Multiphase flow introduction
Lecture 2 - Fundamental definitions and terminology used in Multiphase - I
Lecture 3 - Fundamental definitions and terminology used in Multiphase - II
Lecture 4 - Flow Regime Map for Gas-Liquid System
Lecture 5 - Flow Regime Map for Fluid-Solid System
Lecture 6 - Pneumatic Conveying
Lecture 7 - Momentum Equation through Reynolds Transport Theorem
Lecture 8 - Lockhart Martinelli Correlation
Lecture 9 - Pressure Drop Calculation for Homogeneous Flow
Lecture 10 - Pressure Drop Calculation for Separated and Annular Flow Regime
Lecture 11 - Lagrangian Tracking of Single Particle Under Different Forces
Lecture 12 - Multiphase Interactions
Lecture 13 - Multiphase Interactions
Lecture 14 - Introduction to Multiphase Flow Modeling
Lecture 15 - Algebraic Slip Method and Euler-Euler Method
Lecture 16 - KTGF and Euler-Lagrangian Model
Lecture 17 - Measurement Techniques
Lecture 18 - Measurement Techniques
Lecture 19 - Bubble Column
Lecture 20 - Packed Bed Reactor
Lecture 21 - Fluidized Bed Reactor
Lecture 22 - Summary

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Polymer Physics (IIT-G)

Subject Co-ordinator - Prof. Amit Kumar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Polymers
Lecture 2 - Ideal Chain Models
Lecture 3 - Ideal and Real Chains
Lecture 4 - Thermodynamics of Polymer Solutions - I
Lecture 5 - Thermodynamics of Polymer Solutions - II
Lecture 6 - Thermodynamics of Polymer Solutions - III
Lecture 7 - Phase Behaviour of Polymer Solutions and Blends
Lecture 8 - Phase Behaviour of Polymer Blends and Copolymers
Lecture 9 - Determination of Polymer Molar Mass
Lecture 10 - Determination of Polymer Molar Mass
Lecture 11 - Determination of Polymer Molar Mass
Lecture 12 - Determination of Polymer Molar Mass
Lecture 13 - Branching
Lecture 14 - Branching, Network Formation and Gelation
Lecture 15 - Gelation and Swelling of Network Polymers
Lecture 16 - Amorphous State of Polymers
Lecture 17 - Crystalline State of Polymers
Lecture 18 - Mechanical Properties of Polymers
Lecture 19 - Viscoelasticity
Lecture 20 - Viscoelasticity, Dynamic Mechanical Analysis and Rheology
Lecture 21 - Rubber Elasticity
Lecture 22 - Unentangled Polymer Dynamics
Lecture 23 - Entangled Polymer Dynamics
Lecture 24 - Review

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NPTEL Video Course - Chemical Engineering - NOC:Natural Gas Engineering

Subject Co-ordinator - Prof. Pankaj Tiwari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Natural Gas - I
Lecture 2 - Introduction to Natural Gas - II
Lecture 3 - Introduction to Natural Gas - III
Lecture 4 - Wellbore Performance Relationship (WPR)
Lecture 5 - Choke Performance Relationship (CPR)
Lecture 6 - Nodal Analysis
Lecture 7 - Inflow Performance Relationship (IPR) - I
Lecture 8 - Inflow Performance Relationship (IPR) - II
Lecture 9 - Gas Well Testing
Lecture 10 - Wellbore Performance Relationship (WPR)
Lecture 11 - Choke Performance Relationship (CPR)
Lecture 12 - Nodal Analysis
Lecture 13 - Natural Gas Separation - I
Lecture 14 - Natural Gas Separation - II
Lecture 15 - Dehydration of Natural Gas
Lecture 16 - Sweeting of Natural Gas
Lecture 17 - Compressor Design
Lecture 18 - Measurement of Natural Gas
Lecture 19 - Transportation of Natural Gas - I
Lecture 20 - Transportation of Natural Gas - II
Lecture 21 - Unconventional production of Natural Gas
Lecture 22 - Review

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Engineering Thermodynamics

Subject Co-ordinator - Prof. Sasidhar Gumma

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - First law for closed systems
Lecture 3 - First law for open systems
Lecture 4 - Simple processes
Lecture 5 - Processes involving liquids and ideal gases
Lecture 6 - Temperature dependency of Cp in an ideal gas
Lecture 7 - Efficiency of Heat engines and Statement of Second Law
Lecture 8 - Entropy
Lecture 9 - Lost Work
Lecture 10 - Maxwell's Relations
Lecture 11 - Thermodynamic Diagrams
Lecture 12 - Thermodynamic Tables, Residual Properties
Lecture 13 - Virial Equation of State
Lecture 14 - Residual property relations from EoS
Lecture 15 - Cubic Equation of State
Lecture 16 - Cubic Equation of State
Lecture 17 - Thermodynamic Tables
Lecture 18 - Correlations for Liquids
Lecture 19 - Process Involving Phase Changes
Lecture 20 - Chemical potential
Lecture 21 - Partial molar properties
Lecture 22 - Examples
Lecture 23 - Ideal Solutions
Lecture 24 - Excess Properties
Lecture 25 - Fugacity
Lecture 26 - Calculation of Fugacity using EoS - Part 1
Lecture 27 - Calculation of Fugacity using EoS - Part 2
Lecture 28 - Calculation of Fugacity in Mixtures using Cubic EoS
Lecture 29 - Fugacity in Liquids, Activity Coeffcient

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Lecture 30 - Models for Excess Gibbs free energy - Part 1
Lecture 31 - Models for Excess Gibbs free energy - Part 2
Lecture 32 - Vapor Liquid Equilibrium - Part 1
Lecture 33 - Vapor Liquid Equilibrium - Part 2
Lecture 34 - Azeotropes
Lecture 35 - Gamma/Phi Formulation
Lecture 36 - LLE
Lecture 37 - VLLE
Lecture 38 - Enthalpy changes upon reaction
Lecture 39 - Reaction coordinate
Lecture 40 - Equilibrium constant
Lecture 41 - Examples
Lecture 42 - Conclusion

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NPTEL Video Course - Chemical Engineering - NOC:Mass Transfer Operations-I

Subject Co-ordinator - Dr. B. Mandal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Overview of Mass Transfer Operation
Lecture 2 - Molecular and Eddy Diffusion, Diffusion Velocities and Fluxes
Lecture 3 - Fick's First and Second Law
Lecture 4 - Steady State Molecular Diffusion in fluids under stagnant and laminar flow conditions
Lecture 5 - Diffusion through variable cross-sectional area
Lecture 6 - Gas Phase Diffusion Coefficient measurement
Lecture 7 - Gas Phase Diffusion Coefficient prediction and liquid phase diffusion coefficient measurement and
Lecture 8 - Multicomponent diffusion and diffusivity in solids
Lecture 9 - Mass transfer coefficient concept and classifications
Lecture 10 - Dimensionless groups and correlations for convective mass transfer coefficients
Lecture 11 - Mass transfer coefficient in laminar flow
Lecture 12 - Boundary Layer Theory and mass transfer coefficients in turbulent flow
Lecture 13 - Mass transfer theories
Lecture 14 - Interphase mass transfer
Lecture 15 - Interphase mass transfer and material balance for operating line
Lecture 16 - Number of ideal stages in counter current operation
Lecture 17 - Introduction, classification, Sparged and agitated vessels design
Lecture 18 - Gas dispersed
Lecture 19 - Sieve Tray
Lecture 20 - Liquid dispersed
Lecture 21 - Introduction to absorption, Equilibrium in gas-liquid system, and minimum liquid rate
Lecture 22 - Design of packed column absorber based on the Individual Mass Transfer Coefficient
Lecture 23 - Design of packed column absorber based on the Overall Mass Transfer Coefficient
Lecture 24 - Height Equivalent to a Theoretical Plate (HETP), Design of packed column absorber for dilute and
Lecture 25 - Absorption in plate column
Lecture 26 - Introduction to distillation, binary equilibrium diagrams and concept of relative volatility
Lecture 27 - Distillation in non-ideal systems and concept of enthalpy-concentration diagram
Lecture 28 - Flash distillation
Lecture 29 - Batch and steam distillation

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Lecture 30 - Continuous multistate fractionation
Lecture 31 - Number of trays by McCabe and Thiele for distillation
Lecture 32 - Pinch Points and minimum reflux
Lecture 33 - Reflux below its bubble point
Lecture 34 - Multiple feeds, multiple product withdrawal or side streams
Lecture 35 - Multistage batch distillation with reflux
Lecture 36 - The Ponchon-Savarit method
Lecture 37 - The Ponchon-Savarit method
Lecture 38 - Packed Distillation
Lecture 39 - Introduction to multicomponent distillation and multicomponent flash distillation
Lecture 40 - Minimum stages and minimum reflux in multicomponent distillation
Lecture 41 - Multicomponent batch distillation

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NPTEL Video Course - Chemical Engineering - NOC:Transport Phenomena of Non-Newtonian Fluids

Subject Co-ordinator - Prof. N. Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Basic Concepts
Lecture 2 - Classification of Non-Newtonian Fluids
Lecture 3 - Mathematical Models for Non-Newtonian Fluids
Lecture 4 - Viscoelastic Non-Newtonian Fluids
Lecture 5 - Capillary Viscometers: Sources of Errors and Correction Methods
Lecture 6 - Rotational Viscometers
Lecture 7 - Capillary Viscometers - Errors and Corrections II
Lecture 8 - Equation of Change for Non-Isothermal Systems
Lecture 9 - Rotational Viscometers - II
Lecture 10 - Rotational Viscometers - III
Lecture 11 - Transition from Laminar to Turbulent Flow in Pipes for GNF
Lecture 12 - Equations of Change for Isothermal Systems
Lecture 13 - Equations of Change for Non-Isothermal Systems
Lecture 14 - Power-law Fluids Flow in Concentric Annulus
Lecture 15 - Power-law and Ellis Model Fluids Flow Through Pipes
Lecture 16 - Bingham Plastic Fluids Flow through Pipes
Lecture 17 - Herschel Bulkley Fluids Flow through Pipes
Lecture 18 - Transition and Turbulent Flow of GNF in Pipes - I
Lecture 19 - Transition and Turbulent Flow of GNF in Pipes - II
Lecture 20 - Laminar flow of GNFs between Parallel Plates and along Inclined Surface
Lecture 21 - Laminar flow of GNFs along Inclined Surface and Concentric Annulus
Lecture 22 - Flow of Non-Newtonian Fluids through Packed Beds
Lecture 23 - Dispersion in Packed Beds: Non-Newtonian Effects
Lecture 24 - Liquid-Solid Fluidization by Power-law Liquids
Lecture 25 - Free Convection between Two Vertical Plates
Lecture 26 - Viscous Heat Generation
Lecture 27 - Temperature distribution in fluids confined between co-axial cylinders
Lecture 28 - Temperature distribution for FDF of Newtonian fluids in tubes
Lecture 29 - Heat Transfer Combined with Chemical Reactions

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Lecture 30 - Transpiration Cooling
Lecture 31 - Basics of MT; Diffusion Through Stagnant Gas Film
Lecture 32 - Non-Isothermal Diffusive MT and Forced Convective MT
Lecture 33 - Simultaneous Heat and Mass Transfer
Lecture 34 - Mass Transfer Combined with Chemical Reactions
Lecture 35 - Quasi-Steady Analysis of Simultaneous HT, MT and Chemical Reaction
Lecture 36 - Quasi-Steady Analysis of Simultaneous HT and MT - I
Lecture 37 - Quasi-Steady Analysis of Simultaneous HT and MT - II
Lecture 38 - Quasi-Steady Analysis of Simultaneous HT and MT - III
Lecture 39 - Momentum and Thermal Boundary Layer Flows
Lecture 40 - Momentum Boundary Layer Thickness of Non-Newtonian Fluids
Lecture 41 - Thermal and Concentration Boundary Layer Thickness of Non-Newtonian Fluids

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NPTEL Video Course - Chemical Engineering - NOC:Fluid Flow Operations

Subject Co-ordinator - Dr. S.K. Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Characteristics of fluid (Continued...)
Lecture 3 - Fluid Statics
Lecture 4 - Fluid Statics (Continued...)
Lecture 5 - Fundamentals of flow - Part 1
Lecture 6 - Fundamentals of flow - Part 2
Lecture 7 - One dimensional flow - Part 1
Lecture 8 - One dimensional flow - Part 2
Lecture 9 - One dimensional flow - Part 3
Lecture 10 - Flow of Viscous fluid - Introduction
Lecture 11 - Velocity distribution in laminar flow
Lecture 12 - Velocity distribution in turbulent flow
Lecture 13 - Boundary layer theory
Lecture 14 - Theory of lubrication
Lecture 15 - Frictional resistance
Lecture 16 - Losses in gematric change
Lecture 17 - Losses in geometric change (Continued...)
Lecture 18 - Flow Velocity and Optimum Shape
Lecture 19 - Equation of Energy and Discharge of Water Channel
Lecture 20 - Drag
Lecture 21 - Lift and Cavitation
Lecture 22 - Dimensional Analysis
Lecture 23 - Dimensional Analysis
Lecture 24 - Law of Similarity and Significant Dimensionless Number
Lecture 25 - Compressible Flow - Part 1
Lecture 26 - Compressible Flow - Part 2
Lecture 27 - Measurement of Flow - Part 1
Lecture 28 - Measurement of Flow - Part 2
Lecture 29 - Measurement of Flow - Part 3

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Lecture 30 - Introduction to multiphase flow
Lecture 31 - Hydrodynamics in multiphase flow
Lecture 32 - Hydrodynamics in multiphase flow (Continued...)
Lecture 33 - Applications of multiphase flow

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Intensification

Subject Co-ordinator - Dr. S.K. Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History, Philosophy and Concept
Lecture 2 - Principle Features
Lecture 3 - Strategies and domain based techniques
Lecture 4 - Intensification by fluid flow process
Lecture 5 - Mechanism of Intensification by mixing
Lecture 6 - Intensification in Reactive system
Lecture 7 - Problems leading to sustainable development
Lecture 8 - Concept, Issues and Challenges
Lecture 9 - Strategies in process design
Lecture 10 - Scales and stages of process intensification
Lecture 11 - Methods and Tools for Achieving sustainable design
Lecture 12 - Multi-level Computer aided tools
Lecture 13 - Introduction on Stochastic Optimization
Lecture 14 - Optimization Algorithms
Lecture 15 - Applications of Optimization Algorithms
Lecture 16 - Introduction and Mechanism of Cavitation-based PI
Lecture 17 - Cavitational Reactor Configurations and activity
Lecture 18 - Parametric effects on cavitation
Lecture 19 - Introduction of monolith reactor
Lecture 20 - Preparation of monolithic catalyst
Lecture 21 - Application of monolithic catalyst
Lecture 22 - Hydrodynamics, transport of monolithic reactor
Lecture 23 - Overview of interfacial area based processes
Lecture 24 - Ejector induced downflow system for PI
Lecture 25 - Hydrodynamics and transport in downflow system
Lecture 26 - Introduction and Principles
Lecture 27 - Types of Intensified Distillation Units
Lecture 28 - Design of membrane-assisted distillation
Lecture 29 - Introduction and Principles

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Lecture 30 - Supercritical extraction for process intensification
Lecture 31 - Introduction to membrane and its principles
Lecture 32 - Membrane engineering in process intensification
Lecture 33 - Introduction to microprocess technology
Lecture 34 - Process Intensification by Microreactors
Lecture 35 - Hydrodynamics and transport in microchannel based microreactor

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Reaction Engineering-I

Subject Co-ordinator - Dr. B. Mandal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Overview on Reaction Engineering
Lecture 2 - Kinetics of Homogeneous Reactions
Lecture 3 - Kinetic Model and Temperature Dependency
Lecture 4 - Introduction and Stoichiometry for the Batch System
Lecture 5 - Stoichiometry for Constant Volume Flow and Variable Volume Batch Systems
Lecture 6 - Stoichiometry for Variable Volume Flow System
Lecture 7 - Analysis of Batch Reactor Kinetic Data
Lecture 8 - Intregal Method of Analysis of Batch Reactor Data - Part 1
Lecture 9 - Intregal Method of Analysis of Batch Reactor Data - Part 2
Lecture 10 - Differential Method of Analysis and Variable Volume Batch Reactor Data
Lecture 11 - Introduction and Ideal Batch Reactor Design
Lecture 12 - Ideal Mixed Flow Reactor Design
Lecture 13 - Ideal Plug Flow Reactor Design
Lecture 14 - Size Comparisn of Single and Multiple Reactors
Lecture 15 - Size Comaprison Multiple Reactors
Lecture 16 - Recycle and Autocatalytic Reactors
Lecture 17 - Design for Parallel Reactions
Lecture 18 - Design for Series Reactions
Lecture 19 - Design for Series-Parallel Reactions
Lecture 20 - Denbigh Reactions and Their Special Cases
Lecture 21 - Heats of Reaction and Equilibrium Conversion from Thermodynamics
Lecture 22 - General Graphical Reactor Design Procedure
Lecture 23 - Material and Energy Balances in Batch Reactor
Lecture 24 - Optimum Temperature Progression in Batch Reactor
Lecture 25 - Material and Energy Balances in Flug Flow and Mixed Flow Reactors
Lecture 26 - Ideal and Non-Ideal Mixed Flow Reactor Design and Multiple Steady States
Lecture 27 - Non-Ideal Reactors and Residence Time Distribution
Lecture 28 - RTD Measurement and Moments of RTD
Lecture 29 - RTD in Ideal Reactors

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Lecture 30 - Reactor Modeling using the RTD

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NPTEL Video Course - Chemical Engineering - NOC:Mass Transfer Operations-II

Subject Co-ordinator - Dr. Chandan Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts, Adiabatic saturation temperature
Lecture 2 - Design calculations of cooling tower
Lecture 3 - Design of cooling tower
Lecture 4 - Design of cooling tower
Lecture 5 - Air conditioning, Example problems on dehumidification
Lecture 6 - Mechanism of drying and drying equilibria, drying rate curve
Lecture 7 - Drying
Lecture 8 - Drying
Lecture 9 - Drying time calculation from drying rate curve
Lecture 10 - Introduction to liquid-liquid extraction, liquid-liquid equilibria
Lecture 11 - Effect of temperature on LLE and Design of single stage extraction
Lecture 12 - Design Calculation of Multistage Operation
Lecture 13 - Design calculation of multistage cross-current extraction
Lecture 14 - Design calculation of multistage counter-current extraction, Selection of extractors
Lecture 15 - Leaching
Lecture 16 - Leaching
Lecture 17 - Supercritical Fluid Extraction, equipmet for leaching
Lecture 18 - Fundamentals of membrane separation processes
Lecture 19 - Manufacturing of membranes,advantages and limitations
Lecture 20 - Various models and applications
Lecture 21 - Various models and applications
Lecture 22 - Electric field enhanced membrane separation processes
Lecture 23 - Micellar-enhanced ultrafiltration
Lecture 24 - Adsorption
Lecture 25 - Stage wise and continuous adsorption
Lecture 26 - Fluidized bed and teeter bed
Lecture 27 - Unsteady state fixed bed adsorbers, ion exchange
Lecture 28 - Crystallization, types of crystal geometry
Lecture 29 - Solid-liquid phase equilibrium, Theory of crystallization

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Lecture 30 - Design of crystallizer, crystallization equipment

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NPTEL Video Course - Chemical Engineering - NOC:Mechanical Unit Operations

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Particulate Solids
Lecture 2 - Particle Size
Lecture 3 - Particle Shape and Density
Lecture 4 - Screening
Lecture 5 - Size Analysis by Screening
Lecture 6 - Screening Equipment, Effectiveness and Capacity
Lecture 7 - Methods of Size Reduction
Lecture 8 - Equipment for Size Reduction - Crushers
Lecture 9 - Equipment for Size Reduction - Gridners
Lecture 10 - Equipment for Size Reduction - Ultrafine Grinders and Cutting Machines
Lecture 11 - Storage of Bulk Solids
Lecture 12 - Solids Flow Out and their Flow Patterns
Lecture 13 - Conveying of Bulk Solids
Lecture 14 - Size Enlargement Methods
Lecture 15 - Size Enlargement Equipment - 1
Lecture 16 - Size Enlargement Equipment - 2
Lecture 17 - Flow past Immersed Solid Objects
Lecture 18 - Motion of Particles through Fluids - 1
Lecture 19 - Motion of Particles through Fluids - 2
Lecture 20 - Motion of Particles through Fluids - 3
Lecture 21 - Flow through Beds of Solids - 1
Lecture 22 - Flow through Beds of Solids - 2
Lecture 23 - Flow through Fluidized Beds - 1
Lecture 24 - Flow through Fluidized Beds - 2
Lecture 25 - Filtration
Lecture 26 - Principles of Cake Filtration - 1
Lecture 27 - Principles of Cake Filtration - 2
Lecture 28 - Filtration Equipment
Lecture 29 - Cross Flow Filtration - 1

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Lecture 30 - Cross Flow Filtration - 2
Lecture 31 - Gravity Sedimentation - Classifiers
Lecture 32 - Gravity Sedimentation - Design of Thickeners - 1
Lecture 33 - Gravity Sedimentation - Design of Thickeners - 2
Lecture 34 - Centrifugal Separations - 1
Lecture 35 - Centrifugal Separations - 2
Lecture 36 - Floatation - 1
Lecture 37 - Floatation - 2

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NPTEL Video Course - Chemical Engineering - NOC:Advanced Thermodynamics

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Phase Equilibrium
Lecture 2 - Classical Thermodynamics of Phase Equilibria - 1
Lecture 3 - Classical Thermodynamics of Phase Equilibria - 2
Lecture 4 - Thermodynamic Properties from Volumetric Data
Lecture 5 - Fugacity from Volumetric Data - 1
Lecture 6 - Fugacity from Volumetric Data - 2
Lecture 7 - Intermolecular Forces and Non-Ideal Behaviour
Lecture 8 - Intermolecular Forces-Potential Energy Functions
Lecture 9 - Molecular Theory of Corresponding States - 1
Lecture 10 - Molecular Theory of Corresponding States - 2
Lecture 11 - Intermolecular Potential and EoS
Lecture 12 - Virial Coefficients from Potential Functions
Lecture 13 - Virial Coefficients from Corresponding States Theory
Lecture 14 - Fugacities in Gaseous Mixtures - 1
Lecture 15 - Fugacities in Gaseous Mixtures - 2
Lecture 16 - Fugacities in Gaseous Mixtures - 3
Lecture 17 - Liquid Mixtures and Excess Functions
Lecture 18 - Excess Functions and Activity Coefficients
Lecture 19 - Activity Coefficients and Thermodynamic Consistency
Lecture 20 - Models for Excess Gibbs Energy - 1
Lecture 21 - Models for Excess Gibbs Energy - 2
Lecture 22 - Models for Excess Gibbs Energy - 3
Lecture 23 - Vapour-Liquid Equilibrium - 1
Lecture 24 - Vapour-Liquid Equilibrium - 2
Lecture 25 - Vapour-Liquid Equilibrium - 3
Lecture 26 - Liquid-Liquid Equilibrium - 1
Lecture 27 - Liquid-Liquid Equilibrium - 2
Lecture 28 - Vapour-Liquid-Liquid Equilibrium - 1
Lecture 29 - Vapour-Liquid-Liquid Equilibrium - 2

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Lecture 30 - Solid-Liquid Equilibrium - 1
Lecture 31 - Solid-Liquid Equilibrium - 2

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NPTEL Video Course - Chemical Engineering - NOC:Membrane Technology

Subject Co-ordinator - Prof. Kaustubha Mohanty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Separation Processes, Historical Development, Definition and Types of Membranes
Lecture 2 - Membrane Processes and Classifications, Advantages, Disadvantages, Applications
Lecture 3 - Polymer Basics, Polymers used in Membrane Preparation and their Properties
Lecture 4 - Inorganic Materials for Membrane Preparation, their Advantages and Disadvantages
Lecture 5 - Membrane Modules and Selection, Flow Types
Lecture 6 - Preparation of Synthetic Membrane, Phase Inversion Membranes
Lecture 7 - Composite membranes
Lecture 8 - Inorganic membranes
Lecture 9 - Porous and non-porous membranes, characterization of porous membranes and MF membrane
Lecture 10 - MF membrane characterization
Lecture 11 - UF membrane characterization
Lecture 12 - Passive transport, active transport, description of transport process
Lecture 13 - Transport through porous membrane and nonporus membrane
Lecture 14 - Concept of osmosis and reverse osmosis, thermodynamic analysis
Lecture 15 - Revision of concepts and fundaments
Lecture 16 - HP and LP RO, membrane materials, modules, models for RO transport
Lecture 17 - Advantages of RO, fouling, RO applications, Pressure retarded osmosis
Lecture 18 - Nanofiltration basics, transport mechanism, fouling model and applications
Lecture 19 - Basic principles of UF, membranes and modules, UF configurations
Lecture 20 - Models for UF transport, mass transfer coefficient, membrane rejection and sieving coefficient
Lecture 21 - Factors affecting UF performance, fouling and permeate flux enhancement, UF applications1
Lecture 22 - Micellar-enhanced UF, affinity UF, UF based bioseparation
Lecture 23 - Basic principles, advantages of MF, cross-flow and dead-end MF, membranes and modules
Lecture 24 - Models for MF transport, plugging and throughput, fouling in MF, MF applications
Lecture 25 - Problems and solutions based on RO and MF
Lecture 26 - Problems and solutions based on UF
Lecture 27 - Dialysis, membranes and modules, mass transport in dialysis, diffusion analysis, applications
Lecture 28 - Ion-exchange membranes, ED process, energy requirement, applications, reverse ED
Lecture 29 - PV principle, advantages, mass transfer and applications, hybrid distillation/PV

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Lecture 30 - Problems and solutions based on ED and PV
Lecture 31 - Concept, types of LM, mechanism of mass transfer in LM, choice of solvent and carrier, applicati
Lecture 32 - Basic principle of gas separation, transport mechanism, factors affecting gas separation, applic
Lecture 33 - Basic principle of MD, mechanism, process parameters, membranes, applications
Lecture 34 - Mechanism, coupled transport, carrier agent, active and passive transport, applications
Lecture 35 - Gas-liquid and liquid-liquid contactors, membrane reactors and bioreactors, PEM hydrogen fuel ce
Lecture 36 - Perstraction, membrane chromatography and controlled drug delivery

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NPTEL Video Course - Chemical Engineering - NOC:Computer Aided Applied Single Objective Optimization

Subject Co-ordinator - Prof. Prakash Kotecha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization
Lecture 2 - Linear Regression
Lecture 3 - Multiple, Polynomial and General Linear Least Square Regression
Lecture 4 - Nonlinear Regression
Lecture 5 - Regression
Lecture 6 - Teaching Learning Based Optimization
Lecture 7 - Implementation of TLBO in MATLAB
Lecture 8 - Supplementary
Lecture 9 - Supplementary
Lecture 10 - Particle Swarm Optimization
Lecture 11 - Implementation of Particle Swarm Optimization using MATLAB
Lecture 12 - Differential Evolution
Lecture 13 - Implementation of Differential Evolution using MATLAB
Lecture 14 - Binary Coded Genetic Algorithm
Lecture 15 - Real Coded Genetic Algorithm
Lecture 16 - Implementation of Real Coded Genetic Algorithm using MATLAB
Lecture 17 - Artificial Bee Colony Algorithm
Lecture 18 - Working of Artificial Bee Colony Algorithm
Lecture 19 - Implementation of Artificial Bee Colony using MATLAB
Lecture 20 - Comparison of Variation Operators and Survival Strategies
Lecture 21 - Black-Box Optimization Problems
Lecture 22 - Constraint-Handling in Metaheuristic Techniques
Lecture 23 - Case Study
Lecture 24 - Case Study
Lecture 25 - Parallelization and Vectorization of Fitness Function
Lecture 26 - Constraint-Handling using Correction Approach
Lecture 27 - MATLAB inbuilt functions
Lecture 28 - MATLAB inbuilt functions
Lecture 29 - MATLAB Optimization Tool

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Lecture 30 - MATLAB inbuilt functions
Lecture 31 - Simplex Method for LP
Lecture 32 - Branch and Bound Method for MILP
Lecture 33 - MILP formulation of Production Planning Problem
Lecture 34 - Generalized Algebraic Modelling System
Lecture 35 - Solution of Production Planning Problem using GAMS and NEOS, MIRO

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NPTEL Video Course - Chemical Engineering - NOC:Basic Principles and Calculations in Chemical Engineering

Subject Co-ordinator - Prof. Subrata Kumar Majumdar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition, History, Role of Chemical Engineer
Lecture 2 - Basic Features of Chemical Process
Lecture 3 - Unit systems and dimensions
Lecture 4 - Variables and Properties of Material in System
Lecture 5 - Pressure and Temperature of Flow Process
Lecture 6 - Rate of Process
Lecture 7 - Principles of material balance and calculation
Lecture 8 - Material Balances on Processes with Recycle and Bypass
Lecture 9 - Material balances on reactive processes
Lecture 10 - Material balances on combustion reactions
Lecture 11 - State Equation of Ideal Gas and Calculation
Lecture 12 - State Equation of non-Ideal Gas and Calculation
Lecture 13 - Phase equilibrium
Lecture 14 - Equilibrium Laws, Humidity and Saturation
Lecture 15 - Humidity, Saturation Psychrometric chart
Lecture 16 - Process of phase change
Lecture 17 - Principles of Energy
Lecture 18 - Laws and properties of thermodynamics
Lecture 19 - Standard Heat of Formation
Lecture 20 - The mechanical energy balance
Lecture 21 - Enthalpy balances without reaction
Lecture 22 - Energy balance with multiplle streams without reaction
Lecture 23 - Energy balance on heat of solution
Lecture 24 - Energy balance with heat of reaction
Lecture 25 - Energy balance with heat of reaction (Continued...)
Lecture 26 - Energy balance with heat of combustion
Lecture 27 - Material balance of transient process
Lecture 28 - Unsteady state energy balance
Lecture 29 - Least Square Method Linear equation fitting

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Lecture 30 - Non-linear algebraic equation system
Lecture 31 - Numerical Integration
Lecture 32 - Process Degrees of Freedom
Lecture 33 - Process Flowsheeting and codes
Lecture 34 - Case Study
Lecture 35 - Case Study

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NPTEL Video Course - Chemical Engineering - NOC:Renewable Energy Engineering: Solar, Wind and Biomass Energy

Subject Co-ordinator - Prof. R. Anandalakshmi, Prof. Vaibhav Vasant Goud

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solar Energy: An overview of thermal applications
Lecture 2 - Solar radiation
Lecture 3 - Practice problems - Part I
Lecture 4 - Practice problems - Part II
Lecture 5 - Non-concentrating solar collectors - Part I
Lecture 6 - Non-concentrating solar collectors - Part II
Lecture 7 - Non-concentrating solar collectors - Part III
Lecture 8 - Practice problems - Part I
Lecture 9 - Practice problems - Part II
Lecture 10 - Practice problems - Part III
Lecture 11 - Parabolic solar collectors
Lecture 12 - Practice problems
Lecture 13 - Thermal energy storage systems - Part I
Lecture 14 - Thermal energy storage systems - Part II
Lecture 15 - Solar energy utilization methods
Lecture 16 - Classification of energy resources
Lecture 17 - Broad classification and compositional analysis
Lecture 18 - Characteristics and properties of biomass
Lecture 19 - Properties and structural components of biomass
Lecture 20 - Biomass residues and energy conversion routes
Lecture 21 - Utilisation of biomass through bio-chemical and thermo-chemical routes
Lecture 22 - Conversion mechanism of biomass to biogas and its properties
Lecture 23 - Classification of biogas plants
Lecture 24 - Practice problems - I
Lecture 25 - Practice problems - II
Lecture 26 - Practice problems - III
Lecture 27 - Bioconversion of substrates into alcohol
Lecture 28 - Thermo-chemical conversion, torrefaction and combustion processes
Lecture 29 - Thermo-chemical conversion of biomass to solid, liquid and gaseous fuels

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Lecture 30 - Gasification process
Lecture 31 - Thermo-chemical conversion processes: pyrolysis, liquefaction and conversion processes
Lecture 32 - Practice problems - I
Lecture 33 - Practice problems - II
Lecture 34 - Turbine terms, types and theories - Part I
Lecture 35 - Turbine terms, types and theories - Part II
Lecture 36 - Characteristics and Power Generation from Wind Energy - Part I
Lecture 37 - Characteristics and Power Generation from Wind Energy - Part II
Lecture 38 - Practice problems

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NPTEL Video Course - Chemical Engineering - NOC:Biomass Conversion and Biorefinery

Subject Co-ordinator - Prof. Kaustubha Mohanty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy and Environment scenario
Lecture 2 - Need for biomass based industries
Lecture 3 - Biomass basics
Lecture 4 - Dedicated energy crops
Lecture 5 - Oil cropns and microalgae
Lecture 6 - Enhancing biomass properties
Lecture 7 - Basic concepts and types
Lecture 8 - Feedstocks and properties
Lecture 9 - Economics and LCA
Lecture 10 - Barriers and Types
Lecture 11 - Dilute acid, alkali, ozone
Lecture 12 - Hybrid methods
Lecture 13 - Physical Processes
Lecture 14 - Gasification and Pyrolysis
Lecture 15 - Products and Commercial Success Stories
Lecture 16 - Types, fundamentals, equipments, applications
Lecture 17 - Details of various processes
Lecture 18 - Products and Commercial Success Stories
Lecture 19 - Diesel from vegetable oils, microalgae and syngas
Lecture 20 - Transesterification; FT process, catalysts
Lecture 21 - Biodiesel purification, fuel properties
Lecture 22 - Biooil and biochar production, reactors
Lecture 23 - Factors affecting biooil, biochar production, fuel properties characterization
Lecture 24 - Biooil upgradation technologies
Lecture 25 - Microorganisms, current industrial ethanol production technology
Lecture 26 - Cellulase production, SSF and CBP
Lecture 27 - ABE fermentation pathway and kinetics, product recovery technologies
Lecture 28 - Biohydrogen production, metabolics, microorganisms
Lecture 29 - Biogas technology, fermenter designs, biogas purification

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Lecture 30 - Methanol production and utilization
Lecture 31 - Biomass as feedstock for synthetic organic chemicals, lactic acid, polylactic acid
Lecture 32 - Succinic acid, propionic acid, acetic acid, butyric acid
Lecture 33 - 1,3-propanediol, 2,3-butanedioil, PHA
Lecture 34 - Concept, lignocellulosic biorefinery
Lecture 35 - Aquaculture and algal biorefinery, waste biorefinery
Lecture 36 - Techno-economic evaluation
Lecture 37 - Life-cycle assessment

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NPTEL Video Course - Chemical Engineering - NOC:Aspen PlusÂ® Simulation Software - A basic course for beginne

Subject Co-ordinator - Prof. Prabirkumar Saha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Significance of software with example - Simulation on pen and paper vs simulation on Aspen Plus
Lecture 2 - Understanding Resources and My Exchange, Start using Aspen Plus
Lecture 3 - Overview of setting up of property environment
Lecture 4 - Using Model Pallete - Mixers/Splitters, Separators
Lecture 5 - Using Model Pallete - Exchangers
Lecture 6 - Using Model Pallete - Columns
Lecture 7 - Using Model Palette - Reactors
Lecture 8 - Using Model Palette - Pressure Changers
Lecture 9 - Example: Hydrocarbon Treatment - Part 1
Lecture 10 - Example: Hydrocarbon Treatment - Part 2
Lecture 11 - Setup, Components
Lecture 12 - Property Methods
Lecture 13 - Property Methods and Propeety Sets with example
Lecture 14 - Analysis tools (Pure Components and Binary mixtures)
Lecture 15 - Analysis tools (Ternary mixtures), Data and Regression (Part 1)
Lecture 16 - Data and Regression (Part 2), Property Estimation
Lecture 17 - Practice problems on pure components
Lecture 18 - Practice problems on binary mixtures
Lecture 19 - Miscellaneous practice problems and case studies
Lecture 20 - Model Analysis Tools
Lecture 21 - Separation of Hydrocarbon Mixture
Lecture 22 - Synthesis of Acetaldehyde from Ethanol
Lecture 23 - BTX Separation through Distillation
Lecture 24 - Synthesis of Methanol from Syngas
Lecture 25 - Synthesis of Dimethyl Ether from Carbon Dioxide and Hydrogen
Lecture 26 - Synthesis of Ammonia in Cryogenic Process
Lecture 27 - Production of Cumene
Lecture 28 - Design, Rating and Simulation of Heat Exchanger
Lecture 29 - Absorption and Distillation - Part 1

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Lecture 30 - Absorption and Distillation - Part 2
Lecture 31 - Hydrodealkylation of Toluene
Lecture 32 - Isobutene Production Plant
Lecture 33 - Nitric Oxide Production Plant
Lecture 34 - Plant Economy and Utilities
Lecture 35 - Plant Dynamics and Control

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NPTEL Video Course - Chemical Engineering - NOC:Physical and Electrochemical Characterizations in Chemical Er

Subject Co-ordinator - Prof. Tamal Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Characterization Techniques - Part 1
Lecture 2 - Introduction to Characterization Techniques - Part 2
Lecture 3 - Infrared Spectroscopy: Fundamentals
Lecture 4 - Infrared Spectroscopy: IR Bands and Applications
Lecture 5 - Infrared Spectrophotometer Instrumentation
Lecture 6 - Raman Spectroscopy
Lecture 7 - NMR: Concepts and Fundamentalsâ
Lecture 8 - Chemical Shifts
Lecture 9 - Factors Affecting Chemical Shift and 2D NMRâ
Lecture 10 - Physisorption: Surface Area and Pore Analysis
Lecture 11 - Physisorption Measurements
Lecture 12 - Chemisorption
Lecture 13 - Surface Tension and its Measurement - Part 1
Lecture 14 - Surface Tension and its Measurement - Part 2
Lecture 15 - Interfacial Tension and its Application
Lecture 16 - Interfacial Tension and Influence of Surface Curvatureâ
Lecture 17 - Rheology: Fundamentals and Principlesâ
Lecture 18 - Complex Fluids and their Propertiesâ
Lecture 19 - Rheology: Case Study on Hydrogel Synthesis
Lecture 20 - Electron Spectroscopy for Surface Analysisâ
Lecture 21 - Quantification in XRF and XPS Spectroscopyâ
Lecture 22 - XPS Instrument and Applicationâ
Lecture 23 - Introduction to Electrochemical Characterization Techniquesâ
Lecture 24 - Electrode Potential, Kinetics and Mass Transfer Resistanceâ
Lecture 25 - Voltammetry and Galvanostatic Charge-Dischargeâ

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Technology

Subject Co-ordinator - Prof. Tamal Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Important Steps for Process Development
Lecture 2 - Structure of Chemical Industry
Lecture 3 - Safety and Loss Prevention
Lecture 4 - Sulfuric Acid: Reactions and Thermodynamics
Lecture 5 - SO2 Conversion Reactor and Sulfuric Acid Production Process
Lecture 6 - Sulfur Production: Claus Process
Lecture 7 - Synthesis Gas Production
Lecture 8 - Coal Gasification
Lecture 9 - Coal Gasifiers
Lecture 10 - Gasification Technology and Applications
Lecture 11 - Thermodynamics of Ammonia Synthesis
Lecture 12 - Integrated Ammonia Plant and Hydrogen Recovery - I
Lecture 13 - Integrated Ammonia Plant and Hydrogen Recovery - II
Lecture 14 - Urea Production
Lecture 15 - Nitric acid: Reactions and Thermodynamics
Lecture 16 - Production of Phosphoric Acid: Dihydrate Process
Lecture 17 - Production of Phosphoric Acid: Hemihydrate Process
Lecture 18 - Emission Abatement in Phosphoric Acid Plants
Lecture 19 - Chlorine Production
Lecture 20 - Soda Ash Process
Lecture 21 - Heterogeneous Catalysis
Lecture 22 - Catalysis with Zeolites and production of Iso-butene
Lecture 23 - Production of Ethylbenzene
Lecture 24 - Periodic Flow Reversal and Production of Styrene
Lecture 25 - Selective Oxidation Processes and Ethene Production
Lecture 26 - Monolith Reactors for Automotive Emission
Lecture 27 - Methanol Production
Lecture 28 - Methanol and Formaldehyde Production
Lecture 29 - Fischer-Tropsch Synthesis

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Lecture 30 - Fischer Tropsch Process: SASOL and SDMS
Lecture 31 - Methanol to Gasoline: Haldor Topsoe and TIGAS
Lecture 32 - Fuel Additives
Lecture 33 - Homogenous Catalysis
Lecture 34 - Methanol Carbonylation for Acetic Acid Production
Lecture 35 - Hydroformylation Reactions
Lecture 36 - Hydroformylation of Propene and Higher Alkenes
Lecture 37 - Ethene Oligomerization
Lecture 38 - Dimethyl Terephthalate and Terephthalic Acid Production
Lecture 39 - Bio-refinery products and Process Design
Lecture 40 - Optimal Synthesis of Sustainable Bio-refineries
Lecture 41 - Bio-based Fuels
Lecture 42 - Bio-based Chemicals
Lecture 43 - Bio-refinery Feedstock: Food Waste as a Renewable Raw Material

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NPTEL Video Course - Chemical Engineering - NOC:Inorganic Chemical Technology

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Unit Processes
Lecture 2 - Introduction of Unit Operations
Lecture 3 - Unit Operations and Other General Principles
Lecture 4 - General Principles and Chemical Plant Design
Lecture 5 - Fuel Gases
Lecture 6 - Natural Gas, LPG and Syngas
Lecture 7 - Synthesis gas
Lecture 8 - Industrial Gases
Lecture 9 - Industrial Gases - Carbon Dioxide
Lecture 10 - Industrial Gases - Hydrogen
Lecture 11 - Sulfur Industry
Lecture 12 - Sulfur and sulfuric acid
Lecture 13 - Sulfuric Acid
Lecture 14 - Nitrogen Industries - Ammonia
Lecture 15 - Nitrogen Industries - Nitric Acid
Lecture 16 - Nitrogen Industries - Urea
Lecture 17 - Nitrogen Industries - Ammonium Nitrate
Lecture 18 - Phosphorus Industries - Phosphorus and Phosphoric Acid Production
Lecture 19 - Phosphorus Industries - Phosphoric Acid Production by Wet Processes
Lecture 20 - Phosphorus Industries - Phosphates
Lecture 21 - Potassium Industries - 1
Lecture 22 - Potassium Industries - 2
Lecture 23 - Chlor-Alkali Industry - Soda Ash
Lecture 24 - Chlor-Alkali Industry - Chlorine and Caustic Soda
Lecture 25 - Cement and Lime Industry - Cement
Lecture 26 - Cement and Lime Industry - Lime
Lecture 27 - Glass Industries
Lecture 28 - Surface Coating Industry
Lecture 29 - Paints and Pigments

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Lecture 30 - Varnishes, Lacquers and Industrial Coatings
Lecture 31 - Raw Materials and Basic Ceramic Chemistry
Lecture 32 - Whitewares and Structural Clay Products
Lecture 33 - Refractories, Specialized Ceramic Products and Vitreous Enamel
Lecture 34 - Metallurgical Industries - I
Lecture 35 - Metallurgical Industries - II

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NPTEL Video Course - Chemical Engineering - NOC:Organic Chemical Technology

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organic Chemical Technology
Lecture 2 - Basic Unit Processes and Unit Operations of OCT
Lecture 3 - Introduction to Chemical Plant Design
Lecture 4 - Edible and Essential Oils
Lecture 5 - Vegetable Oils and Processing
Lecture 6 - Processing of Oils and Waxes
Lecture 7 - Soaps and Glycerine Manufacture
Lecture 8 - Detergents Manufacture
Lecture 9 - Carbohydrates Industry - Sugar
Lecture 10 - Carbohydrates Industry - Refined Sugar
Lecture 11 - Carbohydrates Industry - Beet Sugar and Starch
Lecture 12 - Fermentation Industry
Lecture 13 - Fermentation Industry â Ethanol
Lecture 14 - Fermentation Industry â Citric Acid and Penicillin
Lecture 15 - Pulp and Paper Industry
Lecture 16 - Pulp and Paper Industry - 2
Lecture 17 - Pulp and Paper Industry - 3
Lecture 18 - Petroleum Industry
Lecture 19 - Petroleum Refinery Products, Characteristics and Processes
Lecture 20 - Petroleum Refinery Processes
Lecture 21 - Petroleum Refinery Processes - 2
Lecture 22 - Chemicals from C1 Compounds: Methanol and Formaldehyde
Lecture 23 - Chemicals from C1 and C2 Compounds
Lecture 24 - Chemicals from C2 Compounds
Lecture 25 - Chemicals from C2 Compounds - 2
Lecture 26 - Chemicals from C3 Compounds
Lecture 27 - Chemicals from C3 Compounds - 2
Lecture 28 - Chemicals from C4 Compounds
Lecture 29 - Chemicals from Aromatic Compounds

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Lecture 30 - Chemicals from Aromatic Compounds - Phenol
Lecture 31 - Chemicals from Aromatic Compounds - 3
Lecture 32 - Polymer Industry
Lecture 33 - Polymer Industry - 2
Lecture 34 - Rubber Industry
Lecture 35 - Rubber Industry - 2

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NPTEL Video Course - Chemical Engineering - NOC:Solid-Fluid Operations

Subject Co-ordinator - Prof. Subrata Kumar Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Solid-Fluid Operations
Lecture 2 - Characteristics of Single particle
Lecture 3 - Particle size and Its distribution in mixture
Lecture 4 - Mechanism of Size Reduction
Lecture 5 - General Machines for Size Reduction
Lecture 6 - Laws of Energy for Size Reduction
Lecture 7 - Introduction on Size Enlargement
Lecture 8 - Mechanism of Size Enlargement
Lecture 9 - Equipment for Size Enlargement
Lecture 10 - Flow Past a Cylinder and Spherical Particle
Lecture 11 - Terminal velocity of single particle
Lecture 12 - Multiple particle Interaction/Sedimentation: Hindered settling velocity
Lecture 13 - Basic law and terminology of flow through granular bed
Lecture 14 - General expressions for flow through packed beds-Ergun Equation
Lecture 15 - Two-phase flow through packed bed
Lecture 16 - Mixing of Solids: Introduction
Lecture 17 - Degree of mixing and Its Assessment
Lecture 18 - Mixing and agitation of fluids/slurries
Lecture 19 - Basic understandings and applications of fluidization
Lecture 20 - Minimum Fluidization Velocity
Lecture 21 - Basic understanding of froth flotation
Lecture 22 - Separation of particles by Screening
Lecture 23 - Particulate Matter Separation by Gravity Settling Chamber
Lecture 24 - Particle Separation by Cyclone and Centrifuge
Lecture 25 - Particle Separation by Electrostatic Precipitator
Lecture 26 - Separation by Industrial Fabric (Bag) Filters
Lecture 27 - Wet Scrubber for Particle Removal
Lecture 28 - Filtration
Lecture 29 - Dead-End and Continuous Filtration

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Lecture 30 - Reverse Osmosis
Lecture 31 - Introduction to Nanoparticles
Lecture 32 - Synthesis of Nanoparticles - Physical Method
Lecture 33 - Synthesis of Nanoparticles (Chemical Methods)
Lecture 34 - Adsorption: Principle and Applications
Lecture 35 - Analysis of Adsorption by Isotherms
Lecture 36 - Adsorption Kinetics

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NPTEL Video Course - Chemical Engineering - NOC:Energy Conversion Technologies (Biomass and Coal)

Subject Co-ordinator - Prof. Vaibhav V. Goud

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sources of energy
Lecture 2 - Sources of energy
Lecture 3 - Energy scenario
Lecture 4 - Environmental aspects of energy
Lecture 5 - Environmental aspects of energy
Lecture 6 - Environmental aspects of energy
Lecture 7 - Environmental aspects of energy
Lecture 8 - Solid fuels - Part I
Lecture 9 - Solid fuels - Part II
Lecture 10 - Liquid fuels - Part I
Lecture 11 - Liquid fuels - Part II
Lecture 12 - Practice problems - Part I
Lecture 13 - Practice problems - Part II
Lecture 14 - Energy from Bio-based Feedstock
Lecture 15 - Thermal/Thermochemcial processes
Lecture 16 - Practice problems (Pelletization)
Lecture 17 - Practice problems (Torrefaction Mass and Energy Yield)
Lecture 18 - Pyrolysis and Hydrothermal Liquefaction
Lecture 19 - Gasification
Lecture 20 - Practice examples (Pyrolysis, Gasification)
Lecture 21 - Biochemical conversion processes - Anaerobic Digestion in Landfills
Lecture 22 - Bioethanol Production
Lecture 23 - Practice examples (Biogas and Bio-ethanol production)
Lecture 24 - Chemical Conversion Processes - Types of Feedstock and Pretreatment
Lecture 25 - Mechanism of trans-esterification and biodiesel production
Lecture 26 - Green diesel synthesis from bio-based feedstocks
Lecture 27 - Energy from Coal (Carbonization, Gasification and Liquefaction)
Lecture 28 - Practice Example (Combustion of Biomass and Coal)
Lecture 29 - Combustion Process (Biomass and Coal)

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Lecture 30 - Concept of integration of energy system

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NPTEL Video Course - Chemical Engineering - NOC:Petroleum Reservoir Engineering

Subject Co-ordinator - Dr. Pankaj Tiwari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Petroleum Reservoir Engineering
Lecture 2 - Petroleum Reserves
Lecture 3 - Petroleum Geology
Lecture 4 - Well Drilling Methods
Lecture 5 - Thermodynamics of Hydrocarbons
Lecture 6 - Natural Gas Properties
Lecture 7 - Properties of Crude Oil
Lecture 8 - Reservoir Rock Properties
Lecture 9 - Relative Permeability
Lecture 10 - Primary Drive Mechanisms
Lecture 11 - General Material (Volumetric) Balance
Lecture 12 - Volumetric Balance in Oil and Gas Reservoir
Lecture 13 - Fundamentals of Reservoir Fluid Flow
Lecture 14 - General Equations for radial Flow in Reservoir
Lecture 15 - Inflow Performance Relationship for Reservoir Fluids
Lecture 16 - Well Testing and Performance - I
Lecture 17 - Well Testing and Performance - II
Lecture 18 - Secondary Oil Recovery Methods
Lecture 19 - Enhanced Oil Recovery Methods
Lecture 20 - Introduction to Reservoir Simulation
Lecture 21 - Unconventional Natural Gas Production

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NPTEL Video Course - Chemical Engineering - NOC:Applied Statistical Thermodynamics

Subject Co-ordinator - Prof. Tamal Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Statistical Thermodynamics
Lecture 2 - Postulates and Boltzmann Distribution
Lecture 3 - Properties of Canonical Partition Function
Lecture 4 - Canonical Partition Function and Thermodynamic Properties
Lecture 5 - Thermodynamic Properties of Ideal Monoatomic Gases
Lecture 6 - Monoatomic Gases and Gibbs Entropy Equation
Lecture 7 - Energy Fluctuations for Monoatomic Gases
Lecture 8 - Partition Function for Diatomic Gases
Lecture 9 - Vibrational Partition Function
Lecture 10 - Partition Function for Ideal Polyatomic Gas
Lecture 11 - Normal Mode Analysis
Lecture 12 - Illustrations
Lecture 13 - Non-reacting Ideal Gas Mixture
Lecture 14 - Chemically Reacting Gas Mixture
Lecture 15 - Degree of Ionization of Gas Molecules
Lecture 16 - Problems on Ionization of Gas Molecules
Lecture 17 - Microcanonical and Grand Canonical Ensemble
Lecture 18 - Isobaric Isothermal Ensemble
Lecture 19 - Fluctuations in Grand canonical and Isothermal Isobaric Ensembles
Lecture 20 - Semi Grand Canonical Ensemble and Comparison of Ensembles
Lecture 21 - Problems and Adsorbtion Isotherms
Lecture 22 - Virial Equation of State for Polyatomic Molecules
Lecture 23 - Virial Equation of State
Lecture 24 - Virial Equation of State with Higher Order Terms
Lecture 25 - Thermodynamic Properties from Virial Equation of State
Lecture 26 - Interaction Potentials for Spherical Molecules
Lecture 27 - Inferences from Intermolecular Potentials
Lecture 28 - Engineering Application of Virial Equation of State
Lecture 29 - Einstein Model

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Lecture 30 - Einstein Model (Continued...)
Lecture 31 - Debye Model
Lecture 32 - Sublimation Pressure and Enthalpy of Crystals
Lecture 33 - Flory Huggin's Model
Lecture 34 - Ising Model
Lecture 35 - Radial Distribution Function
Lecture 36 - Radial Distribution Function
Lecture 37 - Molecular Dynamics Simulations
Lecture 38 - Square well Potential and Barker Henderson Pertubation Theory

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NPTEL Video Course - Chemical Engineering - NOC:Aspen PlusÂ® Simulation Software - An Advanced Course for Lea

Subject Co-ordinator - Prof. Prabirkumar Saha

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Stream class for solid handling and particle size distribution - Part 1
Lecture 2 - Stream class for solid handling and particle size distribution - Part 2
Lecture 3 - Crystallizer - Stepwise Execution
Lecture 4 - Crystallizer - Example problem
Lecture 5 - Crusher - Stepwise Execution
Lecture 6 - Crusher - Example problem
Lecture 7 - Screen - Stepwise Execution
Lecture 8 - Screen - Example problem
Lecture 9 - Washer and CCD - Stepwise Execution
Lecture 10 - Washer and CCD - Example problem
Lecture 11 - Dryer - Stepwise Execution
Lecture 12 - Dryer - Example problem
Lecture 13 - Granulator - Stepwise Execution
Lecture 14 - Granulator - Example problem
Lecture 15 - Classifier - Stepwise Execution
Lecture 16 - Classifier - Example problem
Lecture 17 - Fluidized Bed - Stepwise Execution
Lecture 18 - Fluidized Bed - Example problem
Lecture 19 - Scrubber - Stepwise Execution
Lecture 20 - Scrubber - Example problem
Lecture 21 - Centrifuge - Stepwise Execution
Lecture 22 - Centrifuge - Example problem
Lecture 23 - Filters - Stepwise Execution
Lecture 24 - Filters - Example problem
Lecture 25 - Cross-flow filters - Stepwise Execution
Lecture 26 - Cross-flow filters - Example problem
Lecture 27 - Fabric filter - Stepwise Execution
Lecture 28 - Fabric filter - Example problem
Lecture 29 - Electrostatic precipitator - Stepwise Execution

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Lecture 30 - Electrostatic precipitator - Example problem
Lecture 31 - Cyclone separator - Stepwise Execution
Lecture 32 - Cyclone separator - Example problem
Lecture 33 - Hydrocyclone - Stepwise Execution
Lecture 34 - Hydrocyclone - Example problem
Lecture 35 - Batch process - Stepwise Execution
Lecture 36 - Batch process - Example problem (setting reaction set)
Lecture 37 - Batch process - Example problem (simulation)
Lecture 38 - Nonconvenstional solids - Stepwise execution and problem introduction
Lecture 39 - Nonconvenstional solids - Solution of Example Problem
Lecture 40 - Petroleum fractaionation - Stepwise execution and problem introduction
Lecture 41 - Petroleum fractaionation - Solution of Example Problem (1st Segment)
Lecture 42 - Petroleum fractaionation - Solution of Example Problem (2nd Segment)
Lecture 43 - Electrolytes - Stepwise execution and problem introduction
Lecture 44 - Electrolytes - Solution of Example Problem
Lecture 45 - Polymers - Theory and problem introduction
Lecture 46 - Polymers - Solution of Example Problem (1st Segment)
Lecture 47 - Polymers - Solution of Example Problem (2nd Segment)
Lecture 48 - Energy Savings - Segment 1
Lecture 49 - Energy Savings - Segment 2
Lecture 50 - Energy Savings - Segment 3
Lecture 51 - Economic Analysis - Segment 1
Lecture 52 - Economic Analysis - Segment 2
Lecture 53 - Economic Analysis - Segment 3
Lecture 54 - Safety Analysis - Introduction
Lecture 55 - Safety Analysis - Pressure Safety Valve
Lecture 56 - Safety Analysis - Rupture Disk and Low Pressure Tank
Lecture 57 - Custom model in Aspen Plus - Segment 1 (using MS Excel)
Lecture 58 - Custom model in Aspen Plus - Segment 2 (using MATLAB)
Lecture 59 - Case study - Segment 1
Lecture 60 - Case study - Segment 2
Lecture 61 - Case study - Segment 3
Lecture 62 - Case study - Segment 4

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NPTEL Video Course - Chemical Engineering - Fluid Mechanics

Subject Co-ordinator - Dr. V. Shankar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
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Lecture 14
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Lecture 16
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Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
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Lecture 40

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NPTEL Video Course - Chemical Engineering - Mass Transfer II

Subject Co-ordinator - Prof. Nishith Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 9
Lecture 10
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Lecture 13
Lecture 14
Lecture 15
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Lecture 29

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Lecture 30
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Lecture 40

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NPTEL Video Course - Chemical Engineering - Plantwide Control of Chemical Processes

Subject Co-ordinator - Dr. Nitin Kaistha

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Process Dynamics and Negative Feedback
Lecture 3 - PID control
Lecture 4 - Common Industrial Control Loops and advanced loops
Lecture 5 - Advanced loops (Continued...) and multivariable systems
Lecture 6 - Systematic Tuning Using Frequency Domain Analysis
Lecture 7 - Frequency Domain Analysis
Lecture 8 - Multivariable Systems
Lecture 9 - RGA and dynamic decoupling
Lecture 10 - Model based control
Lecture 11 - Dynamic Matrix Control
Lecture 12 - Control of Distillation Columns
Lecture 13 - Temperature inferential distillation control
Lecture 14 - Considerations in temperature inferential control
Lecture 15 - Control of Complex Column Configurations
Lecture 16 - Control of Heat Integrated Columns
Lecture 17 - Homogenous extractive distillation
Lecture 18 - More on complex columns and reactive distillation
Lecture 19 - Control of reactors
Lecture 20 - PFR controls (Continued..) & CSTRs
Lecture 21 - CSTR heat management
Lecture 22 - Heat Exchangers and Miscellaneous Systems
Lecture 23 - Degrees of freedom analysis
Lecture 24 - Degrees of freedom (Continued...)
Lecture 25 - Illustration of considerations in control structure synthesis
Lecture 26 - Two column recycle process
Lecture 27 - Throughput manipulator selection
Lecture 28 - Plantwide control structure design
Lecture 29 - Systematizing plantwide control design

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Lecture 30 - The Luyben design procedure
Lecture 31 - Role of equipment capacity constraints
Lecture 32 - Recycle process case study
Lecture 33 - Recycle process case study (Continued...)
Lecture 34 - C4 isomerization process case study
Lecture 35 - C4 isomerization process case study (Continued...)
Lecture 36 - C4 isomerization process case study
Lecture 37 - Systematic economic plantwide control design procedure
Lecture 38 - Ethyl benzene process case study
Lecture 39 - C4 isomerization process revisited
Lecture 40 - Contrasting conventional and top-down approach
Lecture 41 - Cumene process plantwide control

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NPTEL Video Course - Chemical Engineering - NOC:Thermodynamics Of Fluid Phase Equilibria

Subject Co-ordinator - Dr. Jayant K. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review - 1
Lecture 2 - Review - Temperature and Pressure
Lecture 3 - Review - Energy Conservation
Lecture 4 - Properties - Part 1
Lecture 5 - Properties - Part 2
Lecture 6 - Mass-energy analysis of open system
Lecture 7 - Energy analysis of closed system
Lecture 8 - The Second Law of Thermodynamics
Lecture 9 - Entropy
Lecture 10 - Thermodynamic Calculus - 1
Lecture 11 - Thermodynamic Calculus - 2
Lecture 12 - Thermodynamic Calculus - 3
Lecture 13 - Thermodynamic Calculus - 4
Lecture 14 - Legendre Transformation and Free-energy
Lecture 15 - Criteria for phase equilibria
Lecture 16 - Maxwell Relation
Lecture 17 - Stability Criteria
Lecture 18 - Thermodynamics of phase equilibrium
Lecture 19 - Chemical potential and fugacity
Lecture 20 - General discussion on fugacity
Lecture 21 - Ideal Gas Mixture - Part 1
Lecture 22 - Ideal Gas Mixture - Part 2
Lecture 23 - Partial Molar Properties
Lecture 24 - Partial Molar Properties from experimental data
Lecture 25 - Thermodynamics properties from volumetric data - 1
Lecture 26 - Thermodynamics properties from volumetric data - 2
Lecture 27 - Fugacity of pure liquids and solids
Lecture 28 - Thermodynamics properties from volumetric data
Lecture 29 - Approaches to phase equilibria calculation

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Lecture 30 - Traditional Approaches to phase equilibria calculations
Lecture 31 - Algorithms for vapor-liquid equilibria
Lecture 32 - Probability and Multiplicity
Lecture 33 - Multiplicity and maximising the multiplicity
Lecture 34 - Introduction to statistical mechanics
Lecture 35 - Partition function for independent particles
Lecture 36 - Lecture 36
Lecture 37 - Models of Molecular Pair Potentials
Lecture 38 - Molecular Theory of Corresponding States
Lecture 39 - Molecular Interactions in Dense Fluid Media
Lecture 40 - Models for Electrolyte Systems
Lecture 41 - Membrane Osmometry
Lecture 42 - Fugacity of liquid mixture - 1
Lecture 43 - Fugacity of liquid mixture - 2
Lecture 44 - Models for fugacity of liquid mixtures - 1
Lecture 45 - Models for fugacity of liquid mixtures - 2
Lecture 46 - Examples of Fugacity of liquids
Lecture 47 - Stability of the Fluid Phases
Lecture 48 - Theories of Solution - I
Lecture 49 - Theories of Solution - II
Lecture 50 - Polymer Solutions
Lecture 51 - Example Problems on Polymer Solutions

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Engineering Thermodynamics (2019)

Subject Co-ordinator - Dr. Jayant K. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Measurability and controllability of energy
Lecture 3 - Postulates of thermodynamics - I
Lecture 4 - Postulates of thermodynamics - II
Lecture 5 - Definition of intensive variables and driving forces for temperature and pressure flow
Lecture 6 - Driving force for the matter flow
Lecture 7 - Basic properties, phase diagram, and thermodynamic table
Lecture 8 - Work, and heat
Lecture 9 - First law of thermodynamics for closed system
Lecture 10 - First law of thermodynamics
Lecture 11 - First law of thermodynamics for open system
Lecture 12 - First law of thermodynamics
Lecture 13 - The second law of the thermodynamics
Lecture 14 - Carnot cycle and thermodynamic temperature
Lecture 15 - The concept of entropy
Lecture 16 - Maximum work and entropy of ideal gas
Lecture 17 - Power cycles and examples
Lecture 18 - Mathematical properties of fundamental equations
Lecture 19 - Generalized thermodynamic potential - I
Lecture 20 - Generalized thermodynamic potential - II
Lecture 21 - Multivariable Calculus
Lecture 22 - Maxwell's relations and examples
Lecture 23 - Jacobian method and its applications
Lecture 24 - Equilibrium and stability - I
Lecture 25 - Equilibrium and stability - II
Lecture 26 - Stability criteria
Lecture 27 - Intrinsic stability of thermodynamic system
Lecture 28 - Phase transitions
Lecture 29 - Clapeyron Equation and Vapour Pressure Correlations

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Lecture 30 - Equation of state
Lecture 31 - Equation of state (Continued...)
Lecture 32 - Repulsive Interaction
Lecture 33 - Fugacity
Lecture 34 - Thermodynamics of mixtures
Lecture 35 - Partial molar properties and examples
Lecture 36 - Examples of partial molar properties for real processes
Lecture 37 - Obtaining the partial molar properties from experimental data
Lecture 38 - Partial molar properties of ideal gas mixtures
Lecture 39 - Chemical potential of ideal gas mixtures
Lecture 40 - Fugacity coefficient in terms of measurable properties
Lecture 41 - Fugacity coefficient for mixtures
Lecture 42 - Fugacity coefficient for ideal mixtures
Lecture 43 - Activity coefficient for mixtures
Lecture 44 - Gibbs - Duhem relations and its impacts on the activity
Lecture 45 - Excess Gibbs free energy model - I
Lecture 46 - Two suffix Margules equation
Lecture 47 - Excess Gibbs free energy model - II
Lecture 48 - Vapor Liquid Equilibria
Lecture 49 - Vapor Liquid Equilibria (examples)
Lecture 50 - Vapor Liquid Equilibria (non-ideal mixtures - I)
Lecture 51 - Vapor Liquid Equilibria (non-ideal mixtures - II)
Lecture 52 - Azeotropes
Lecture 53 - Azeotrope (binary mixture)
Lecture 54 - Liquid-Liquid equilibria - 1
Lecture 55 - liquid-liquid equilibria (Continued...) and solid-liquid equilibria
Lecture 56 - Solid-liquid equilibria (Continued...)
Lecture 57 - Solid-liquid equilibria examples and properties
Lecture 58 - Examples of boiling point elevation
Lecture 59 - Solubility of gases in the liquid
Lecture 60 - Chemical reaction equilibria - I
Lecture 61 - Chemical reaction equilibria - II
Lecture 62 - Chemical reaction equilibria - III
Lecture 63 - Chemical reaction equilibria - IV

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NPTEL Video Course - Chemical Engineering - NOC:Methods of Adhesion Measurement for Pressure Sensitive Adhesi

Subject Co-ordinator - Prof. Animangsu Ghatak

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Strain and Stress Equilibrium
Lecture 2 - Introduction of Strain and Stress Equilibrium (Continued...)
Lecture 3 - Stress-Strain Relation
Lecture 4 - Plane Strain and Plane Stress Approximations
Lecture 5 - Introduction to Contact Mechanics
Lecture 6 - Loading on Elastic Half-Space
Lecture 7 - Distributed Normal Load and Shear Load on an elastic half space
Lecture 8 - Uniformly Distributed normal load on an elastic half space
Lecture 9 - Indentation on an elastic half-space using a curved bottom punch
Lecture 10 - Spatially varying normal load on an elastic half-space
Lecture 11 - Axi-symmetric loading on an elastic half space
Lecture 12 - Axi-symmetric loading on an elastic half space (Continued...)
Lecture 13 - Axi-symmetric loading on an elastic half space (Continued...)
Lecture 14 - Uniform loading on a triangular area of contact
Lecture 15 - Hertzian Mechanics
Lecture 16 - Hertzian Mechanics (Continued...)
Lecture 17 - Concepts of Surface and interfacial energy
Lecture 18 - Estimation of Surface and interfacial energy
Lecture 19 - Estimation of Surface and interfacial energy (Continued...)
Lecture 20 - Estimation of Surface and interfacial energy (Continued...)
Lecture 21 - Surface tension of liquid using Young's Equation
Lecture 22 - Indentation of an elastic half space with interaction
Lecture 23 - JKR contact mechanics between two spheres with adhesion
Lecture 24 - JKR contact mechanics between two spheres with adhesion (Continued...)
Lecture 25 - JKR contact mechanics between two spheres with adhesion (Continued...)
Lecture 26 - JKR contact mechanics between two cylinders
Lecture 27 - JKR contact mechanics between two cylinders (Continued...)
Lecture 28 - Estimation of adhesion hysteresis using rolling contact mechanics
Lecture 29 - Estimation of adhesion hysteresis using rolling contact mechanics (Continued...)

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Lecture 30 - Adhesion of a rigid punch with convex head on an elastic half-space
Lecture 31 - Adhesion of a rigid punch with convex head on an elastic half-space (Continued...)
Lecture 32 - Indentation of an elastic half space using a concave indenter
Lecture 33 - Indentation of an elastic half space using a concave indenter: Comparison with a flat plate inde
Lecture 34 - Numerical Problems on Indentation of an elastic half space using a concave indenter
Lecture 35 - Indentation of an elastic half space using a concave indenter having general ellipsoidal shape:
Lecture 36 - Multiplicity of indenters / Contact Area splitting: Adhesion between two rigid spheres and Effec
Lecture 37 - JKR vs. DMT model
Lecture 38 - Numerical Problems on JKR vs. DMT model
Lecture 39 - Thin, elastic film sandwiched between two rigid parallel plates
Lecture 40 - Thin, elastic film sandwiched between two rigid parallel plates (Continued...)
Lecture 41 - Thin, elastic film sandwiched between two rigid parallel plates (Continued...)
Lecture 42 - Estimation of load required to pull a rigid plate from a thin, elastic adhesive bonded system
Lecture 43 - Estimation of load required to pull a rigit plate from a thin, elastic adhesive bonded system (C
Lecture 44 - A thin elastic adhesive sandwiched between two parallel plates (perfect slippage at interface be
Lecture 45 - A thin elastic adhesive sandwiched between two parallel disks (perfect slippage at interface bet
Lecture 46 - Adhesive layer sandwiched between two parallel disks
Lecture 47 - Peel experiment
Lecture 48 - Peel experiment (Continued...)
Lecture 49 - Bending of thin plate
Lecture 50 - Bending of thin plate (Continued...)
Lecture 51 - Lift-off experiment for measuring adhesion strength
Lecture 52 - Lift-off experiment for measuring adhesion strength (Continued...)
Lecture 53 - Lift-off experiment for measuring adhesion strength (Continued...)
Lecture 54 - Physical Mechanisms of Enhancing Adhesion without using Viscoelastic Effect
Lecture 55 - Physical Mechanisms of Enhancing Adhesion without using Viscoelastic Effect (Continued...)
Lecture 56 - Adhesive Layer with Spatially varying Thickness and Modulus
Lecture 57 - Adhesion of Viscoelastic Spheres
Lecture 58 - Adhesion of Vistoelastic Spheres (Continued...)
Lecture 59 - Adhesion on Rough Surface
Lecture 60 - Adhesion on a Randomly Rough Surface and Summary of the Course content covered

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NPTEL Video Course - Chemical Engineering - Biochemical Engineering

Subject Co-ordinator - Dr. Saikat Chakraborty, Dr. Rintu Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Biology & Biotechnology
Lecture 2 - Glimpses of Microbial World - Bacteria
Lecture 3 - Virus and Cell Organelles
Lecture 4 - Carbohydrate
Lecture 5 - Nucleic Acid
Lecture 6 - Lipids
Lecture 7 - Proteins
Lecture 8 - Biochemistry & Thermodynamics of Enzymes
Lecture 9 - Enzyme Kinetics
Lecture 10 - Regulation of Enzyme Activity
Lecture 11 - Regulation of Enzyme Activity
Lecture 12 - Effects of Substrate and Inhibition, pH and Temperature on Enzyme Activity
Lecture 13 - Immobilized Enzymes
Lecture 14 - Immobilized Enzymes (Continued...)
Lecture 15 - Interphase Mass Transfer and Reaction in Immobilized Enzymes
Lecture 16 - Interphase Mass Transfer and Reaction in Immobilized Enzymes (Continued...)
Lecture 17 - Effectiveness Factor in Immobilized Enzymes
Lecture 18 - Bioenergetics and Glycolysis
Lecture 19 - TCA Cycle
Lecture 20 - Electron Transport Chain & Oxidative Phosphorylation
Lecture 21 - Pentose Phosphate Pathways Glycogenesis & Glycogenolysis
Lecture 22 - Urea Cycle, Gluconeogenesis and Glyoxalate Cycle
Lecture 23 - Microbial Growth
Lecture 24 - Effect of Mass Transfer on Microbial & Fungal Growth
Lecture 25 - Effect of Multiple Substrates and Inhibition on Microbial Growth
Lecture 26 - Design of Bioreactors
Lecture 27 - Design of Chemostats
Lecture 28 - Stability of Bioreactors
Lecture 29 - Stability of Bioreactors (Continued...)

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Lecture 30 - Introduction to Receptor - Ligand Binding
Lecture 31 - Effects of Ligand Depletion and Multiple Receptors on Binding Kinetics
Lecture 32 - Effects of Ligand Depletion and Multiple Receptors on Binding Kinetics (Continued...)
Lecture 33 - Receptors-Mediated Endocytosis
Lecture 34 - Kinetics of Receptor-Mediated Endocytosis
Lecture 35 - General Model for Receptor-Mediated Endocytosis
Lecture 36 - Multiple Interacting Microbial Population
Lecture 37 - Manufacture of Biochemicals
Lecture 38 - Manufacture of Biochemicals (Continued...) & Strategies for Biomolecules Separation
Lecture 39 - Strategies for Biomolecules Separation (Continued...)
Lecture 40 - Strategies for Biomolecules Separation (Continued...)

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NPTEL Video Course - Chemical Engineering - Microscale Transport Processes

Subject Co-ordinator - Dr. Somnath Ganguly, Prof. S. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Lab on Chip
Lecture 4 - Lab on Chip (Continued...)
Lecture 5 - Microscale manufacturing practices
Lecture 6 - Photolithography
Lecture 7 - Photolithography (Continued...)
Lecture 8 - Deposition
Lecture 9 - Plastic microfluidic devices
Lecture 10 - Mixing
Lecture 11 - Micro Heat Pipes
Lecture 12 - Mixing (Continued...)
Lecture 13 - Mixing (Continued...)
Lecture 14 - Micro Heat Pipes (Continued...)
Lecture 15 - Mixing (Continued...)
Lecture 16 - Dispersion
Lecture 17 - Dispersion (Continued...)
Lecture 18 - Dispersion (Continued...)
Lecture 19 - Electrowetting
Lecture 20 - Electro osmosis
Lecture 21 - Electrowetting (Continued...)
Lecture 22 - Electro osmosis (Continued...)
Lecture 23 - Dielectrophoresis
Lecture 24 - Dielectrophoresis (Continued...)
Lecture 25 - Dielectrophoresis (Continued...)
Lecture 26 - Scaling dimension and issues
Lecture 27 - Slip flow
Lecture 28 - Microstructured reactor
Lecture 29 - Immiscible flow in microchannel

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Lecture 30 - Immiscible flow in microchannel (Continued...)
Lecture 31 - Immiscible flow in microchannel (Continued...)
Lecture 32 - Scaling dimension and issues (Continued...)
Lecture 33 - Immiscible flow in microchannel (Continued...)
Lecture 34 - Plastic device making
Lecture 35 - Transport processes and their descriptions
Lecture 36 - Convective fluid dynamics in microchannels
Lecture 37 - Microfluidic networks
Lecture 38 - Electrohydrodynamic atomization
Lecture 39 - Electrohydrodynamic atomization (Continued...)
Lecture 40 - Interfacial phenomena in thin liquid films

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NPTEL Video Course - Chemical Engineering - Multiphase Flow

Subject Co-ordinator - Prof. P.K. Das, Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Estimation of Flow Patterns
Lecture 3 - Estimation of Flow Patterns (Continued...)
Lecture 4 - Flow Pattern Maps Fascinating Taylor Bubbles
Lecture 5 - Definitions and Common Terminologies
Lecture 6 - Definitions and Common Terminologies (Continued...)
Lecture 7 - Simple Analytical Models
Lecture 8 - The Homogeneous Flow Theory
Lecture 9 - The Homogeneous Flow Theory (Continued...)
Lecture 10 - Compressible Flow A Recapitulation
Lecture 11 - Compressible Flow A Recapitulation (Continued...)
Lecture 12 - Choked Flow Condition for Homogeneous Flow
Lecture 13 - Drift Flux Model
Lecture 14 - Drift Flux Model (Continued...)
Lecture 15 - Drift Flux Model (Continued...)
Lecture 16 - Drift Flux Model (Continued...)
Lecture 17 - Separated Flow Model
Lecture 18 - Separated Flow Model (Continued...)
Lecture 19 - Separated Flow Model (Continued...)
Lecture 20 - Separated Flow Model - Condition of Choking
Lecture 21 - Separated Flow Model - Condition of Choking (Continued...)
Lecture 22 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction
Lecture 23 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction (Continued...)
Lecture 24 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction (Continued...)
Lecture 25 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction (Continued...)
Lecture 26 - Analysis of Specific Flow Regimes
Lecture 27 - Analysis of Specific Flow Regimes (Continued...)
Lecture 28 - Analysis of Specific Flow Regimes - Slug Flow (Continued...)
Lecture 29 - Two Phase Flow with Phase Change - An Introduction to Boiling Heat Transfer

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Lecture 30 - Bubble Growth
Lecture 31 - Different Types of Nucleation
Lecture 32 - Ibullition from Hot Surfaces
Lecture 33 - Cycle of Bubble Growth and Departure
Lecture 34 - Heat Transfer in Different Regimes of Boiling
Lecture 35 - Heat Transfer in Different Regimes of Boiling (Continued...)
Lecture 36 - Critical Heat Flux, Film Boiling
Lecture 37 - Measurement Techniques for Two Phase flow Parameters
Lecture 38 - Measurement Techniques for Two Phase flow Parameters - Void Fraction Measurement
Lecture 39 - Measurement Techniques for Two Phase flow Parameters - Void Fraction Measurement (Continued...)
Lecture 40 - Measurement Techniques for Two Phase flow Parameters - Estimation of Flow Patterns

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NPTEL Video Course - Chemical Engineering - Novel Separation Processes

Subject Co-ordinator - Prof. S. De

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Separation Processes
Lecture 2 - Identification of Novel Separation Processes
Lecture 3 - Membrane Separation Processes
Lecture 4 - Membrane Separation Processes (Continued...1)
Lecture 5 - Membrane Separation Processes (Continued...2)
Lecture 6 - Membrane Separation Processes (Continued...3)
Lecture 7 - Membrane Separation Processes (Continued...4)
Lecture 8 - Membrane Separation Processes (Continued...5)
Lecture 9 - Membrane Separation Processes (Continued...6)
Lecture 10 - Membrane Separation Processes (Continued...7)
Lecture 11 - Membrane Separation Processes (Continued...8)
Lecture 12 - Membrane Separation Processes (Continued...9)
Lecture 13 - Membrane Separation Processes (Continued...10)
Lecture 14 - Membrane Separation Processes (Continued...11)
Lecture 15 - Membrane Separation Processes (Continued...12)
Lecture 16 - Membrane Separation Processes (Continued...13)
Lecture 17 - Membrane Separation Processes (Continued...14)
Lecture 18 - Membrane Separation Processes (Continued...15)
Lecture 19 - Membrane Separation Processes (Continued...16)
Lecture 20 - Membrane Separation Processes (Continued...17)
Lecture 21 - Membrane Separation Processes (Continued...18)
Lecture 22 - External Field Induced Membrane Separation Processes
Lecture 23 - External Field Induced Membrane Separation Processes (Continued...1)
Lecture 24 - External Field Induced Membrane Separation Processes (Continued...2)
Lecture 25 - External Field Induced Membrane Separation Processes (Continued...3)
Lecture 26 - External Field Induced Membrane Separation Processes (Continued...4)
Lecture 27 - Gas Separation
Lecture 28 - Gas Separation (Continued...)
Lecture 29 - Surfactant Based Separation Processes

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Lecture 30 - Surfactant Based Separation Processes (Continued...)
Lecture 31 - Micellar Enhanced Ultrafiltration
Lecture 32 - Micellar Enhanced Ultrafiltration (Continued...)
Lecture 33 - Liquid Membranes
Lecture 34 - Liquid Membranes (Continued...)
Lecture 35 - Centrifugal Separation Processes
Lecture 36 - Chromatographic Separation Processes
Lecture 37 - Chromatographic Separation Processes (Continued...)
Lecture 38 - Ion Exchange Processes
Lecture 39 - Electrophoretic Separation Methods
Lecture 40 - Electrophoretic Separation Methods (Continued...)
Lecture 41 - Supercritical Fluid Extraction

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NPTEL Video Course - Chemical Engineering - Process Control and Instrumentation

Subject Co-ordinator - Dr. D. Sarkar, Dr. A.K. Jana

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Process Control
Lecture 2 - Introduction to Process Control (Continued...)
Lecture 3 - Mathematical Modeling (Continued...1)
Lecture 4 - Mathematical Modeling (Continued...2)
Lecture 5 - Mathematical Modeling (Continued...3)
Lecture 6 - Dynamic Behavior of Chemical Processes
Lecture 7 - Dynamic Behavior of Chemical Processes (Continued...1)
Lecture 8 - Dynamic Behavior of Chemical Processes (Continued...2)
Lecture 9 - Dynamic Behavior of Chemical Processes (Continued...3)
Lecture 10 - Dynamic Behavior of Chemical Processes (Continued...4)
Lecture 11 - Dynamic Behavior of Chemical Processes (Continued...5)
Lecture 12 - Dynamic Behavior of Chemical Processes (Continued...6)
Lecture 13 - Dynamic Behavior of Chemical Processes (Continued...7)
Lecture 14 - Dynamic Behavior of Chemical Processes (Continued...8)
Lecture 15 - Feedback Control Schemes
Lecture 16 - Feedback Control Schemes (Continued...1)
Lecture 17 - Feedback Control Schemes (Continued...2)
Lecture 18 - Feedback Control Schemes (Continued...3)
Lecture 19 - Feedback Control Schemes (Continued...4)
Lecture 20 - Feedback Control Schemes (Continued...5)
Lecture 21 - Feedback Control Schemes (Continued...6)
Lecture 22 - Feedback Control Schemes (Continued...7)
Lecture 23 - Feedback Control Schemes (Continued...8)
Lecture 24 - Feedback Control Schemes (Continued...9)
Lecture 25 - Feedback Control Schemes (Continued...10)
Lecture 26 - Feedback Control Schemes (Continued...11)
Lecture 27 - Feedback Control Schemes (Continued...12)
Lecture 28 - Feedback Control Schemes (Continued...13)
Lecture 29 - Feedback Control Schemes (Continued...14)

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Lecture 30 - Advanced Control Schemes
Lecture 31 - Advanced Control Schemes (Continued...1)
Lecture 32 - Advanced Control Schemes (Continued...2)
Lecture 33 - Advanced Control Schemes (Continued...3)
Lecture 34 - Advanced Control Schemes (Continued...4)
Lecture 35 - Instrumentation
Lecture 36 - Instrumentation
Lecture 37 - Instrumentation
Lecture 38 - Instrumentation
Lecture 39 - Instrumentation
Lecture 40 - Instrumentation
Lecture 41 - Transducer Elements
Lecture 42 - Pressure Measurement
Lecture 43 - Pressure Measurement (Continued...1)
Lecture 44 - Pressure Measurement (Continued...2)

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NPTEL Video Course - Chemical Engineering - Instability and Patterning of Thin Polymer Films

Subject Co-ordinator - Dr. R. Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Some Fundamental Surface Related Concepts - I
Lecture 4 - Surface Tension (in terms of molecular interactions)
Lecture 5 - Effect Surface Tension
Lecture 6 - Young Laplace Equation
Lecture 7 - Rayleish Instability
Lecture 8 - Meso Scale Fabrication Approaches
Lecture 9 - Photo Lithography - I
Lecture 10 - Photo Lithography - II
Lecture 11 - Photo Lithography - III
Lecture 12 - Photo Lithography - IV
Lecture 13 - Photo Lithography - V
Lecture 14 - Nano Imprint Lithography
Lecture 15 - Nano Imprint Lithography (Continued...)
Lecture 16 - Soft Lithography - I
Lecture 17 - Soft Lithography - II
Lecture 18 - Soft Lithography - III
Lecture 19 - Soft Lithography - IV
Lecture 20 - Soft Lithography - V
Lecture 21 - Soft Lithography - VI
Lecture 22 - Atomic Force Microscope - I
Lecture 23 - Atomic Force Microscope - II
Lecture 24 - Atomic Force Microscope - III
Lecture 25 - Atomic Force Microscope - IV
Lecture 26 - Atomic Force Microscope - V
Lecture 27 - Intermolecular Forces between Particles and Surfaces - I
Lecture 28 - Intermolecular Forces between Particles and Surfaces - II
Lecture 29 - Intermolecular Forces between Particles and Surfaces - III

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Lecture 30 - Intermolecular Forces between Particles and Surfaces - IV
Lecture 31 - Spontaneous instability and dwetting of thin polymer film - I
Lecture 32 - Spontaneous instability and dwetting of thin polymer film - II
Lecture 33 - Spontaneous instability and dwetting of thin polymer film - III
Lecture 34 - Spontaneous instability and dwetting of thin polymer film - IV
Lecture 35 - Spontaneous instability and dwetting of thin polymer film - V
Lecture 36 - Spontaneous instability and dwetting of thin polymer film - VI
Lecture 37 - Spontaneous instability and dwetting of thin polymer film - VII
Lecture 38 - Template Guided Dewetting
Lecture 39 - Elastic Contact Instability and Lithography
Lecture 40 - Gradient Surfaces

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NPTEL Video Course - Chemical Engineering - Advanced Mathematical Techniques in Chemical Engineering

Subject Co-ordinator - Prof. S. De

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to vector space
Lecture 2 - Introduction to vector space (Continued...)
Lecture 3 - Onto, into, one to one function
Lecture 4 - Vectors
Lecture 5 - Vectors (Continued...)
Lecture 6 - Contraction Mapping
Lecture 7 - Contraction Mapping (Continued...)
Lecture 8 - Matrix, Determinant
Lecture 9 - Eigenvalue Problem in Discrete Domain
Lecture 10 - Eigenvalue Problem in Discrete Domain (Continued...)
Lecture 11 - Eigenvalue Problem in Discrete Domain (Continued...)
Lecture 12 - Eigenvalue Problem in Discrete Domain (Continued...)
Lecture 13 - Stability Analysis
Lecture 14 - Stability Analysis (Continued...)
Lecture 15 - Stability Analysis (Continued...)
Lecture 16 - More Examples
Lecture 17 - Partial Differential Equations
Lecture 18 - Partial Differential Equations (Continued...)
Lecture 19 - Eigenvalue Problem in Continuous Domain
Lecture 20 - Special ODEs
Lecture 21 - Adjoint Operator
Lecture 22 - Theorems of Eigenvalues and Eigenfunction
Lecture 23 - Solution PDE
Lecture 24 - Solution of Parabolic PDE
Lecture 25 - Solution of Parabolic PDE
Lecture 26 - Solution of Higher Dimensional PDEs
Lecture 27 - Solution of Higher Dimensional PDEs (Continued...)
Lecture 28 - Four Dimensional Parabolic PDE
Lecture 29 - Solution of Elliptic and Hyperbolic PDE

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Lecture 30 - Solution of Elliptic and Hyperbolic PDE (Continued...)
Lecture 31 - PDE in Cylindrical and Spherical Coordinate
Lecture 32 - Solution of non-homogeneous PDE
Lecture 33 - Solution of non-homogeneous PDE (Continued...)
Lecture 34 - Solution of non-homogeneous Parabolic PDE
Lecture 35 - Solution of non-homogeneous Elliptic PDE
Lecture 36 - Solution of non-homogeneous Elliptic PDE (Continued...)
Lecture 37 - Similarity Solution
Lecture 38 - Similarity Solution (Continued...)
Lecture 39 - Integral Method
Lecture 40 - Laplace Transform
Lecture 41 - Fourier Transform

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Process Modeling in Membrane Separation Proce

Subject Co-ordinator - Prof. S. De

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Separation Processes and Introduction of Membrane System
Lecture 2 - Fundamentals of Separation Processes and Introduction of Membrane System (Continued...)
Lecture 3 - Fundamentals of Separation Processes and Introduction of Membrane System (Continued...)
Lecture 4 - Fundamentals of Separation Processes and Introduction of Membrane System (Continued...)
Lecture 5 - Modeling of Reverse Osmosis
Lecture 6 - Concentration Polarization
Lecture 7 - Osmotic Pressure Controlling Filtration
Lecture 8 - Osmotic Pressure Controlling Filtration (Continued...)
Lecture 9 - Osmotic Pressure Controlling Filtration (Continued...)
Lecture 10 - Osmotic Pressure Controlling Filtration (Continued...)
Lecture 11 - Osmotic Pressure Controlling Filtration (Continued...)
Lecture 12 - Osmotic Pressure Controlling Filtration (Continued...)
Lecture 13 - Modeling of Gel Layer Controlling Filtration
Lecture 14 - Modeling of Gel Layer Controlling Filtration (Continued...)
Lecture 15 - Modeling of Gel Layer Controlling Filtration (Continued...) and Resistance in Series Models
Lecture 16 - Design of Membrane Module
Lecture 17 - Design of Membrane Module (Continued...)
Lecture 18 - Design of Membrane Module (Continued...)
Lecture 19 - Modeling of Dialysis
Lecture 20 - Modeling of Dialysis (Continued...)

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NPTEL Video Course - Chemical Engineering - NOC:Soft Nano Technology

Subject Co-ordinator - Dr. R. Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Introduction - 2
Lecture 3 - Introduction - 3
Lecture 4 - Fundamental Concepts Related to Surface Tension - 1
Lecture 5 - Fundamental Concepts Related to Surface Tension - 2
Lecture 6 - Fundamental Concepts Related to Surface Tension - 3
Lecture 7 - Fundamental Concepts Related to Surface Tension - 4
Lecture 8 - Components of Surface Tension - 1
Lecture 9 - Components of Surface Tension - 2
Lecture 10 - Sell Assembly of Surfactant Molecules
Lecture 11 - Laplace Pressure
Lecture 12 - Photo Lithography - 1
Lecture 13 - Photo Lithography - 2
Lecture 14 - Photo Lithography - 3
Lecture 15 - Photo Lithography - 4
Lecture 16 - Photo Lithography - 5
Lecture 17 - Photo Lithography - 6
Lecture 18 - Soft Lithography - I
Lecture 19 - Soft Lithography - 2
Lecture 20 - Soft Lithography - 3
Lecture 21 - Soft Lithography - 4
Lecture 22 - Soft Lithography - 5
Lecture 23 - Soft Lithography - 6
Lecture 24 - Atomic Force Microscope - 1
Lecture 25 - Atomic Force Microscope - 2
Lecture 26 - Atomic Force Microscope - 3
Lecture 27 - Atomic Force Microscope - 4
Lecture 28 - Atomic Force Microscope - 5
Lecture 29 - Atomic Force Microscope - 6

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Lecture 30 - Dewetting - 1
Lecture 31 - Dewetting - 2
Lecture 32 - VdW Interaction Between Two Surfaces
Lecture 33 - Interaction Between Two Surfaces - 2
Lecture 34 - Interaction Between Two Surfaces - 3
Lecture 35 - Dewetting - 3
Lecture 36 - Pattern Directed Dewetting - I
Lecture 37 - Pattern Directed Dewetting - II
Lecture 38 - Spin Dewetting
Lecture 39 - Elastic Contact Instability - I
Lecture 40 - Elastic Contact Instability - II

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NPTEL Video Course - Chemical Engineering - NOC:Adiabatic Two-Phase Flow and Flow Boiling in Microchannel

Subject Co-ordinator - Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Introduction to Multiphase Flow
Lecture 2 - Brief Introduction to Multiphase Flow (Continued...)
Lecture 3 - Two Phase Flow through Micro Channels
Lecture 4 - Two Phase Flow through Micro Channels (Continued...)
Lecture 5 - Criteria for Confinement for in Case of Two Phase Flow
Lecture 6 - Pertinent Dimensionless Numbers in Two Phase
Lecture 7 - Flow Pattern Maps for Milli and Micro Systems
Lecture 8 - Pattern Transition from Energy Minimisation Principle
Lecture 9 - Experimental Identification of Flow Regimes
Lecture 10 - Experimental Identification of Flow Regimes (Continued...)
Lecture 11 - Flow Regimes and Void Fraction Estimation
Lecture 12 - Influence of Operating Parameter on Flow Patterns
Lecture 13 - Influence of Operating Parameter on Flow Patterns (Continued...)
Lecture 14 - Influence of Operating Parameter on Flow Patterns (Continued...)
Lecture 15 - Influence of Operating Parameter on Flow Patterns (Continued...)
Lecture 16 - Void Fraction Characteristic Mini and Micro Channel
Lecture 17 - Void Fraction and Pressure Drop in Reduced Dimensions - Experimental results
Lecture 18 - Void Fraction and Pressure Drop in Reduced Dimensions - Experimental results (Continued...)
Lecture 19 - Theoretical Analysis of Two Phase Flow in Reduced Dimensions
Lecture 20 - Theoretical Analysis of Two Phase Flow in Reduced Dimensions (Continued...)
Lecture 21 - Flow Pattern based Analysis in Micro Systems - Drift Flux Model
Lecture 22 - Flow Pattern based Modelling - Slug Flow Model
Lecture 23 - Flow Boiling in Microchannels
Lecture 24 - Tutorial - I
Lecture 25 - Tutorial - II

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NPTEL Video Course - Chemical Engineering - NOC:Phase Equilibrium Thermodynamics

Subject Co-ordinator - Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - First Law of Thermodynamics
Lecture 4 - Second Law of Thermodynamics
Lecture 5 - Second Law of Thermodynamics (Continued...)
Lecture 6 - Entropy Change during Spontaneous Processes
Lecture 7 - Criteria of Spontaneity
Lecture 8 - Criteria of Spontaneity (Continued...)
Lecture 9 - Thermodynamic Network
Lecture 10 - Thermodynamic Network (Continued...)
Lecture 11 - Tutorial 1
Lecture 12 - Gibbs free energy as a function of temperature and pressure
Lecture 13 - P-v-T behaviour of gases
Lecture 14 - P-v-T behaviour (Continued...)
Lecture 15 - P-v-T behaviour (Continued...)
Lecture 16 - P-v-T behaviour (Continued...)
Lecture 17 - Tutorial 2
Lecture 18 - Property estimation from P-v-T behaviour
Lecture 19 - Property estimation (Continued...)
Lecture 20 - Concept of chemical potential
Lecture 21 - Chemical potential (Continued...)
Lecture 22 - Homogeneous open systems
Lecture 23 - Homogeneous open systems (Continued...)
Lecture 24 - Heterogeneous Closed Systems
Lecture 25 - Tutorial 3
Lecture 26 - Concept of fugacity
Lecture 27 - Fugacity (Continued...)
Lecture 28 - Estimation of fugacity coefficients
Lecture 29 - Fugacity of condensed phase

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Lecture 30 - Mixtures
Lecture 31 - Mixtures (Continued...)
Lecture 32 - Tutorial 4
Lecture 33 - Partial molar properties
Lecture 34 - Partial molar properties (Continued...)
Lecture 35 - Partial molar fugacity
Lecture 36 - Ideal solutions
Lecture 37 - Ideal solutions (Continued...)
Lecture 38 - Ideal solutions (Continued...)
Lecture 39 - Ideal solutions (Continued...)
Lecture 40 - Non-ideal solutions
Lecture 41 - Non-ideal solutions (Continued...)
Lecture 42 - Non-ideal solutions (Continued...)
Lecture 43 - Non-ideal solutions (Continued...)
Lecture 44 - Non-ideal solutions (Continued...)
Lecture 45 - Deviations from ideal dilute solutions
Lecture 46 - Tutorial 5
Lecture 47 - Tutorial 6
Lecture 48 - Thermodynamics Consistency Test of VLE Data
Lecture 49 - Retrograde Condensation
Lecture 50 - Partial and Complete Immiscibility of Liquid Mixtures
Lecture 51 - Partial and Complete Immiscibility of Liquid Mixtures (Continued...)
Lecture 52 - Phase Equilibrium for Mass Transfer Processes
Lecture 53 - Control Mass Analysis of Transient process
Lecture 54 - Control Volume Analysis
Lecture 55 - Throttling and problem
Lecture 56 - Tutorial 7
Lecture 57 - First Law for reacting systems
Lecture 58 - Estimation of standard heat of reaction
Lecture 59 - Effect of operating variables on heat of reaction
Lecture 60 - Chemical Reaction Equilibrium
Lecture 61 - Equilibrium constant and its estimation
Lecture 62 - Relation of Equilibrium constant to composition
Lecture 63 - Effect of operating conditions on equilibrium conversion
Lecture 64 - Relation of Equilibrium constant to composition (Continued...)
Lecture 65 - Miscellaneous concepts on Reaction Equilibrium

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NPTEL Video Course - Chemical Engineering - NOC:Transport Phenomena

Subject Co-ordinator - Prof. Sunando Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fourier and Fick's Laws
Lecture 3 - Shell Momentum Balance
Lecture 4 - Example of Shell Momentum Balance
Lecture 5 - Example of Shell Momentum Balance (Continued...)
Lecture 6 - Example of Shell Momentum Balance (Continued...)
Lecture 7 - Example of Shell Momentum Balance (Continued...)
Lecture 8 - Example of Shell Momentum Balance (Continued...)
Lecture 9 - Equations of Change for Isothermal Systems
Lecture 10 - Equations of Change for Isothermal Systems (Continued...)
Lecture 11 - Equations of Change for Isothermal Systems (Continued...)
Lecture 12 - Equations of Change for Isothermal Systems (Continued...)
Lecture 13 - Equations of Change for Isothermal Systems (Continued...)
Lecture 14 - Equations of Change for Isothermal Systems (Continued...)
Lecture 15 - Unsteady Flow
Lecture 16 - Boundary Layers
Lecture 17 - Boundary Layers (Continued...)
Lecture 18 - Boundary Layers (Continued...)
Lecture 19 - Boundary Layers (Continued...)
Lecture 20 - Boundary Layers (Continued...)
Lecture 21 - Boundary Layers (Continued...)
Lecture 22 - Boundary Layers (Continued...)
Lecture 23 - Boundary Layers (Continued...)
Lecture 24 - Boundary Layers (Continued...)
Lecture 25 - Turbulent Boundary Layers
Lecture 26 - Turbulent Boundary Layers (Continued...)
Lecture 27 - Turbulent Boundary Layers (Continued...)
Lecture 28 - Drag
Lecture 29 - Drag (Continued...)

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Lecture 30 - Heat Transfer Basics
Lecture 31 - Heat Transfer Basics (Continued...)
Lecture 32 - 1-D Heat Conduction - Temperature Distributions
Lecture 33 - 1-D Heat Conduction - Shell Heat Balance
Lecture 34 - Shell Heat Balance
Lecture 35 - Viscous Dissipation
Lecture 36 - Transient Conduction
Lecture 37 - Transient Conduction (Continued...)
Lecture 38 - Forced Convection
Lecture 39 - Energy Equation
Lecture 40 - Energy Equation (Continued...)
Lecture 41 - Free Convection
Lecture 42 - Thermal Boundary Layer
Lecture 43 - Mass Transfer
Lecture 44 - Mass Transfer (Continued...)
Lecture 45 - Mass Transfer (Continued...)
Lecture 46 - Mass Transfer (Continued...)
Lecture 47 - Mass Transfer (Continued...)
Lecture 48 - Mass Transfer (Continued...)
Lecture 49 - Mass Transfer (Continued...)
Lecture 50 - Mass Transfer (Continued...)
Lecture 51 - (Lecture Missing)
Lecture 52 - Boundary Layer Similarity
Lecture 53 - Boundary Layer - Analogy
Lecture 54 - Analogy - Tutorial I
Lecture 55 - Analogy - Tutorial II

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Instrumentation

Subject Co-ordinator - Prof. Debasis Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Principles and Representation of Instruments
Lecture 2 - General Principles and Representation of Instruments (Continued...)
Lecture 3 - General Principles and Representation of Instruments (Continued...)
Lecture 4 - General Principles and Representation of Instruments (Continued...)
Lecture 5 - General Principles and Representation of Instruments (Continued...)
Lecture 6 - Performance Characteristics of Instruments and Data Analysis - I
Lecture 7 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)
Lecture 8 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)
Lecture 9 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)
Lecture 10 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)
Lecture 11 - Performance Characteristics of Instruments and Data Analysis - II
Lecture 12 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)
Lecture 13 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)
Lecture 14 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)
Lecture 15 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)
Lecture 16 - Transducer Elements
Lecture 17 - Transducer Elements (Continued...)
Lecture 18 - Transducer Elements (Continued...)
Lecture 19 - Transducer Elements (Continued...)
Lecture 20 - Transducer Elements (Continued...)
Lecture 21 - Pressure Measurement
Lecture 22 - Pressure Measurement
Lecture 23 - Pressure Measurement
Lecture 24 - Pressure Measurement
Lecture 25 - Pressure Measurement
Lecture 26 - High Vacuum Measurement
Lecture 27 - High Vacuum Measurement (Continued...)
Lecture 28 - High Vacuum Measurement (Continued...)
Lecture 29 - High Vacuum Measurement (Continued...)

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Lecture 30 - Pressure Measurement
Lecture 31 - Temperature Measurement
Lecture 32 - Temperature Measurement (Continued...)
Lecture 33 - Temperature Measurement (Continued...)
Lecture 34 - Temperature Measurement (Continued...)
Lecture 35 - Temperature Measurement (Continued...)
Lecture 36 - Temperature Measurement (Continued...)
Lecture 37 - Temperature Measurement (Continued...)
Lecture 38 - Temperature Measurement (Continued...)
Lecture 39 - Temperature Measurement (Continued...)
Lecture 40 - Temperature Measurement (Continued...)
Lecture 41 - Flow Measurement
Lecture 42 - Flow Measurement (Continued...)
Lecture 43 - Flow Measurement (Continued...)
Lecture 44 - Flow Measurement (Continued...)
Lecture 45 - Flow Measurement (Continued...)
Lecture 46 - Level Measurement
Lecture 47 - Level Measurement (Continued...)
Lecture 48 - Level Measurement (Continued...)
Lecture 49 - Level Measurement (Continued...)
Lecture 50 - Level Measurement (Continued...)
Lecture 51 - Miscellaneous Measurements
Lecture 52 - Miscellaneous Measurements
Lecture 53 - Miscellaneous Measurements
Lecture 54 - Miscellaneous Measurements
Lecture 55 - Miscellaneous Measurements
Lecture 56 - Pneumatic Control Valve
Lecture 57 - Pneumatic Control Valve (Continued...)
Lecture 58 - Pneumatic Control Valve (Continued...) and P&ID
Lecture 59 - GATE Questions
Lecture 60 - GATE Questions (Continued...)

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NPTEL Video Course - Chemical Engineering - NOC:Optimization in Chemical Engineering

Subject Co-ordinator - Prof. Debasis Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization
Lecture 2 - Introduction to Optimization (Continued...)
Lecture 3 - Introduction to Optimization (Continued...)
Lecture 4 - Introduction of Optimization (Continued...)
Lecture 5 - Introduction of Optimization (Continued...)
Lecture 6 - Optimization Problem Formulation
Lecture 7 - Optimization Problem Formulation (Continued...)
Lecture 8 - Optimization Problem Formulation (Continued...)
Lecture 9 - Optimization Problem Formulation (Continued...)
Lecture 10 - Optimization Problem Formulation (Continued...)
Lecture 11 - Basic Concepts of Optimization - I
Lecture 12 - Basic Concepts of Optimization - I (Continued...)
Lecture 13 - Basic Concepts of Optimization - I (Continued...)
Lecture 14 - Basic Concepts of Optimization - I (Continued...)
Lecture 15 - Basic Concepts of Optimization - I (Continued...)
Lecture 16 - Basic Concepts of Optimization - II
Lecture 17 - Basic Concepts of Optimization - II (Continued...)
Lecture 18 - Basic Concepts of Optimization - II (Continued...)
Lecture 19 - Basic Concepts of Optimization - II (Continued...)
Lecture 20 - Basic Concepts of Optimization - II (Continued...)
Lecture 21 - Unconstrained Single Variable Optimization
Lecture 22 - Unconstrained Single Variable Optimization
Lecture 23 - Unconstrained Single Variable Optimization
Lecture 24 - Unconstrained Single Variable Optimization
Lecture 25 - Unconstrained Single Variable Optimization
Lecture 26 - Unconstrained Multivariable Optimization
Lecture 27 - Unconstrained Multivariable Optimization
Lecture 28 - Unconstrained Multivariable Optimization
Lecture 29 - Unconstrained Multivariable Optimization

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Lecture 30 - Unconstrained Multivariable Optimization
Lecture 31 - Unconstrained Multivariable Optimization
Lecture 32 - Unconstrained Multivariable Optimization
Lecture 33 - Unconstrained Multivariable Optimization
Lecture 34 - Unconstrained Multivariable Optimization
Lecture 35 - Unconstrained Multivariable Optimization
Lecture 36 - Introduction to Linear Programming
Lecture 37 - Introduction to Linear Programming (Continued...)
Lecture 38 - Introduction to Linear Programming (Continued...)
Lecture 39 - Introduction to Linear Programming (Continued...)
Lecture 40 - Introduction to Linear Programming (Continued...)
Lecture 41 - Linear Programming - The Simplex Method
Lecture 42 - Linear Programming - The Simplex Method (Continued...)
Lecture 43 - Linear Programming - The Simplex Method (Continued...)
Lecture 44 - Linear Programming - The Simplex Method (Continued...)
Lecture 45 - Linear Programming - The Simplex Method (Continued...)
Lecture 46 - Constrained Nonlinear Programming
Lecture 47 - Constrained Nonlinear Programming (Continued...)
Lecture 48 - Constrained Nonlinear Programming (Continued...)
Lecture 49 - Constrained Nonlinear Programming (Continued...)
Lecture 50 - Constrained Nonlinear Programming (Continued...)
Lecture 51 - Applications of Optimization
Lecture 52 - Applications of Optimization (Continued...)
Lecture 53 - Applications of Optimization (Continued...)
Lecture 54 - Applications of Optimization (Continued...)
Lecture 55 - Applications of Optimization (Continued...)
Lecture 56 - Software Tools for Optimization
Lecture 57 - Software Tools for Optimization (Continued...)
Lecture 58 - Software Tools for Optimization (Continued...)
Lecture 59 - Software Tools for Optimization (Continued...)
Lecture 60 - Software Tools for Optimization (Continued...)

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NPTEL Video Course - Chemical Engineering - NOC:Heat Transfer (2018)

Subject Co-ordinator - Prof. Sunando Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Heat Transfer
Lecture 2 - Introduction to Heat Transfer
Lecture 3 - Heat Diffusion Equation
Lecture 4 - Relevant Boundary Conditions in Conduction
Lecture 5 - One Dimensional Steady State Conduction
Lecture 6 - Temperature Distribution in Radial Systems
Lecture 7 - Tutorial Problem on Critical Insulation Thickness
Lecture 8 - Heat Source Systems
Lecture 9 - Tutorial Problems of Heat Generating Systems
Lecture 10 - Transient Conduction
Lecture 11 - Lumped Capacitance (Continued...) and Tutorial Problem
Lecture 12 - Transient heat Conduction
Lecture 13 - Transient Conduction - Heisler Chart
Lecture 14 - Heat Transfer from Extended Surface
Lecture 15 - Fins and General Conduction Analysis
Lecture 16 - Fundamentals of Convection
Lecture 17 - Equations of Change for Non-isothermal Systems
Lecture 18 - Equations of Change for Non-isothermal Systems (Continued...)
Lecture 19 - Tutorial on the Application of Energy Equation
Lecture 20 - Nusselt Number of a heated sphere in Stagnant Air
Lecture 21 - Momentum and Thermal Boundary Layers
Lecture 22 - The Flat Plate in Parallel Flow - Hydrodynamics and Momentum Transfer
Lecture 23 - The Flat Plate in Parallel Flow - Heat Transfer
Lecture 24 - The Effects of Turbulence
Lecture 25 - Turbulent External Flow
Lecture 26 - Heat and Momentum Transfer Analogy
Lecture 27 - Mixed Boundary Layers
Lecture 28 - Tutorial Problem on External Flow and Behavior of Heat Transfer Coefficient
Lecture 29 - Tutorial Problem in External Flow and Convection

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Lecture 30 - Tutorial Problem in External Flow and Convection
Lecture 31 - Tutorial Problem in External Flow and Convection
Lecture 32 - Internal Flow Heat Transfer
Lecture 33 - Internal Flow Heat Transfer (Continued...)
Lecture 34 - Internal Flow Heat Transfer (Continued...)
Lecture 35 - Internal Flow and Heat Transfer (Continued...)
Lecture 36 - Internal Flow and Heat Transfer (Tutorial)
Lecture 37 - Free Convection
Lecture 38 - Heat Exchangers
Lecture 39 - Heat Exchangers
Lecture 40 - Heat Exchangers
Lecture 41 - Tutorial Problems on Heat Exchanger Calculations
Lecture 42 - Tutorial Problem on LMTD and Dirt Factor
Lecture 43 - Epsilon-NTU Method - 1
Lecture 44 - Epsilon-NTU Method - 1 (Continued...)
Lecture 45 - Tutorial Problems on Epsilon - NTU Methods
Lecture 46 - Tutorial Problems on Epsilon - NTU Methods
Lecture 47 - Boiling, Evaporation and Evaporators
Lecture 48 - Radiation - Fundamental Concepts
Lecture 49 - Spectral Blackbody Radiation Intesity and Emissive Power
Lecture 50 - Wein's Law, Stephen Boltzmann Law, Blackbody Radiation Function, Tutorial Problem
Lecture 51 - Kirchhoff's Law
Lecture 52 - Tutorial on Emissivity, Absroptivity and Blackbody Radiation Functions
Lecture 53 - Solar Radiation and the Concept of View Factors
Lecture 54 - Determination of View Factors
Lecture 55 - Radiosity Blackbody Radiation Exchanges, Relevant Problem
Lecture 56 - Network Method for Radiation Exchange in an Enclosure
Lecture 57 - Network Method - Two and Three Zone Enclosures
Lecture 58 - Tutorial Problem on Radiation Exhange using the Network Method
Lecture 59 - Radiation Shields
Lecture 60 - Gaseous Radiation (Participating Medium)

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NPTEL Video Course - Chemical Engineering - NOC:Flow through Porous Media

Subject Co-ordinator - Dr. Somnath Ganguly

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction (Definition Of Porous Media)
Lecture 2 - Introduction (Conceptual Flow Models)
Lecture 3 - Introduction (Applications)
Lecture 4 - Mass Continuity (Introduction)
Lecture 5 - Mass Continuity (Cartesian Coordinates)
Lecture 6 - Mass Continuity (Cylindrical Coordinates)
Lecture 7 - Mass Continuity (Radial Flow)
Lecture 8 - Mass Continuity (Non-Uniform Permeability)
Lecture 9 - Mass Continuity (Continued...)
Lecture 10 - Mass Continuity (Streamlines And Potential Lines)
Lecture 11 - Mass Continuity (Elementary Flow)
Lecture 12 - Mass Continuity (Source/Sink)
Lecture 13 - Mass Continuity (Superposition Of Elementary Flow)
Lecture 14 - Mass Continuity (Superposition Of Elementary Flow) (Continued...)
Lecture 15 - Transport Mechanisms (Introduction)
Lecture 16 - Transport Mechanisms (Combined Mode)
Lecture 17 - Transport Mechanisms (Adsorption/Pore Condensation)
Lecture 18 - Transport Mechanisms (Continued...)
Lecture 19 - Flow Equation (Introduction)
Lecture 20 - Flow Equations (Continued...)
Lecture 21 - Flow Equations (Viscous Flow in Capillary
Lecture 22 - Flow Equations (Packed Bed)
Lecture 23 - Flow Equations (Fluidized Bed)
Lecture 24 - Miscible Displacement (Uniform Velocity Over Capillary Cross-Section)
Lecture 25 - Miscible Displacement (Laminar Flow in Capillary)
Lecture 26 - Miscible Displacement (Movement of Concentration Pulse)
Lecture 27 - Miscible Displacement (Step Change in Concentration)
Lecture 28 - Miscible Displacement (Continued...)
Lecture 29 - Miscible Displacement (Continued...)

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Lecture 30 - Miscible Displacement (Continued...)
Lecture 31 - Miscible Displacement (Continued...)
Lecture 32 - Miscible Displacement (Fractured Porous Media)
Lecture 33 - Miscible Displacement (Viscous Front)
Lecture 34 - Immiscible Flow
Lecture 35 - Immiscible Flow (Continued...)
Lecture 36 - Immiscible Flow (Continued...)
Lecture 37 - Immiscible Flow (Continued...)
Lecture 38 - Immiscible Flow (Continued...)
Lecture 39 - Immiscible Flow (Continued...)
Lecture 40 - Immiscible Flow (Continued...)
Lecture 41 - IMMISCIBLE FLOW (Continued...)
Lecture 42 - Immiscible Flow (Continued...)
Lecture 43 - Immiscible Flow (Continued...)
Lecture 44 - Immiscible Flow (Continued...)
Lecture 45 - Immiscible Flow (Continued...)
Lecture 46 - Immiscible Flow (Continued...)
Lecture 47 - Interception Of Suspended Solids
Lecture 48 - Interception Of Suspended Solids (Continued...)
Lecture 49 - Interception Of Suspended Solids (Continued...)
Lecture 50 - Interception Of Suspended Solids (Continued...)
Lecture 51 - Interception Of Suspended Solids (Continued...)
Lecture 52 - Interception Of Suspended Solids (Continued...)
Lecture 53 - Deformable Porous Media
Lecture 54 - Deformable Porous Media (Continued...)
Lecture 55 - Deformable Porous Media (Continued...)
Lecture 56 - Heat Transfer With Fluid Flow
Lecture 57 - Heat Transfer With Fluid Flow (Continued...)
Lecture 58 - Heat Transfer With Fluid Flow (Continued...)
Lecture 59 - Characterization
Lecture 60 - Characterization (Continued...)

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NPTEL Video Course - Chemical Engineering - NOC:Fundamentals of Particle and Fluid Solid Processing

Subject Co-ordinator - Prof. Arnab Atta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solid particle characterization
Lecture 2 - Solid particle characterization (Continued...)
Lecture 3 - Particle size distribution
Lecture 4 - Particle size distribution (Continued...)
Lecture 5 - Particle size distribution (Continued...)
Lecture 6 - Fluid - particle mechanics
Lecture 7 - Fluid - particle mechanics (Continued...)
Lecture 8 - Fluid - particle mechanics (Continued...)
Lecture 9 - Fluid - particle mechanics (Continued...)
Lecture 10 - Fluid - particle mechanics (Continued...)
Lecture 11 - Fluid - particle mechanics (Continued...)
Lecture 12 - Fluid - particle mechanics (Continued...)
Lecture 13 - Fluid - particle mechanics (Continued...)
Lecture 14 - Fluid - particle mechanics (Continued...)
Lecture 15 - Fluid - particle mechanics (Continued...)
Lecture 16 - Flow through packed beds
Lecture 17 - Flow through packed beds (Continued...)
Lecture 18 - Flow through packed beds (Continued...)
Lecture 19 - Flow through packed beds (Continued...)
Lecture 20 - Flow through packed beds (Continued...)
Lecture 21 - Fluidization
Lecture 22 - Fluidization (Continued...)
Lecture 23 - Fluidization (Continued...)
Lecture 24 - Fluidization (Continued...)
Lecture 25 - Fluidization (Continued...)
Lecture 26 - Sedimentation
Lecture 27 - Sedimentation (Continued...)
Lecture 28 - Sedimentation (Continued...)
Lecture 29 - Sedimentation (Continued...)

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Lecture 30 - Sedimentation (Continued...)
Lecture 31 - Filtration
Lecture 32 - Filtration (Continued...)
Lecture 33 - Filtration (Continued...)
Lecture 34 - Filtration (Continued...)
Lecture 35 - Filtration (Continued...)
Lecture 36 - Centrifugal Separation
Lecture 37 - Centrifugal Separation (Continued...)
Lecture 38 - Centrifugal Separation (Continued...)
Lecture 39 - Centrifugal Separation (Continued...)
Lecture 40 - Centrifugal Separation (Continued...)
Lecture 41 - Particle size reduction
Lecture 42 - Particle size reduction (Continued...)
Lecture 43 - Particle size reduction (Continued...)
Lecture 44 - Particle size reduction (Continued...)
Lecture 45 - Particle size reduction (Continued...)
Lecture 46 - Particle size reduction (Continued...)
Lecture 47 - Particle size enlargement
Lecture 48 - Particle size enlargement (Continued...)
Lecture 49 - Particle size enlargement (Continued...)
Lecture 50 - Particle size enlargement (Continued...)
Lecture 51 - Fluid - solid transport
Lecture 52 - Fluid - solid transport (Continued...)
Lecture 53 - Fluid - solid transport (Continued...)
Lecture 54 - Fluid - solid transport (Continued...)
Lecture 55 - Fluid - solid transport (Continued...)
Lecture 56 - Colloids and nanoparticles
Lecture 57 - Colloids and nanoparticles (Continued...)
Lecture 58 - Colloids and nanoparticles (Continued...)
Lecture 59 - Colloids and nanoparticles (Continued...)
Lecture 60 - Colloids and nanoparticles (Continued...)

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NPTEL Video Course - Chemical Engineering - NOC:Plant Design and Economics

Subject Co-ordinator - Prof. Debasis Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Typical Design Steps
Lecture 3 - Flow Diagram
Lecture 4 - Flow Diagram - Mass and Energy Balance
Lecture 5 - Piping and Instrumentation Diagram
Lecture 6 - Selection of Process Equipment
Lecture 7 - Process Utilities
Lecture 8 - Plant Location
Lecture 9 - Site and Plant Layout
Lecture 10 - Heuristics in Process Synthesis and Design
Lecture 11 - Capital Investment
Lecture 12 - Capital Cost Estimates
Lecture 13 - Cost Components in Capital Investments
Lecture 14 - Methods of Capital Cost Estimates
Lecture 15 - Estimation of Total Product Cost
Lecture 16 - Different Types of Interest
Lecture 17 - Continuous Interest, Cash Flow Diagram, Time Value of Money
Lecture 18 - Uniform Cash Flows and Continuous Flows
Lecture 19 - Income Tax and Depreciation
Lecture 20 - Depreciation
Lecture 21 - Cumulative Cash Flow and Profitability Standards
Lecture 22 - Profitability Analysis
Lecture 23 - Profitability Analysis (Continued...)
Lecture 24 - Profitability Analysis (Continued...)
Lecture 25 - Alternative Investment, Replacement and Sensitivity Analysis
Lecture 26 - Introduction to Process Synthesis
Lecture 27 - Hierarchical Approach to Process Synthesis - I
Lecture 28 - Hierarchical Approach to Process Synthesis - II
Lecture 29 - Hierarchical Approach to Process Synthesis - III

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Lecture 30 - Hierarchical Approach to Process Synthesis - IV
Lecture 31 - Basic Reactor Principles
Lecture 32 - Reactor Synthesis for Complex Reactions by Attainable Region
Lecture 33 - Reactor Synthesis for Complex Reactions by Attainable Region
Lecture 34 - Reactor Synthesis for Complex Reactions by Attainable Region
Lecture 35 - General Procedure for Reactor Design and Cost Estimation
Lecture 36 - Introduction to Separation Systems
Lecture 37 - Selection Criteria for Separation Processes
Lecture 38 - Design of Multi-component Distillation Column
Lecture 39 - Design of Multi-component Distillation Column
Lecture 40 - Introduction to Sequencing of Ordinary Distillation Columns
Lecture 41 - Sequences for Simple Nonintegrated Distillation Columns
Lecture 42 - Distillation Sequencing using Columns with Sidestreams
Lecture 43 - Distillation Sequencing using Thermal Coupling
Lecture 44 - Azeotropic Distillation
Lecture 45 - Azeotropic Distillation Methods and Cost Estimation
Lecture 46 - Introduction to Pinch Technology
Lecture 47 - Composite Curves
Lecture 48 - The Problem Table Method
Lecture 49 - The Heat Recovery Pinch and The Grand Composite Curve
Lecture 50 - Heat Exchanger Network Design
Lecture 51 - Introduction
Lecture 52 - Fires and Explosions
Lecture 53 - Fires and Explosions
Lecture 54 - Toxic Release, Hazard Identification and MSDS
Lecture 55 - Inherently Safer Design
Lecture 56 - Optimality Criteria for Unconstrained Functions
Lecture 57 - Examples
Lecture 58 - Equality Constrained Problems
Lecture 59 - Linear Programming Problems
Lecture 60 - Batch Process Scheduling

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NPTEL Video Course - Chemical Engineering - NOC:Material and Energy Balance Computations

Subject Co-ordinator - Prof. Arnab Atta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Calculations
Lecture 2 - Introduction to Engineering Calculations (Continued...)
Lecture 3 - Introduction to Engineering Calculations (Continued...)
Lecture 4 - Introduction to Processes and Process Variables
Lecture 5 - Introduction to Processes and Process Variables (Continued...)
Lecture 6 - Fundamentals of Material Balance
Lecture 7 - Fundamentals of Material Balance (Continued...)
Lecture 8 - Fundamentals of Material Balance (Continued...)
Lecture 9 - Fundamentals of Material Balance (Continued...)
Lecture 10 - Material Balance of Single-unit
Lecture 11 - Material Balance of Multiple Units
Lecture 12 - Material Balance of Multiple Units (Continued...)
Lecture 13 - Material Balance of Multiple Units (Continued...)
Lecture 14 - Material Balance of Multiple Units (Continued...)
Lecture 15 - Material Balance of Multiple Units - Recycle
Lecture 16 - Material Balance of Recycle and Bypass Units
Lecture 17 - Material Balance of Recycle and Bypass Units (Continued...)
Lecture 18 - Introduction
Lecture 19 - Introduction (Continued...)
Lecture 20 - Introduction (Continued...)
Lecture 21 - Multiple reactions and reactive process balance
Lecture 22 - Reactive process balance
Lecture 23 - Multiple reactions and reactive process balance
Lecture 24 - Reactive process balance (Continued...)
Lecture 25 - Reactive process balance (Continued...)
Lecture 26 - Combustion reactions balance
Lecture 27 - Combustion reactions balance (Continued...)
Lecture 28 - Single-phase systems
Lecture 29 - Single phase systems (Continued...)

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Lecture 30 - Single-phase problems and concept of multi-phase system
Lecture 31 - Introduction to Energy Balance - I
Lecture 32 - Introduction to Energy Balance - II
Lecture 33 - Introduction to Energy Balance - III
Lecture 34 - Introduction to Energy Balance - IV
Lecture 35 - Introduction to Energy Balance - V
Lecture 36 - Introduction to Energy Balance - VI
Lecture 37 - Introduction to Energy Balance - VII
Lecture 38 - Introduction to Energy Balance - VIII
Lecture 39 - Introduction to Energy Balance - IX
Lecture 40 - Introduction to Energy Balance - X
Lecture 41 - Introduction to Energy Balance - XI
Lecture 42 - Estimation of Physical Properties - I
Lecture 43 - Estimation of Physical Properties - II
Lecture 44 - Estimation of Physical Properties - III
Lecture 45 - Tutorial - I
Lecture 46 - Tutorial - II
Lecture 47 - Tutorial - III
Lecture 48 - Tutorial - IV
Lecture 49 - Estimation of Physical Parameters - IV
Lecture 50 - Estimation of Physical Parameters - V
Lecture 51 - Energy Balance with Chemical Reactions - I
Lecture 52 - Energy Balance with Chemical Reactions - II
Lecture 53 - Energy Balance with Chemical Reactions - III
Lecture 54 - Energy Balance with Chemical Reactions - IV
Lecture 55 - Energy Balance with Chemical Reactions - V
Lecture 56 - Energy Balance with Chemical Reactions - VI
Lecture 57 - Humidity and Psychrometric Chart - I
Lecture 58 - Humidity and Psychrometric Chart - II
Lecture 59 - Humidity and Psychrometric Chart - III
Lecture 60 - Humidity and Psychrometric Chart - IV

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NPTEL Video Course - Chemical Engineering - NOC:Principles and Practices of Process Equipment and Plant Desig

Subject Co-ordinator - Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Optimum design and design documentation
Lecture 4 - Introduction to Mass Transfer Processes
Lecture 5 - Phase Equillibrium
Lecture 6 - Phase Equillibrium (Continued...)
Lecture 7 - Phase Equillibrium (Continued...)
Lecture 8 - Distillation
Lecture 9 - Flash Distillation and Design problem
Lecture 10 - Fractionation
Lecture 11 - Fractionation (Continued...)
Lecture 12 - McCabe-Thiele construction for number of ideal stages
Lecture 13 - Optimum Design
Lecture 14 - Multi-component fractionation design
Lecture 15 - Batch Distillation
Lecture 16 - Practical issues in desigining distillation processes
Lecture 17 - Design of absorbers
Lecture 18 - Design of absorbers (Continued...)
Lecture 19 - Design of absorbers (Continued...)
Lecture 20 - Tower and Tower internals
Lecture 21 - Tower and Tower internals (Continued...)
Lecture 22 - Tower and Tower internals (Continued...)
Lecture 23 - Sieve Tray Design
Lecture 24 - Sieve Tray Design (Continued...)
Lecture 25 - Sieve Tray Design (Continued...)
Lecture 26 - Bubble Cap Tray Design
Lecture 27 - Bubble Cap Tray Design (Continued...)
Lecture 28 - Bubble Cap Tray Design (Continued...)
Lecture 29 - Tower and Tower internals (Packed Tower Design)

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Lecture 30 - Tower and Tower internals (Packed Tower Design) (Continued...)
Lecture 31 - Adsorption
Lecture 32 - Packed bed adsorption
Lecture 33 - Packed bed adsorber design
Lecture 34 - Packed bed adsorber design (Continued...)
Lecture 35 - Liquid-liquid extraction (LLE)
Lecture 36 - Liquid-liquid extraction (L2)
Lecture 37 - Liquid-liquid extraction (L3)
Lecture 38 - Liquid-liquid extraction (L4)
Lecture 39 - Liquid-liquid extraction (L5)
Lecture 40 - Design of Mass Transfer Processes (Review)
Lecture 41 - Design of Heat Transfer Processes - Introduction
Lecture 42 - Double Pipe Heat exchanger
Lecture 43 - Double Pipe Heat exchanger (Continued...)
Lecture 44 - Double Pipe Heat exchanger (Continued...)
Lecture 45 - Design of Shell and Tube Heat Exchangers - a general overview
Lecture 46 - Design of Shell and Tube Heat Exchangers - a general overview (Continued...)
Lecture 47 - Shell and Tube Heat Exchanger - Design
Lecture 48 - Shell and Tube Heat Exchanger - Design
Lecture 49 - Heat exchanger Network Analysis
Lecture 50 - Heat exchanger Network Analysis (Continued...)
Lecture 51 - Heat exchanger Network Analysis (Continued...)
Lecture 52 - Heat exchanger Network Analysis (Continued...)
Lecture 53 - Heat exchanger Network Analysis (Continued...)
Lecture 54 - Plant Hydraulics
Lecture 55 - Plant Hydraulics (Continued...)
Lecture 56 - Plant Hydraulics (Continued...)
Lecture 57 - Plant Hydraulics (End)
Lecture 58 - Process Vessels
Lecture 59 - Process Instrumentation and Control
Lecture 60 - Engineered Safety
Lecture 61 - Process Utilities
Lecture 62 - Process Design using Simulators
Lecture 63 - Process Packages
Lecture 64 - Design of a 10 TPD Mono-nitrotoluene plant

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NPTEL Video Course - Chemical Engineering - NOC:Mathematical Modelling and Simulation of Chemical Engineering

Subject Co-ordinator - Prof. Sourav Mondal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Constitutive relations
Lecture 4 - Constitutive relations - Mass transfer and thermodynamics
Lecture 5 - Process diagrams
Lecture 6 - Special functions
Lecture 7 - Partial differential equations
Lecture 8 - Partial differential equations - Separation of variables
Lecture 9 - PDE - Separation of variables (Continued...)
Lecture 10 - PDE - Integral transforms
Lecture 11 - Numerical techniques of solving PDE - Discretization
Lecture 12 - Stability of finite difference schemes
Lecture 13 - Numerical solution of PDE - Method of lines
Lecture 14 - Numerical solution of implicit formulation - Tridiagonal matrix
Lecture 15 - Numerical solution of PDE - Finite volume method
Lecture 16 - Perturbation methods
Lecture 17 - Asymptotics
Lecture 18 - Matched Asymptotics
Lecture 19 - Stability of dynamical systems
Lecture 20 - Stability of dynamical systems (Continued...)
Lecture 21 - Modelling transport phenomena problems - Part 1
Lecture 22 - Modelling transport phenomena problems - Part 2
Lecture 23 - Modelling transport phenomena problems - Part 3
Lecture 24 - Modelling transport phenomena problems - Part 4
Lecture 25 - Modelling transport phenomena problems - Part 5
Lecture 26 - Modelling reaction systems - Packed bed catalytic reactor
Lecture 27 - Modelling intraparticle transport and catalysis
Lecture 28 - Modelling pore diffusion and reaction
Lecture 29 - Modelling enzymatic reactions

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Lecture 30 - Demonstration of COMSOL Multiphysics
Lecture 31 - Modelling of multistage distillation process
Lecture 32 - FUG method of stage calculations
Lecture 33 - MESH equations and DOF analysis
Lecture 34 - Tearing method
Lecture 35 - Bubble point method stage calculations
Lecture 36 - Simultaneous correction method
Lecture 37 - Block tridiagonal matrix
Lecture 38 - Simple binary batch distillation
Lecture 39 - Multistage batch distillation
Lecture 40 - Heat exchanger network design pinch analysis
Lecture 41 - Pinch point temperature
Lecture 42 - Heat exchanger network synthesis
Lecture 43 - Solving a distillation column using Aspen plus
Lecture 44 - Solving two unit operations using Aspen Plus
Lecture 45 - Solving multiple units using Aspen Plus
Lecture 46 - Dispersed phase modelling - Introduction
Lecture 47 - Population balance equation
Lecture 48 - Dispersed phase modelling - Breakage process
Lecture 49 - Drop size distribution in lean mixtures
Lecture 50 - Mass transfer in lean liquid-liquid dispersion
Lecture 51 - Dispersed phase modelling - Aggregation
Lecture 52 - Dispersed phase modelling - Aerosol dynamics
Lecture 53 - Dispersed phase modelling - Aerosol dynamics (Continued...)
Lecture 54 - Solution of the population balance equation
Lecture 55 - Numerical solution of the population balance equation
Lecture 56 - Kinetic monte carlo simulation
Lecture 57 - Response surface methodology
Lecture 58 - Design of experiments
Lecture 59 - Artificial neural network
Lecture 60 - Supervised training

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NPTEL Video Course - Chemical Engineering - NOC:Advanced Process Dynamics

Subject Co-ordinator - Prof. Parag A. Deshpande

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and motivation
Lecture 2 - Dynamics of linear first order autonomous systems
Lecture 3 - Dynamics of linear first order autonomous systems (Continued...)
Lecture 4 - Lumped parameter analysis of cooling of a body
Lecture 5 - Lumped parameter analysis of cooling of a body (Continued...)
Lecture 6 - Introduction to higher order systems
Lecture 7 - Phase plane analysis of linear autonomous second order systems
Lecture 8 - Phase plane analysis of linear autonomous second order systems (Continued...)
Lecture 9 - Analysis of a free spring-mass system
Lecture 10 - Analysis of a free spring-mass system (Continued...)
Lecture 11 - Dynamics of non-autonomous systems
Lecture 12 - Similarity solution for non-autonomous higher order dynamics
Lecture 13 - Similarity solution for non-autonomous higher order dynamics (Continued...)
Lecture 14 - Analysis of a forced spring-mass system
Lecture 15 - Analysis of a forced spring-mass system (Continued...)
Lecture 16 - Phase portraits of linear autonomous systems of order three and higher
Lecture 17 - Phase portraits of linear autonomous systems of order three and higher (Continued...)
Lecture 18 - Analysis of complex reaction systems
Lecture 19 - Analysis of complex reaction systems (Continued...)
Lecture 20 - Analysis of complex reaction systems (Continued...)
Lecture 21 - Introduction to non-linear systems
Lecture 22 - Logistic population growth model
Lecture 23 - Logistic population growth model (Continued...)
Lecture 24 - Logistic population growth with harvesting
Lecture 25 - Logistic population growth with harvesting (Continued...)
Lecture 26 - Logistic population growth with threshold population
Lecture 27 - Logistic population growth with threshold population (Continued...)
Lecture 28 - Analysis of population dynamics in discrete domain
Lecture 29 - Analysis of fixed points and bifurcation in discrete domain

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Lecture 30 - Analysis of fixed points and bifurcation in discrete domain (Continued...)
Lecture 31 - More on bifurcations in non-linear systems
Lecture 32 - Non-linear systems in higher dimensions
Lecture 33 - Reactor stability analysis
Lecture 34 - Reactor stability analysis (Continued...)
Lecture 35 - Reactor stability analysis (Continued...)
Lecture 36 - Analysis of infectious disease dynamics
Lecture 37 - Analysis of infectious disease dynamics (Continued...)
Lecture 38 - Analysis of infectious disease dynamics (Continued...)
Lecture 39 - Analysis of atmosphere dynamics using Lorenz equations
Lecture 40 - Analysis of atmosphere dynamics using Lorenz equations (Continued...)
Lecture 41 - Analysis of system dynamics in transform domain
Lecture 42 - Analysis of first order system subjected to ideal forcing functions
Lecture 43 - Analysis of first order system subjected to ideal forcing functions (Continued...)
Lecture 44 - Analysis of response of second order systems
Lecture 45 - Analysis of response of second order systems (Continued...)
Lecture 46 - Analysis of (p,q) order systems
Lecture 47 - Analysis of (p,q) order systems (Continued...)
Lecture 48 - Analysis of multiple input - multiple output systems
Lecture 49 - Block diagrams and inter-conversion of state-space and transform domain models
Lecture 50 - Analysis of inverse response systems
Lecture 51 - Analysis of dynamics of discrete-time systems
Lecture 52 - Sampling and reconstruction of continuous signals
Lecture 53 - Conversion of continuous models to discrete-time models
Lecture 54 - Introduction to z-transforms
Lecture 55 - z-transforms Continued
Lecture 56 - Response of discrete-time systems
Lecture 57 - Response of discrete-time systems (Continued...)
Lecture 58 - Response of discrete-time systems (Continued...)
Lecture 59 - Stability analysis in transform domain
Lecture 60 - Review of the course

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NPTEL Video Course - Chemical Engineering - NOC:Metallocene and Metal-Carbene based Organometallic Compounds

Subject Co-ordinator - Prof. Sanjib K. Patra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Brief Introduction to Polymers
Lecture 2 - A Brief Introduction to Polymers (Continued...)
Lecture 3 - Polyethylene and Polypropylene: Chemical structure and properties
Lecture 4 - Polyethylene and Polypropylene: Chemical structure and properties (Continued...)
Lecture 5 - Common polymerization protocol and mechanism
Lecture 6 - Common polymerization protocol and mechanism (Continued...)
Lecture 7 - Common polymerization protocol and mechanism: Controlled Polymerization
Lecture 8 - Anionic living polymerization and Coordination polymerization
Lecture 9 - Transition metal/Organometallic complexes: Unique reactions
Lecture 10 - Metallocene compounds: Structure and Bonding
Lecture 11 - Metallocene compounds: Structure and Bonding (Continued...)
Lecture 12 - Bonding in Metallocene, MOT and Electronic nature
Lecture 13 - Bonding and Electronic nature in Bent Metallocene
Lecture 14 - Bonding and Electronic nature in Bent Metallocene (Continued...)
Lecture 15 - General Synthetic Strategies for Metallocenes (Parallel and Bent)
Lecture 16 - Properties and Unique Reactivities of parallel and bent Metallocenes
Lecture 17 - Unique Reactivities of bent Metallocenes
Lecture 18 - Unique Reactivities of bent Metallocenes (Continued...)
Lecture 19 - Coordination polymerization of olefin and stereoregularity
Lecture 20 - Olefin polymerization by Zeigler Natta Catalyst: Important features
Lecture 21 - Coordination polymerization of olefin by Metallocene Catalysts: A new avenue in polyolefin catal
Lecture 22 - Coordination polymerization of olefin by Metallocene Catalysts: A new avenue in polyolefin catal
Lecture 23 - Symmetry of metallocene and Stereoregularity in polyolefin
Lecture 24 - Symmetry of metallocene and Stereoregularity in polyolefin (Continued...)
Lecture 25 - Metallocene to Post-metallocene catalysts for olefin polymerization
Lecture 26 - Metallocene to Post-metallocene catalysts for olefin polymerization (Continued...)
Lecture 27 - Polymerization strategy for industrial preparation of LLDPE
Lecture 28 - Polymerization strategy for industrial preparation of LLDPE (Continued...)
Lecture 29 - Metallocene and Post-metallocene Catalysts: Homogeneous to Heterogeneous and Lab to Industry

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Lecture 30 - Metallocene and Post-metallocene Catalysts: Homogeneous to Heterogeneous and Lab to Industry (Co
Lecture 31 - Depolymerization of synthetic polymers: Role of organometallic and metallocene based catalysts
Lecture 32 - Depolymerization of synthetic polymers: Role of organometallic and metallocene based catalysts
Lecture 33 - Metal-carbene complexes as versatile catalysts for multiple useful reactions: A short introducti
Lecture 34 - Metal-carbene complexes as versatile catalysts for multiple useful reactions: A short introducti
Lecture 35 - Bonding and Electronic properties in Metal-carbene complexes
Lecture 36 - General synthetic protocol of Metal-carbene complexes
Lecture 37 - N-Heterocyclic carbene (NHC) complex: Bonding and General synthetic protocol
Lecture 38 - Alkene metathesis by metal-carbene catalysts and its mechanism
Lecture 39 - Utility of metal-carbene catalysts in alkene polymerization
Lecture 40 - Industrially important polymers by ROMP: Recent development and scope; Overall summary of this c

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Engineering Fluid Dynamics and Heat Transfer

Subject Co-ordinator - Prof. Rabibrata Mukherjee, Prof. Arnab Atta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Basic Concepts and Kinematics - 1
Lecture 2 - Kinematics - 2
Lecture 3 - Kinematics - 3
Lecture 4 - Kinematics - 4
Lecture 5 - Kinematics - 5 - Shear Stress
Lecture 6 - Kinematics - 6 and Conservation Equation - 1
Lecture 7 - Conservation Equation - 2
Lecture 8 - Conservation Equation - 3 - Conservation of Momentum
Lecture 9 - Conservation Equation - 4 - Conservation of Momentum - 2
Lecture 10 - Conservation Equation - 5 - Conservation of Momentum - 3
Lecture 11 - Exact Solution - 1
Lecture 12 - Exact Solution - 2
Lecture 13 - Exact Solution - 3
Lecture 14 - Exact Solution - 4
Lecture 15 - Boundary Layer Analysis - 1
Lecture 16 - Boundary Layer Analysis - 2
Lecture 17 - Boundary Layer Analysis - 3
Lecture 18 - Boundary Layer Analysis - 4: Blasius Solution - 1
Lecture 19 - Boundary Layer Analysis - 4: Blasius Solution - 2
Lecture 20 - Boundary Layer Analysis - 5: Momentum Integral Method - 1
Lecture 21 - Boundary Layer Analysis - 6: Momentum Integral Method - 2
Lecture 22 - Boundary Layer Analysis - 6: Momentum Integral Method - 3
Lecture 23 - Turbulence - 1
Lecture 24 - Turbulence - 2
Lecture 25 - Turbulence - 3
Lecture 26 - Turbulence - 4
Lecture 27 - Turbulence - 5
Lecture 28 - Turbulence - 6
Lecture 29 - Turbulence - 7

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Lecture 30 - Turbulence - 8 and Final Wrap-up
Lecture 31 - Fundamentals and Mechanism of Heat Transfer
Lecture 32 - Fundamentals and Mechanism of Heat Transfer (Continued...)
Lecture 33 - Fundamentals and Mechanism of Heat Transfer (Continued...)
Lecture 34 - Fundamentals and Mechanism of Heat Transfer (Continued...)
Lecture 35 - Fundamentals and Mechanism of Heat Transfer (Continued...)
Lecture 36 - One-dimensional Heat Conduction
Lecture 37 - One-dimensional Heat Conduction (Continued...)
Lecture 38 - One-dimensional Heat Conduction (Continued...)
Lecture 39 - One-dimensional Heat Conduction (Continued...)
Lecture 40 - One-dimensional Heat Conduction (Continued...)
Lecture 41 - One-dimensional Heat Conduction (Continued...)
Lecture 42 - One-dimensional Heat Conduction (Continued...)
Lecture 43 - Transient Heat Conduction
Lecture 44 - Transient Heat Conduction (Continued...)
Lecture 45 - Transient Heat Conduction (Continued...)
Lecture 46 - Forced Convection
Lecture 47 - Forced Convection (Continued...)
Lecture 48 - Forced Convection (Continued...)
Lecture 49 - Forced Convection (Continued...)
Lecture 50 - Forced Convection (Continued...)
Lecture 51 - Internal Forced Convection
Lecture 52 - Internal Forced Convection (Continued...)
Lecture 53 - Internal Forced Convection (Continued...)
Lecture 54 - Internal Forced Convection (Continued...)
Lecture 55 - Internal Forced Convection (Continued...)
Lecture 56 - Natural Convection
Lecture 57 - Natural Convection (Continued...)
Lecture 58 - Boiling and Condensation
Lecture 59 - Radiation
Lecture 60 - Radiation (Continued...)

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NPTEL Video Course - Chemical Engineering - NOC:Characterization of Polymers, Elastomers and Composites

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1
Lecture 2 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1
Lecture 3 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1
Lecture 4 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1
Lecture 5 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1
Lecture 6 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2
Lecture 7 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2
Lecture 8 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2
Lecture 9 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2
Lecture 10 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2
Lecture 11 - Identification by Chemical Techniques, Implication of National and International Standards along
Lecture 12 - Identification by Chemical Techniques, Implication of National and International Standards along
Lecture 13 - Identification by Chemical Techniques, Implication of National and International Standards along
Lecture 14 - Identification by Chemical Techniques, Implication of National and International Standards along
Lecture 15 - Identification by Chemical Techniques, Implication of National and International Standards along
Lecture 16 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites
Lecture 17 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Contir
Lecture 18 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Contir
Lecture 19 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Contir
Lecture 20 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Contir
Lecture 21 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, cou
Lecture 22 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, cou
Lecture 23 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, cou
Lecture 24 - Practical demonstration on UV-Visible spectroscopy
Lecture 25 - Practical demonstration on FTIR spectroscopy and Sulphur analyzer
Lecture 26 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc
Lecture 27 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc
Lecture 28 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc
Lecture 29 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc

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Lecture 30 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc
Lecture 31 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and comp
Lecture 32 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and comp
Lecture 33 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and comp
Lecture 34 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and comp
Lecture 35 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and comp
Lecture 36 - Thermal analysis techniques and application in polymer, elastomer and composites
Lecture 37 - Thermal analysis techniques and application in polymer, elastomer and composites (Continued...)
Lecture 38 - Thermal analysis techniques and application in polymer, elastomer and composites (Continued...)
Lecture 39 - Practical demostration on TGA, DSC and DMA
Lecture 40 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
Lecture 41 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
Lecture 42 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
Lecture 43 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
Lecture 44 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
Lecture 45 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE
Lecture 46 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE
Lecture 47 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE
Lecture 48 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE
Lecture 49 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE
Lecture 50 - Applications of microscopy in polymers, elastomers and composites
Lecture 51 - Applications of microscopy in polymers, elastomers and composites (Continued...)
Lecture 52 - Practical demonstration on optical microscopy
Lecture 53 - Practical demonstration on atomic force microscopy (AFM)
Lecture 54 - Practical demonstration on image processing using standard software (Image)
Lecture 55 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent
Lecture 56 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent
Lecture 57 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent
Lecture 58 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent
Lecture 59 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent
Lecture 60 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent

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NPTEL Video Course - Chemical Engineering - NOC:Matlab-Based Programming Lab in Chemical Engineering

Subject Co-ordinator - Prof. Parag A. Deshpande

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation for the Lab Course
Lecture 2 - Analysis of the Need of Computers in Process Industries
Lecture 3 - Analysis of the Need of Computers in Process Industries (Continued...)
Lecture 4 - Discussion on Computational Tools available to Chemical Engineers
Lecture 5 - Analysis and Comparison of different Programming Languages
Lecture 6 - MATLAB Primer - Basic Features
Lecture 7 - MALTAB Primer - Writing Codes
Lecture 8 - MATLAB Primer - Coding (Continued...)
Lecture 9 - MATLAB Primer - Coding (Continued...)
Lecture 10 - MATLAB Primer - Plotting and Presentation of Results
Lecture 11 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Problem Definition and Analysis
Lecture 12 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Theory and Solution Strategy
Lecture 13 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Solution of the Problem under ...
Lecture 14 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Solution of the Problem under ...
Lecture 15 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Presentation and Interpretation ...
Lecture 16 - LAB 2 - Steady-state Operation of a Diabatic CSTR Problem Definition and Analysis
Lecture 17 - LAB 2 - Steady-state Operation of a Diabatic CSTR Theory and Solution Strategy
Lecture 18 - LAB 2 - Steady-state Operation of a Diabatic CSTR Solution of the Problem under ...
Lecture 19 - LAB 2 - Steady-state Operation of a Diabatic CSTR Solution of the Problem under ...
Lecture 20 - LAB 2 - Steady-state Operation of a Diabatic CSTR Analysis and Presentation ...
Lecture 21 - LAB 3 - Analysis of multicomponent distillation Problem definition and analysis
Lecture 22 - LAB 3 - Analysis of Multicomponent Distillation Theory and Solution Strategy
Lecture 23 - LAB 3 - Analysis of Multicomponent Distillation Solution of the Problem under Various ...
Lecture 24 - LAB 3 - Analysis of Multicomponent Distillation Solution of the Problem under Various ...
Lecture 25 - LAB 3 - Analysis of Multicomponent Distillation Presentation and Analysis of Results
Lecture 26 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Problem Definition ...
Lecture 27 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Theory and Solution ...
Lecture 28 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Solution of the Problem ...
Lecture 29 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Solution of the Problem ...

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Lecture 30 - LAB 4 - Analysis of cooling of a solid body in a reservoir Presentation ...
Lecture 31 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Problem Definition ...
Lecture 32 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Theory and Solution ...
Lecture 33 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Solution of the Problem
Lecture 34 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Solution of the problem
Lecture 35 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Presentation ...
Lecture 36 - LAB 6 - Analysis of Steady-state Heat Conduction in a 1-D rod
Lecture 37 - LAB 6 - Analysis of Steady-state Heat Conduction in a 1-D rod
Lecture 38 - LAB 6 - Analysis of steady-state Heat Conduction in a 1-D rod
Lecture 39 - LAB 6 - Analysis of steady-state Heat Conduction in a 1-D rod
Lecture 40 - LAB 6 - Analysis of steady-state Heat Conduction in a 1-D rod
Lecture 41 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Problem definition and ...
Lecture 42 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Theory and solution strategy
Lecture 43 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Solution of the problem ...
Lecture 44 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Solution of the problem ...
Lecture 45 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Analysis and interpretation ...
Lecture 46 - LAB 8 - Heat conduction in higher dimensions Problem definition and analysis
Lecture 47 - LAB 8 - Heat conduction in higher dimensions Background theory and solution strategy
Lecture 48 - LAB 8 - Heat conduction in higher dimensions Problem solution
Lecture 49 - LAB 8 - Heat conduction in higher dimensions Problem solution (Continued...)
Lecture 50 - LAB 8 - Heat conduction in higher dimensions Problem solution and analysis
Lecture 51 - LAB 9 - Process economics and optimisation Problem definition and analysis
Lecture 52 - LAB 9 - Process economics and optimisation Theory and solution strategy
Lecture 53 - LAB 9 - Process economics and optimisation Solution of the problem
Lecture 54 - LAB 9 - Process economics and optimisation Solution of the problem (Continued...)
Lecture 55 - LAB 9 - Process economics and optimisation Solution of the problem and analysis of ...
Lecture 56 - LAB 10 - Regression and curve - fitting of data Problem definition and analysis
Lecture 57 - LAB 10 - Regression and curve - fitting of data Background theory and solution strategy
Lecture 58 - LAB 10 - Regression and curve - fitting of data Problem solution
Lecture 59 - LAB 10 - Regression and curve - fitting of data Problem solution (Continued...)
Lecture 60 - Review of the course

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NPTEL Video Course - Chemical Engineering - NOC:Petroleum Technology

Subject Co-ordinator - Dr. Sonali Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Petroleum How it is stored under the earth Exploration of petroleum underground
Lecture 2 - Concept of Seismic Reflection, Introduction to Drilling
Lecture 3 - Drilling Mud and Mechanisms of Recovery of Petroleum
Lecture 4 - Composition of Crude Petroleum and Evaluation of Oil Stocks
Lecture 5 - Evaluation of Oil Stocks: Vaporization Characteristics
Lecture 6 - Primary Processing of Crude Oil: Desalting
Lecture 7 - Primary Processing of Crude Oil: Atmospheric Distillation Unit (ADU)
Lecture 8 - Primary Processing of Crude Oil: Reflux Systems, Vacuum Distillation Unit (VDU)
Lecture 9 - Products and Process Utilities in Primary Processing, Pipe Still Heater
Lecture 10 - Refinery Units
Lecture 11 - Secondary Processing: Decomposition of Residues: Thermal Cracking
Lecture 12 - Coking, Gasification and Steam Cracking
Lecture 13 - Secondary Processing: Decomposition of Residues: Hydrocracking
Lecture 14 - Secondary Processing: Decomposition of Residues: Catalytic Cracking
Lecture 15 - Secondary Processing: Decomposition of Residues: Process description of FCC
Lecture 16 - Properties and Testing of Petroleum Products
Lecture 17 - Properties and Testing of Petroleum Products (Continued...)
Lecture 18 - Properties and Testing of Petroleum Products (Continued...)
Lecture 19 - Properties and Testing of Petroleum Products (Continued...)
Lecture 20 - Properties and Testing of Petroleum Products (Continued...)
Lecture 21 - Petroleum fractions from distillation units
Lecture 22 - Petroleum fractions from distillation units (Continued...)
Lecture 23 - Petroleum fractions from distillation units (Continued...)
Lecture 24 - Petroleum fractions from distillation units (Continued...)
Lecture 25 - Petroleum fractions from distillation units (Continued...)
Lecture 26 - Upgradation of straight run cuts from atmospheric distillation unit
Lecture 27 - Upgradation of straight run cuts from atmospheric distillation unit (Continued...)
Lecture 28 - Upgradation of straight run cuts from atmospheric distillation unit (Continued...)
Lecture 29 - Upgradation of straight run cuts from atmospheric distillation unit (Continued...)

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Lecture 30 - Upgradation of straight run cuts from distillation unit
Lecture 31 - Purification processes
Lecture 32 - Purification processes (Continued...)
Lecture 33 - Bitumen preparation processes
Lecture 34 - Grease: preparation, description and application
Lecture 35 - Emission control and effluent treatment in refinery
Lecture 36 - Fundamentals of thermochemistry: Combustion
Lecture 37 - Fundamentals of thermochemistry: Flame
Lecture 38 - Fundamentals of thermochemistry: Adiabatic flame temperature
Lecture 39 - Fundamentals of thermochemistry: Burner
Lecture 40 - Fundamentals of thermochemistry: Internal Combustion engine

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NPTEL Video Course - Chemical Engineering - NOC:Rheology and Processing of Paints, Plastic and Elastomer Base

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Introduction to Polymer
Lecture 2 - Structure Process Correlation
Lecture 3 - Basic Rheology
Lecture 4 - Classification of Fluids
Lecture 5 - Flow of Liquids Through Various Channels - 1
Lecture 6 - Flow of Liquids Through Various Channels - 2
Lecture 7 - Flow of Liquids Through Various Channels - 3
Lecture 8 - Introduction to Viscometers and Rheometers
Lecture 9 - Ostwald Viscometer, Brookfield Viscometer, Falling Piston Viscometers
Lecture 10 - ODR, MDR, RPA, PPR
Lecture 11 - DMA -In-Light of rheology
Lecture 12 - Master Curve and its Implications
Lecture 13 - Capillary Rheometer
Lecture 14 - Introduction to Paints and importance of rheology in paints
Lecture 15 - Rheology of paints - 1
Lecture 16 - Rheology of paints - 2
Lecture 17 - Rheology of Adhesives and Sealants
Lecture 18 - Rheology of Fiber and Plastics
Lecture 19 - Practical demonstration on Brookfield viscometer and Oswald viscometer
Lecture 20 - Practical demonstration on Mooney viscometer, ODR and MDR
Lecture 21 - Practical demonstration on RPA
Lecture 22 - Practical demonstration on PPR and DMA
Lecture 23 - Practical demonstration on Capillary Rheometer
Lecture 24 - Numeriacal Problems related to basic rhelogy
Lecture 25 - Importance of compounding and introduction to various compounding ingredients
Lecture 26 - Properties and role of various compounding ingredients
Lecture 27 - Surface treatment of reinforcing elements
Lecture 28 - Rhelogy of Elastomers
Lecture 29 - Importance of die swell (correlating with normal force differences)

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Lecture 30 - Melt Fracture and other ectrudate instabilities
Lecture 31 - Introduction to plastic and rubber mixing and blending
Lecture 32 - Various mixing equipment and their importance
Lecture 33 - Introduction to Two-Roll Mill and Mixing on Two - Roll Mill 1
Lecture 34 - Introduction to Two-Roll Mill and Mixing on Two - Roll Mill 2
Lecture 35 - Introduction to Internel mixture Kneaders and Mixing using Internel mixture and Kneaders
Lecture 36 - Practical demonstration of Rubber mixing on a two roll and using an internal mixer
Lecture 37 - Molding Techniques
Lecture 38 - Calendering
Lecture 39 - Extrusion
Lecture 40 - Rheology of Injection moulding process
Lecture 41 - Plastic and fiber-related processing
Lecture 42 - Numerical problems related to various processing techniques
Lecture 43 - Wire coating, Garvey die, Profile Extrusion
Lecture 44 - Introduction to FEA based computationalfluid mechanics on extrusion - 1
Lecture 45 - Introduction to FEA based computationalfluid mechanics on extrusion - 2
Lecture 46 - Introduction to FEA based computationalfluid mechanics on extrusion - 3
Lecture 47 - Practical demonstartion on FEA
Lecture 48 - Concluding remarks and commentson applied rheology for advanced learners

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NPTEL Video Course - Chemical Engineering - NOC:Petroleum Formation Evaluation

Subject Co-ordinator - Dr. Neetish Kumar Maurya, Dr. Sayantan Ghosh

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Petroleum Formation Evaluation
Lecture 2 - Mud Logging
Lecture 3 - Mud Logging (Continued...)
Lecture 4 - Coring Operations
Lecture 5 - Coring Operations (Continued...)
Lecture 6 - Wireline Logging
Lecture 7 - Resistivity Log
Lecture 8 - Resistivity Log (Continued...)
Lecture 9 - Resistivity Log (Continued...)
Lecture 10 - Resistivity Log (Continued...)
Lecture 11 - Resistivity Log (Continued...)
Lecture 12 - Resistivity Log (Continued...)
Lecture 13 - Resistivity Log (Continued...)
Lecture 14 - Resistivity Log (Continued...)
Lecture 15 - Resistivity Log (Continued...)
Lecture 16 - Spontaneous Potential Log
Lecture 17 - Spontaneous Potential Log (Continued...)
Lecture 18 - Petrophysical Model
Lecture 19 - Petrophysical Model (Continued...)
Lecture 20 - Gamma Ray Log
Lecture 21 - Gamma Ray Log (Continued...)
Lecture 22 - Gamma Ray Log (Continued...)
Lecture 23 - Caliper Log
Lecture 24 - Porosity Logs
Lecture 25 - Density Porosity Log
Lecture 26 - Density Porosity Log (Continued...)
Lecture 27 - Density Porosity Log (Continued...)
Lecture 28 - Density Porosity Log (Continued...)
Lecture 29 - Density Porosity Log (Continued...)

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Lecture 30 - Neutron Porosity Log
Lecture 31 - Neutron Porosity Log (Continued...)
Lecture 32 - Neutron Porosity Log (Continued...)
Lecture 33 - Neutron Porosity Log (Continued...)
Lecture 34 - Neutron Porosity Log (Continued...)
Lecture 35 - Sonic (Acoustic) Porosity Log
Lecture 36 - Sonic Porosity Log (Continued...)
Lecture 37 - Sonic Porosity Log (Continued...)
Lecture 38 - Sonic Porosity Log (Continued...)
Lecture 39 - Sonic Porosity Log (Continued...)
Lecture 40 - NMR Log
Lecture 41 - NMR Log (Continued...)
Lecture 42 - Well Log interpretation
Lecture 43 - Well Log interpretation (Continued...)
Lecture 44 - Well Log interpretation (Continued...)
Lecture 45 - Well Log interpretation (Continued...)
Lecture 46 - Well Log Interpretation (Continued...)
Lecture 47 - Well Log Interpretation (Continued...)
Lecture 48 - Well Log Interpretation (Continued...)
Lecture 49 - Well Log Interpretation (Continued...)
Lecture 50 - Well Log Interpretation (Continued...)
Lecture 51 - Formation Evalution (well log analysis) Practical
Lecture 52 - Formation tops and Core Data
Lecture 53 - Formation Temperature and Shaliness
Lecture 54 - Formation porosity and Water Saturation
Lecture 55 - Permeability and Effective Porosity
Lecture 56 - Determination of Archie Equation Parameters
Lecture 57 - Lithology Determination
Lecture 58 - Net Pay and Well Diagram
Lecture 59 - Rock Typing
Lecture 60 - Miscellaneous Topics

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NPTEL Video Course - Chemical Engineering - NOC:Momentum Transfer in Fluids

Subject Co-ordinator - Prof. Somenath Ganguly, Prof. Sunando DasGupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Basic Concepts
Lecture 2 - Elementary Framework
Lecture 3 - Elementary Framework (Continued...)
Lecture 4 - Elementary Framework (Continued...)
Lecture 5 - Elementary Framework (Continued...)
Lecture 6 - Shell Momentum Balance - 1
Lecture 7 - Shell Momentum Balance - 2
Lecture 8 - Shell Momentum Balance - 3
Lecture 9 - Shell Momentum Balance - 4
Lecture 10 - Limitations and General Approach - Continuity Equation
Lecture 11 - Elements of Inviscid Flow
Lecture 12 - Elements of Inviscid Flow (Continued...)
Lecture 13 - Elements of Inviscid Flow (Continued...)
Lecture 14 - Elements of Inviscid Flow (Continued...)
Lecture 15 - Elements of Inviscid Flow (Continued...)
Lecture 16 - Equations of Motion - Conceptual Derivation of NS Equations
Lecture 17 - Use of NS Equation for Solving Previous Problems
Lecture 18 - Equations of Motion and Applications - 1
Lecture 19 - Equations of Motion and Applications - 2
Lecture 20 - Equations of Motion and Applications - 3
Lecture 21 - Motion of fluid particles
Lecture 22 - Motion of fluid particles (Continued...)
Lecture 23 - Motion of fluid particles (Continued...)
Lecture 24 - Stream Function and Potential Function
Lecture 25 - Stream Function and Potential Function (Continued...)
Lecture 26 - Equations of Motion and Applications - 4
Lecture 27 - Equations of Motion and Applications - 5
Lecture 28 - Basic Equations in Integral Form - 1
Lecture 29 - Basic Equations in Integral Form - 2

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Lecture 30 - Basic Equations in Integral Form - 3
Lecture 31 - Complex Potential
Lecture 32 - Complex Potential (Continued...)
Lecture 33 - Complex Potential (Continued...)
Lecture 34 - Complex Potential (Continued...)
Lecture 35 - Complex Potential (Continued...)
Lecture 36 - Basic Equations in Integral Form - 4
Lecture 37 - Basic Equations in Integral Form - 5
Lecture 38 - Basic Equations in Integral Form - 6
Lecture 39 - Bernoulli's Equation Fundamentals - 1
Lecture 40 - Bernoulli's Equation Fundamentals - 2
Lecture 41 - Elements of Fluid Statics and Associated Problems
Lecture 42 - Elements of Fluid Statics and Associated Problems (Continued...)
Lecture 43 - Elements of Fluid Statics and Associated Problems (Continued...)
Lecture 44 - Dimensional Analysis and Similitude
Lecture 45 - Dimensional Analysis and Similitude (Continued...)
Lecture 46 - Bernoulli's Equation Application - 1
Lecture 47 - Bernoulli's Equation Application - 2
Lecture 48 - Bernoulli's Equation Application - 3
Lecture 49 - Bernoulli's Equation Application - 4
Lecture 50 - Bernoulli's Equation Application - 5
Lecture 51 - Bernoulli's Equation Application - 6
Lecture 52 - Flow meters
Lecture 53 - Pumps
Lecture 54 - Recap of Fluid Dynamics
Lecture 55 - Cavitation and Net Positive Suction Head
Lecture 56 - Flow Metaring and Associated Problems
Lecture 57 - Flow Metaring and Associated Problems (Continued...)
Lecture 58 - Flow Metaring and Associated Problems (Continued...)
Lecture 59 - Turbulence
Lecture 60 - Flow Through Porous Media

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NPTEL Video Course - Chemical Engineering - NOC:Enhanced Oil Recovery Techniques

Subject Co-ordinator - Prof. Ajay Mandal

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles of Enhanced Oil Recovery (EOR); Difference of Tertiary recovery
Lecture 2 - Pressure maintenance and Well Patterns
Lecture 3 - Need for EOR and Screening Methods
Lecture 4 - Sweep and Displacement Efficiencies
Lecture 5 - Fundamental of immiscible fluid displacement processes
Lecture 6 - Buckley Leverette Theorem for one dimensional immiscible displacement
Lecture 7 - Welge Method for Oil Recovery Calculation
Lecture 8 - Effects of verious parameters on recovery by water flood
Lecture 9 - Chemical Enhanced Oil Recovery Methods
Lecture 10 - Enhanced Oil Recovery by Polymer Flooding - I
Lecture 11 - Enhanced Oil Recovery by Polymer Flooding - II
Lecture 12 - Enhanced Oil Recovery by Polymer Flooding - III
Lecture 13 - Oil Recovery by Polymer Flooding: Lab Study and Recovery Calculations
Lecture 14 - Surfactant Flooding: Properties of Surfactants
Lecture 15 - Surfactant Flooding for Enhanced Oil recovery - I
Lecture 16 - Surfactant Flooding for Enhanced Oil recovery - II
Lecture 17 - Phase Behaviour of Surfactant Stabilized Microemulsions
Lecture 18 - Surfactant Flooding and Screening Criteria
Lecture 19 - Micellar - Polymer Flooding
Lecture 20 - Microemulsion Flooding
Lecture 21 - Nanoemulsion and Pickering Emulsion for EOR
Lecture 22 - Alkali Flooding for EOR and Monitoring of Chemical Flooding
Lecture 23 - Foam Flooding for EOR
Lecture 24 - Introduction to Miscible Flooding, Thermodynamics of miscibility
Lecture 25 - Thermodynamics of miscibility and Mechanisms of Miscible Displacement
Lecture 26 - Minimum Miscibility Pressure (MMP)
Lecture 27 - Mechanisms of Miscible flooding
Lecture 28 - Enriched Gas Injection/Condensing Gas Drive
Lecture 29 - CO2 Sequestration, utilisation and storage

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Lecture 30 - Mechanisms of CO2 Miscible flooding
Lecture 31 - Immiscible flooding Mechanisms of CO2
Lecture 32 - Thermal Oil Recovery Methods
Lecture 33 - Mechanisms of Thermal Oil Recovery
Lecture 34 - Thermal Oil Recovery: Hot Water and Steam flooding
Lecture 35 - Steam Flooding for EOR
Lecture 36 - Steam Assisted Gravity Drainage and Hybrid Steam Injection
Lecture 37 - Thermal Oil Recovery-In-Situ Combustion
Lecture 38 - Air Requirement in In-situ Combustion
Lecture 39 - Electromagnetic heating and Ultrasonication for Enhanced Oil Recovery
Lecture 40 - Low salinity water flooding
Lecture 41 - Low salinity water flooding (Continued...)
Lecture 42 - Low salinity water flooding (Continued...)
Lecture 43 - Low salinity water flooding (Continued...)
Lecture 44 - Low salinity water flooding in Carbonate Reservoir - Smart Water Flooding
Lecture 45 - Nanotechnology based EOR
Lecture 46 - Nanotechnology based EOR (Continued...)
Lecture 47 - Microbial Enhanced Oil Recovery
Lecture 48 - Carbonated water injection (CWI) for EOR
Lecture 49 - Plasma pulse technology and Exothermic Chemical Treatment (ECT) in EOR
Lecture 50 - Enhanced Gas Recoveries
Lecture 51 - Water Shutoff and Profile Modification
Lecture 52 - Reservoir Simulation Studies for Enhanced Oil Recovery
Lecture 53 - Introduction to Artificial Intelligence and Machine Learning in EOR
Lecture 54 - Techno-economic feasibility analysis
Lecture 55 - Review of Classes
Lecture 56 - Review of Classes (Continued...)
Lecture 57 - Review of Classes (Continued...)
Lecture 58 - Case Studies of EOR Methods
Lecture 59 - Case Studies of EOR Methods (Continued...)
Lecture 60 - Role of Petroleum Engineering for design and operation of EOR Methods

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NPTEL Video Course - Chemical Engineering - NOC:Adsorption Science and Technology: Fundamentals and Applicati

Subject Co-ordinator - Prof. Sourav Mondal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Background of Adsorption
Lecture 2 - Adsorbents
Lecture 3 - Key Features of Adsorption, Thermodynamic Background
Lecture 4 - Adsorption Isotherm
Lecture 5 - Langmuir Isotherm
Lecture 6 - Multicomponent Langmuir and Other Isotherms
Lecture 7 - Other Important Isotherms (Continued...)
Lecture 8 - Equilibrium Modelling - I
Lecture 9 - Equilibrium Modelling - II
Lecture 10 - Adsorption Kinetics
Lecture 11 - BET Analysis
Lecture 12 - Gas Sorption
Lecture 13 - Surface Area Calculations
Lecture 14 - Pore Size Analysis
Lecture 15 - Limitations of BET Analysis
Lecture 16 - Adsorption and Diffusion Models
Lecture 17 - Film Diffusion
Lecture 18 - Linear Driving Force Model
Lecture 19 - Intraparticle Adsorption Diffusion Model
Lecture 20 - Slurry Adsorption
Lecture 21 - Fixed Bed Adsorption
Lecture 22 - Mass Transfer Zone Modelling
Lecture 23 - Fixed Bed Design: Thomas Model
Lecture 24 - Fixed Bed Design: Adams-Bohart and Other Models
Lecture 25 - Fixed Bed Design: Constant Pattern Behaviour
Lecture 26 - Fixed Bed Design: Multi-Scale Model
Lecture 27 - Fixed Bed Adsorption: Illustrative Problems
Lecture 28 - Introduction to Pressure Swing Adsorption (PSA)
Lecture 29 - Modelling PSA Systems

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Lecture 30 - Design of Medical Grade Oxygen Concentrator
Lecture 31 - Introduction to Chromatography
Lecture 32 - Chromatography: Principles
Lecture 33 - Column Chromatography
Lecture 34 - Chromatography: Illustrative Problems 1
Lecture 35 - Chromatography: Illustrative Problems 2
Lecture 36 - Ion Exchange: Principles
Lecture 37 - Ion Exchange Adsorbents
Lecture 38 - Ion Exchange: Illustrative Problem
Lecture 39 - Ion Exchange Cycle
Lecture 40 - Ion Exchange Cycle: Illustrative Problem

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NPTEL Video Course - Chemical Engineering - NOC:Advanced Heat Conduction

Subject Co-ordinator - Prof. Debasis Sarkar

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Concepts
Lecture 2 - Fourierâ s Law of Heat Conduction
Lecture 3 - General Heat Conduction Equation
Lecture 4 - Initial and Boundary Conditions for the Heat Equation
Lecture 5 - 1D Steady-State Heat Conduction and Kirchhoff Transformation
Lecture 6 - Extended Surfaces: Fins
Lecture 7 - Extended Surfaces: Fins (Continued...)
Lecture 8 - Sturm-Liouville Problem
Lecture 9 - Fourier Series
Lecture 10 - Fourier-Bessel Series
Lecture 11 - Fourier-Legendre Series
Lecture 12 - Tutorial on Fourier Expansions
Lecture 13 - Uniqueness of Solution and Introduction to Separation of Variables
Lecture 14 - Problems on Rectangular Coordinate System
Lecture 15 - Problems on Rectangular Coordinate System (Continued...)
Lecture 16 - Problems on Cylindrical Coordinate System
Lecture 17 - Problems on Cylindrical Coordinate System (Continued...)
Lecture 18 - Problems on Spherical Coordinate System
Lecture 19 - Lumped Heat Capacity System
Lecture 20 - Distributed Systems: Exact Solution by SOV
Lecture 21 - 1D Transient Problems with Convective Boundary Conditions
Lecture 22 - 1D Transient Problems with Convective Boundary Conditions (Continued...)
Lecture 23 - Graphical Solution of Transient Problems: Heislerâ s Chart
Lecture 24 - Semi-infinite and Infinite Solids: Fourier Integral
Lecture 25 - Semi-infinite and Infinite Medium in Cartesian Coordinate System
Lecture 26 - Semi-infinite Medium in Cylindrical and Spherical Coordinates
Lecture 27 - Semi-infinite Medium: The Similarity Method
Lecture 28 - Semi-infinite Medium: Laplace Transform Method
Lecture 29 - Introduction to Integral Transforms

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Lecture 30 - Transient Heat Conduction in Finite Domain
Lecture 31 - Transient Heat Conduction in Finite Domain (Continued...)
Lecture 32 - Steady-State Heat Conduction in Finite Domain
Lecture 33 - Heat Conduction in Semi-infinite/Infinite Domain
Lecture 34 - Hankel Transforms: Heat Conduction in Cylindrical Coordinates
Lecture 35 - Duhamelâ s Method: Time-Dependent Boundary Conditions
Lecture 36 - Duhamelâ s Method: Discontinuity in Boundary Condition
Lecture 37 - Applications of Duhamelâ s Method: Examples
Lecture 38 - Introduction to Greenâ s Function
Lecture 39 - Determination of Greenâ s Function and Solution of Heat Equation
Lecture 40 - Moving Interface Problems
Lecture 41 - Moving Interface Problems (Continued...)
Lecture 42 - A Single-Region Phase-Change Problem: Stefanâ s Exact Solution
Lecture 43 - A Two-Region Phase-Change Problem: Neumannâ s Exact Solution
Lecture 44 - Solution of Phase-Change Problems: Similarity Method and Quasi-Steady Approximation
Lecture 45 - Representation of Local Heat Sources by Delta Function
Lecture 46 - Heat Conduction in a Slab with Local Heat Sources
Lecture 47 - Heat Conduction in a Long Solid Cylinder with Local Heat Sources
Lecture 48 - Heat Conduction in a Solid Sphere with Local Heat Sources
Lecture 49 - Infinite Region with Point Heat Sources and Heat Conduction with Moving Heat Sources
Lecture 50 - Introduction to Integral Method
Lecture 51 - Integral Method for Semi-Infinite Medium
Lecture 52 - Integral Method for Problems with Temperature Dependent Thermo-physical Properties
Lecture 53 - Integral Method for Heat Conduction with Phase Change
Lecture 54 - Integral Method for Finite Region and A Brief Introduction to Method of Residuals
Lecture 55 - An Introduction to Porous Media
Lecture 56 - Heat Conduction Equation for Porous Media
Lecture 57 - Heat Conduction for Porous Media: Examples
Lecture 58 - Introduction to Heat Conduction in Anisotropic Solids
Lecture 59 - Heat Conduction in Anisotropic Solids
Lecture 60 - Introduction to Numerical Solution for Heat Conduction Problems
Lecture 61 - Finite Difference Method for 1D Heat Conduction Problems
Lecture 62 - Finite Difference Method for 2D Heat Conduction Problems
Lecture 63 - Finite Difference Method for Transient Heat Conduction Problems
Lecture 64 - MATLAB Functions for Solution of Heat Conduction Problems
Lecture 65 - MATLAB PDE Toolbox for Solution of Heat Conduction Problems

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NPTEL Video Course - Chemical Engineering - NOC:CFD Applications in Chemical Processes

Subject Co-ordinator - Prof. Arnab Atta

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Introduction
Lecture 5 - Introduction
Lecture 6 - Fundamentals of Fluid Flow and Heat Transfer
Lecture 7 - Fundamentals of Fluid Flow and Heat Transfer
Lecture 8 - Boundary Conditions
Lecture 9 - Boundary Conditions
Lecture 10 - Basics of Finite Volume Method
Lecture 11 - Numerical Methods for CFD
Lecture 12 - Numerical Methods for CFD
Lecture 13 - Numerical Methods for CFD
Lecture 14 - Numerical Methods for CFD
Lecture 15 - Numerical Methods for CFD
Lecture 16 - Finite Volume Method
Lecture 17 - Finite Volume Method
Lecture 18 - Finite Volume Method
Lecture 19 - Finite Volume Method
Lecture 20 - Finite Volume Method
Lecture 21 - Finite Volume Method
Lecture 22 - Finite Volume Method
Lecture 23 - Finite Volume Method
Lecture 24 - Finite Volume Method
Lecture 25 - Finite Volume Method
Lecture 26 - Finite Volume Method
Lecture 27 - Pressure-velocity coupling
Lecture 28 - Pressure-velocity coupling
Lecture 29 - Pressure-velocity coupling

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Lecture 30 - Pressure-velocity coupling
Lecture 31 - CFD Tools and Modeling Single-phase System
Lecture 32 - CFD Tools and Modeling Single-phase System
Lecture 33 - CFD Tools and Modeling Single-phase System
Lecture 34 - CFD Tools and Modeling Single-phase System
Lecture 35 - CFD Tools and Modeling Single-phase System
Lecture 36 - Modeling Multiphase Systems
Lecture 37 - Modeling Multiphase Systems
Lecture 38 - Modeling Multiphase Systems
Lecture 39 - Modeling Multiphase Systems
Lecture 40 - Modeling Multiphase Systems
Lecture 41 - Modeling Multiphase Systems
Lecture 42 - Modeling Multiphase Systems
Lecture 43 - Modeling Multiphase Systems
Lecture 44 - Modeling Multiphase Systems
Lecture 45 - Modeling Multiphase Systems
Lecture 46 - Modeling Multiphase Systems
Lecture 47 - Turbulence Modeling
Lecture 48 - Turbulence Modeling
Lecture 49 - Turbulence Modeling
Lecture 50 - Turbulence Modeling
Lecture 51 - Turbulence Modeling
Lecture 52 - Turbulence Modeling
Lecture 53 - Turbulence Modeling
Lecture 54 - Turbulence Modeling
Lecture 55 - Turbulence Modeling
Lecture 56 - CFD in Reaction Engineering
Lecture 57 - CFD in Reaction Engineering
Lecture 58 - CFD in Reaction Engineering
Lecture 59 - Validation and Troubleshooting in CFD
Lecture 60 - Validation and Troubleshooting in CFD

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NPTEL Video Course - Chemical Engineering - NOC:Engineering Aspects of Biofuels and Biomass Conversion Techno

Subject Co-ordinator - Prof. Ejaz Ahmad

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Economic and innovation opportunities
Lecture 3 - Economic and innovation opportunities, Government policies
Lecture 4 - Government policies and sustainable development goals
Lecture 5 - Brief on biomass conversion technologies
Lecture 6 - Types of biomass and their categorization
Lecture 7 - Types of biomass and their classification
Lecture 8 - Biomass Availability
Lecture 9 - History of Biofuels and Technologies
Lecture 10 - Generation of Biofuels and Technologies
Lecture 11 - Briquetting
Lecture 12 - Briquetting
Lecture 13 - Briquetting and Process Flow Diagram
Lecture 14 - PFD for Briquetting
Lecture 15 - Briquetting and Pelletization
Lecture 16 - Introduction to Gasifier Stoves
Lecture 17 - Commercial Gasifier Stove
Lecture 18 - Household Biomass Gas Stoves
Lecture 19 - Gasifier Stove Design and Performance Test
Lecture 20 - Factors Affecting Gasifier Stove Performance
Lecture 21 - Biomass Characterization
Lecture 22 - Large Scale Gasifier Theory and Process Flow Development
Lecture 23 - Process Flow Development and Preliminary Design
Lecture 24 - Preliminary Design Calculation
Lecture 25 - Commercial Gasifiers and Selection Criteria
Lecture 26 - Introduction to High Temperature Processes
Lecture 27 - Introduction to Biomass Pyrolysis
Lecture 28 - Types of Pyrolysis
Lecture 29 - PFD for Biomass Pyrolysis

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Lecture 30 - Types of Reactor and Bio Oil Upgradation
Lecture 31 - Introduction to Low-temperature conversion technologies
Lecture 32 - Catalytic Processes for Biomass conversion
Lecture 33 - High-Value chemical, Sweeteners, biopolymers Production from biomass
Lecture 34 - Fuel additives, Green gasoline and green diesel Production
Lecture 35 - Sustainable Aviation Fuel Production
Lecture 36 - Introduction of Biochemical Conversion
Lecture 37 - Pretreatment of Biomass
Lecture 38 - Types Of Pretreatment
Lecture 39 - Physico - Chemical Pretreatment and Enzymatic hydrolysis
Lecture 40 - Ethanol Production
Lecture 41 - Introduction to Biogas Production
Lecture 42 - Anaerobic Digestion
Lecture 43 - Components Of AD Digester and Design consideration
Lecture 44 - Factor Affecting AD Digester and Sampling
Lecture 45 - Types of Digestors
Lecture 46 - Introduction to Biogas Plant Equipment
Lecture 47 - Biogas Storage and Handling
Lecture 48 - Biogas Plant Maintenance And control Philosophy
Lecture 49 - Biogas Handling And Enrichment
Lecture 50 - Biogas Enrichment Technology
Lecture 51 - Introduction to Algal Biomass
Lecture 52 - Sources and Generation of Algal Biomass
Lecture 53 - Algal Biomass Conversion Technology
Lecture 54 - Mechanistic Insight into Algae Conversion Technology
Lecture 55 - Chemical Production From Algal Biomass
Lecture 56 - Introduction to Non-Edible oil Conversion Processes
Lecture 57 - Non Edible Oil Properties and Processes
Lecture 58 - Biodiesel Production and Transesterification
Lecture 59 - Metal Catalyzed conversion Processes
Lecture 60 - Waste Cooking Oil conversion

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Python and Petroleum Data Analytics

Subject Co-ordinator - Prof. Archana

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Significance of Python and Petroleum Data Analytics
Lecture 3 - Significance of Python and Petroleum Data Analytics
Lecture 4 - Significance of Python and Petroleum Data Analytics
Lecture 5 - Significance of Python and Petroleum Data Analytics
Lecture 6 - Programming Fundamentals - 1
Lecture 7 - Programming Fundamentals - 2
Lecture 8 - Programming Fundamentals - 3
Lecture 9 - Programming Fundamentals - 4
Lecture 10 - Programming Fundamentals - 5
Lecture 11 - Implementation of Python Libraries - 1
Lecture 12 - Implementation of Python Libraries - 2
Lecture 13 - Implementation of Python Libraries - 3
Lecture 14 - Implementation of Python Libraries - 4
Lecture 15 - Implementation of Python Libraries - 5
Lecture 16 - Implementation of Python Libraries - NUMPY - I
Lecture 17 - Implementation of Python Libraries - NUMPY - II
Lecture 18 - Implementation of Python Libraries - NUMPY - III
Lecture 19 - Implementation of Python Libraries - Matplotlib - I
Lecture 20 - Implementation of Python Libraries - Matplotlib - II
Lecture 21 - Data Wrangling and Preprocessing - I
Lecture 22 - Data Wrangling and Preprocessing - II
Lecture 23 - Data Wrangling and Preprocessing - III
Lecture 24 - Data Wrangling and Preprocessing - IV
Lecture 25 - Data Wrangling and Preprocessing - V
Lecture 26 - Data Wrangling and Preprocessing - VI
Lecture 27 - Data Wrangling and Preprocessing - VII
Lecture 28 - Data Wrangling and Preprocessing - VIII
Lecture 29 - Data Wrangling and Preprocessing - IX

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Lecture 30 - Data Wrangling and Preprocessing - X
Lecture 31 - Data Manipulation - I
Lecture 32 - Data Manipulation - II
Lecture 33 - Data Manipulation - III
Lecture 34 - Data Manipulation - IV
Lecture 35 - Data Manipulation - V
Lecture 36 - Handling Missing Values-CCA
Lecture 37 - Handling Missing Values-Univariate Analysis
Lecture 38 - Handling Missing Values-Multivariate Analysis
Lecture 39 - Machine Learning - Supervised - I
Lecture 40 - Machine Learning - Supervised - II
Lecture 41 - Supervised Machine Learning - I
Lecture 42 - Supervised Machine Learning - II
Lecture 43 - Supervised Machine Learning - III
Lecture 44 - Supervised Machine Learning - IV
Lecture 45 - Supervised Machine Learning - V
Lecture 46 - Supervised Machine Learning - VI
Lecture 47 - Supervised Machine Learning - VII
Lecture 48 - Supervised Machine Learning - VIII
Lecture 49 - Supervised Machine Learning - IX
Lecture 50 - Supervised Machine Learning - X
Lecture 51 - Supervised Machine Learning Algorithm - I
Lecture 52 - Supervised Machine Learning Algorithm - II
Lecture 53 - Supervised Machine Learning Algorithm - III
Lecture 54 - Supervised Machine Learning Algorithm - IV
Lecture 55 - Supervised Machine Learning Algorithm - V
Lecture 56 - Supervised and Unsupervised Machine Learning
Lecture 57 - Supervised Machine Learning
Lecture 58 - Unsupervised Machine Learning
Lecture 59 - Supervised Machine Learning
Lecture 60 - Supervised Machine Learning

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NPTEL Video Course - Chemical Engineering - NOC:Foundations on Rubber Science, Technology and Manufacturing

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History and Importance of Rubber, Rubber Plantation: Cultivation and Harvesting, Challenges in Na
Lecture 2 - Types of Rubber: Natural vs Synthetic, vs Specialty Rubbers
Lecture 3 - Applications of Rubber in Various Industries
Lecture 4 - Hyper-elasticity, Thermo-elasticity and Viscoelasticity: Three Basics Attributes of Rubbers
Lecture 5 - Structure-Property Correlation
Lecture 6 - Polymerization of Rubbers: Synthesis and Techniques
Lecture 7 - Modification of Rubbers: Chemical modification, TPE and blending
Lecture 8 - Vulcanization of Rubbers: Sulfur based Curing
Lecture 9 - Vulcanization of Rubbers: Peroxide and Other Curing System
Lecture 10 - Physical Testing: Static and Dynamic Mechanical Testing
Lecture 11 - Thermal Properties of Rubbers/Elastomers
Lecture 12 - Origin of Elasticity and Thermo-elasticity
Lecture 13 - Physics of Rubber Elasticity
Lecture 14 - Physics of Viscoelasticity - 1
Lecture 15 - Physics of Viscoelasticity - 2
Lecture 16 - Basics of Rheology of Rubbers and Practical Demonstration on Rubber Process Analyzer, Parallel P
Lecture 17 - Rubber Compounding: Introduction to Rubber Compounding, its Significance, Types of Compounding I
Lecture 18 - Rubber Compounding: Anti-degradants (Antioxidants and Antiozonants)
Lecture 19 - Rubber Compounding: Fillers Reinforcing, Non-reinforcing, Special Fillers (Rubber Nanocomposites
Lecture 20 - Rubber Compounding: Plasticizers and Process Oils
Lecture 21 - Rubber Compounding: Flame Retardants and Miscellaneous Ingredients
Lecture 22 - General Purpose Rubber: Natural Rubber - 1
Lecture 23 - General Purpose Rubber: Natural Rubber - 2 and Synthetic Isoprene Rubber
Lecture 24 - General Purpose Rubber: Styrene-Butadiene Rubber (SBR)
Lecture 25 - General Purpose Rubber: Isobutylene-Isoprene Rubber (IIR) / Butyl Rubber
Lecture 26 - General Purpose Rubber: NBR (Nitrile Butadiene Rubber), HNBR (Hydrogenated NBR), and XNBR (Carbo
Lecture 27 - General Purpose Rubber: Butadiene Rubber (BR)
Lecture 28 - General Purpose Rubber: Chloroprene Rubber / Neoprene (CR)
Lecture 29 - General Purpose Rubber: Ethylene Propylene Diene Monomer (EPDM) and Other Unsaturated Hydrocarbo

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Lecture 30 - Specialty Rubbers: Silicone Rubber (Q or VMQ)
Lecture 31 - Specialty Rubbers: Acrylic and Other Rubbers with Ester Side Chain ACM (Acrylic Copolymer Rubber
Lecture 32 - Specialty Rubbers: Polyurethane Rubbers
Lecture 33 - Specialty Rubbers: Fluoro Rubber (FKM) and Polyphosphazenes
Lecture 34 - Specialty Rubbers: Thermoplastic Rubber (TPR)
Lecture 35 - Specialty Rubbers: Thermoplastic Vulcanizates (TPV)
Lecture 36 - Specialty Rubbers: Miscellaneous Rubbery Materials (Polysulfides, Polyethers, and Halogenated Po
Lecture 37 - Rubber Processing: Mastication and Rubber Processing Stages
Lecture 38 - Mixing and Processing on Two-Roll Mill
Lecture 39 - Two-Roll Mill: Effect of Different Parameters
Lecture 40 - Internal Mixer
Lecture 41 - Moulding Equipment's
Lecture 42 - Engineering on Rubber Products: Tyres
Lecture 43 - Engineering on Rubber Products: Conveyer Belt
Lecture 44 - Engineering on Rubber Products: Transmission Belt
Lecture 45 - Engineering on Rubber Products: Hoses and Seals
Lecture 46 - Engineering on Rubber Products: Rubber Springs: Mounts and Isolators
Lecture 47 - Miscellaneous Rubber Products and Testing Procedures
Lecture 48 - Composites and its types
Lecture 49 - Reinforcement: Particulate
Lecture 50 - Reinforcement: Fiber
Lecture 51 - Synergism in Properties: Mechanical, Electrical and Morphological
Lecture 52 - Textile Technology: Fundamentals and Basic Terminology
Lecture 53 - Application of Textiles in Rubbers Industry (Rubber to Fabric Adhesion and Surface Treatment Inc
Lecture 54 - Concept of Adhesion
Lecture 55 - Adhesion Parameters: Surface Energy, Surface Roughness, and Spreading Coefficient
Lecture 56 - Rubber-based Adhesion Science and Technology
Lecture 57 - Rubber-based Adhesion Science and Technology
Lecture 58 - Rubber to Metal Bonding
Lecture 59 - Practical Demonstration on Adhesion
Lecture 60 - Finite Element Analysis (FEA) and its Application in the Manufacturing of Rubber Products
Lecture 61 - Hyper Elastic Models and their Applications in Simulation
Lecture 62 - Die Design and Modelling for Predicting Flow Behavior
Lecture 63 - FEA Based Damage Model and Lifetime Estimation
Lecture 64 - Demonstration on FEA in Rubber Metal Bonding
Lecture 65 - Current Advancements in Rubber
Lecture 66 - Innovations In Rubber Processing Techniques Possibilities of 3-D Printing
Lecture 67 - Computational Modelling in Rubber Technology
Lecture 68 - Role of Rubber in Sustainable Development Biodegradable and Green Rubber Regulatory

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Lecture 69 - Industry Academia collaborations carer Opportunities and Start-up

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NPTEL Video Course - Chemical Engineering - NOC:Transport Processes and Modelling of Sustainable Electrochemi

Subject Co-ordinator - Prof. Sourav Mondal, Prof. Sirshendu De, Prof. Guy Ramon, Prof. Raka Mondal

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to charge transport and its relevance to electrochemical energy system
Lecture 2 - Conservation of ion and Nernst Planck Equations
Lecture 3 - The advection-diffusion migration framework
Lecture 4 - Poisson Equation for the electric potential distribution
Lecture 5 - Electric Double Layer (EDL) and its structure
Lecture 6 - Approximate models of the EDL, and the electric potential distribution
Lecture 7 - Basics of Electrokinetic phenomena - I
Lecture 8 - Basics of Electrokinetic phenomena - II
Lecture 9 - Solute transport through the pores of membrane
Lecture 10 - Prediction of pore charge density and solute flux
Lecture 11 - Basics of hydrodynamic transport in porous media: Relevance to membrane based Electrolyser and F
Lecture 12 - Introduction to Saffman Taylor instability
Lecture 13 - Analysis of multiphase transport in porous media
Lecture 14 - Liquid vapour transport in porous media
Lecture 15 - Transport of neutral solute through the porous-walled microchannel
Lecture 16 - Transport of charged solute through the porous-walled microchannel
Lecture 17 - Introduction to design of green H2 units
Lecture 18 - Modelling framework of individual standalone unit
Lecture 19 - Transport process in membrane electrolytes - Part I
Lecture 20 - Transport process in membrane electrolytes - Part II

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NPTEL Video Course - Chemical Engineering - NOC:Fundamental of Carbon Capture, Utilization and Storage

Subject Co-ordinator - Prof. Archana

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of existing Green House Gas (GHG) emissions issues
Lecture 2 - Overview of existing Green House Gas (GHG) emissions issues (Continued...)
Lecture 3 - Overview of existing Green House Gas (GHG) emissions issues (Continued...)
Lecture 4 - Overview of existing Green House Gas (GHG) emissions issues (Continued...)
Lecture 5 - Overview of existing Green House Gas (GHG) emissions issues (Continued...)
Lecture 6 - Introduction and Necessity of CCS: Global emissions, Climate change
Lecture 7 - Introduction and Necessity of CCS: Evidence of climate change
Lecture 8 - Introduction and Necessity of CCS: Concept of carbon trading
Lecture 9 - Introduction and Necessity of CCS: Concept of carbon credit and carbon footprint
Lecture 10 - Introduction and Necessity of CCS: Concept of carbon credit and carbon footprint (Continued...)
Lecture 11 - Introduction to carbon storage and different sequestration (CCUS)
Lecture 12 - Biological carbon sequestration: Forests and woodlands biological carbon sequestration
Lecture 13 - Biological carbon sequestration: Ocean Biological carbon sequestration - Part 1
Lecture 14 - Biological carbon sequestration: Ocean Biological carbon sequestration - Part 2
Lecture 15 - Different options of carbon sequestration
Lecture 16 - Concept of Carbon Intensity
Lecture 17 - Carbon intensity calculation
Lecture 18 - Carbon Neutral
Lecture 19 - Carbon Neutrality and Net Zero Emission
Lecture 20 - Overview Of Carbon Neutral, Net Zero Emission, Carbon Positive and Carbon Negative
Lecture 21 - Overview ofÂ Carbon capture technologies: Post-combustion, Pre-combustion, Oxy-combustion
Lecture 22 - Carbon capture methods: adsorption and absorption processes (Continued...)
Lecture 23 - Carbon capture methods: adsorption and absorption processes
Lecture 24 - Carbon capture methods: adsorption and absorption processes (Continued...)
Lecture 25 - Carbon capture methods: adsorption and absorption processes (Continued...)
Lecture 26 - Fundamental of carbon capture, utilization and storage
Lecture 27 - Fundamental of carbon capture, utilization and storage (Continued...)
Lecture 28 - Fundamental of carbon capture, utilization and storage (Continued...)
Lecture 29 - Fundamental of carbon capture, utilization and storage

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Lecture 30 - Fundamental of carbon capture, utilization and storage
Lecture 31 - CO2 Geological sequestration and Trapping Mechanism
Lecture 32 - CO2 Geological sequestration and Trapping Mechanism (Continued...)
Lecture 33 - CO2 Geological sequestration and Trapping Mechanism (Continued...)
Lecture 34 - CO2 Geological sequestration and Trapping Mechanism
Lecture 35 - CO2 Geological sequestration and Trapping Mechanism
Lecture 36 - CO2 Geological sequestration and Trapping Mechanism
Lecture 37 - CO2 Geological sequestration and Trapping Mechanism (Continued...)
Lecture 38 - CO2 Geological sequestration and Trapping Mechanism (Continued...)
Lecture 39 - CO2 Geological sequestration and Trapping Mechanism (Continued...)
Lecture 40 - CO2 Geological sequestration and Trapping Mechanism (Continued...)
Lecture 41 - CO2Â Utilization: CO2Â flooding - EOR
Lecture 42 - CO2Â Utilization: CO2Â flooding - EOR (Continued...)
Lecture 43 - CO2Â Utilization: CO2Â flooding - EOR (Continued...)
Lecture 44 - CO2Â Utilization: CO2Â flooding - EOR (Continued...)
Lecture 45 - CO2Â Utilization: CO2Â flooding - EOR (Continued...)
Lecture 46 - CO2 flooding: Enhanced Coal Bed Methane Recovery
Lecture 47 - CO2 flooding: Enhanced Coal Bed Methane Recovery (Continued...)
Lecture 48 - CO2 flooding: Enhanced Coal Bed Methane Recovery (Continued...)
Lecture 49 - CO2 flooding: Enhanced Coal Bed Methane Recovery (Continued...)
Lecture 50 - CO2 flooding: Enhanced Coal Bed Methane Recovery (Continued...)
Lecture 51 - Underground CO2Â sequestration-CO2Â sequestration as hydrates
Lecture 52 - Underground CO2Â sequestration-CO2Â sequestration as hydrates (Continued...)
Lecture 53 - Underground CO2Â sequestration-CO2Â sequestration as hydrates (Continued...)
Lecture 54 - Underground CO2Â sequestration-CO2Â sequestration as hydrates (Continued...)
Lecture 55 - Underground CO2Â sequestration-CO2Â sequestration as hydrates (Continued...)
Lecture 56 - Carbon utilisation technologies: Latest Advances - Part I
Lecture 57 - Carbon utilisation technologies: Latest Advances - Part II
Lecture 58 - Carbon utilisation technologies: Latest Advances - Part III
Lecture 59 - Cost in CCUS plants - Part I
Lecture 60 - Cost in CCUS plants - Part II

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NPTEL Video Course - Chemical Engineering - Chemical Engineering Thermodynamics

Subject Co-ordinator - Prof. M.S. Ananth

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thermodynamics and the Chemical Industry
Lecture 2 - James Prescot Joule and the first law
Lecture 3 - Sadi Carnot and the second law
Lecture 4 - Equilibrium and Extrema in work
Lecture 5 - Illustrative Calculations - I
Lecture 6 - Properties of pure substances
Lecture 7 - The p-h chart
Lecture 8 - Work calculation
Lecture 9 - Illustrative Calculations - II
Lecture 10 - Heat-Work Interconversion Devices
Lecture 11 - Refrigeration / Thermodynamics of mixtures
Lecture 12 - The Gibbs Duhem equation
Lecture 13 - Models for Excess Gibbs Free Energy
Lecture 14 - Van Laar model
Lecture 15 - Gaseous and liquid mixtures
Lecture 16 - Separation Work / Equations of state
Lecture 17 - Chemical potentials in gas and condensed phases
Lecture 18 - Vapour Liquid Equilibria - I
Lecture 19 - Vapour Liquid Equilibria - II
Lecture 20 - Solvent-Solvent mixtures
Lecture 21 - Solvent-Solute mixtures
Lecture 22 - Liquid-liquid equilibria
Lecture 23 - An industrial example
Lecture 24 - Liquid-liquid equilibria / Reaction Equilibria
Lecture 25 - Reaction Equilibria
Lecture 26 - Illustrative Examples - I
Lecture 27 - Illustrative Examples - II
Lecture 28 - Illustrative Examples - III
Lecture 29 - Simultaneous Relations

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Lecture 30 - Thermodynamic Consistency / Reverse Osmosis
Lecture 31 - Miscellaneous topics in phase equilibria
Lecture 32 - Absorption Refrigeration
Lecture 33 - Summary of Classical Thermodynamics
Lecture 34 - Molecular basis of Thermodynamics - I
Lecture 35 - Molecular basis of Thermodynamics - II

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NPTEL Video Course - Chemical Engineering - Computational Fluid Dynamics

Subject Co-ordinator - Prof. Sreenivas Jayanti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation for CFD and Introduction to the CFD approach
Lecture 2 - Illustration of the CFD approach through a worked out example
Lecture 3 - Eulerian approach, Conservation Equation, Derivation of Mass Conservation Equation and Statement
Lecture 4 - Forces acting on a control volume; Stress tensor; Derivation of the momentum conservation equatio
Lecture 5 - Kinematics of deformation in fluid flow; Stress vs strain rate relation; Derivation of the Navier
Lecture 6 - Equations governing flow of incompressible flow; Initial and boundary conditions; Wellposedness c
Lecture 7 - Equations for some simple cases; Generic scalar transport equation form of the governing equation
Lecture 8 - cut out the first 30s; Spatial discretization of a simple flow domain; Taylorâ s series expansio
Lecture 9 - Finite difference approximation of pth order of accuracy for qth order derivative; cross -derivat
Lecture 10 - One -sided high order accurate approximations; Explicit and implicit formulations for the time d
Lecture 11 - Numerical solution of the unsteady advection equation using different finite difference approxim
Lecture 12 - Need for analysis of a discretization scheme; Concepts of consistency, stability and convergence
Lecture 13 - Statement of the stability problem; von Neumann stability analysis of the first order wave equat
Lecture 14 - Consistency and stability analysis of the unsteady diffusion equation; Analysis for two- and thr
Lecture 15 - Interpretation of the stability condition; Stability analysis of the generic scalar equation and
Lecture 16 - Template for the generic scalar transport equation and its extension to the solution of Navier-S
Lecture 17 - Illustration of application of the template using the MacCormack scheme for a three-dimensional
Lecture 18 - Stability limits of MacCormack scheme; Limitations in extending compressible flow schemes to inc
Lecture 19 - Artificial compressibility method and the streamfunction-vorticity method for the solution of NS
Lecture 20 - Pressur e equation method for the solution of NS equations
Lecture 21 - Pressure-correction approach to the solution of NS equations on a staggered grid; SIMPLE and its
Lecture 22 - Need for effici ent solution of linear algebraic equations; Classification of approaches for the
Lecture 23 - Direct methods for linear algebraic equations; Gaussian elimination method
Lecture 24 - Gauss-Jordan method; LU decomposition method; TDMA and Thomas algorithm
Lecture 25 - Basic iterative methods for linear algebraic equations
Lecture 26 - Convergence analysis of basic iterative schemes; Diagonal dominance condition for convergence; I
Lecture 27 - Application to the Laplace equation
Lecture 28 - Advanced iterative methods
Lecture 29 - Advanced iterative methods; Strongly Implicit Proc edure; Conjugate gradient method; Multigrid m

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Lecture 30 - Illustration of the Multigrid method for the Laplace equation
Lecture 31 - Overview of the approach of numerical solution of NS equations for simple domains; Introduction
Lecture 32 - Derivation of the energy conservation equation
Lecture 33 - Derivation of the species conservation equation; dealing with chemical reactions
Lecture 34 - Turbulence; Characteri stics of turbulent flow; Dealing with fluctuations and the concept of tim
Lecture 35 - Derivation of the Reynolds -averaged Navier -Stokes equations; identification of the closure pro
Lecture 36 - Reynol ds stresses in turbulent flow; Time and length scales of turbulence; Energy cascade; Mixi
Lecture 37 - One-equation model for turbulent flow
Lecture 38 - Two -equation model for turbulent flow; Numerical calculation of turbulent reacting flows
Lecture 39 - Calculation of near-wall region in turbulent flow; wall function approach; near-wall turbulence
Lecture 40 - Need for special methods for dealing with irregular flow geometry; Outline of the Body-fitted gr
Lecture 41 - Transformation of the governing equations; Illustration for the Laplace equation; Appearance and
Lecture 42 - Finite vol ume method for complicated flow domain; Illustration for the case of flow through a c
Lecture 43 - Finite volume method for the general case
Lecture 44 - Generation of a structured grid for irregular flow domain; Algebraic methods; Elliptic grid gene
Lecture 45 - Unstructured grid generation; Domain nodalization; Advancing front method for triangulation
Lecture 46 - Delaunay triangulation method for unstructured grid generation
Lecture 47 - Co -located grid approach for irregular geometries; Pressure correction equation for a co -locat

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NPTEL Video Course - Chemical Engineering - Computational Techniques

Subject Co-ordinator - Dr. Niket S. Kaisare

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Computational and Error Analysis
Lecture 3 - Linear Equations - Part 1
Lecture 4 - Linear Equations - Part 2
Lecture 5 - Linear Equations - Part 3
Lecture 6 - Linear Equations - Part 4
Lecture 7 - Linear Equations - Part 5
Lecture 8 - Linear Equations - Part 6
Lecture 9 - Non Linear Algebraic Equations - Part 1
Lecture 10 - Non Linear Algebraic Equations - Part 2
Lecture 11 - Non Linear Algebraic Equations - Part 3
Lecture 12 - Non Linear Algebraic Equations - Part 4
Lecture 13 - Non Linear Algebraic Equations - Part 5
Lecture 14 - Non Linear Algebraic Equations - Part 6
Lecture 15 - Regression and Interpolation - Part 1
Lecture 16 - Regression and Interpolation - Part 2
Lecture 17 - Regression and Interpolation - Part 3
Lecture 18 - Regression and Interpolation - Part 4
Lecture 19 - Regression and Interpolation - Part 5
Lecture 20 - Differentiation and Integration - Part 1
Lecture 21 - Differentiation and Integration - Part 2
Lecture 22 - Differentiation and Integration - Part 3
Lecture 23 - Differentiation and Integration - Part 4
Lecture 24 - Differentiation and Integration - Part 5
Lecture 25 - Ordinary Differential Equations (initial value problems) - Part 1
Lecture 26 - Ordinary Differential Equations (initial value problems) - Part 2
Lecture 27 - Ordinary Differential Equations (initial value problems) - Part 3
Lecture 28 - Ordinary Differential Equations (initial value problems) - Part 4
Lecture 29 - Ordinary Differential Equations (initial value problems) - Part 5

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Lecture 30 - Ordinary Differential Equations (initial value problems) - Part 6
Lecture 31 - Ordinary Differential Equations (initial value problems) - Part 7
Lecture 32 - Ordinary Differential Equations (initial value problems) - Part 8
Lecture 33 - Ordinary Differential Equations (initial value problems) - Part 9
Lecture 34 - Ordinary Differential Equations (boundary value problems) - Part 1
Lecture 35 - Ordinary Differential Equations (boundary value problems) - Part 2
Lecture 36 - Ordinary Differential Equations (boundary value problems) - Part 3
Lecture 37 - Partial Differential Equations - Part 1
Lecture 38 - Partial Differential Equations - Part 2
Lecture 39 - Partial Differential Equations - Part 3
Lecture 40 - Partial Differential Equations - Part 4

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NPTEL Video Course - Chemical Engineering - Particle Characterization (PG)

Subject Co-ordinator - Dr. R. Nagarajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Morphological Characterization
Lecture 4 - Morphological Characterization
Lecture 5 - Morphological Characterization
Lecture 6 - Morphological Characterization
Lecture 7 - Morphological Characterization
Lecture 8 - Morphological Characterization
Lecture 9 - Morphological Characterization
Lecture 10 - Morphological Characterization
Lecture 11 - Morphological Characterization
Lecture 12 - Morphological Characterization
Lecture 13 - Structural Characterization
Lecture 14 - Interfacial Characterization
Lecture 15 - Surface Adhesion
Lecture 16 - Surface Adhesion
Lecture 17 - Surface Adhesion
Lecture 18 - Particle Removal
Lecture 19 - Particle Removal
Lecture 20 - Particle Cohesion
Lecture 21 - Particle Cohesion
Lecture 22 - Transport Properties
Lecture 23 - Transport Properties
Lecture 24 - Transport Properties
Lecture 25 - Transport Properties
Lecture 26 - Chemical & Compositional Characterization
Lecture 27 - Chemical & Compositional Characterization
Lecture 28 - Chemical & Compositional Characterization
Lecture 29 - Nano-particle Characterization

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Lecture 30 - Nano-particle Characterization
Lecture 31 - Nano-particle Characterization
Lecture 32 - Nano-particle Characterization
Lecture 33 - Practical Relevance of Particle Characterization
Lecture 34 - Practical Relevance of Particle Characterization
Lecture 35 - Practical Relevance of Particle Characterization
Lecture 36 - Practical Relevance of Particle Characterization
Lecture 37 - Practical Relevance of Particle Characterization
Lecture 38 - Practical Relevance of Particle Characterization
Lecture 39 - Practical Relevance of Particle Characterization
Lecture 40 - Summary

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NPTEL Video Course - Chemical Engineering - Statistics for Experimentalists

Subject Co-ordinator - Dr. A. Kannan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Random Variables
Lecture 3 - Discrete Probability Distributions
Lecture 4 - Example Set - I
Lecture 5 - Continuous probability distributions
Lecture 6 - Normal probability distribution
Lecture 7 - Exploratory Data Analysis - Part A
Lecture 8 - Exploratory Data Analysis - Part B
Lecture 9 - Example Set - II
Lecture 10 - Example Set - III
Lecture 11 - Random samples
Lecture 12 - Random samples
Lecture 13 - Point Estimation
Lecture 14 - Sampling distributions and the Central Limit Theorem
Lecture 15 - Example Set - IV Part A
Lecture 16 - Estimation of Population Parameters Using Moments
Lecture 17 - Confidence Intervals (Part A)
Lecture 18 - Confidence Intervals (Part B)
Lecture 19 - The T-distribution
Lecture 20 - Chi-square distribution
Lecture 21 - F-Distribution
Lecture 22 - Example Set - V
Lecture 23 - Hypothesis Testing - Part A
Lecture 24 - Hypothesis Testing - Part B
Lecture 25 - Hypothesis Testing - Part C
Lecture 26 - Analysis of Experiments involving Single Factor - Part A
Lecture 27 - Analysis of Experiments involving Single Factor - Part B
Lecture 28 - Blocking and Randomization
Lecture 29 - Example Set - VI - Part A

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Lecture 30 - Example Set - VI - Part B
Lecture 31 - Factorial Design of Experiments - Part A
Lecture 32 - Factorial Design of Experiments - Part B
Lecture 33 - Fractional Factorial Design - Part A
Lecture 34 - Fractional Factorial Design - Part B
Lecture 35 - Factorial Design of Experiments
Lecture 36 - Factorial Design of Experiments
Lecture 37 - Factorial Design of Experiments
Lecture 38 - Regression Analysis
Lecture 39 - Regression Analysis
Lecture 40 - Hypothesis Testing in Linear Regression
Lecture 41 - Discussion on Regression Output
Lecture 42 - Regression Analysis
Lecture 43 - Regression Analysis
Lecture 44 - Regression Analysis
Lecture 45 - Orthogonal Model Fitting Concepts - Part A
Lecture 46 - Orthogonal Model Fitting Concepts - Part B
Lecture 47 - Experimental Design Strategies - A
Lecture 48 - Experimental Design Strategies - B
Lecture 49 - Experimental Design Strategies - C
Lecture 50 - Response Surface Methodology - A
Lecture 51 - Response Surface Methodology - B
Lecture 52 - Optimal Designs - Part A
Lecture 53 - Optimal Designs - Part B
Lecture 54 - Statistics for Experimentalists - Summary Part A
Lecture 55 - Statistics for Experimentalists - Summary Part B

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NPTEL Video Course - Chemical Engineering - Multiphase Flows - Analytical solutions and Stability Analysis

Subject Co-ordinator - Prof. S. Pushpavanam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and overview of the course
Lecture 2 - Stratified flow in a micro channel
Lecture 3 - Stratified flow in a micro channel
Lecture 4 - Flow regimes in microchannels
Lecture 5 - Scaling Analysis
Lecture 6 - Scaling Analysis
Lecture 7 - Interfacial tension and its role in Multiphase flows
Lecture 8 - Eulerian and Lagrangian approaches
Lecture 9 - Reynolds Transport Theorem and the Equation of Continuity
Lecture 10 - Derivation of Navier-Stokes equation
Lecture 11 - Vector operations in general orthogonal coordinates
Lecture 12 - Normal and shear stresses on arbitrary surfaces
Lecture 13 - Normal and shear stresses on arbitrary surfaces
Lecture 14 - Stresses on deforming surfaces
Lecture 15 - Pulsatile flow
Lecture 16 - Pulsatile flow
Lecture 17 - Pulsatile flow
Lecture 18 - Viscous heating
Lecture 19 - Domain perturbation methods
Lecture 20 - Flow between wavy walls
Lecture 21 - Introduction to stability of dynamical systems
Lecture 22 - Stability of distributed systems (PDEs)
Lecture 23 - Stability of a reaction-diffusion system (Continued...)
Lecture 24 - Rayleigh-Benard convection
Lecture 25 - Rayleigh-Benard convection
Lecture 26 - Rayleigh-Benard convection
Lecture 27 - Rayleigh-Benard convection
Lecture 28 - Rayleigh Benard convection
Lecture 29 - Rayleigh-Taylor â heavy over lightâ instability

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Lecture 30 - Rayleigh-Taylor instability (Continued...)
Lecture 31 - Capillary jet instability
Lecture 32 - Capillary jet instability
Lecture 33 - Capillary jet instability
Lecture 34 - Tutorial Session
Lecture 35 - Turing patterns
Lecture 36 - Turing patterns
Lecture 37 - Marangoni convection
Lecture 38 - Marangoni convection
Lecture 39 - Flow in a circular curved channel
Lecture 40 - Flow in a circular curved channel
Lecture 41 - Stability of flow through curved channels
Lecture 42 - Stability of flow through curved channels
Lecture 43 - Viscous Fingering
Lecture 44 - Viscous Fingering
Lecture 45 - Shallow Cavity flows

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Time-Frequency Analysis and Wavelet Transform

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Lecture 1.1 A
Lecture 2 - Introduction - Lecture 1.1 B
Lecture 3 - Introduction - Lecture 1.2 A
Lecture 4 - Introduction - Lecture 1.2 B
Lecture 5 - Basic Definitions and concepts - Lecture 2.1 (Basic Definitions and concepts - Part I)
Lecture 6 - Basic Definitions and concepts - Lecture 2.2 (Basic Definitions and concepts - Part II)
Lecture 7 - Basic Definitions and concepts - Lecture 2.3 (Basic Definitions and concepts - Part III)
Lecture 8 - A review of Fourier transforms - Lecture 3.1 (Continuous time Fourier series)
Lecture 9 - A review of Fourier transforms - Lecture 3.2 (Continuous time Fourier transform)
Lecture 10 - A review of Fourier transforms - Lecture 3.3 (Discrete time Fourier series)
Lecture 11 - A review of Fourier transforms - Lecture 3.4 (Discrete time Fourier transform)
Lecture 12 - A review of Fourier transforms - Lecture 3.5 (Properties of Fourier transforms)
Lecture 13 - A review of Fourier transforms - Lecture 3.6 (Discrete Fourier transform)
Lecture 14 - A review of Fourier transforms - MATLAB demo of Fourier transform and periodogram
Lecture 15 - Duration and Bandwidth - Duration and Bandwidth
Lecture 16 - Duration and Bandwidth - Bandwidth equation and Instantaneous frequency
Lecture 17 - Duration and Bandwidth - Instantaneous frequency and analytic signals
Lecture 18 - Duration and Bandwidth - Duration-Bandwidth principle
Lecture 19 - Duration and Bandwidth - Requirements of time-frequency anlysis techniques
Lecture 20 - Duration and Bandwidth - Requirements of time-frequency analysis and techniques
Lecture 21 - Short-time Fourier transform - Short-time Fourier transform
Lecture 22 - Short-time Fourier transform - Auxillary (MATLAB demonstration)
Lecture 23 - Short-time Fourier transform - Properties of STFT
Lecture 24 - Practical aspects of STFT
Lecture 25 - Closing Remarks
Lecture 26 - Wigner-Ville Distributions
Lecture 27 - Properties of WVD
Lecture 28 - Properties of WVD 2
Lecture 29 - Discrete WVD

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Lecture 30 - Pseudo and Smoothed WVD
Lecture 31 - Cohens class and smoothed WVD
Lecture 32 - Cohens class and smoothed WVD
Lecture 33 - Cohens class and Ambiguity functions
Lecture 34 - Affine class and closing remarks
Lecture 35 - Continuous Wavelet Transform
Lecture 36 - Continuous Wavelet Transforms
Lecture 37 - Scale to Frequency
Lecture 38 - Computational aspects of CWT
Lecture 39 - Scalogram and MATLAB demonstration
Lecture 40 - Scalogram and MATLAB demonstration
Lecture 41 - Scaling function
Lecture 42 - Scaling Function
Lecture 43 - Wavelets
Lecture 44 - Wavelets
Lecture 45 - Applications of CWT
Lecture 46 - Applications of CWT
Lecture 47 - Discrete Wavelet Transform
Lecture 48 - Discrete Wavelet Transform.
Lecture 49 - Orthogonal scaling function bases and MRA
Lecture 50 - Orthogonal scaling function bases and MRA.
Lecture 51 - Wavelet Filters and Fast DWT Algorithm
Lecture 52 - Wavelet Filters and Fast DWT Algorithm (Continued...)
Lecture 53 - Wavelet Filters and Fast DWT Algorithm (Continued...)
Lecture 54 - Wavelets for DWT
Lecture 55 - Wavelets for DWT (Continued...)
Lecture 56 - Wavelets for DWT (Continued...)
Lecture 57 - DWT computation
Lecture 58 - DWT computation (Continued...)
Lecture 59 - DWT computation (Continued...)

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NPTEL Video Course - Chemical Engineering - Chemical Engineering Principles of CVD Processes

Subject Co-ordinator - Dr. R. Nagarajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - CVD Reactor and Process Design Fundamentals
Lecture 3 - Overview of CVD Process Fundamentals
Lecture 4 - Basics of Chemical Equilibrium Calculations and Flow Dynamics
Lecture 5 - Introduction to CVD Films
Lecture 6 - Film Structure and Properties
Lecture 7 - Pressure Effects on CVD Processes
Lecture 8 - CVD of Metals
Lecture 9 - CVD of Coatings
Lecture 10 - CVD Film Property Measurements
Lecture 11 - CVD Film Property Measurements
Lecture 12 - CVD in Tungsten Filament Lamps
Lecture 13 - CVD in Tungsten Filament Lamps
Lecture 14 - CVD in Hot Corrosion
Lecture 15 - CVD Transport Phenomena
Lecture 16 - CVD Transport Phenomena
Lecture 17 - CVD Transport Phenomena
Lecture 18 - CVD Transport Phenomena
Lecture 19 - CVD Transport Phenomena
Lecture 20 - CVD Applications
Lecture 21 - CVD Applications
Lecture 22 - CVD Applications
Lecture 23 - CVD Applications
Lecture 24 - CVD Applications
Lecture 25 - CVD Overview
Lecture 26 - Review of CVD Basics
Lecture 27 - Review of CVD Basics
Lecture 28 - CVD Question Bank
Lecture 29 - Basics of Nano-Structured Material Synthesis

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Lecture 30 - Basics of Nano-Structured Material Synthesis
Lecture 31 - Undesirable CVD
Lecture 32 - Undesirable CVD
Lecture 33 - Undesirable CVD
Lecture 34 - Multi-component Transport Fundamentals
Lecture 35 - Multi-component Transport Fundamentals
Lecture 36 - Multi-component Transport Fundamentals
Lecture 37 - Multi-component Transport Fundamentals
Lecture 38 - Multi-component Transport Fundamentals
Lecture 39 - Multi-component Transport Fundamentals

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NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering 1 (Homogeneous Reactors)

Subject Co-ordinator - Prof K. Krishnaiah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation and Introduction - Part I
Lecture 2 - Motivation and Introduction - Part II
Lecture 3 - What is Chemical Engineering - Part I
Lecture 4 - What is Chemical Engineering - Part II
Lecture 5 - What is Chemical Reaction Engineering - Part I
Lecture 6 - What is Chemical Reaction Engineering - Part II
Lecture 7 - Homogeneous and Heterogeneous Reactions - Part I
Lecture 8 - Homogeneous and Heterogeneous Reactions - Part II
Lecture 9 - Basics of Kinetics and Contacting
Lecture 10 - Design of Batch reactors - Part I
Lecture 11 - Design of Batch reactors - Part II
Lecture 12 - Basics of Plug Flow Reactor - Part I
Lecture 13 - Basics of Plug Flow Reactor - Part II
Lecture 14 - Design of Plug Flow Reactors - Part I
Lecture 15 - Design of Plug Flow Reactors - Part II
Lecture 16 - Basics of Mixed Flow Reactors
Lecture 17 - Design of Mixed Flow Reactors
Lecture 18 - Basics of Kinetics
Lecture 19 - Kinetics of Heterogeneous reactions - Part I
Lecture 20 - Kinetics of Heterogeneous reactions - Part II
Lecture 21 - Kinetics of Heterogeneous reactions - Part III
Lecture 22 - Kinetics of Homogeneous reactions
Lecture 23 - Reaction rate for Homogeneous reactions
Lecture 24 - Gas Phase Homogeneous reactions
Lecture 25 - (Continued...) And later Reactor Design of PFR
Lecture 26 - Reactor Design for MFR and Combination of reactors
Lecture 27 - PFR and MFR in series.
Lecture 28 - Unsteady state MFR and PFR
Lecture 29 - Recycle Reactors

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Lecture 30 - Recycle Reactors (Autocatalytic reactions) - Part I
Lecture 31 - Recycle Reactors (Autocatalytic reactions) - Part II
Lecture 32 - Multiple Reactions - Part I
Lecture 33 - Multiple Reactions - Part II
Lecture 34 - Multiple Reactions - Part III
Lecture 35 - Multiple Reactions - Part IV
Lecture 36 - Multiple Reactions - Part V
Lecture 37 - Multiple Reactions - Part VI
Lecture 38 - Non-Isothermal Reactors - Part I
Lecture 39 - Non-Isothermal Reactors - Part II
Lecture 40 - Non-Isothermal Reactors (Graphical Design)
Lecture 41 - Non-Isothermal Reactors contd. & Adiabatic Reactors
Lecture 42 - Non-Isothermal Reactors (Graphical Design) (Continued...)
Lecture 43 - Non-Isothermal Batch Reactors
Lecture 44 - Non-isothermal Plug Flow Reactors - Part I
Lecture 45 - Non-isothermal Plug Flow Reactors - Part II
Lecture 46 - Adiabatic Plug Flow Reactors
Lecture 47 - Non-isothermal Mixed Flow Reactors
Lecture 48 - Non-isothermal Mixed Flow Reactors (Continued...) (Multiple steady states) - Part I
Lecture 49 - Non-isothermal Mixed Flow Reactors (Continued...) (Multiple steady states) - Part II
Lecture 50 - Non-Ideal Flow and Residence Time Distributions (RTD) basics - Part I
Lecture 51 - Non-Ideal Flow and Residence Time Distributions (RTD) basics - Part II
Lecture 52 - RTD for various reactors (Continued...) Part I
Lecture 53 - RTD for various reactors (Continued...) Part II
Lecture 54 - Diagnosing the ills of equipments and Various RTD Models
Lecture 55 - Dispersion Model
Lecture 56 - Dispersion with reaction Model and Tanks in Series Model
Lecture 57 - Multi-parameter model (MFR with dead space and bypass)
Lecture 58 - Direct use of RTD to predict conversion (Macro and Micro-fluid as well as Macro & Micro-mixing C
Lecture 59 - Direct use of RTD to predict conversion (Macro and Micro-fluid as well as Macro & Micro-mixing C
Lecture 60 - Direct use of RTD to predict conversion (Macro and Micro-fluid as well as Macro & Micro-mixing C

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NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering 2 (Heterogeneous Reactors)

Subject Co-ordinator - Prof K. Krishnaiah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Kinetics (Gas solid non-catalytic reaction)
Lecture 2 - Intro to Kinetics (Continued...) for catalytic reactions in different reactors
Lecture 3 - Heterogeneous rate of reactions and different types of kinetic models for non-catalytic reactions
Lecture 4 - Basics of Kinetics of type A & B reactions (Shrinking core model & Porous particle homogeneous mo
Lecture 5 - Shrinking Core Model (Continued...)
Lecture 6 - Shrinking Core Model (Continued...)
Lecture 7 - (Continued...) & Proof of Pseudo steady state assumption
Lecture 8 - Shrinking core model (Continued...) for type D reactions
Lecture 9 - Shrinking core model (Continued...) for type D reactions (Continued...)
Lecture 10 - Reactors, Homogeneous reaction model, Design of non-catalytic gas solid reactors
Lecture 11 - Design of non-catalytic gas solid reactors (Continued...)
Lecture 12 - Design of non-catalytic gas solid reactors (Continued...)
Lecture 13 - Design equation for MF of solids, uniform gas composition, const. single particle size, Shrinkin
Lecture 14 - Design equation for MF of solids, mixture of particles for different sizes but unchanging size,
Lecture 15 - Design equation for MF of solids with elutriation, mixture of particles of different size, unifo
Lecture 16 - General Performance equation for non-catalytic gas solid reactions
Lecture 17 - Catalytic reactions (LHHW Kinetic model)
Lecture 18 - LHHW Kinetic model (Continued...) - Part I
Lecture 19 - LHHW Kinetic model (Continued...) - Part II
Lecture 20 - Industrially important catalytic reaction models
Lecture 21 - Inter and Intraphase effectiveness fator
Lecture 22 - Interface effectiveness factor & Generalized nonisothermal effectiveness factor for external mas
Lecture 23 - Generalized nonisothermal effectiveness factor for external mass transfer step (Continued...)
Lecture 24 - Mass transfer correlations for various reactors
Lecture 25 - Isothermal intraphase effectiveness factor - Part I
Lecture 26 - Isothermal intraphase effectiveness factor - Part II
Lecture 27 - Non-isothermal intraphase effectiveness factor
Lecture 28 - Inter and Intraphase effectiveness factor (Continued...)
Lecture 29 - Inter and Intraphase Mass transfer

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Lecture 30 - Packed (fixed) bed catalytic reactor design
Lecture 31 - Graphical design of Fixed bed reactors
Lecture 32 - Packed Bed Design (Continued...)
Lecture 33 - Design equations for Packed bed reactor design
Lecture 34 - Conservative Equations for Packed bed Reactor design
Lecture 35 - Problem solving session
Lecture 36 - Fluidized Bed Reactor Design - Part I
Lecture 37 - Fluidized Bed Reactor Design - Part II
Lecture 38 - Fluidized Bed Reactor Design - Part III
Lecture 39 - Fluidized Bed Reactor Design - Part IV
Lecture 40 - Continued... (Fluidized bed reactor Models)
Lecture 41 - Continued... (Davidson Harrison model and Kunii Levenspiel model)
Lecture 42 - Continued... (Kunii Levenspiel Model)
Lecture 43 - Slurry Reactor Design

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NPTEL Video Course - Chemical Engineering - NOC:MATLAB Programming for Numerical Computation

Subject Co-ordinator - Dr. Niket S.Kaisare

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Basics of Programming using MATLAB
Lecture 3 - Array Operations in MATLAB
Lecture 4 - Loops and Execution Control
Lecture 5 - Tutorial
Lecture 6 - MATLAB Files -- Scripts and Functions
Lecture 7 - Plotting and Output
Lecture 8 - How to submit MATLAB Assignment
Lecture 9 - Errors in Numerical Computation
Lecture 10 - Truncation Errors and Taylors Series
Lecture 11 - Round-Off Errors; and Iterative Methods
Lecture 12 - Step-wise Methods and Error Propagation
Lecture 13 - How to get MATLAB Online access (for all enrolled students of this course)
Lecture 14 - Differentiation in Single Variable
Lecture 15 - Higher Order Differentiation Formulae
Lecture 16 - Partial Differentials (Bonus)
Lecture 17 - Numerical Integration
Lecture 18 - Multiple Applications of Integration Formulae
Lecture 19 - In-Build MATLAB Integration Functions
Lecture 20 - Basics of Linear Algebra
Lecture 21 - Gauss Elimination and Back-Substitution
Lecture 22 - LU Decomposition and Partial Pivoting
Lecture 23 - Gauss Siedel Method
Lecture 24 - (Tutorial)
Lecture 25 - Tri-Diagonal Matrix Algorithm
Lecture 26 - Nonlinear Equations in Single Variable
Lecture 27 - Using MATLAB command fzero
Lecture 28 - Fixed Point Iteration in Single Variable
Lecture 29 - Newton-Raphson (single variable)

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Lecture 30 - Using MATLAB command fsolve (multi-variable)
Lecture 31 - Newton-Raphson (multi Variable)
Lecture 32 - Introduction
Lecture 33 - Linear Least Squares Regression
Lecture 34 - Nonlinear and Functional Regression
Lecture 35 - Interpolation Functions in MATLAB
Lecture 36 - Introduction and Euler\'s Method
Lecture 37 - Runge-Kutta (RK-2) method
Lecture 38 - MATLAB ode45 algorithm
Lecture 39 - Higher order Runge-Kutta Methods
Lecture 40 - Error Analysis
Lecture 41 - Multi-Variable ODE
Lecture 42 - Stiff Systems & Solution using ode15s
Lecture 43 - Method of Lines for transient PDEs
Lecture 44 - A Final Example
Lecture 45 - Tutorial

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NPTEL Video Course - Chemical Engineering - NOC:Computational Fluid Dynamics

Subject Co-ordinator - Prof. Sreenivas Jayanti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation
Lecture 2 - Flow in a rectangular duct
Lecture 3 - Flow in a rectangular duct
Lecture 4 - Tutorial 1
Lecture 5 - Tutorial 1 (Continued...) Solution for algebraic equations using Gauss- Seidel Method
Lecture 6 - Flow in a triangular duct
Lecture 7 - Flow in a triangular duct
Lecture 8 - Tutorial 2
Lecture 9 - Tutorial 2 (Continued...) Description of FV method and solution using G-S Method
Lecture 10 - Effect of grid spacing & upcoming course outline
Lecture 11 - Mass conservation equations
Lecture 12 - Momentum conservation equations
Lecture 13 - Forces acting on control volume
Lecture 14 - Kinematics of deformation in fluid flow
Lecture 15 - Equations governing fluid flow in incompressible fluid
Lecture 16 - Navier-Stokes equation for simple cases of flow
Lecture 17 - Energy conservation equations
Lecture 18 - Practical cases of fluid flow with heat transfer in CFD point of view
Lecture 19 - Practical cases of fluid flow with mass transfer in CFD point of view
Lecture 20 - Equations governing fluid flow with chemical reactions
Lecture 21 - Concept of wellposedness of mathematical problems
Lecture 22 - Introduction to finite difference methods
Lecture 23 - Finite difference approximation on an uniform mesh
Lecture 24 - Higher order and mixed derivatives
Lecture 25 - Solution of Poisson equation in rectangular duct-Turorial
Lecture 26 - Discretization of time domain
Lecture 27 - FD approx. on a non-uniform mesh and need of analysis of obtained discretization
Lecture 28 - Need for the analysis of discretized equation
Lecture 29 - Properties of Numerical Schemes

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Lecture 30 - Properties of Numerical Schemes
Lecture 31 - Tutorial on Stability Analysis
Lecture 32 - Analysis of Generic 1-d scalar transport equation
Lecture 33 - Introduction to the solution of coupled N-S equations
Lecture 34 - N-S equation in compressible flow- Mac Cormack Scheme
Lecture 35 - Stability limits of Mac-Cormack Scheme and the intro to Beam-Warming Scheme
Lecture 36 - Implicit Beam-Warming Scheme
Lecture 37 - Compressible flow to Incompressible flow
Lecture 38 - Solution of coupled equations
Lecture 39 - Artificial compressiblity method, Stream function-vorticity method
Lecture 40 - Pressure equation method, Staggered grid system
Lecture 41 - Pressure Correction Method
Lecture 42 - Tutorial on Pressure Correction Method
Lecture 43 - Tutorial on Pressure Correction Method (Continued...)
Lecture 44 - Introduction to the basic numerical methods
Lecture 45 - Direct Methods
Lecture 46 - Tri-diagonal Matrix Algorithm
Lecture 47 - TDMA and other iterative methods
Lecture 48 - Recap of basic iterative methods.
Lecture 49 - Convergence analysis of basic iterative methods
Lecture 50 - Successive Over Relaxation (SOR) method
Lecture 51 - Alternating Direction Implicit (ADI) method
Lecture 52 - Strongly Implicit Procedure (ILU) method
Lecture 53 - Multigrid method
Lecture 54 - Body Fitted Grid Approach
Lecture 55 - Formulation Of Finite Volume Method
Lecture 56 - Methods For Unstructured Grid Generation
Lecture 57 - Triangulation
Lecture 58 - The Advancing Front Method continuation
Lecture 59 - Time and length scale of turbulance
Lecture 60 - The turbulent closure problem
Lecture 61 - The generic formulation for turbulence
Lecture 62 - More generic formulation and summary

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Statistical Hypothesis Testing

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation
Lecture 2 - Probability and statistics
Lecture 3 - Probability and Statistics
Lecture 4 - R Tutorial 1
Lecture 5 - Statistics for Hypothesis Testing - Part 1
Lecture 6 - Statistics for Hypothesis Testing - Part 2
Lecture 7 - Statistics for sample mean
Lecture 8 - Statistics for Variance and Proportion
Lecture 9 - Type I and Type II errors
Lecture 10 - p value
Lecture 11 - Hypothesis testing of means
Lecture 12 - Hypothesis testing of variance and proportions
Lecture 13 - Confidence interval construction
Lecture 14 - Hypothesis testing using confidence interval
Lecture 15 - Hypothesis testing of correlation
Lecture 16 - Statistic for linear regression
Lecture 17 - Hypothesis testing in linear regression
Lecture 18 - Power of hypothesis test
Lecture 19 - Factors affecting hypothesis test

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NPTEL Video Course - Chemical Engineering - NOC:Applied Time-Series Analysis

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1 - Part 1 - Motivation and Overview 1
Lecture 2 - Lecture 1 - Part 2 - Motivation and Overview 2
Lecture 3 - Lecture 2 - Part 1 - Motivation and Overview 3
Lecture 4 - Lecture 2 - Part 2 - Motivation and Overview 4
Lecture 5 - Lecture 3 - Part 1 - Motivation and Overview 5
Lecture 6 - Lecture 3 - Part 2 - Motivation and Overview 6
Lecture 7 - Lecture 4 - Part 1 - Probability and Statistics Review 1A
Lecture 8 - Lecture 4 - Part 2 - Probability and Statistics Review 1B
Lecture 9 - Lecture 5 - Part 1 - Probability and Statistics Review 1C
Lecture 10 - Lecture 5 - Part 2 - Probability and Statistics Review 1D
Lecture 11 - Lecture 6 - Part 1 - Probability and Statistics Review 2A
Lecture 12 - Lecture 6 - Part 2 - Probability and Statistics Review 2B
Lecture 13 - Lecture 6 - Part 3 - Probability and Statistics Review 2C
Lecture 14 - Lecture 7 - Part 1 - Probability and Statistics Review 2D
Lecture 15 - Lecture 7 - Part 2 - Probability and Statistics Review 2E
Lecture 16 - Lecture 7 - Part 3 - Probability and Statistics Review 2F
Lecture 17 - Lecture 8 - Part 1 - Probability and Statistics Review 2G (with R Demonstration)
Lecture 18 - Lecture 8 - Part 2 - Probability and Statistics Review 2H (with R Demonstration)
Lecture 19 - Lecture 9 - Part 1 - Probability and Statistics Review 2I
Lecture 20 - Lecture 9 - Part 2 - Probability and Statistics Review 2J
Lecture 21 - Lecture 9 - Part 3 - Introduction to Random Processes 1
Lecture 22 - Lecture 10 - Part 1 - Introduction to Random Processes 2
Lecture 23 - Lecture 10 - Part 2 - Introduction to Random Processes 3
Lecture 24 - Lecture 11 - Part 1 - Introduction to Random Processes 4
Lecture 25 - Lecture 11 - Part 2 - Introduction to Random Processes 5
Lecture 26 - Lecture 11 - Part 3 - Autocovariance & Autocorrelation Functions 1
Lecture 27 - Lecture 12 - Part 1 - Autocovariance & Autocorrelation Functions 2
Lecture 28 - Lecture 12 - Part 2 - Autocovariance & Autocorrelation Functions 3
Lecture 29 - Lecture 13 - Part 1 - Autocovariance & Autocorrelation Functions 4

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Lecture 30 - Lecture 13 - Part 2 - Autocovariance & Autocorrelation Functions 5
Lecture 31 - Lecture 13 - Part 3 - Autocovariance & Autocorrelation Functions 6
Lecture 32 - Lecture 14 - Part 1 - Autocovariance & Autocorrelation Functions 7
Lecture 33 - Lecture 14 - Part 2 - Autocovariance & Autocorrelation Functions 8
Lecture 34 - Lecture 15 - Part 1 - Autocovariance & Autocorrelation Functions 9
Lecture 35 - Lecture 15 - Part 2 - Partial Autocorrelation Functions
Lecture 36 - Lecture 16 - Part 1 - Autocorrelation and Partial-autocorrelation Functions (with R Demonstratio
Lecture 37 - Lecture 16 - Part 2 - Models for Linear Stationary Processes 1
Lecture 38 - Lecture 17 - Part 1 - Models for Linear Stationary Processes 2
Lecture 39 - Lecture 17 - Part 2 - Models for Linear Stationary Processes 3
Lecture 40 - Lecture 18 - Part 1 - Models for Linear Stationary Processes 4
Lecture 41 - Lecture 18 - Part 2 - Models for Linear Stationary Processes 5
Lecture 42 - Lecture 18 - Part 3 - Models for Linear Stationary Processes 6
Lecture 43 - Lecture 19 - Part 1 - Models for Linear Stationary Processes 7
Lecture 44 - Lecture 19 - Part 2 - Models for Linear Stationary Processes 8
Lecture 45 - Lecture 19 - Part 3 - Models for Linear Stationary Processes 9
Lecture 46 - Lecture 20 - Part 1 - Models for Linear Stationary Processes 10
Lecture 47 - Lecture 20 - Part 2 - Models for Linear Stationary Processes 11
Lecture 48 - Lecture 21 - Part 1 - Models for Linear Stationary Processes 12
Lecture 49 - Lecture 21 - Part 2 - Models for Linear Stationary Processes 13
Lecture 50 - Lecture 22 - Part 1 - Models for Linear Stationary Processes 14 (with R Demonstrations)
Lecture 51 - Lecture 22 - Part 2 - Models for Linear Stationary Processes 15 (with R Demonstrations)
Lecture 52 - Lecture 22 - Part 3 - Models for Linear Stationary Processes 16 (with R Demonstrations)
Lecture 53 - Lecture 23 - Part 1 - Models for Linear Non-stationary Processes 1
Lecture 54 - Lecture 23 - Part 2 - Models for Linear Non-stationary Processes 2 (with R Demonstrations)
Lecture 55 - Lecture 24 - Part 1 - Models for Linear Non-stationary Processes 3 (with R Demonstrations)
Lecture 56 - Lecture 24 - Part 2 - Models for Linear Non-stationary Processes 4
Lecture 57 - Lecture 25 - Part 1 - Models for Linear Non-stationary Processes 5
Lecture 58 - Lecture 25 - Part 2 - Models for Linear Non-stationary Processes 6 (with R Demonstrations)
Lecture 59 - Lecture 26 - Part 1 - Fourier Transforms for Deterministic Signals 1
Lecture 60 - Lecture 26 - Part 2 - Fourier Transforms for Deterministic Signals 2
Lecture 61 - Lecture 27 - Part 1 - Fourier Transforms for Deterministic Signals 3
Lecture 62 - Lecture 27 - Part 2 - Fourier Transforms for Deterministic Signals 4
Lecture 63 - Lecture 28 - Part 1 - Fourier Transforms for Deterministic Signals 5
Lecture 64 - Lecture 28 - Part 2 - Fourier Transforms for Deterministic Signals 6
Lecture 65 - Lecture 29 - Part 1 - Fourier Transforms for Deterministic Signals 7
Lecture 66 - Lecture 29 - Part 2 - Fourier Transforms for Deterministic Signals 8
Lecture 67 - Lecture 30 - Part 1 - Fourier Transforms for Deterministic Signals 9
Lecture 68 - Lecture 30 - Part 2 - DFT and Periodogram 1

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Lecture 69 - Lecture 31 - Part 1 - DFT and Periodogram 2
Lecture 70 - Lecture 31 - Part 2 - DFT and Periodogram 3 (with R Demonstrations)
Lecture 71 - Lecture 32 - Part 1 - Spectral Representations of Random Processes 1
Lecture 72 - Lecture 32 - Part 2 - Spectral Representations of Random Processes 2
Lecture 73 - Lecture 33 - Part 1 - Spectral Representations of Random Processes 3
Lecture 74 - Lecture 33 - Part 2 - Spectral Representations of Random Processes 4
Lecture 75 - Lecture 33 - Part 3 - Spectral Representations of Random Processes 5
Lecture 76 - Lecture 34 - Part 1 - Spectral Representations of Random Processes 6
Lecture 77 - Lecture 34 - Part 2 - Spectral Representations of Random Processes 7
Lecture 78 - Lecture 35 - Part 1 - Introduction to Estimation Theory 1
Lecture 79 - Lecture 35 - Part 2 - Introduction to Estimation Theory 2
Lecture 80 - Lecture 35 - Part 3 - Introduction to Estimation Theory 3
Lecture 81 - Lecture 36A - Introduction to Estimation Theory -4
Lecture 82 - Lecture 36B - Goodness of Estimators 1 - 1
Lecture 83 - Lecture 37A - Goodness of Estimators 1 - 2
Lecture 84 - Lecture 37B - Goodness of Estimators 1 - 3
Lecture 85 - Lecture 37C - Goodness of Estimators 1 - 4
Lecture 86 - Lecture 38A - Goodness of Estimators 2 - 1
Lecture 87 - Lecture 38B - Goodness of Estimators 2 - 2
Lecture 88 - Lecture 38C - Goodness of Estimators 2 - 3
Lecture 89 - Lecture 39A - Goodness of Estimators 2 - 4
Lecture 90 - Lecture 39B - Goodness of Estimators 2 - 5 (with R demonstrations)
Lecture 91 - Lecture 39C - Goodness of Estimators 2 - 6
Lecture 92 - Lecture 40A - Goodness of Estimators 2 - 7
Lecture 93 - Lecture 40B - Goodness of Estimators 2 - 8
Lecture 94 - Lecture 41A - Estimation Methods 1 - 1
Lecture 95 - Lecture 41B - Estimation Methods 1 - 2
Lecture 96 - Lecture 42A - Estimation Methods 1 - 3
Lecture 97 - Lecture 42B - Estimation Methods 1 - 4
Lecture 98 - Lecture 42C - Estimation Methods 1 - 5
Lecture 99 - Lecture 43A - Estimation Methods 1 - 6 (with R demonstrations)
Lecture 100 - Lecture 43B - Estimation Methods 1 - 7 (with R demonstrations)
Lecture 101 - Lecture 44A - Estimation Methods 1 - 8
Lecture 102 - Lecture 44B - Estimation Methods 1 - 9
Lecture 103 - Lecture 44C - Estimation Methods 2 - 1
Lecture 104 - Lecture 45A - Estimation Methods 2 - 2
Lecture 105 - Lecture 45B - Estimation Methods 2 - 3
Lecture 106 - Lecture 46A - MLE and Bayesian Estimation - 1
Lecture 107 - Lecture 46B - MLE and Bayesian Estimation - 2

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Lecture 108 - Lecture 47A - MLE and Bayesian Estimation - 3
Lecture 109 - Lecture 47B - MLE and Bayesian Estimation - 4
Lecture 110 - Lecture 48A - Estimation of Time Domain Statistics - 1
Lecture 111 - Lecture 48B - Estimation of Time Domain Statistics - 2
Lecture 112 - Lecture 49 - Periodogram as PSD Estimator

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NPTEL Video Course - Chemical Engineering - NOC:Rheology of Complex Materials

Subject Co-ordinator - Dr. Abhijit P. Deshpande

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Flow phenomena in complex materials and Microstructure - 1
Lecture 2 - Flow phenomena in complex materials and Microstructure - 2
Lecture 3 - Applications of rheology
Lecture 4 - Applications of rheology
Lecture 5 - Applications of rheology
Lecture 6 - Applications of rheology
Lecture 7 - Stress and strain rate - 1
Lecture 8 - Stress and strain rate - 2
Lecture 9 - Velocity gradient and strain rate - 1
Lecture 10 - Velocity gradient and strain rate 1 Stress and strain rate - 3
Lecture 11 - Kinematics for simple flows - 1
Lecture 12 - Kinematics for simple flows - 2
Lecture 13 - Introduction to tensors
Lecture 14 - Rheometric flows
Lecture 15 - Viscous response - 1
Lecture 16 - Viscous response - 2
Lecture 17 - Viscoelasticity - Relaxation process
Lecture 18 - Viscoelasticity - Maxwell model
Lecture 19 - Linear viscoelasticity - oscillatory shear - 1
Lecture 20 - Linear viscoelasticity - oscillatory shear - 2
Lecture 21 - Introduction to tensors - 2
Lecture 22 - Introduction to tensors - 3
Lecture 23 - Rheometers - 1
Lecture 24 - Rheometers - 2
Lecture 25 - Rheometers - 3
Lecture 26 - Rheometers - 4
Lecture 27 - Rheometers - 5
Lecture 28 - Governing equations for rheology - 1
Lecture 29 - Governing equations for rheology - 2

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Lecture 30 - Relaxation time spectrum - 1
Lecture 31 - Relaxation time spectrum - 2
Lecture 32 - Linear viscoelasticity
Lecture 33 - Time temperature superposition
Lecture 34 - Linear viscoelasticity
Lecture 35 - General linear viscoelasticity
Lecture 36 - Rotational rheometry
Lecture 37 - Review of material functions - 1
Lecture 38 - Review of material functions - 2
Lecture 39 - Survey of material functions for polymers - 1
Lecture 40 - Survey of material functions for polymers - 2
Lecture 41 - Survey of material functions for polymers - 3
Lecture 42 - Survey of material functions for polymers - 4
Lecture 43 - Survey of material functions for multiphase systems - 1
Lecture 44 - Strain and convected rate - 1
Lecture 45 - Strain and convected rate - 2
Lecture 46 - Strain and convected rate - 3
Lecture 47 - Strain and convected rate - 4
Lecture 48 - Normal stresses - 1
Lecture 49 - Normal stresses - 2
Lecture 50 - Structured materials - yield stress
Lecture 51 - Yield stress and thixotropic materials
Lecture 52 - Normal stresses and stress growth
Lecture 53 - Rheometer demonstration
Lecture 54 - Review of material functions - 3
Lecture 55 - Survey of material functions for multiphase macromolecular systems
Lecture 56 - Problems during rheometry - example of cone and plate - 1
Lecture 57 - Problems during rheometry - example of cone and plate - 2
Lecture 58 - Strain, convected derivatives, non-linear models - 1
Lecture 59 - Strain, convected derivatives, non-linear models - 2
Lecture 60 - Rheometer demonstration
Lecture 61 - Microscopic modeling of rheology - 1
Lecture 62 - Microscopic modeling of rheology - 2
Lecture 63 - Live Session

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NPTEL Video Course - Chemical Engineering - NOC:Process Control - Design, Analysis and Assessment

Subject Co-ordinator - Prof. Ragunathan Rengasamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introductory Concepts
Lecture 3 - Introduction to Modeling
Lecture 4 - Introduction to Control Structures
Lecture 5 - Process Modelling
Lecture 6 - State Space Modeling
Lecture 7 - State Space Solution
Lecture 8 - Laplace Transforms - Part 1
Lecture 9 - Laplace Transforms - Part 2
Lecture 10 - Analysis of transfer function models - Part 1
Lecture 11 - Analysis of transfer function models - Part 2
Lecture 12 - Stability
Lecture 13 - MATLAB Tutorial 1
Lecture 14 - MATLAB Tutorial 2
Lecture 15 - Controller Equations
Lecture 16 - Controllers and analysis of closed loop transfer functions
Lecture 17 - P, PI and PID Controllers
Lecture 18 - Stability analysis of closed loop systems
Lecture 19 - Controller design and tuning - Part 1
Lecture 20 - Controller design and tuning - Part 2
Lecture 21 - Traditional Advanced Control - Part 1
Lecture 22 - Traditional Advanced Control - Part 2
Lecture 23 - Frequency Response Analysis - Part 1
Lecture 24 - Frequency Response Analysis - Part 2
Lecture 25 - Traditional Advanced Control - Part 3
Lecture 26 - Traditional Advanced Control - Part 4
Lecture 27 - Traditional Advanced Control - Part 5
Lecture 28 - Understanding PID Gains
Lecture 29 - Nyquist Stability Criterion - Part 1

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Lecture 30 - Nyquist Stability Criterion - Part 2
Lecture 31 - Nyquist Stability Criterion - Part 3
Lecture 32 - Controllers for Unstable Systems
Lecture 33 - Traditional Advanced Control - Part 6
Lecture 34 - Traditional Advanced Control - Part 7
Lecture 35 - Multivariable Control - Part 1
Lecture 36 - Multivariable Control - Part 2
Lecture 37 - Model Predictive Control - Part 1
Lecture 38 - Model Predictive Control - Part 2
Lecture 39 - Model Predictive Control-Mathematical Formulation - Part 1
Lecture 40 - Model Predictive Control-Mathematical Formulation - Part 2
Lecture 41 - Model Predictive Control - Discrete Model
Lecture 42 - Model Predictive Control - Putting all these together
Lecture 43 - Stability Analysis-Various methods - Part 1
Lecture 44 - Stability Analysis-Various methods - Part 2
Lecture 45 - Stability Analysis-Various methods - Part 3
Lecture 46 - PID Tuning
Lecture 47 - MATLAB Tutorial-Controller Tuning - Part 1
Lecture 48 - MATLAB Tutorial-Controller Tuning - Part 2
Lecture 49 - MATLAB Tutorial - Controller Design - Part 1
Lecture 50 - MATLAB Tutorial - Controller Design - Part 2
Lecture 51 - MATLAB Tutorial - Controller Design - Part 3
Lecture 52 - Conclusion Lecture

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NPTEL Video Course - Chemical Engineering - System Identification

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation and Overview 1
Lecture 2 - Motivation and Overview 2
Lecture 3 - Motivation and Overview 3
Lecture 4 - Motivation and Overview 4
Lecture 5 - Journey into Identification 1
Lecture 6 - Journey into Identification 2
Lecture 7 - Journey into Identification 3
Lecture 8 - Journey into Identification (Case Studies) 4
Lecture 9 - Journey into Identification (Case Studies) 5
Lecture 10 - Journey into Identification (Case Studies) 6
Lecture 11 - Journey into Identification (Case Studies) 7
Lecture 12 - Journey into Identification (Case Studies) 8
Lecture 13 - Journey into Identification (Case Studies) 9
Lecture 14 - Journey into Identification (Case Studies) 10
Lecture 15 - Journey into Identification (Case Studies) 11
Lecture 16 - Journey into Identification (Case Studies) 12
Lecture 17 - Journey into Identification (Case Studies) 13
Lecture 18 - Journey into Identification (Case Studies) 14
Lecture 19 - Journey into Identification (Case Studies) 15
Lecture 20 - Journey into Identification (Case Studies) 16
Lecture 21 - Journey into Identification 17
Lecture 22 - Journey into Identification 18
Lecture 23 - Response-based Description 1
Lecture 24 - Response-based Description 2
Lecture 25 - Response-based Description 3
Lecture 26 - Response-based Description 4
Lecture 27 - Response-based Description 5
Lecture 28 - Response-based Description 6
Lecture 29 - Response-based Description 7

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Lecture 30 - Response-based Description 8
Lecture 31 - Response-based Description 9
Lecture 32 - Response-based Description 10
Lecture 33 - Response-based Description 11
Lecture 34 - Response-based Description 12
Lecture 35 - Response-based Description 13
Lecture 36 - Discrete time LTI system 1
Lecture 37 - Discrete time LTI system 2
Lecture 38 - z-Domain Descriptions 1
Lecture 39 - z-Domain Descriptions 2
Lecture 40 - z-Domain Descriptions 3
Lecture 41 - z-Domain Descriptions 4
Lecture 42 - z-Domain Descriptions 5
Lecture 43 - z-Domain Descriptions 6
Lecture 44 - State Space Representation 1
Lecture 45 - State Space Representation 2
Lecture 46 - State Space Representation 3
Lecture 47 - State Space Representation 4
Lecture 48 - Sampled - Data Systems 1
Lecture 49 - Sampled - Data Systems 2
Lecture 50 - Sampled - Data Systems 3
Lecture 51 - Sampled - Data Systems 4
Lecture 52 - Sampled - Data Systems 5
Lecture 53 - Sampled - Data Systems 6
Lecture 54 - Sampled - Data Systems 7
Lecture 55 - Sampled - Data Systems 8
Lecture 56 - Probability_Random variables and moments - Review 1
Lecture 57 - Probability_Random variables and moments - Review 2
Lecture 58 - Probability_Random variables and moments - Review 3
Lecture 59 - Probability_Random variables and moments - Review 4
Lecture 60 - Probability_Random variables and moments - Review 5
Lecture 61 - Probability_Random variables and moments - Review 6
Lecture 62 - Random Processes - Review 1
Lecture 63 - Random Processes - Review 2
Lecture 64 - Random Processes - Review 3
Lecture 65 - Random Processes - Review 4
Lecture 66 - Random Processes - Review 5
Lecture 67 - Random Processes - Review 6 (MATLAB)
Lecture 68 - Random Processes - Review 7

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Lecture 69 - Random Processes - Review 8
Lecture 70 - Spectral Representation 1
Lecture 71 - Spectral Representation 2
Lecture 72 - Spectral Representation 3
Lecture 73 - Models for Identification 1
Lecture 74 - Models for Identification 2
Lecture 75 - Models for Identification 3
Lecture 76 - Models for Identification 4
Lecture 77 - One step and multi-step ahead prediction 1
Lecture 78 - One step and multi-step ahead prediction 2
Lecture 79 - One step and multi-step ahead prediction 3
Lecture 80 - One step and multi-step ahead prediction 4
Lecture 81 - One step and multi-step ahead prediction 5
Lecture 82 - Introduction to estimation theory 1
Lecture 83 - Introduction to estimation theory 2
Lecture 84 - Fisher's information and properties of estimators 1
Lecture 85 - Fisher's information and properties of estimators 2
Lecture 86 - Fisher's information and properties of estimators 3
Lecture 87 - Fisher's information and properties of estimators 4
Lecture 88 - Fisher's information and properties of estimators 5
Lecture 89 - Fisher's information and properties of estimators 6
Lecture 90 - Fisher's information and properties of estimators 7
Lecture 91 - Fisher's information and properties of estimators 8
Lecture 92 - Fisher's information and properties of estimators 9
Lecture 93 - Fisher's information and properties of estimators 10
Lecture 94 - Fisher's information and properties of estimators 11
Lecture 95 - Fisher's information and properties of estimators 12
Lecture 96 - Fisher's information and properties of estimators 13
Lecture 97 - Fisher's information and properties of estimators 14
Lecture 98 - Fisher's information and properties of estimators 15
Lecture 99 - Estimation of non-parametric model 1
Lecture 100 - Estimation of non-parametric model 2
Lecture 101 - Estimation of non-parametric model 3
Lecture 102 - Estimation of non-parametric model 4
Lecture 103 - Estimation of non-parametric model 5
Lecture 104 - Estimation of non-parametric model 3
Lecture 105 - Estimation of non-parametric model 4
Lecture 106 - Estimation of non-parametric model 5
Lecture 107 - Estimation of parametric model 1

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Lecture 108 - Estimation of parametric model 2
Lecture 109 - Estimation of parametric model 3
Lecture 110 - Estimation of parametric model 4
Lecture 111 - State-Space/Subspace identification 1
Lecture 112 - State-Space/Subspace identification 2
Lecture 113 - State-Space/Subspace identification 3
Lecture 114 - State-Space/Subspace identification 4
Lecture 115 - State-Space/Subspace identification 5
Lecture 116 - State-Space/Subspace identification 6
Lecture 117 - State-Space/Subspace identification 7
Lecture 118 - State-Space/Subspace identification 8
Lecture 119 - Input for Identification
Lecture 120 - Input for Identification
Lecture 121 - Input for Identification

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NPTEL Video Course - Chemical Engineering - NOC:Fluid and Particle Mechanics

Subject Co-ordinator - Prof. Basavaraju

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fluid Stattics
Lecture 3 - Newton Law of Viscosity
Lecture 4 - Equation of Continuity Differential
Lecture 5 - Equation of Linear Momentum - 1
Lecture 6 - Equation of Linear Momentum - 2
Lecture 7 - Bernoulli's Equation
Lecture 8 - Solution of Navier Stokes - 1
Lecture 9 - Solution of Navier Stokes - 1
Lecture 10 - Introduction to cylindrical coordinate systems
Lecture 11 - Continuity equation in cylindrical coordinates
Lecture 12 - Solution of Navier Stokes in the Cylindrical co-ordinate system - 1
Lecture 13 - Solution of Navier Stokes in the Cylindrical co-ordinate system - 2
Lecture 14 - Circular poiseuille flow
Lecture 15 - Shear Stress Distribution
Lecture 16 - Flow between two concentric cylinder
Lecture 17 - Taylor couette flow
Lecture 18 - Viscosity and Momentum Transfer
Lecture 19 - Device For Measuring Fluid Viscosity
Lecture 20 - Fluid Properties And its Behaviour
Lecture 21 - Tutorial 4
Lecture 22 - Choice of Scaling Parameter
Lecture 23 - Non Dimensional analysis
Lecture 24 - Non-dimensional analysis - 2
Lecture 25 - Non-dimensional analysis - 3 (Buckingham Pi Theorem)
Lecture 26 - Non-dimensional analysis - 4 (Trinity test)
Lecture 27 - Non-dimensional analysis - 5 (Concept of similarity)
Lecture 28 - Characterization Of Particles - 1
Lecture 29 - Characterization Of Particles - 2

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Lecture 30 - Motion of a Particle in a fluid
Lecture 31 - Brownian motion and electophoresis
Lecture 32 - Sedimentation and Seperation
Lecture 33 - Settling velocity - Stoke's regime and Newton's regime
Lecture 34 - Applications of settling - I
Lecture 35 - Applications of settling - II
Lecture 36 - Colloidal aggregates - Introduction
Lecture 37 - Settling of colloidal aggregates
Lecture 38 - Tutorial 5
Lecture 39 - Settling of colloidal aggregates - free settling
Lecture 40 - Settling in Multiple Particles System
Lecture 41 - Flow Through Packed Bed
Lecture 42 - Pressure Drop Through Packed Bed
Lecture 43 - Tutorial 6
Lecture 44 - Pressure Droped Through Packed bed Continue
Lecture 45 - Fluidized Bed - 1
Lecture 46 - Fluidized Bed - 2
Lecture 47 - Filtration - 1
Lecture 48 - Filtration - 2
Lecture 49 - Tutorial 7
Lecture 50 - Laminar and Turbulent Flows - 1
Lecture 51 - Laminar and Turbulent Flows - 2
Lecture 52 - Laminar and Turbulent Flows - 3
Lecture 53 - Turbulent Stress and Turbulent Shear Layer
Lecture 54 - Turbulent Flow near a wall and in a pipe
Lecture 55 - Effect of rough Walls
Lecture 56 - Roughness in Turbulent Pipe Flow
Lecture 57 - Pipes of non-circular cross section
Lecture 58 - Minnor Losses, Sudden Expansion and Contraction
Lecture 59 - Friction Losses in Sudden Expansion
Lecture 60 - Tutorial 8
Lecture 61 - Momentum and Kinetic Energy Correction Factor
Lecture 62 - pressure drop in pipes which connected in series
Lecture 63 - Pressure Drop in Pipes Which Connected in Parallel
Lecture 64 - Pressure Drop in Pipes Which Connected at Junction
Lecture 65 - Boundary Layer
Lecture 66 - Boundary Layer - Momentum Integral Analysis - 1
Lecture 67 - Boundary Layer - Momentum Integral Analysis - 2
Lecture 68 - Boundary Layer - Differential Approach

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Lecture 69 - Laminar and Turbulent Boundary Layer
Lecture 70 - Tutorial 9

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NPTEL Video Course - Chemical Engineering - NOC:Continuum Mechanics and Transport Phenomena

Subject Co-ordinator - Prof. T. Renganathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Measurement and Prediction - Part 1
Lecture 2 - Measurement and Prediction - Part 2
Lecture 3 - Overview of Transport Phenomena
Lecture 4 - Scope of Course
Lecture 5 - Continuum Hypothesis
Lecture 6 - Lagrangian and Eulerian Descriptions - Part 1
Lecture 7 - Lagrangian and Eulerian Descriptions - Part 2
Lecture 8 - Substantial Derivative - Part 1
Lecture 9 - Substantial Derivative - Part 2
Lecture 10 - Substantial Derivative Example - 1
Lecture 11 - Substantial Derivative Example - 2
Lecture 12 - Visualization of Flow Patterns: Streamline, Pathline
Lecture 13 - Visualization of Flow Patterns: Streakline
Lecture 14 - Streamline, Pathline: Steady Flow Example
Lecture 15 - Streamline, Pathline, Streakline: Unsteady Flow Example
Lecture 16 - System and Control Volume
Lecture 17 - Reynolds transport theorem : Introduction
Lecture 18 - Reynolds transport theorem : Simplified form
Lecture 19 - Reynolds transport theorem : General form - Part 1
Lecture 20 - Reynolds transport theorem : General form - Part 2
Lecture 21 - Integral and differential balances
Lecture 22 - Integral total mass balance
Lecture 23 - Integral total mass balance : Simplification
Lecture 24 - Integral total mass balance : Examples
Lecture 25 - Differential total mass balance - Part 1
Lecture 26 - Differential total mass balance - Part 2
Lecture 27 - Differential total mass balance : Examples - Part 1
Lecture 28 - Differential total mass balance : Examples - Part 2
Lecture 29 - Integral linear momentum balance - Part 1

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Lecture 30 - Integral linear momentum balance - Part 2
Lecture 31 - Integral linear momentum balance : Examples - Part 1
Lecture 32 - Integral linear momentum balance : Examples - Part 2
Lecture 33 - Integral linear momentum balance : Examples - Part 3
Lecture 34 - Differential linear momentum balance : Introduction
Lecture 35 - Differential linear momentum balance : Transient, convection and body force terms
Lecture 36 - Stress vector - Part 1
Lecture 37 - Stress vector - Part 2
Lecture 38 - Stress tensor - Part 1
Lecture 39 - Stress tensor - Part 2
Lecture 40 - Cauchy's formula
Lecture 41 - Components of Stress Vector : Example
Lecture 42 - Properties of stress tensor - Part 1
Lecture 43 - Properties of stress tensor - Part 2
Lecture 44 - Total stress tensor for fluids
Lecture 45 - Comparison of solids and fluids
Lecture 46 - Fluids at rest
Lecture 47 - Differential linear momentum balance : Surface force terms
Lecture 48 - Differential linear momentum balance : All terms
Lecture 49 - Convective momentum flux tensor
Lecture 50 - Differential linear momentum balance : Closure problem
Lecture 51 - Normal Strain and Shear Strain - Part 1
Lecture 52 - Normal Strain and Shear Strain - Part 2
Lecture 53 - Displacement Field and Displacement Gradient - Part 1
Lecture 54 - Displacement Field and Displacement Gradient - Part 2
Lecture 55 - Strain Displacement Gradient Relation : Example
Lecture 56 - Strain Displacement Gradient Relation : Normal and shear strain
Lecture 57 - Strain Displacement Gradient Relation : Rotation and volumetric strain
Lecture 58 - Strain Displacement Gradient Relation : Examples
Lecture 59 - Displacement Gradient Tensor
Lecture 60 - Components of Total Displacement - Part 1
Lecture 61 - Components of Total Displacement - Part 2
Lecture 62 - Strain Tensor and Rotation Tensor - Part 1
Lecture 63 - Components of Total Displacement : Example
Lecture 64 - Normal and Shear Strain Rate
Lecture 65 - Strain Rate Velocity Gradient Relation
Lecture 66 - Volumetric Strain Rate
Lecture 67 - Velocity Gradient Tenso
Lecture 68 - Strain Rate : Example 1

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Lecture 69 - Strain Rate : Example 2
Lecture 70 - Stress Strain Relation : Introduction
Lecture 71 - Material Properties
Lecture 72 - Hookeâ s Law - Strain-stress Relation
Lecture 73 - Relation Between Material Properties
Lecture 74 - Hookeâ s Law - Stress-strain Relation
Lecture 75 - Hookeâ s Law : Examples
Lecture 76 - Stress Strain Rate Relation : Introduction
Lecture 77 - Newtonâ s Law of Viscosity : 1D Form
Lecture 78 - Newtonâ s Law of Viscosity : 3D Form
Lecture 79 - Navier Stokes Equation
Lecture 80 - Fluid at Rest : Pressure Distribution
Lecture 81 - Hydrostatic Pressure Distribution in Liquid
Lecture 82 - Hydrostatic Pressure Distribution in Gas
Lecture 83 - Fluid in Rigid Body Motion : Pressure Distribution
Lecture 84 - Flow Regimes : Laminar and Turbulent flow
Lecture 85 - Euler Equation
Lecture 86 - Bernoulli Equation : Inviscid Flow
Lecture 87 - Bernoulli Equation : Example 1
Lecture 88 - Bernoulli Equation : Irrotational Flow
Lecture 89 - Bernoulli Equation : Example 2
Lecture 90 - Planar Couette Flow - Governing Equations
Lecture 91 - Planar Couette Flow - Velocity and Pressure Distribution
Lecture 92 - Planar Couette Flow - Shear Force
Lecture 93 - Planar Poiseuille Flow : Governing Equations
Lecture 94 - Planar Poiseuille Flow : Velocity and Pressure Distribution
Lecture 95 - Planar Poiseuille Flow : Shear force
Lecture 96 - Planar Poiseuille Flow : Shear Stress Distribution
Lecture 97 - Viscous Stress vs. Molecular Momentum Flux - Part 1
Lecture 98 - Viscous Stress vs. Molecular Momentum Flux - Part 2
Lecture 99 - Linear Momentum Balance : Fluid Mechanics vs. Momentum Transport - Part 1
Lecture 100 - Linear Momentum Balance : Fluid Mechanics vs. Momentum Transport - Part 2
Lecture 101 - Viscous Stress vs. Molecular Momentum Flux - Part 3
Lecture 102 - Integral Energy Balance - Part 1
Lecture 103 - Integral Energy Balance - Part 2
Lecture 104 - Simplification of Integral Energy Balance
Lecture 105 - Integral Energy Balance : Examples
Lecture 106 - Differential Energy Balance : Introduction
Lecture 107 - Differential Total Energy Balance - Part 1

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Lecture 108 - Differential Total Energy Balance - Part 2
Lecture 109 - Differential Energy Balance - Part 1
Lecture 110 - Differential Energy Balance - Part 2
Lecture 111 - Differential Energy Balance - Part 3
Lecture 112 - Fourierâ s Law of Heat Conduction
Lecture 113 - Simplifications of Differential Energy Balance
Lecture 114 - Heat Conduction in Slab
Lecture 115 - Heat Conduction in Furnace Wall
Lecture 116 - Non Isothermal Planar Couette Flow

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NPTEL Video Course - Chemical Engineering - NOC:Environmental Quality Monitoring and Analysis

Subject Co-ordinator - Dr. R. Ravi Krishna

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Chemicals of Concern
Lecture 3 - Water Quality Screening Parameters
Lecture 4 - Water Quality Parameters
Lecture 5 - Air quality parameters; Sustainability
Lecture 6 - PM - Particulate Matter
Lecture 7 - Physical/Chemical properties of interest
Lecture 8 - Partition Constants
Lecture 9 - Soil-air partition constants
Lecture 10 - Application/Example of Equilibrium Partitioning
Lecture 11 - Introduction to Environmental Monitoring and Sampling
Lecture 12 - Environmental Sampling
Lecture 13 - Environmental Analysis
Lecture 14 - Environmental Analysis
Lecture 15 - Environmental Analysis of Organics in Water
Lecture 16 - Environmental Analysis
Lecture 17 - Tutorial
Lecture 18 - Tutorial (Continued...)
Lecture 19 - Analysis Methods - Introduction and Water Quality Parameters
Lecture 20 - Analysis Methods - Water Quality Parameters
Lecture 21 - Analysis Methods - Review of Standard Methods
Lecture 22 - Analysis Methods - Organics in water
Lecture 23 - Analysis Methods - Overall Methodology for Organics
Lecture 24 - Analysis Methods - Chromatography Fundamentals
Lecture 25 - Analysis Methods - Gas Chromatography
Lecture 26 - Analysis Methods - Gas Chromatography (Mass Spectrometry)
Lecture 27 - Analysis Methods - Liquid Chromatography
Lecture 28 - Monitoring methods for Air - PM - Part 1
Lecture 29 - Monitoring methods for Air - PM - Part 2

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Lecture 30 - Monitoring methods for Air - Vapor - Part 1
Lecture 31 - Monitoring methods for Air - Vapor - Part 2
Lecture 32 - Monitoring methods for Air - Vapor - Part 3
Lecture 33 - Monitoring and Measurement of Microorganisms
Lecture 34 - Transport of Pollutants - Introduction
Lecture 35 - Transport of Pollutants - Box Models in Water
Lecture 36 - Transport of Pollutants - Box Models in Air
Lecture 37 - Transport of Pollutants - Dispersion
Lecture 38 - Transport of Pollutants - Gaussian Dispersion Model
Lecture 39 - Dispersion Model - Parameters - Part 1
Lecture 40 - Dispersion Model - Parameters - Part 2
Lecture 41 - Gaussian Dispersion Model
Lecture 42 - Gaussian Dispersion Model - Example, Additional topics
Lecture 43 - Regulatory Models
Lecture 44 - Introduction to Interphase Mass Transfer
Lecture 45 - Interphase mass transfer - Application to Environmental Interfaces
Lecture 46 - Interphase mass transfer - Flux and mass transfer resistance
Lecture 47 - Interphase mass transfer - Boundary Layer and Mass Transfer Coefficient
Lecture 48 - Interphase mass transfer - Individual and Overall Mass Transfer Coefficients
Lecture 49 - Overall Mass Transfer Coefficient
Lecture 50 - Estimation of the Mass Transfer Coefficients
Lecture 51 - Air-Water Exchange
Lecture 52 - Evaporation from different surfaces
Lecture 53 - Sediment-Water exchange
Lecture 54 - Application of Interphase mass transfer
Lecture 55 - Contamination of Sediments
Lecture 56 - Release from Sediments
Lecture 57 - Unsteady state release from sediments
Lecture 58 - Other mechanisms of chemical release from sediments - Part 1
Lecture 59 - Other mechanisms of chemical release from sediments - Part 2
Lecture 60 - Soil - Air Transfer
Lecture 61 - Remediation of contaminated sediments - Application of transport models

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NPTEL Video Course - Chemical Engineering - Synthetic and Natural Supramolecular Architectures: An Approach T

Subject Co-ordinator - Prof. ChebroluPulla Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Impetus
Lecture 2 - Introduction to Supramolecular Science and Technology
Lecture 3 - Introduction to Supramolecular Science and Technology
Lecture 4 - A quickwalk - through the Supramolecular Architectures
Lecture 5 - A quickwalk - through the Supramolecular Architectures
Lecture 6 - A quickwalk - through the Supramolecular Architectures
Lecture 7 - Weak intermolecular forces : What, Where, When and How?
Lecture 8 - Weak intermolecular forces : What, Where, When and How?
Lecture 9 - Weak intermolecular forces : What, Where, When and How?
Lecture 10 - Weak intermolecular forces : What, Where, When and How?
Lecture 11 - Weak intermolecular forces : What, Where, When and How?
Lecture 12 - Weak intermolecular forces : What, Where, When and How?
Lecture 13 - Chemistry concepts of Immediate relevance - Part 1
Lecture 14 - Chemistry concepts of Immediate relevance - Part 2
Lecture 15 - Chemistry concepts of Immediate relevance - Part 3
Lecture 16 - Chemistry concepts of Immediate relevance - Part 4
Lecture 17 - Chemistry concepts of Immediate relevance - Part 5
Lecture 18 - Chemistry concepts of Immediate relevance - Part 6
Lecture 19 - Chemistry concepts of Immediate relevance - Part 7
Lecture 20 - Molecular recognition - Part 1
Lecture 21 - Molecular recognition - Part 2
Lecture 22 - Molecular recognition - Part 3
Lecture 23 - Molecular recognition - Part 4
Lecture 24 - Molecular recognition - Part 5
Lecture 25 - Molecular recognition - Part 6
Lecture 26 - Molecular recognition - Part 7
Lecture 27 - Molecular recognition - Part 8
Lecture 28 - Molecular recognition - Part 9
Lecture 29 - Molecular recognition - Part 10

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Lecture 30 - Property driven functions of Supramolecular assembly
Lecture 31
Lecture 32
Lecture 33 - Metal coordinated architectures
Lecture 34 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 1
Lecture 35 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 2
Lecture 36 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 3
Lecture 37 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 4
Lecture 38 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 5
Lecture 39 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 6
Lecture 40 - From molecules to machines : A glimpse at the travel

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NPTEL Video Course - Chemical Engineering - NOC:Artificial Lift

Subject Co-ordinator - Prof. Abdus Samad

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to oil and gas
Lecture 2 - Drilling and Completion
Lecture 3 - Well completion
Lecture 4 - Oil and gas production systems
Lecture 5 - Pumps, compressors and flow through pipes
Lecture 6 - Reservoir fluid
Lecture 7 - Fluid properties and Phase diagram - Part 1
Lecture 8 - Fluid properties and Phase diagram - Part 2
Lecture 9 - Nodal analysis
Lecture 10 - Reservoir deliverability - Single phase flow
Lecture 11 - Reservoir deliverability - Two phase flow
Lecture 12 - Flow over a flat surface or flow through pipe - Part 1
Lecture 13 - Flow over a flat surface or flow through pipe - Part 2
Lecture 14 - Single-Phase, Multi-Phase-Emulsion
Lecture 15 - Emulsification and demulsification
Lecture 16 - Single and Multi Phase flow-flow regimes
Lecture 17 - Multi phase flow-flow models
Lecture 18 - Choke Performance
Lecture 19 - Pump classifications
Lecture 20 - Classification of artificial lifts - Part 1
Lecture 21 - Classification of artificial lifts - Part 2
Lecture 22 - Sucker rod pump (SRP) - Part 1
Lecture 23 - Sucker rod pump (SRP) - Part 2
Lecture 24 - Sucker rod pump (SRP) - Part 3
Lecture 25 - Sucker rod pump (SRP) - Part 4
Lecture 26 - Sucker rod pump (SRP) - Part 5
Lecture 27 - Sucker rod pump (SRP) - Part 6
Lecture 28 - SRP-Pump performance analysis - Part 1
Lecture 29 - SRP-Pump performance analysis - Part 2

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Lecture 30 - SRP-Pump performance analysis - Part 3
Lecture 31 - Introduction to progressive cavity punp
Lecture 32 - Progressive cavity Pump - Part 1
Lecture 33 - Progressive cavity Pump - Part 2
Lecture 34 - Progressive cavity Pump - Part 3
Lecture 35 - Progressive cavity Pump - Part 4
Lecture 36 - Progressive cavity Pump - Part 5
Lecture 37 - Electric submersible pump - Part 1
Lecture 38 - Electric submersible pump - Part 2
Lecture 39 - Electric submersible pump - Part 3
Lecture 40 - ESP- basic electrical systems - Part 1
Lecture 41 - ESP- basic electrical systems - Part 2
Lecture 42 - ESP- basic electrical systems - Part 3
Lecture 43 - ESP- numerical problems - Part 1
Lecture 44 - ESP- numerical problems - Part 2
Lecture 45 - ESP- numerical problems - Part 3
Lecture 46 - ESP- numerical problems - Part 1
Lecture 47 - ESP- numerical problems - Part 2
Lecture 48 - Gas lift basics - Part 1
Lecture 49 - Gas lift basics - Part 2
Lecture 50 - Gas lift valves and installartion - Part 1
Lecture 51 - Gas lift valves and installartion - Part 2
Lecture 52 - Plunger lift and design
Lecture 53 - Hydraulic jet pump fundamentals - Part 1
Lecture 54 - Hydraulic jet pump fundamentals - Part 2
Lecture 55 - Hydraulic engine pumps and design - Part 1
Lecture 56 - Hydraulic engine pumps and design - Part 2
Lecture 57 - Surface pump units for jet pump - Part 1
Lecture 58 - Surface pump units for jet pump - Part 2
Lecture 59 - Surface pump units for jet pump - Part 3
Lecture 60 - Surface compressor for gas lift - Part 1
Lecture 61 - Surface compressor for gas lift - Part 2
Lecture 62 - Surface compressor for gas lift - Part 3

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NPTEL Video Course - Chemical Engineering - NOC:Interfacial Engineering

Subject Co-ordinator - Prof. Manigandan

Co-ordinating Institute - IIT - Ropar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to interfaces
Lecture 2 - Importance of surface; Application of interfaces
Lecture 3 - Basics of classical and emerging tools
Lecture 4 - Concepts of capillarity and surface tension (ST) and measurement of ST and contact angle
Lecture 5 - Overview of various surface tension measurement techniques
Lecture 6 - Young-Dupre equation; Tutorial
Lecture 7 - Young-Laplace equation; Tutorial
Lecture 8 - Kelvin equation; Tutorial
Lecture 9 - Contact angle for ideal and non-ideal cases; Application of Young-Dupre
Lecture 10 - Measurement of contact angle of surfaces at fluid-fluid interfaces
Lecture 11 - Washburn approach; Tutorial
Lecture 12 - Work of cohesion, adhesion, and spreading coefficient
Lecture 13 - Girifalco-Good Fowkes equation; Tutorial
Lecture 14 - Demonstration of force tensiometer
Lecture 15 - Demonstration of optical tensiometer
Lecture 16 - Shapes of micelles, critical micelle concentration (CMC); critical packing parameter (CPP)
Lecture 17 - Thermodynamic principles of self-assembly
Lecture 18 - Micellar-enhanced ultrafiltration (MEUF): A surfactant-based separation technique
Lecture 19 - HLB guidelines; Debye plot
Lecture 20 - Surface excess concepts and problem solving
Lecture 21 - Gibbs adsorption isotherm equation
Lecture 22 - Deposition of Langmuir Blodgett (LB) films; Adsorption from solution
Lecture 23 - Demonstration of double barrier LB deposition technique
Lecture 24 - Emulsion and microemulsion; Application of microemulsion
Lecture 25 - Demonstration of emulsification using several emulsifying devices
Lecture 26 - Demonstration of particle size analyzer
Lecture 27 - Demonstration of particle/droplet tracking using an inverted microscope
Lecture 28 - Introduction to colloids
Lecture 29 - Understanding Intermolecular forces

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Lecture 30 - van der Waals force
Lecture 31 - Lifshitz approach
Lecture 32 - Electrical double layer (EDL) interaction (Helmholtz)
Lecture 33 - Gouy-Chapman EDL Model
Lecture 34 - Gouy-Chapman-Stern EDL model
Lecture 35 - Overlapping double layer interaction
Lecture 36 - Derjaguin approximation; DLVO forces of interactions
Lecture 37 - Force-measuring techniques: Direct and indirect measurements
Lecture 38 - Steric (Polymer-mediated) forces
Lecture 39 - Electrokinetic phenomena
Lecture 40 - Demonstration of zeta potential measurements

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NPTEL Video Course - Chemical Engineering - Building Towards a Career in Chemical Industry

Subject Co-ordinator - Prof. Nagarajan R, Prof. MS Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Need for this course
Lecture 2 - Learning Objectives and schedule
Lecture 3 - Sectors of Chemical Industry
Lecture 4 - Understanding cost by Engineers
Lecture 5 - Investment Cost
Lecture 6 - Understanding Financial Performance of Companies
Lecture 7 - Global perspective of Chemical Industry
Lecture 8 - Nature and Development of Indian Chemical Industry
Lecture 9 - Research, Tech development and Licensing
Lecture 10 - Guest lectuer on skill development
Lecture 11 - Technology Development Process
Lecture 12 - Technology Readiness Level
Lecture 13 - Evolution of Technology - Caustic soda example
Lecture 14 - Evolution of Technology - Caustic soda example
Lecture 15 - Case study of heat recovery
Lecture 16 - Case study of Tech development- auto thermal gasification
Lecture 17 - Guidelines on choosing and completing a project report on Technology Development
Lecture 18 - Guidelines on choosing and completing a project report
Lecture 19 - Example of a case study of an affordable potable water drinking technology described in detail
Lecture 20 - Example of potable water technolohy through desalination of sea water
Lecture 21 - Case study of manufacturing of Polysilicon in India as a example of Technology Development
Lecture 22 - Case study of manufacturing of Polysilicon in India as a example of Technology Development (Cont
Lecture 23 - Industrial R&D ecosystem in India
Lecture 24 - Technology Tranfer - prospects and challenges
Lecture 25 - Guidelines on choosing and completing a project report
Lecture 26 - Jobs and career options in Industry
Lecture 27 - Continuation of Jobs and career options in Industry
Lecture 28 - Application of Taguchi Quality Function analysis to industrial processes
Lecture 29 - Course review and Introduction to Taguchi Quality Function Development

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Lecture 30 - Preparing for Job interviews

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NPTEL Video Course - Chemical Engineering - NOC:Artificial Intelligence in Drug Discovery and Development

Subject Co-ordinator - Prof. Rajnish Kumar

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Drug Discovery and Development
Lecture 2 - Overview of Drug Discovery Workflows
Lecture 3 - Drug Design Strategies
Lecture 4 - Conventional Methods for Drug Discovery
Lecture 5 - Riddles in Drug Discovery
Lecture 6 - History and Evolution of AI in Drug Discovery
Lecture 7 - Overview of AI Technologies
Lecture 8 - Key Application of AI Across the Pipeline
Lecture 9 - Available AI Tools and Platforms
Lecture 10 - Advantages of AI Integration in Drug Discovery
Lecture 11 - Introduction to Machine Learning Concepts
Lecture 12 - Overview of Neural Networks
Lecture 13 - Feature Engineering and Data Preprocessing
Lecture 14 - Evaluation Metrics for AI Models
Lecture 15 - Introduction to Python Libraries for AI in Drug Discovery
Lecture 16 - introduction to Drug Targets
Lecture 17 - Basic of Target Identification and Validation
Lecture 18 - Omics Data Integration for Target Discovery
Lecture 19 - Binding Site and Proteins Structure Prediction with AI
Lecture 20 - Hands on Tutorial Protein Structure Prediction
Lecture 21 - Introduction and Approches to Virtual Screening
Lecture 22 - AI Tools for Virtual Screening
Lecture 23 - AI Assisted Molecular Docking
Lecture 24 - Workflow of High Throughput Virtual Screening
Lecture 25 - Hands on Tutorial - AI Assisted Molecular Docking
Lecture 26 - Basics of Lead Optimization
Lecture 27 - AI for Drug Target Interaction Studies
Lecture 28 - QSAR Modelling
Lecture 29 - Introduction to Molecular Dynamic MDSimulation

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Lecture 30 - Hands on Tutorial MD Analysis
Lecture 31 - Introduction to ADMET Properties
Lecture 32 - Importance of ADMET and Its Prediction in Lead Optimization
Lecture 33 - Conventional Methods for ADMET Prediction
Lecture 34 - Openly Available Resources for ADMET Prediction
Lecture 35 - Hands on Tutorial AI Enabled ADMET Prediction
Lecture 36 - Overview of Clinical Trials
Lecture 37 - Patient Recruitment, Stratification and Retention
Lecture 38 - Clinical Trial Protocol Design and Optimization
Lecture 39 - Predicting Outcomes of Clinical Trials with AI
Lecture 40 - Data Collection and Monitoring for Regulatory Submissions
Lecture 41 - Introduction to Generative AI in Drug Design
Lecture 42 - Deep Generative Models for Drug Design
Lecture 43 - Benchmarking Generative Models for Drug Design
Lecture 44 - Molecule Optimization with Generative AI
Lecture 45 - Hands on Tutorial GNN Based De Novo Drug Design
Lecture 46 - AI in Genomics for Personalized Treatment
Lecture 47 - AI in Real Time Monitoring and Feedback
Lecture 48 - Overview and Data Sources for AI in Drug Repurposing
Lecture 49 - Integrating Multi Target Drug Discovery
Lecture 50 - network Pharmacology with AI
Lecture 51 - Public AI Resources for Drug Discovery
Lecture 52 - Success Case Studies of AI in Drug Discovery
Lecture 53 - Challenges in Modern Drug Discovery Realm
Lecture 54 - Regularory Considerations for AI Implementation
Lecture 55 - Future Outlook Explainable Artificial Intelligence XAI and Other Emerging Technologies in Drug D
Lecture 56 - Molecular Structure Representation
Lecture 57 - Solubility Prediction Using Machine Learning
Lecture 58 - Bioactivity Prediction
Lecture 59 - Pharmacophore Based Virtual Screening
Lecture 60 - Similarity Based Screening

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NPTEL Video Course - Chemical Engineering - NOC:Pharmaceutical Dosage Forms

Subject Co-ordinator - Prof. Ruchi Chawla

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Pharmaceutical Processes Clarification
Lecture 2 - Fundamentals of Pharmaceutical Processes Drying
Lecture 3 - Fundamentals of Pharmaceutical Processes Milling
Lecture 4 - Fundamentals of Pharmaceutical Processes Mixing
Lecture 5 - Introduction to Pharmaceutical Dosage Forms
Lecture 6 - Fundamentals of Pharmaceutical Processes Compaction
Lecture 7 - Pharmaceutical Rheology
Lecture 8 - Doge form Development Pre formulation Studies Bulk Characterization - Part 1
Lecture 9 - Doge form Development Pre formulation Studies Bulk Characterization - Part 2
Lecture 10 - Pre Formulation Studies Solubility and Stability Analysis - Part 1
Lecture 11 - Pre Formulation Studies Solubility and Stability Analysis - Part 2
Lecture 12 - Biopharmaceutics and Pharmacokinetics Principles and P K Models
Lecture 13 - Biopharmaceutics and Pharmacokinetics Factors Affecting Drug Kinetics
Lecture 14 - Biopharmaceutics and Pharmacakinetics Dosage form Design and Evaluation
Lecture 15 - Tablets and Types of Tablets
Lecture 16 - Tablet Design and Excipients
Lecture 17 - Tablets Granulation and Compression
Lecture 18 - Evaluation of Tablets and Defects
Lecture 19 - Tablet Coating Types of Coating and Process of Coating
Lecture 20 - Tablet Coating Evalution and Defects
Lecture 21 - Capsules hard Gelation Capsules and Formulation Cmponents
Lecture 22 - Soft Gelatin Capsules Formulation and Evaluation
Lecture 23 - Capsules Evaluation and Quality Control
Lecture 24 - Microencapsulation
Lecture 25 - Sustained Release Dosage Forms - I
Lecture 26 - Sustained Release Dosage Forms - II
Lecture 27 - Sustained Release Dosage Forms - III
Lecture 28 - Monophasic Liquid Dosage Forms Classification and Components prproj
Lecture 29 - Monophasic Liquid Dosage Forms Formulation and Evaluation

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Lecture 30 - Pharmaceutical Suspensions Types and Formulation Excipients
Lecture 31 - Pharmaceutical Suspensions Evalution
Lecture 32 - Pharmaceutical Emulsion Types, Theories of Emulsification
Lecture 33 - Pharmaceutical Emulsion Formulation Excipients and Evaluation
Lecture 34 - Stability of Biphasic Liquids
Lecture 35 - Semi Solid Dosage Forms Types and Excipient Selection
Lecture 36 - Semi Solid Dosage Forms Properties, Evaluation and Stability
Lecture 37 - Sterile Products - I
Lecture 38 - Sterile Products - II
Lecture 39 - Suppositories Types, Bases and Properties
Lecture 40 - Suppositories Evaluation and Stability
Lecture 41 - Pharmaceutical Aerosols Properties and Excipients
Lecture 42 - Pharmaceutical Aerosols Evaluation and Stability
Lecture 43 - Novel Drug Delivery Systems - 1
Lecture 44 - Novel Drug Delivery Systems - 2
Lecture 45 - Targeted Drug Delivery Systems - I
Lecture 46 - Targeted Drug Delivery Systems - II
Lecture 47 - Targeted Drug Delivery Systems - III
Lecture 48 - Dissolution
Lecture 49 - Pilot Plant Scale Up and Manufacturing Design
Lecture 50 - Sampling
Lecture 51 - Pharmaceutical Packaging Types and Process - 1
Lecture 52 - Pharmaceutical Packaging Types and Process - 2
Lecture 53 - Pharmaceutical Packaging Types and Process - 3
Lecture 54 - Stability Testing and Kinetic Principles - 1
Lecture 55 - Stability Testing and Kinetic Principles - 2
Lecture 56 - Concept of Statistical Quality Control
Lecture 57 - Manufacturing Working Formula Procedures
Lecture 58 - Quality Management
Lecture 59 - Drug Regulatory Affairs - 1
Lecture 60 - Drug Regulatory Affairs - 2

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NPTEL Video Course - Chemical Engineering - NOC:Pharmaceutical Crystal Engineering for Design, Development ar

Subject Co-ordinator - Prof. Dinesh Kumar

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Crystallisation Terminologies
Lecture 2 - Crystalline Solids - Introduction and Types
Lecture 3 - Stages of Crystallization
Lecture 4 - Crystal Growth Theories and Solubility
Lecture 5 - Metastable Zone Width MSZW and Ostwald Steprule
Lecture 6 - Crystallization Basics and Types of Crystalline Materials
Lecture 7 - Crystallization Process, Methods of Crystallization, Factors Affecting Crystallization
Lecture 8 - Evaporative Crystallization
Lecture 9 - Anti Solvent Crystallization
Lecture 10 - Melt Crystallization, Crystallization of Chiral Compounds
Lecture 11 - Phases and Phase Diagrams
Lecture 12 - Yield and Productivity of Pharmaceutical Crystallization Process
Lecture 13 - Filtration, Washing and drying after crystallization
Lecture 14 - Miscellaneouse facter for Desigen a Crystallization Process
Lecture 15 - Problems due to Improper Process Design and Industrial Aspects
Lecture 16 - Batch vs Continuous Crystallization
Lecture 17 - Crystallizers Used in Continuous Crystallization
Lecture 18 - Cooling Continuous Crystallization
Lecture 19 - Continuous Manufacturing in Pharma Industry
Lecture 20 - AI/ML in Pharmaceutical Manufaturing and Pharma Industry 4.0
Lecture 21 - Polymorphism and It's Impact on Prarmaceutical Properties
Lecture 22 - Disappearing Polymorphs and Mechanisms of Polymorphic Interconversion
Lecture 23 - Methods of Polymorph Screening
Lecture 24 - Solid State Characterization of Polymorphs
Lecture 25 - Effect of Polymorphism on Pharmaceutical Processing
Lecture 26 - Basic Introduction, History, Type of Cocrystals
Lecture 27 - Prerequisite Criteria for Coformers Selection to Design Cocrystals
Lecture 28 - Compution Approaches for the Selection of Coformers
Lecture 29 - Laboratory Methods for Sereening of Cocrystals

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Lecture 30 - Application, Characterization and Regulatory Aspects of Cocrystals
Lecture 31 - Introduction, Thermodynamics and Pharmaceutical Importance of Hydrates or Solvates
Lecture 32 - Classification of Hydrates
Lecture 33 - Kinetics and Mechanism of Dehydration or Hydration
Lecture 34 - Preparation and Characterization of Hydrates and Solvates
Lecture 35 - Stability and Regulatory aspects of Hydrae Solvates
Lecture 36 - FTIR Spectroscopy for Solid State Pharmaceutics
Lecture 37 - XRD for Solid State Pharmaceutics
Lecture 38 - Electon Diffraction and ssNMR Application in Pharmaceuticals
Lecture 39 - Raman Spectrocopy for Solid State Pharmaceutiecs
Lecture 40 - Solid State UV and Surface Free Energy Calculations
Lecture 41 - Introduction to Thermal Analysis and Its Applications in Pharmaceutical Industry
Lecture 42 - Applications of DSC in Pharmaceutical Industry
Lecture 43 - Practical Considerations and Celibration of DSC
Lecture 44 - Thermolravimetric Analysis and Its Applications in Pharmaceuticals
Lecture 45 - Isothermal Microcalorimetry, Hot Stage Microscopy and Dynamic Vapor Sorption Analyis
Lecture 46 - Quality by Design QbD for DS and DP Manufacturing
Lecture 47 - Process Analytical Technology PAT
Lecture 48 - Other PAT Tools, Benefits and Industrial Concerns
Lecture 49 - Pharmaceutical Crystallization Scale up and SUPAC
Lecture 50 - Process Safety in DS and DP Manufacturing
Lecture 51 - Physicochemical Characterization of Pharmaceuticas Solid Forms
Lecture 52 - Impact of Amorphous forms on Pharmaceutical Properties
Lecture 53 - Mechanical Studies of Pharmaceutical Solid Forms
Lecture 54 - Impact of Pharmaceutical Solid forms on Powder Flow Properties
Lecture 55 - Advancements in Solid Particle Size and Shame Measurements
Lecture 56 - Stability Studies of DS and DP
Lecture 57 - Stability Testing Aspects of Formulation Development and Preformulation Studies
Lecture 58 - API Coprocessing Introduction and Routes of Coprocessing
Lecture 59 - Molecular Modelling and Simulation studies for Polymorph and Crystal Habit
Lecture 60 - Molecular Modelling and Simulation studies of Amorphous Solid Dispersions and Cocrystals

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NPTEL Video Course - Chemical Engineering - NOC:Pharmacological and Toxicological Screening Methods

Subject Co-ordinator - Prof. Vinod Tiwari

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Morals of Animal Testing and 3R Strategy
Lecture 2 - Common Laboratory Animals and Maintenance - Part A
Lecture 3 - Common Laboratory Animals and Maintenance - Part B
Lecture 4 - CCSEA Guidelines for Experimentation on Animals - Part 1
Lecture 5 - CCSEA Guidelines for Experimentation on Animals - Part 2
Lecture 6 - Form B per rule 8a for Submission of Research protocols
Lecture 7 - Anesthesia and Euthanasia of Experimental Animals
Lecture 8 - Alternatives to Animals Usage in Research
Lecture 9 - In vitro Models
Lecture 10 - Stem Cell Therapy, Skin Patch Test
Lecture 11 - In silico Models, Microfluidic Chips and Recent Trends
Lecture 12 - High Throughput Screening HTS Assays
Lecture 13 - Western Blotting
Lecture 14 - Assay and its Types - Part A
Lecture 15 - Assay and its Types - Part B
Lecture 16 - Introduction to Alzheimer's Disease
Lecture 17 - Symptoms and Pathophysiology of Alzheimer's Disease
Lecture 18 - Screening Models of Alzheimer's Disease
Lecture 19 - Introduction to Parkinson's Desease
Lecture 20 - Models of Parkinson,s Disease
Lecture 21 - Introduction to Depression
Lecture 22 - Diagnosis and Pharmacotherapeutics for the Treatment of Depression
Lecture 23 - Models for the Screening of Anti depressant Drugs
Lecture 24 - Behavioural Tests for the Assessment of Anti depressant Activity
Lecture 25 - Introduction to Pain and Its Pathobiology
Lecture 26 - Preclinical Models for Neuropathic Pain
Lecture 27 - Preclinical Models for Inflammatory Pain
Lecture 28 - Behavioural Assays for Pain Measurement in Animals
Lecture 29 - Behavioural Assays for Spontaneous Pain Assessment

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Lecture 30 - Introduction to Diabetes
Lecture 31 - Pathophysiology and Diagnosis of Diabetes
Lecture 32 - Current Pharmacotherapeutics Used for the Treatment of Diabetes Mellitus
Lecture 33 - In Vitro Models of Diabetes Mellitus
Lecture 34 - In Vitro Models of Diabetes Mellitus
Lecture 35 - Pharmacological Screening and Its Types
Lecture 36 - Transgenic Animals Production and Maintenance
Lecture 37 - Humanized Mouse Introduction
Lecture 38 - Application of Transgenic Animals
Lecture 39 - Applications of Humanized Mouse Model
Lecture 40 - Introduction to Toxicology
Lecture 41 - Mechanisms of Toxicity and Toxicant Action
Lecture 42 - Toxicity Testing Studies as per OECD Guidelines
Lecture 43 - ICH Guidelines for Drug Toxicity Studies
Lecture 44 - Good Laboratry Practices for Safety Studies
Lecture 45 - Acute and Sb Acute Toxicity Studies
Lecture 46 - Chronic Toxicity Studies
Lecture 47 - Mutagenicity and Genotoxicity Studies
Lecture 48 - Teratogenicity Studies
Lecture 49 - Reproductive Toxicology
Lecture 50 - Neurobehavioral Toxicology
Lecture 51 - Cardiovascular Toxicity
Lecture 52 - Respiratory Toxicology
Lecture 53 - Dermal Toxicology
Lecture 54 - Toxicology of The Liver
Lecture 55 - Introduction of Carcinogenesis
Lecture 56 - Categories of Carcinogenicity Studies
Lecture 57 - Autophagy and Apoptosis
Lecture 58 - Apoptotic Pathways and Necroptosis
Lecture 59 - Methods to Screen Carcinogens and Anti Cancer Agents

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NPTEL Video Course - Chemical Engineering - NOC:General Pharmacology

Subject Co-ordinator - Prof. Vinod Tiwari

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Pharmacology - Part A
Lecture 2 - Basics of Pharmacology - Part B
Lecture 3 - Routes of Drug Administration
Lecture 4 - Drug Interactions
Lecture 5 - Adverse Drug Reactions and It's Types
Lecture 6 - Basics of Pharmacokinetics
Lecture 7 - Memberane Transport
Lecture 8 - Absorption and Distribution
Lecture 9 - Drug Metabolism
Lecture 10 - Excretion, Enzyme Induction, Inhibition and Elimination Kinetics
Lecture 11 - Principles and Mechanisms of Drug Action
Lecture 12 - Receptor Pharmacology
Lecture 13 - Enzymes and Ion Channels
Lecture 14 - Signal Transduction Mechanisms
Lecture 15 - The Dose response Relationship
Lecture 16 - Drug Dosage and Factors Modifying Drug Action
Lecture 17 - Approaches to Drug Discovery and Network Pharmacology Concpt and Application
Lecture 18 - Informed Consent
Lecture 19 - Clinical Trials
Lecture 20 - Therapeutic Drug Monitoring
Lecture 21 - Introduction to Autocoids, Histamine and Antihistamine
Lecture 22 - Hydroxytryptamine, Its Antagonists and Drug Therapy of Migraine
Lecture 23 - Prostaglandins, Leukotrienes Eicosanoids and Platelet Activating Factor
Lecture 24 - Nonsteroidal Anti inflammatory Drugs and Antipyretic Analgesics
Lecture 25 - Antirheumatics and Antigout Drugs
Lecture 26 - Introduction to Hemodynamics and Electrophysiology of The Heart
Lecture 27 - Drugs Used in Congestive Heart Failure and Anti hypertensive Drugs
Lecture 28 - Anti anginal, Anti arrhythmic Drugs and Anti hyperlipidemic Drugs
Lecture 29 - Hematinics, Coagulants and Anticoagulants

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Lecture 30 - Fibrinolytics, Antiplatelet Drugs and Plasma Volue Expanders
Lecture 31 - Asthma and Anti asthmatic Drugs
Lecture 32 - Drugs Used in the Management of COPD
Lecture 33 - Expectorants and Antitussives
Lecture 34 - Nasal Decongestants
Lecture 35 - Respiratory Stimulants
Lecture 36 - Anti Ulcer Agents
Lecture 37 - Drugs for Constipation and Diarrhoea
Lecture 38 - Appetite Stimulants and Suppressent
Lecture 39 - Digestant and Carrminatives
Lecture 40 - Emetics and Anti Emetics 1 1
Lecture 41 - Introduction to Endocrine Pharmacology
Lecture 42 - Anterior Pituitary Hormones Analogues and their Inhibitors
Lecture 43 - Thyroid Hormones and Hormones Regulating Plasma Calcium Level
Lecture 44 - Insulin, Oral Hypoglycemic Agents and Glucagon
Lecture 45 - ACTH and Corticosteroids
Lecture 46 - Androgen and Anabolic Steroids
Lecture 47 - Estrogens, Progestins and Contraceptives
Lecture 48 - Oxytocin and Other Drugs Acting on Uterus
Lecture 49 - Physiology of Urine Formation
Lecture 50 - Diuretics and Antidiuretics
Lecture 51 - General Anesthetics
Lecture 52 - Sedatives, Hypnotics and Anxiolytics
Lecture 53 - Antipsychotics and Antimanic Drugs
Lecture 54 - Antidepressant and Antianxiety Drugs
Lecture 55 - CNS Stimulants and Cognition Enhancers
Lecture 56 - Organization and Functions of ANS
Lecture 57 - Cholinergic and Anticholinergic Druges
Lecture 58 - Adrenergic and Antiadrengergic Drugs
Lecture 59 - Immunophrmacology
Lecture 60 - Vaccine, Antisera and Vitamins

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NPTEL Video Course - Chemical Engineering - NOC:Principles and Practice of Sleep Medicine

Subject Co-ordinator - Multifaculty

Co-ordinating Institute - CHRI Chennai

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sleep Its Core Principles, Architecture and Functional Significance
Lecture 2 - Neurophysiology of sleep
Lecture 3 - Sleep neurotransmitters
Lecture 4 - Circadian rhythms
Lecture 5 - Stages of Sleep Sleep Health Sleep Deprivation
Lecture 6 - Sleep disorders
Lecture 7 - Clinical Insights on Insomia, Narcolepsy and Restless Legs Syndrome
Lecture 8 - Clinical Insights on Parasomnias with Case Studies
Lecture 9 - Central SLeep Apnea
Lecture 10 - Obstuctive Sleep Apnea
Lecture 11 - Assessment of upper airway anatomy in OSA, Nasopharyngoscopy and Imaging Studies
Lecture 12 - Screening Tools For Sleep Related Breathing Disorders
Lecture 13 - Evaluation of SleepDisorders by Polysomnography (PSG), Interpretation and Sleep Scoring
Lecture 14 - Evaluation of Neurological Causes of sleep disorders, EEG and Management - Part 1
Lecture 15 - Evaluation of Neurological Causes of sleep disorders, EEG and Management - Part 2
Lecture 16 - Paediatric Sleep Disorders
Lecture 17 - Pharmacological treatments related to sleep
Lecture 18 - Continuous Positve Airway Pressure
Lecture 19 - Surgical Mangement for OSA - ENT perspective
Lecture 20 - Surgical Mangement of Obstructive Sleep Apnea - An overview from Dental perspective
Lecture 21 - Lifestyle and behavioural Interventions; Cognitive Behaviour Therapy (CBT)
Lecture 22 - Lifestyle and behavioural Interventions; Cognitive Behaviour Therapy (CBT) Demonstration

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NPTEL Video Course - Chemical Engineering - Chemical Technology - I

Subject Co-ordinator - Dr. I.D. Mall

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Chemical process Industries
Lecture 2 - Raw material for Organic Chemical Industries
Lecture 3 - Unit processes and unit operations in organic chemical Industries
Lecture 4 - Coal and coal as chemicals feed stock
Lecture 5 - Coal carbonization and Coke oven plant
Lecture 6 - Gasification of Coal,Petrocoke and Biomass
Lecture 7 - Introduction to Pulp and paper Industry, Raw material for paper industry and Technological develo
Lecture 8 - Pulping and Bleaching
Lecture 9 - Recovery of Chemicals
Lecture 10 - Stock preparation and paper making
Lecture 11 - Introduction to Soap and detergent, Soap making and Recovery of Glycerine
Lecture 12 - Synthetic detergent and Linear alkyl benzene
Lecture 13 - Sugar and Fermentation industry
Lecture 14 - Ethanol as Biofuel and Chemical feed stock
Lecture 15 - Introduction
Lecture 16 - Evaluation of Crude oil,Petroleum Products and Apetrochemicals
Lecture 17 - Crude oil Distillation
Lecture 18 - Thermal Cracking
Lecture 19 - Catalytic cracking
Lecture 20 - Catalytic reforming
Lecture 21 - Alkylation, Isomerisation and Polymerisation
Lecture 22 - Desulphurisation Processes and Recovery of Sulphur
Lecture 23 - Profile of petrochemical Industry and its structure
Lecture 24 - Naphtha and gas cracking for production of olefins
Lecture 25 - Recovery of chemicals from FCC and steam cracking
Lecture 26 - Synthesis gas and its derivatives
Lecture 27 - Ethylene derivatives
Lecture 28 - Propylene, Propylene oxide and Isopropanol
Lecture 29 - Aromatics Production

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Lecture 30 - Aromatics product profile, Ethyl benzene & Styrene, Cumene and phenol, Bisphenol, Aniline
Lecture 31 - Introduction to polymer, Elastomer and Synthetic Fibre, Polymerisation
Lecture 32 - Polymers
Lecture 33 - Polyvinylchloride, polycarbonate, thermoset resin
Lecture 34 - Elastomers
Lecture 35 - Polymides or Nylons(PA)
Lecture 36 - DMT and Terephtalic Acid, Polyester, PET resin, PTB resin
Lecture 37 - Acrylic Fibre, Modified Acrylic Fibre, Acrylonitrile, Acrolein, Propylene Finber, Polyurethane
Lecture 38 - Viscose Rayon and Acetate rayon
Lecture 39 - Pesticide
Lecture 40 - Dye and Intermediates

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NPTEL Video Course - Chemical Engineering - Process Integration

Subject Co-ordinator - Dr. B. Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Process integration, methods and area of application
Lecture 2 - Fundamental concepts related to heat integration - Part 1
Lecture 3 - Fundamental concepts related to heat integration - Part 2
Lecture 4 - Data extraction
Lecture 5 - Hot composite curves
Lecture 6 - Cold composite curves
Lecture 7 - Hot and cold composite curves and the pinch
Lecture 8 - Threshold problems
Lecture 9 - Energy targeting procedure
Lecture 10 - Problem Table Algorithm - Part 1
Lecture 11 - Grand composite curve
Lecture 12 - Problem Table Algorithm - Part 2
Lecture 13 - Number of units target
Lecture 14 - Shell targeting - Part 1
Lecture 15 - Area targeting - Part 1
Lecture 16 - Area targeting - Part 2
Lecture 17 - Coast targeting - Part 1
Lecture 18 - Coast targeting - Part 2
Lecture 19 - Supertargeting- optimization of Î t min
Lecture 20 - Global & stream specific Î t min and its relevance
Lecture 21 - Topology Trap
Lecture 22 - Rules for Pinch Design Method (PDM) - Part 1
Lecture 23 - Rules for Pinch Design Method (PDM) - Part 2
Lecture 24 - Application of PDM for MER Hen Synthesis
Lecture 25 - Design for threshold problems
Lecture 26 - Design for single pinch problems
Lecture 27 - Design for multi pinch problems
Lecture 28 - HEN optimization
Lecture 29 - Remaining problem analysis

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Lecture 30 - Driving Force Plot
Lecture 31 - Low Temperature process Design - Part 1
Lecture 32 - Low Temperature process Design - Part 2
Lecture 33 - Integration of Gas turbine with process - Part 1
Lecture 34 - Integration of Gas turbine with process - Part 2
Lecture 35 - Placement and Integration of Distillation Column
Lecture 36 - Heat Integration of evaporators
Lecture 37 - Integration of heat pump
Lecture 38 - Placement of Heat Engine, Heat pump and Reactors
Lecture 39 - Integration of Furnace
Lecture 40 - Problem solving using HINT Software - Part 1
Lecture 41 - Problem solving using HINT Software - Part 2
Lecture 42 - Problem solving using HINT Software - Part 3
Lecture 43 - Problem solving using HINT Software - Part 4

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NPTEL Video Course - Chemical Engineering - Mechanical Operations

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Characterization of a single particle - 1
Lecture 3 - Characterization of a single particle - 2
Lecture 4 - Characterization of collection of particles - 1
Lecture 5 - Characterization of collection of particles - 2
Lecture 6 - Fine grain size distribution
Lecture 7 - Effectiveness of screen - 1
Lecture 8 - Effectiveness of screen - 2
Lecture 9 - Industrial screening equipment
Lecture 10 - Size reduction
Lecture 11 - Laws of comminution
Lecture 12 - Examples of Laws of comminution - 1
Lecture 13 - Examples of Laws of comminution - 2
Lecture 14 - Size reduction equipment - 1
Lecture 15 - Size reduction equipment - 2
Lecture 16 - Particle dynamics - 1
Lecture 17 - Particle dynamics - 2
Lecture 18 - Particle dynamics-Examples
Lecture 19 - Classification and Jigging - 1
Lecture 20 - Classification and Jigging - 2

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NPTEL Video Course - Chemical Engineering - NOC:Waste to Energy Conversion

Subject Co-ordinator - Prof. P. Mondal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Introduction - 2
Lecture 3 - Characterization of wastes - 1
Lecture 4 - Characterization of wastes - 2
Lecture 5 - Characterization of wastes - 3
Lecture 6 - Tutorial on Chatacterization of wastes
Lecture 7 - Energy production from wastes through incineration - 1
Lecture 8 - Energy production from wastes through incineration - 2
Lecture 9 - Tutorial on incineration
Lecture 10 - Energy production from wastes through gasification - 1
Lecture 11 - Energy production from wastes through gasification - 2
Lecture 12 - Syngas utilization - 1
Lecture 13 - Syngas utilization - 2
Lecture 14 - Energy production from wastes through pyrolysis - 1
Lecture 15 - Energy production from wastes through pyrolysis - 2
Lecture 16 - Tutorial on gasification
Lecture 17 - Tutorial on Pyrolysis
Lecture 18 - Densification of solids - 1
Lecture 19 - Densification of solids - 2
Lecture 20 - Efficiency improvement of power plant - 1
Lecture 21 - Efficiency improvement of power plant - 2
Lecture 22 - Energy production from waste plastics - 1
Lecture 23 - Energy production from waste plastics - 2
Lecture 24 - Gas clean up - 1
Lecture 25 - Gas clean up - 2
Lecture 26 - Energy production from organic wastes through anaerobic digestion - 1
Lecture 27 - Energy production from organic wastes through anaerobic digestion - 2
Lecture 28 - Design of anaerobic digester
Lecture 29 - Introduction to Microbial fuel cells

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Lecture 30 - Energy production from organic wastes through fermentation - 1
Lecture 31 - Energy production from organic wastes through fermentation - 2
Lecture 32 - Tutorial on anaerobic digestion
Lecture 33 - Tutorial on fermentation
Lecture 34 - Energy production from wastes through transesterification - 1
Lecture 35 - Energy production from wastes through transesterification - 2
Lecture 36 - Tutorial on transesterification
Lecture 37 - Cultivation of algal biomass and treatment of waste water - 1
Lecture 38 - Cultivation of algal biomass and treatment of waste water - 2
Lecture 39 - Energy production form algal biomass - 1
Lecture 40 - Energy production form algal biomass - 2

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NPTEL Video Course - Chemical Engineering - NOC:Unit Operations of Particulate Matter

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sedimentation and Batch Sedimentation Test - 1
Lecture 3 - Sedimentation and Batch Sedimentation Test - 2
Lecture 4 - Centrifugal Sedimentation and Equipment - 1
Lecture 5 - Centrifugal Sedimentation and Equipment - 2
Lecture 6 - Filtration - 1
Lecture 7 - Filtration - 2
Lecture 8 - Filtration - 3
Lecture 9 - Continuous Filtration - 1
Lecture 10 - Continuous Filtration - 2
Lecture 11 - Fluidisation - 1
Lecture 12 - Fluidisation - 2
Lecture 13 - Liquid Fluidisation
Lecture 14 - Gas Fluidisation - 1
Lecture 15 - Gas Fluidisation - 2
Lecture 16 - Flotation - 1
Lecture 17 - Flotation - 2
Lecture 18 - Transportaion of solids - 1
Lecture 19 - Transportaion of solids - 2
Lecture 20 - Transportaion of solids - 3

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NPTEL Video Course - Chemical Engineering - NOC:Introduction to Polymer Physics (IIT-R)

Subject Co-ordinator - Prof. Prateek Kumar Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course, Macromolecules and Life, Molecular flexibility
Lecture 2 - Classification of polymers, Types of polymerization, Average molecular weights and polydispersity
Lecture 3 - Motivation to study polymer physics
Lecture 4 - Random Walk Models of Single Chain I
Lecture 5 - Random Walk Models of Single Chain II
Lecture 6 - Random Walk Models of Single Chain III
Lecture 7 - Models of semiflexible chains (Kratky Porod Model) - Part I
Lecture 8 - Models of semiflexible chains (Kratky Porod Model) - Part II
Lecture 9 - Probability density of an ideal chain - Part I
Lecture 10 - Probability density of an ideal chain - Part II
Lecture 11 - Entropic Elasticity, Bead-Spring Model, Simulations of random walk models
Lecture 12 - Derivation of Diffusion equation, Einstein notation
Lecture 13 - Definition of Radius of gyration
Lecture 14 - Radius of gyration for an ideal chain, concept of ideality
Lecture 15 - Nonbonded interactions, hydrophobic and hydrophilic behaviour
Lecture 16 - Definition of excluded volume; good, bad, and theta solvent
Lecture 17 - Virial expansion, Flory theory for good solvent
Lecture 18 - Flory theory for bad solvent, self-similarity and fractal nature of polymers
Lecture 19 - Derivation of fractal dimension, concentration regimes and overlap concentration
Lecture 20 - Size, shape, and structure. Gyration tensor and measures of asphericity.
Lecture 21 - Order-disorder transition
Lecture 22 - Scattering experiments, Pair correlation function
Lecture 23 - Structure of polymer chain, Introduction to Monte Carlo simulations of polymer chains
Lecture 24 - Monte Carlo algorithm
Lecture 25 - Practical aspects of Monte Carlo simulation
Lecture 26 - Molecular Dynamics Simulations, Review of Thermodynamics
Lecture 27 - Solution Thermodynamics - I
Lecture 28 - Solution Thermodynamics - II
Lecture 29 - Solution Thermodynamics - III

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Lecture 30 - Solution Thermodynamics - IV
Lecture 31 - Phase separation regime, Introduction to lattice model of solutions
Lecture 32 - Lattice Model of Solutions - I
Lecture 33 - Lattice Model of Solutions - II
Lecture 34 - Phase behaviour of liquid solutions
Lecture 35 - Lattice models of polymeric systems
Lecture 36 - Brownian motion - I
Lecture 37 - Brownian motion - II
Lecture 38 - Brownian motion - III
Lecture 39 - Brownian motion - IV
Lecture 40 - Brownian motion - V
Lecture 41 - Rouse Model - I
Lecture 42 - Rouse Model - II
Lecture 43 - Rouse Model - III
Lecture 44 - Rouse Model - IV
Lecture 45 - Problems in Rouse Model, Hydrodynamic Interactions
Lecture 46 - Zimm Model - I
Lecture 47 - Zimm Model - II
Lecture 48 - Continuum Mechanics - I
Lecture 49 - Continuum Mechanics - II
Lecture 50 - Kuhnâ s Theory of Rubber Elasticity
Lecture 51 - Elasticity of polymer network
Lecture 52 - Microscopic definition of stress tensor - I
Lecture 53 - Microscopic definition of stress tensor - II, Dumbbell model, introduction to Rouse model
Lecture 54 - Models for entangled polymeric systems - I
Lecture 55 - Models for entangled polymeric systems - II
Lecture 56 - Rheology of complex fluids
Lecture 57 - Rheometers and rheological tests - I
Lecture 58 - Rheometers and rheological tests - II
Lecture 59 - Maxwell model - I
Lecture 60 - Maxwell model - II, Closing notes

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NPTEL Video Course - Chemical Engineering - NOC:Equipment Design: Mechanical Aspects

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Stress and Strain Relationship - 1
Lecture 3 - Stress and Strain Relationship - 2
Lecture 4 - Terminologies
Lecture 5 - Design of shell
Lecture 6 - Design of heads - 1
Lecture 7 - Design of heads - 2
Lecture 8 - Design of heads - 3
Lecture 9 - Compensation for Opening - 1
Lecture 10 - Compensation for Opening - 2
Lecture 11 - L D ratio
Lecture 12 - Design of Flanges - 1.1
Lecture 13 - Design of Flanges - 1.2
Lecture 14 - Design of Flanges - 2.1
Lecture 15 - Design of Flanges - 2.2
Lecture 16 - Design of support - 1
Lecture 17 - Design of support - 2
Lecture 18 - Vessel under external pressure - 1
Lecture 19 - Vessel under external pressure - 2
Lecture 20 - Vessel under very high pressure

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Safety

Subject Co-ordinator - Dr. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Safety and Accident Loss Statistics
Lecture 2 - Risk Management and Hazardous Substance Rules
Lecture 3 - Nature of Accident and major disasters
Lecture 4 - Fundamental Principles
Lecture 5 - Problems related to Safety and Accident Loss Statistics
Lecture 6 - Toxicology
Lecture 7 - Toxicology
Lecture 8 - Dose Response Relationship
Lecture 9 - Dose Response and Threshold Dose
Lecture 10 - Industrial Hygiene
Lecture 11 - Material Safety Data Sheet - I
Lecture 12 - Material Safety Data Sheet - II
Lecture 13 - Industrial Hygiene
Lecture 14 - Noise, vibration and Radiation
Lecture 15 - Industrial Hygiene
Lecture 16 - Problems related to Industrial Hygiene
Lecture 17 - Introduction to Source Models
Lecture 18 - Source Models for Gas
Lecture 19 - Source Models for Pool Boiling
Lecture 20 - Source Model Problems
Lecture 21 - Fire and Explosions
Lecture 22 - Fire and Explosions
Lecture 23 - Explosion and its Classification - I
Lecture 24 - Explosion and its Classification - II
Lecture 25 - Fire Extinguishers - I
Lecture 26 - Fire Extinguishers - II
Lecture 27 - Problems related to Fire and Explosion
Lecture 28 - Designs to prevent Fire and Explosion
Lecture 29 - Designs to prevent Fire and Explosion

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Lecture 30 - General Design Methods to prevent Fire
Lecture 31 - Sprinklers - I
Lecture 32 - Sprinklers - II
Lecture 33 - Introduction to Reliefs
Lecture 34 - Type of Reliefs
Lecture 35 - Relief Scenario
Lecture 36 - Relief Sizing
Lecture 37 - Hazard and Hazard Identification
Lecture 38 - Hazard Identification Methods and HAZOP
Lecture 39 - Safety Reviews and Risk Assessment - I
Lecture 40 - Risk Assessment - II
Lecture 41 - Review of Probability Theory
Lecture 42 - Event Trees
Lecture 43 - Fault Trees
Lecture 44 - Cause Consequence Analysis and Layer of Protection Analysis
Lecture 45 - Bow-Tie Analysis
Lecture 46 - Accident Research
Lecture 47 - Accident Causation Theories
Lecture 48 - Accident Investigation Procedure - I
Lecture 49 - Accident Investigation Procedure - II
Lecture 50 - Jaipur Terminal Fire, India
Lecture 51 - The Flixborough UK, Cyclohexane Disaster
Lecture 52 - Seveso Accident
Lecture 53 - The Chernobyl Nuclear Disaster
Lecture 54 - Bhopal Gas Tragedy
Lecture 55 - Bhopal Gas Tragedy
Lecture 56 - Nuclear Radiation
Lecture 57 - Process Safety Management
Lecture 58 - Personal Protective Equipments
Lecture 59 - Safety
Lecture 60 - Nuclear Disaster

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NPTEL Video Course - Chemical Engineering - NOC:Technologies for Clean and Renewable Energy Production

Subject Co-ordinator - Prof. P. Mondal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Coal as a Source of Energy
Lecture 3 - Characterization of Coal
Lecture 4 - Conventional Route for Energy Production from Coal
Lecture 5 - Tutorial 1
Lecture 6 - Cleaner Route for Energy Production from Coal
Lecture 7 - Gasification of Coal - 1
Lecture 8 - Gasification of Coal - 2
Lecture 9 - Direct Liquefaction of Coal
Lecture 10 - Tutorial 2
Lecture 11 - Petroleum as a Source of Energy
Lecture 12 - Characteristics of Crude Oil and Petroleum Products
Lecture 13 - Refining of Crude Oil for Liquid Fuels Production
Lecture 14 - Conversion of Intermediate Products
Lecture 15 - Tutorial 3
Lecture 16 - Impurities Removal from Liquid Fuels
Lecture 17 - Residue Upgradation - 1
Lecture 18 - Residue Upgradation - 2
Lecture 19 - Heavy Crude Oil Processing
Lecture 20 - Tutorial 4
Lecture 21 - Properties and Routes for Energy Production
Lecture 22 - Syn Gas Production from Natural Gas
Lecture 23 - Syn Gas to Liquid Fuel Production
Lecture 24 - Hydrogen Production from Natural Gas
Lecture 25 - Tutorial 5
Lecture 26 - Solar Energy - 1
Lecture 27 - Solar Energy - 2
Lecture 28 - Wind Energy - 1
Lecture 29 - Wind Energy - 2

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Lecture 30 - Tutorial 6
Lecture 31 - Hydro Energy - 1
Lecture 32 - Hydro Energy - 2
Lecture 33 - Geothermal Energy
Lecture 34 - Tidal Energy
Lecture 35 - Tutorial 7
Lecture 36 - Energy from Biomass and Wastes 1 (Biological Route)
Lecture 37 - Energy from Biomass and Wastes 2 (Chemical Route)
Lecture 38 - Energy from Biomass and Wastes 3 (Physical Route)
Lecture 39 - Energy Conversations
Lecture 40 - Tutorial 8

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NPTEL Video Course - Chemical Engineering - NOC:Polymer Reaction Engineering

Subject Co-ordinator - Prof. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Polymerization Process - I
Lecture 2 - Introduction to polymerization process - II
Lecture 3 - A Short History of polymerization process, monomers and its distribution
Lecture 4 - Gradient and graft copolymer, polymer and its compositions, isomerism in polymers - I
Lecture 5 - Gradient and graft copolymer, polymer and its compositions, isomerism in polymers - II
Lecture 6 - Bonding forces in polymers
Lecture 7 - Molecular weight and its distribution
Lecture 8 - Control on Polymer Synthesis - I
Lecture 9 - Control on Polymer Synthesis - II
Lecture 10 - Control on Polymer Synthesis - III
Lecture 11 - Morphology of polymers
Lecture 12 - Introduction to reactor design - I
Lecture 13 - Introduction to reactor design - II
Lecture 14 - Temperature dependent term and Interpretation of batch reactor data - I
Lecture 15 - Temperature dependent term and Interpretation of batch reactor data - II
Lecture 16 - Interpretation of batch reactor data - III
Lecture 17 - Interpretation of batch reactor data - IV
Lecture 18 - Design equation for ideal reactors
Lecture 19 - Design Equation for Single Reaction System
Lecture 20 - Multiple reactor system
Lecture 21 - Recycle reactor and autocatalytic reaction
Lecture 22 - Multiple reactions system - I
Lecture 23 - Multiple reactions system - II
Lecture 24 - Multiple reactions system - III
Lecture 25 - Problem Solving - I
Lecture 26 - Problem Solving - II
Lecture 27 - Problem Solving - III
Lecture 28 - Step-growth polymerization - I
Lecture 29 - Step Growth Polymerization - II

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Lecture 30 - Step Growth Polymerization - III
Lecture 31 - Step Growth Polymerization - IV
Lecture 32 - Radical Chain Polymerization Introduction
Lecture 33 - Radical Chain Polymerization Comparison with Ionic Chain Polymerization
Lecture 34 - Radical Chain Polymerization Mode of Propagation
Lecture 35 - Radical Chain Polymerization Rate of Polymerization
Lecture 36 - Radical Chain Polymerization Rate Expression
Lecture 37 - Radical Chain Polymerization Process Analysis - I
Lecture 38 - Radical Chain Polymerization Process Analysis - II
Lecture 39 - Radical Chain Polymerization Half-life, Propagation and Termination - I
Lecture 40 - Radical Chain Polymerization Half-life, Propagation and Termination - II
Lecture 41 - Radical Chain Polymerization Redox Initiation
Lecture 42 - Radical Chain Polymerization Photochemical and Ionization Initiation
Lecture 43 - Radical Chain Polymerization Other Initiation Techniques - I
Lecture 44 - Radical Chain Polymerization Other Initiation Techniques - II
Lecture 45 - Heterogeneous Polymerization Introduction - I
Lecture 46 - Heterogeneous Polymerization Introduction - II
Lecture 47 - Population Balance Modeling Other Techniques - I
Lecture 48 - Population Balance Modeling Other Techniques - II
Lecture 49 - Emulsion Polymerization Batch Polymerization
Lecture 50 - Emulsion Polymerization Semi-continuous polymerization
Lecture 51 - Emulsion Polymerization Nucleation, Morphology and Reactor Types - I
Lecture 52 - Emulsion Polymerization Nucleation, Morphology and Reactor Types - II
Lecture 53 - Emulsion Polymerization PSD and Implementation of the Process - I
Lecture 54 - Emulsion Polymerization PSD and Implementation of the Process - II
Lecture 55 - Living and dormant Polymerization
Lecture 56 - Ionic Polymerization - I
Lecture 57 - Ionic Polymerization - II
Lecture 58 - Ionic Polymerization - III
Lecture 59 - Ionic Polymerization - IV
Lecture 60 - Ionic Polymerization - V

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NPTEL Video Course - Chemical Engineering - NOC:Process Equipment Design

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Classification of exchangers - 1
Lecture 3 - Classification of exchangers - 2
Lecture 4 - Basic Design Parameters - 1
Lecture 5 - Basic Design Parameters - 2
Lecture 6 - Double Pipe Heat Exchanger - 1
Lecture 7 - Double Pipe Heat Exchanger - 2
Lecture 8 - Double Pipe Heat Exchanger - 3
Lecture 9 - Types of Shell and Tube exchangers
Lecture 10 - Exchanger Tubes
Lecture 11 - Exchanger Shell
Lecture 12 - STE design - Kernâ s method - 1
Lecture 13 - STE design - Kernâ s method - 2
Lecture 14 - STE design - Kernâ s method - 3
Lecture 15 - STE design - Kernâ s method: Example - 4
Lecture 16 - STE design - Kernâ s method: Example - 5
Lecture 17 - STE design - Bellâ s method - 1
Lecture 18 - STE design - Bellâ s method - 2
Lecture 19 - STE design - Bellâ s method - 3
Lecture 20 - STE design - Bellâ s method: Example - 4
Lecture 21 - STE design - Bellâ s method: Example - 5
Lecture 22 - Design of Condenser - 1
Lecture 23 - Design of Condenser - 2
Lecture 24 - Design of Condenser - 3
Lecture 25 - Design of Condenser - 4
Lecture 26 - Design of Condenser - 5
Lecture 27 - Design of Reboiler - 1
Lecture 28 - Design of Reboiler - 2
Lecture 29 - Design of Reboiler - 3

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Lecture 30 - Design of Reboiler - 4
Lecture 31 - Design of Reboiler - 5
Lecture 32 - Design of Reboiler - 6
Lecture 33 - Design of Reboiler - 7
Lecture 34 - Design of Evaporator - 1
Lecture 35 - Design of Evaporator - 2
Lecture 36 - Design of Evaporator - 3
Lecture 37 - Design of Evaporator - 4
Lecture 38 - Design of Evaporator - 5
Lecture 39 - Design of Crystallizer - 1
Lecture 40 - Design of Crystallizer - 2
Lecture 41 - Design of Crystallizer - Examples
Lecture 42 - Design of Crystallizer - Types
Lecture 43 - Design of Packed Column - 1
Lecture 44 - Design of Packed Column - 2
Lecture 45 - Design of Packed Column - 3
Lecture 46 - Design of Packed Column - 4
Lecture 47 - Design of Packed Column - 5
Lecture 48 - Distillation Column - 1
Lecture 49 - Distillation Column - 2
Lecture 50 - Distillation Column - 3
Lecture 51 - Distillation Column - 4
Lecture 52 - Distillation Column - 5
Lecture 53 - Distillation Column - 6
Lecture 54 - Distillation Column - 7
Lecture 55 - Distillation Column - 8
Lecture 56 - Distillation Column - Mechanical Design - 1
Lecture 57 - Distillation Column - Mechanical Design - 2
Lecture 58 - Distillation Column - Mechanical Design - 3
Lecture 59 - Distillation Column - Mechanical Design - 4
Lecture 60 - Distillation Column - Mechanical Design - 5

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NPTEL Video Course - Chemical Engineering - NOC:Advanced Thermodynamics and Molecular Simulations

Subject Co-ordinator - Prof. Prateek Kumar Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Molecular basis of energy and entropy
Lecture 3 - Probability and probability distributions
Lecture 4 - Probability distributions and thermodynamic equilibrium
Lecture 5 - Energy distribution in molecular systems
Lecture 6 - First and second law of thermodynamics
Lecture 7 - Reversible and irreversible processes; third law of thermodynamics; legendre transformation; ther
Lecture 8 - Thermodynamic functions for multi-component systems; chemical potential; why do we minimize therm
Lecture 9 - Extensive and intensive variables; gibbs duhem relation; euler theorem; maxwell relations
Lecture 10 - Discrete and continuous probabilities; stirling approximation
Lecture 11 - Binomial distribution approaches Gaussian distribution for large n; definition of drunkard walk
Lecture 12 - Solution of drunkard walk; Lagrange multipliers
Lecture 13 - Energy distribution in molecular system revisited; introduction to thermodynamic ensembles
Lecture 14 - Canonical ensemble: most probable distribution, partition function
Lecture 15 - Definition of temperature; third law of thermodynamics
Lecture 16 - Canonical ensemble: Helmholtz free energy, averages and fluctuations, specific heat, deriving id
Lecture 17 - Partition function of a dense gas; grand canonical ensemble: partition function, most probable d
Lecture 18 - Computing properties in grand canonical ensemble
Lecture 19 - Isothermal isobaric ensemble
Lecture 20 - Summary of thermodynamic ensembles; partition function of an ideal gas
Lecture 21 - Mixing and phase separation, phase equilibrium of a multiphase multicomponent system, Gibbs phas
Lecture 22 - Pure component phase diagram; solution thermodynamics: Helmholtz free energy density
Lecture 23 - Characterizing mixing and phase separation using Helmholtz free energy density
Lecture 24 - Common tangent construction, definition of binodal, spinodal, and critical point
Lecture 25 - Osmotic pressure and chemical potential
Lecture 26 - Lattice model of liquid solutions - I
Lecture 27 - Lattice model of liquid solutions - II
Lecture 28 - Lattice model of liquid solutions - III
Lecture 29 - Critical review of Lattice model, theoretical basis of molecular dynamics simulation

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Lecture 30 - Theoretical basis of molecular dynamics simulation
Lecture 31 - Interaction energy and force field
Lecture 32 - Liouiville theorem; theoretical basis of Monte Carlo simulation
Lecture 33 - Introduction to Monte Carlo simulation method
Lecture 34 - Markov chain algorithm, condition for equilibrium and detailed balance
Lecture 35 - Metropolis algorithm, periodic boundary condition
Lecture 36 - Numerical implementation of Monte Carlo simulation: Python Examples - I
Lecture 37 - Numerical implementation of Monte Carlo simulation: Python Examples - II
Lecture 38 - Numerical implementation of Monte Carlo simulation: Python Examples - III
Lecture 39 - Numerical implementation of Monte Carlo simulation: Python Examples - IV
Lecture 40 - Numerical implementation of Monte Carlo simulation: Python Examples - V
Lecture 41 - Particle simulations: comparison with quantum chemical and continuum simulations; bridging lengt
Lecture 42 - Pair potentials
Lecture 43 - Saving CPU time: short range and long range interactions
Lecture 44 - Bonded and non-bonded interactions, force fields
Lecture 45 - Practical aspects of molecular simulations
Lecture 46 - Numerical implementation of MD; thermostat and barostat
Lecture 47 - MD simulations - efficiency and parallelization, sampling and averaging, analysis of simulation
Lecture 48 - MD simulations - analysis of simulation trajectories (continued), Case Studies - I
Lecture 49 - MD simulations - Case Studies - II
Lecture 50 - MD simulations - Case Studies - III
Lecture 51 - Free energies and phase behavior; extension of canonical ensemble Monte Carlo to other ensembles
Lecture 52 - Extension of canonical ensemble Monte Carlo to other ensembles (Continued...)
Lecture 53 - Monte Carlo in Gibbs ensemble and semi-grand canonical ensemble, thermodynamic integration
Lecture 54 - Thermodynamic integration (continued); Widom's particle insertion; overlapping distribution meth
Lecture 55 - Multiple histogram method; umbrella sampling; thermodynamic cycle; potential of mean force; pull
Lecture 56 - Tackling time scale issues (continued); nonequilibrium molecular dynamics; mesoscale simulations
Lecture 57 - Multiparticle collision dynamics; lattice Boltzmann method; coarse-graining
Lecture 58 - Case studies
Lecture 59 - Simulations of chemical reactions using Kinetic Monte Carlo simulations
Lecture 60 - Reactive force fields; Ab initio molecular dynamics and other advanced methods; molecular simula

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NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Utilities

Subject Co-ordinator - Prof. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Chemical Process Utilities
Lecture 2 - Energy Perspective to the Utilities
Lecture 3 - Power Cycle
Lecture 4 - Fuel Analysis
Lecture 5 - Practice problems related to power cycle and fuel analysis
Lecture 6 - Heat Transfer Utilities - I
Lecture 7 - Heat Transfer Utilities - II
Lecture 8 - Plate and Frame Heat Exchangers Types
Lecture 9 - Solar Energy - I
Lecture 10 - Solar Energy - II
Lecture 11 - Heat Transfer Media and Solar energy
Lecture 12 - Water
Lecture 13 - Water Chemistry
Lecture 14 - Inhibition and Water Treatment
Lecture 15 - Boiler Water treatment
Lecture 16 - Water Governance
Lecture 17 - Water Quality standards - I
Lecture 18 - Water Quality Standards - II
Lecture 19 - Steam
Lecture 20 - Boilers
Lecture 21 - Industrial Boiler Types
Lecture 22 - Boilers
Lecture 23 - Boilers- Question Practice
Lecture 24 - Steam Generation Unit
Lecture 25 - Steam Generation Unit-Heaters
Lecture 26 - Attemperator and Steam Drum
Lecture 27 - Steam Traps, Centralization, and Fuel Selection
Lecture 28 - Economizer, Super heaters, and Safety devices
Lecture 29

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Lecture 30 - Insulation of Steam Generators
Lecture 31 - Air
Lecture 32 - Air Filtration and Pneumatic Conveying
Lecture 33 - Introduction to Pneumatic Conveying System
Lecture 34 - Conveying System Types
Lecture 35 - Material Properties and Pipeline Feeding Devices
Lecture 36 - Feeding devices
Lecture 37 - Gas-solid flows
Lecture 38 - Design of Pipelines Elements of Pipeline Design
Lecture 39 - Natural Gas Transmission - I
Lecture 40 - Natural Gas Transmission - II
Lecture 41 - Natural Gas Transmission - III
Lecture 42 - Pipeline Mechanical design - Natural Gas Transmission - IV
Lecture 43 - Cooling Tower; Theory and Some Basic Calculations
Lecture 44 - Concept of Heat Transfer in Cooling Tower and itâ s Components
Lecture 45 - Types and Components of Cooling Tower
Lecture 46 - Components and Materials of Construction and Applications of Cooling Tower
Lecture 47 - Control and Maintenance in cooling towers
Lecture 48 - Pressure Levels and Terminology - I
Lecture 49 - Pressure Levels and Terminology - II
Lecture 50 - Gauges for Pressure Measurement
Lecture 51 - Refrigerants and Refrigeration
Lecture 52 - Introduction to Refrigeration
Lecture 53 - Refrigeration System Components
Lecture 54 - Refrigeration System Components and Refrigeration Cycle
Lecture 55 - Refrigeration Systems
Lecture 56 - Refractories
Lecture 57 - Thermodynamic Principles and Corrosion in Refractories
Lecture 58 - Slag Attack and Kinds of Refractories in Uses
Lecture 59 - Brief history of Insulations and itâ s fundamental principles
Lecture 60 - Heat transfer in Insulations materials

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NPTEL Video Course - Chemical Engineering - NOC:Physico-Chemical Processes for Waste Water Treatment

Subject Co-ordinator - Prof. Vimal Chandra Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Water Pollution and Control
Lecture 2 - Environmental Acts and Standards
Lecture 3 - Water Quality Monitoring: Physical Parameters
Lecture 4 - Water Quality Monitoring: Physical and Chemical Parameters
Lecture 5 - Water Quality Monitoring: Chemical Parameters - I
Lecture 6 - Water Quality Monitoring: Chemical Parameters - II
Lecture 7 - Water Quality Monitoring: Biological/Biochemical Parameters - I
Lecture 8 - Water Quality Monitoring: Biological/Biochemical Parameters - II
Lecture 9 - Water Quality Monitoring: Bacteriological Parameters
Lecture 10 - Treatment of Water and Wastewater
Lecture 11 - Flow Equalization
Lecture 12 - Aeration - I
Lecture 13 - Aeration - II
Lecture 14 - Aeration - III
Lecture 15 - Aeration - IV
Lecture 16 - Aeration - V
Lecture 17 - Aeration - VI
Lecture 18 - Coagulation and Flocculation - I
Lecture 19 - Coagulation and Flocculation - II
Lecture 20 - Coagulation and Flocculation - III
Lecture 21 - Coagulation and Flocculation - IV
Lecture 22 - Settling and Sedimentation - I
Lecture 23 - Settling and Sedimentation - II
Lecture 24 - Settling and Sedimentation - III
Lecture 25 - Settling and Sedimentation - IV
Lecture 26 - Settling and Sedimentation - V
Lecture 27 - Settling and Sedimentation - VI
Lecture 28 - Filtration - I
Lecture 29 - Filtration - II

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Lecture 30 - Filtration - III
Lecture 31 - Adsorption - I
Lecture 32 - Adsorption - II
Lecture 33 - Adsorption - III
Lecture 34 - Adsorption - IV
Lecture 35 - Adsorption - V
Lecture 36 - Adsorption - VI
Lecture 37 - Ion-exchange - I
Lecture 38 - Ion-exchange - II
Lecture 39 - Ion-exchange - III
Lecture 40 - Ion-exchange - IV
Lecture 41 - Wastewater treatment by membrane processes - I
Lecture 42 - Wastewater treatment by membrane processes - II
Lecture 43 - Wastewater treatment by membrane processes - III
Lecture 44 - Wastewater treatment by membrane processes - IV
Lecture 45 - Wastewater treatment by membrane processes - V
Lecture 46 - Advanced Oxidation Processes (AOP) - Introduction
Lecture 47 - AOP - Photocatalytic wastewater treatment
Lecture 48 - AOP - Fenton, ozone and catalytic treatment
Lecture 49 - AOP - Electrochemical wastewater treatment - I
Lecture 50 - AOP - Electrochemical wastewater treatment - II
Lecture 51 - AOP - Sono-hybrid wastewater treatment
Lecture 52 - Disinfection - I
Lecture 53 - Disinfection - II
Lecture 54 - Disinfection - III
Lecture 55 - Case Study - Wastewater treatment in sugar industry
Lecture 56 - Case Study - Wastewater treatment in distillery
Lecture 57 - Case Study - Wastewater treatment in fertilizer industry
Lecture 58 - Case Study - Wastewater treatment in petroleum refining industry
Lecture 59 - Case Study - Common effluent treatment plant (CETP)
Lecture 60 - Choice of technology and summary

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NPTEL Video Course - Chemical Engineering - NOC:Basic Environmental Engineering and Pollution Abatement

Subject Co-ordinator - Prof. P. Mondal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Ecology, Environment and Biodiversity
Lecture 3 - Ecosystem services and its risks - 1
Lecture 4 - Ecosystem services and its risks - 2
Lecture 5 - Tutorial-1
Lecture 6 - Pollution types and sources
Lecture 7 - Pollution: Impacts/Consequences
Lecture 8 - Transmission of pollutants in environment - 1
Lecture 9 - Transmission of pollutants in environment - 2
Lecture 10 - Tutorial-2
Lecture 11 - Environmental quality and standards - 1
Lecture 12 - Environmental quality and standards - 2
Lecture 13 - Instrumental techniques of environmental analysis - 1
Lecture 14 - Instrumental techniques of environmental analysis - 2
Lecture 15 - Tutorial-3
Lecture 16 - Sampling and characterization - 1 (Gas, air ,emission)
Lecture 17 - Sampling and characterization - 2 (water, wastewater, effluents)
Lecture 18 - Sampling and characterization - 3 (solid waste and soil)
Lecture 19 - Environmental laws and regulatory framework
Lecture 20 - Tutorial-4
Lecture 21 - Air pollution control - 1
Lecture 22 - Air pollution control - 2
Lecture 23 - Air pollution control - 3
Lecture 24 - Air pollution control - 4
Lecture 25 - Tutorial-5
Lecture 26 - Treatment of surface and ground water for drinking water generation
Lecture 27 - Treatment of domestic and industrial wastewater: Schemes
Lecture 28 - Primary treatment equipment
Lecture 29 - Secondary treatment processes

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Lecture 30 - Tutorial-6
Lecture 31 - Secondary treatment equipment - 1
Lecture 32 - Secondary treatment equipment - 2
Lecture 33 - Advanced secondary processes - 1
Lecture 34 - Advanced secondary processes - 2
Lecture 35 - Tutorial-7
Lecture 36 - Advanced secondary processes - 3
Lecture 37 - Tertiary treatment - 1
Lecture 38 - Tertiary treatment - 2
Lecture 39 - Tertiary treatment - 3
Lecture 40 - Tutorial-8
Lecture 41 - Sludge management - 1
Lecture 42 - Sludge management - 2
Lecture 43 - Sludge management - 3
Lecture 44 - Industrial Pollution Control in GPI - 1 (General aspect and pollution control in sugar industry)
Lecture 45 - Tutorial-9
Lecture 46 - Industrial Pollution Control in GPI - 2 (Pollution control in Distillery)
Lecture 47 - Industrial Pollution Control in GPI - 3 (Pollution control in Tannery)
Lecture 48 - Pollution control in Petroleum refinery and petrochemicals industry
Lecture 49 - Industrial Pollution Control in GPI - 4
Lecture 50 - Tutorial 10
Lecture 51 - Solid waste and hazardous waste management - 1
Lecture 52 - Solid waste and hazardous waste management - 2
Lecture 53 - Solid waste and hazardous waste management - 3
Lecture 54 - Solid waste and hazardous waste management - 4
Lecture 55 - Tutorial-11
Lecture 56 - Air Pollution Management, Air quality survey, NAAQI - 1
Lecture 57 - Air Pollution Management, Air quality survey, NAAQI - 2
Lecture 58 - Management of special category wastes - 1
Lecture 59 - Management of special category wastes - 2
Lecture 60 - Tutorial-12

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NPTEL Video Course - Chemical Engineering - NOC:Biological Process Design for Wastewater Treatment

Subject Co-ordinator - Prof. Vimal Chandra Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biological Process Design for Wastewater Treatment
Lecture 2 - Microorganisms in Biological Wastewater Treatment
Lecture 3 - Fundamentals of Biochemical Operations
Lecture 4 - Wastewater Characterization - I
Lecture 5 - Wastewater Characterization - II
Lecture 6 - Wastewater Characterization - III
Lecture 7 - Wastewater Characterization - IV
Lecture 8 - Wastewater Characterization - V
Lecture 9 - Stoichiometry of Microbial Growth - I
Lecture 10 - Stoichiometry of Microbial Growth - II
Lecture 11 - Stoichiometry of Microbial Growth - III
Lecture 12 - Reaction Kinetics
Lecture 13 - Bacterial Growth Kinetics - I
Lecture 14 - Bacterial Growth Kinetics - II
Lecture 15 - Reactor Hydraulics - I
Lecture 16 - Reactor Hydraulics - II
Lecture 17 - Treatment of Water and Wastewater - I
Lecture 18 - Treatment of Water and Wastewater - II
Lecture 19 - Coagulation, Flocculation, and Sedimentation - I
Lecture 20 - Coagulation, Flocculation, and Sedimentation - II
Lecture 21 - Lagoon
Lecture 22 - Activated Sludge Process
Lecture 23 - Sequential Batch Reactor
Lecture 24 - Trickling Filter
Lecture 25 - Rotating Disc Reactor
Lecture 26 - Up-flow Anaerobic Sludge Blanket (UASB) reactor
Lecture 27 - UASB and Biotower
Lecture 28 - Advanced Biological Wastewater Treatment: Fluidized Bed Bioreactors
Lecture 29 - Advanced Biological Wastewater Treatment: Membrane Bioreactors

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Lecture 30 - Advanced Biological Wastewater Treatment: Moving Bed Biofilm Reactor (MBBR)
Lecture 31 - Sludge Management - I
Lecture 32 - Sludge Management - II
Lecture 33 - Sludge Management - III
Lecture 34 - Sludge Management - IV
Lecture 35 - Sludge Management - V
Lecture 36 - Sludge Management - VI
Lecture 37 - Sustainable Development and Environmental Impact Assessment
Lecture 38 - Management of Wastewater from Dairy Industry
Lecture 39 - Management of Wastewater from Slaughterhouse
Lecture 40 - Common Effluent Treatment Plant (CETP)

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NPTEL Video Course - Chemical Engineering - NOC:Advanced Reaction Engineering

Subject Co-ordinator - Prof. Taraknath Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction_Various Reactors_BR
Lecture 3 - Design Equation_Continuous reactor (CSTR_PFR_PBR)
Lecture 4 - Design Equation_Continuous reactor (CSTR_PFR_PBR)_Sizing
Lecture 5 - Reaction Rate with Conversion, Temperature, and pressure (Batch/Flow system)
Lecture 6 - Space time Space velocity and CSTRs in series/parallel
Lecture 7 - Effect of Pressure Drop on reactor design (PBR)_(X vs W) and (P vs W)
Lecture 8 - Effect of Pressure Drop on Reactor design (PBR)_(X vs W)_ (P vs W)
Lecture 9 - Effect of Pressure Drop in PBR reactor_Analytical solution of Differential equation
Lecture 10 - Effect of Pressure Drop in PBR reactor_Analytical solution for Reaction With Pressure drop
Lecture 11 - Effect of Pressure Drop in PBR reactor_Example
Lecture 12 - Differential Reactor_rate of reaction_catalyst deactivation
Lecture 13 - Catalyst deactivation
Lecture 14 - Catalyst Deactivation_Temperature (T) - Time (t) trajectories
Lecture 15 - Moving Bed Reactor_Catalyst deactivation
Lecture 16 - STTR_Catalyst deactivation
Lecture 17 - Multi phase reactors-1: Slurry reactor - 1
Lecture 18 - Multi phase reactors-1: Slurry reactor - 2
Lecture 19 - Multi phase reactors-1: Slurry reactor - 3
Lecture 20 - Multi phase reactors-2: Trickle bed reactor - 1
Lecture 21 - Multi phase reactors-2: Trickle bed reactor - 2
Lecture 22 - Multi phase reactors-2: Trickle bed reactor - 3
Lecture 23 - Bioreactor_Cell Growth and Rate laws
Lecture 24 - Bioreactors_Stoichiometry_Yield coefficients_rate of substrate consumption
Lecture 25 - Bioreactors_Example_Yield coefficients and rate law parameters estimation
Lecture 26 - Bioreactors_Mass Balances (Cell, Substrate, Product)
Lecture 27 - Bioreactors_Chemostats
Lecture 28 - Steady State Non Isothermal reactor design_EB equation
Lecture 29 - Steady State Non Isothermal reactor design_Example

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Lecture 30 - SS Non Isothermal reactor design_Reaction with Heat Exchange
Lecture 31 - SS Non Isothermal reactor design_Heat Exchange_ T-profile for a few cases
Lecture 32 - SS Non Isothermal reactor design_Equilibrium conversion
Lecture 33 - SS Non Isothermal reactor design_Optimum feed temperature
Lecture 34 - SS Non Isothermal reactor design_Multiple Steady States
Lecture 35 - SS Non Isothermal reactor design_Ignition Extinction Curves
Lecture 36 - SS Non Isothermal reactor design_Runaway reaction in a CSTR
Lecture 37 - SS Non Isothermal reactor design_Energy Balance:Multiple rxn in a CSTR/PFR (Examples)
Lecture 38 - Non-ideal flow - 1
Lecture 39 - Basics of Non-ideal flow - 2
Lecture 40 - Basics of Non-ideal flow - 3
Lecture 41 - Non-ideal flow-Segregation model
Lecture 42 - One parameter Model-Tank in Series model (TIS)
Lecture 43 - Non-ideal flow-Dispersion model - Part 1
Lecture 44 - Non-ideal flow-Dispersion model - Part 2
Lecture 45 - Non-ideal flow-Dispersion model - Part 3
Lecture 46 - Two parameter Models-Modeling real reactors with Combinations of Ideal Reactors
Lecture 47 - Solid Catalyzed Reaction: Reaction and Diffusion - Part 1
Lecture 48 - Solid Catalyzed Reaction: Reaction and Diffusion - Part 2
Lecture 49 - Solid Catalyzed Reaction: Reaction and Diffusion - Part 3
Lecture 50 - Catalysis and Catalytic Reactors - Part 1
Lecture 51 - Catalysis and Catalytic Reactors - Part 2
Lecture 52 - Catalysis and Catalytic Reactors - Part 3
Lecture 53 - Collection and Analysis of Rate - Part 1
Lecture 54 - Collection and Analysis of Rate - Part 2
Lecture 55 - Collection and Analysis of Rate - Part 3
Lecture 56 - Polymath and ODE solver
Lecture 57 - Catalyst Synthesis - Part 1
Lecture 58 - Catalyst Synthesis - Part 2
Lecture 59 - Catalyst Characterization Techniques: BET, Pore size, Pore volume
Lecture 60 - Catalyst Characterization Techniques

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NPTEL Video Course - Chemical Engineering - NOC:Polymer Process Engineering

Subject Co-ordinator - Prof. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Polymers
Lecture 2 - Polymers and Polymerization Techniques
Lecture 3 - Characteristics of Polymers - I
Lecture 4 - Characteristics of Polymers - II
Lecture 5 - Applications of Polymers
Lecture 6 - Thermodynamics of Polymer Systems - I
Lecture 7 - Thermodynamics of Polymer Systems - II
Lecture 8 - Thermodynamics of Polymer Systems - III
Lecture 9 - Thermodynamics of Polymer Systems - IV
Lecture 10 - Thermodynamics of Polymer Systems - V
Lecture 11 - Applied polymer rheology: Fluid behavior
Lecture 12 - Applied polymer rheology: Structure and properties of deforming polymer
Lecture 13 - Applied polymer rheology: Flow of polymers with supermolecular structure
Lecture 14 - Applied polymer rheology: Transport phenomena
Lecture 15 - Applied polymer rheology: Rheometry
Lecture 16 - Heat Transfer Phenomenon in polymer systems: Introduction
Lecture 17 - Heat Transfer Phenomenon in polymer systems: Thermal properties
Lecture 18 - Heat Transfer Phenomenon in polymer systems: Thermal properties and conduction
Lecture 19 - Heat Transfer Phenomenon in polymer systems: Conduction and Convection
Lecture 20 - Heat Transfer Phenomenon in polymer systems: Convection and Radiation
Lecture 21 - Mass Transfer Phenomenon in Polymers: Introduction
Lecture 22 - Steady State Diffusion in Polymers
Lecture 23 - Mass transfer coefficient and dimensionless numbers
Lecture 24 - Mass transfer phenomenon in polymers: Laminar flow and boundary layer conditions
Lecture 25 - Mass transfer phenomenon in polymers: Diffusivity and solubility of gases
Lecture 26 - Chemical reaction engineering in polymers: Introduction
Lecture 27 - Chemical reaction engineering in polymers: Condensation (Step-growth) polymerization
Lecture 28 - Chemical reaction engineering in polymers: Addition (Chain-Growth) Polymerization - I
Lecture 29 - Chemical reaction engineering in polymers: Addition (Chain-Growth) Polymerization - II

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Lecture 30 - Chemical reaction engineering in polymers: Addition (Chain-Growth) Polymerization - III
Lecture 31 - Injection Moulding - 1
Lecture 32 - Injection Moulding - 2
Lecture 33 - Extrusion
Lecture 34 - Blow moulding
Lecture 35 - Calendaring and Fiber spinning
Lecture 36 - Polymer Testing - 1
Lecture 37 - Polymer testing - 2 (Standardization, Sample preparation)
Lecture 38 - Polymer testing - 3
Lecture 39 - Polymer testing - 4 (Measuring of rheological properties)
Lecture 40 - Polymer testing - 5 (Mechanical properties; Hardness, tensile and compression)
Lecture 41 - Polymer testing - 6
Lecture 42 - Polymer Testing - 7
Lecture 43 - Polymer Testing - 8
Lecture 44 - Polymer Testing - 9
Lecture 45 - Polymer Testing - 10
Lecture 46 - Polymeric Materials Used in Electronics
Lecture 47 - Polymers in Electronics: Epoxies
Lecture 48 - Epoxies, Phenoxies, and Silicones
Lecture 49 - Polyimides
Lecture 50 - Fluorocarbons, Polyxylyenes, and Polyesters
Lecture 51 - Polymer Materials in Electronics
Lecture 52 - Functions of Coatings - I
Lecture 53 - Functions of Coatings - II
Lecture 54 - Natural fibers reinforced composites - I
Lecture 55 - Natural fibers reinforced composites - II
Lecture 56 - NFRCs and Polymer Applications
Lecture 57 - Polymer Applications in Building Materials
Lecture 58 - Polymer applications in different fields: Polymer in textile
Lecture 59 - Polymer applications in different fields: Polymer in cosmetics
Lecture 60 - Polymer applications in different fields: Polymer and food packaging

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NPTEL Video Course - Chemical Engineering - NOC:Nanotechnology in Chemical Engineering

Subject Co-ordinator - Prof. Taraknath Das

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Overview
Lecture 2 - Introduction - Types of materials
Lecture 3 - Introduction - Properties
Lecture 4 - Introduction - Properties - HT
Lecture 5 - Introduction - Properties - MT_Defects
Lecture 6 - Introduction - Properties - Mech_Ele_Opt_Mag
Lecture 7 - Introduction - Synthesis of nanomaterials
Lecture 8 - Introduction - Characterizations and Applications
Lecture 9 - Structure and Bonding
Lecture 10 - Synthesis of nanomaterials - Physical method - I
Lecture 11 - Synthesis of nanomaterials - Physical method - II
Lecture 12 - Synthesis of nanomaterials - Physical method - III
Lecture 13 - Synthesis of nanomaterials - Physical method - IV
Lecture 14 - Synthesis of nanomaterials - Chemical method - I
Lecture 15 - Synthesis of nanomaterials - Chemical method - II
Lecture 16 - Synthesis of nanomaterials - Chemical method - III
Lecture 17 - Synthesis of Nanomaterials Some special NMs_synthesis of carbon NMs - Fullerene
Lecture 18 - Synthesis of Nanomaterials Some special NMs_synthesis of carbon NMs - CNTs
Lecture 19 - Synthesis of Nanomaterials_Synthesis of Porous Silicon (Si)
Lecture 20 - Synthesis of Nanomaterials_Synthesis of MOFs
Lecture 21 - Synthesis of Nanomaterials_Synthesis of Aerogels
Lecture 22 - Synthesis of Nanomaterials_Synthesis of Zeolite
Lecture 23 - Characterizations of Nanomaterials_SEM
Lecture 24 - Characterization of nanomaterials_TEM
Lecture 25 - Characterization of nanomaterials_SPM, STM, AFM, SNOM
Lecture 26 - Characterizations of Nanomaterials_BET - 1
Lecture 27 - Characterizations of Nanomaterials_BET - 2
Lecture 28 - Characterizations of Nanomaterials_TGA_ Zeta potential
Lecture 29 - Materials Characterization Techniques_XRD

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Lecture 30 - Materials Characterization Techniques_XPS
Lecture 31 - Materials Characterization Techniques_FTIR
Lecture 32 - Materials Characterization Techniques_Raman_UV-vis-NIR_DLS
Lecture 33 - Applications of Nanotechnology in Wastewater Treatment
Lecture 34 - Nanotechnology in Mass Transfer - 1
Lecture 35 - Applications of Nanotechnology in Mass Transfer - 2_Nanofluids_CO2 adsorption
Lecture 36 - Applications of Nanotechnology in Heat Transfer
Lecture 37 - Applications of NMs in Catalysis (Photocatalysis_contaminants degradation_CO2 conversion _liquid
Lecture 38 - Applications of NPs in enhanced oil recovery (EOR)
Lecture 39 - Applications of Nanotechnology in Hydrogen Storage
Lecture 40 - Applications of Nanotechnology in Biofuels

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NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering

Subject Co-ordinator - Prof. Jayant M Modak

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction & Overview
Lecture 2 - Basic concepts
Lecture 3 - Thermodynamics of Chemical Reactions - Part I
Lecture 4 - Thermodynamics of Chemical Reactions - Part II
Lecture 5 - Chemical Reaction Kinetics - Overview
Lecture 6 - Chemical Reaction Kinetics & Reactor Design
Lecture 7 - Chemical Reactor Design
Lecture 8 - Problem Solving
Lecture 9 - Complec Reactions - Introduction
Lecture 10 - Complex Reactions - Yield & Selectivity
Lecture 11 - Complex Reactions - Quasi Steady State and Quasi Equilibrium Approximations
Lecture 12 - Complex Reactions - Kinetics of Chain Reactions & polymerization
Lecture 13 - Catalytic reactions - Introduction
Lecture 14 - Catalytic reactions - Adsorption & Desorption
Lecture 15 - Catalytic reactions - Kinetics
Lecture 16 - Monomolecular Reaction Network & Lumping Analysis
Lecture 17 - Problem solving
Lecture 18 - Gas-solid Catalytic Reactions - External diffusion
Lecture 19 - Gas-solid Catalytic Reactions - Transport in Catalyst Pellet
Lecture 20 - Gas-solid Catalytic Reactions - Diffusion & Reaction - I
Lecture 21 - Gas-solid Catalytic Reactions - Diffusion & Reaction - II
Lecture 22 - Gas-solid Catalytic Reactions - Diffusion & Reaction - III
Lecture 23 - Gas-solid Catalytic Reactions - Nonisothermal effects
Lecture 24 - Gas-solid Noncatalytic Reactions
Lecture 25 - Gas-Liquid Reactions
Lecture 26 - Problem solving
Lecture 27 - Chemical Reactor Design
Lecture 28 - Chemical Reactor Design
Lecture 29 - Nonisothermal Reactor Operation

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Lecture 30 - Case Study - Ethane dehyrogenation
Lecture 31 - Case Study - Hydrogenation of Oil
Lecture 32 - Case Study - Ammonia Synthesis
Lecture 33 - Autothermal reactors
Lecture 34 - Parametric Sensitivity
Lecture 35 - CSTR - multiple steady states
Lecture 36 - Stability Analysis - Basics
Lecture 37 - Stability Analysis - Examples
Lecture 38 - Nonideal flow and reactor performance - I
Lecture 39 - Nonideal flow and reactor performance - II
Lecture 40 - Problem solving

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NPTEL Video Course - Chemical Engineering - Fundamentals of Transport Processes

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Dimensional Analysis
Lecture 3 - Dimensional Analysis (Continued...)
Lecture 4 - Dimensionless Groups
Lecture 5 - Continuum description
Lecture 6 - Mechanisms of diffusion - I
Lecture 7 - Mechanisms of diffusion - II
Lecture 8 - Unidirectional Transport Cartesian Coordinates - I
Lecture 9 - Unidirectional Transport Cartesian Coordinates - II Similarity Solutions
Lecture 10 - Unidirectional Transport Cartesian Coordinates - III Similarity Solutions
Lecture 11 - Unidirectional Transport Cartesian Coordinates - IV Seperation of Variables
Lecture 12 - Unidirectional Transport Cartesian Coordinates - V Seperation of Variables
Lecture 13 - Unidirectional Transport Cartesian Coordinates - VI Oscillatory Flows
Lecture 14 - Unidirectional Transport Cartesian Coordinates - VII Momentum Source in the Flow
Lecture 15 - Unidirectional Transport Cartesian Coordinates - VIII Heat & Mass Sources
Lecture 16 - Unidirectional Transport Cylindrical Coordinates - I Conservation Equations
Lecture 17 - Unidirectional Transport Cylindrical Coordinates - II Similarity Solutions
Lecture 18 - Unidirectional Transport Cylindrical Coordinates - III Seperation of Variables
Lecture 19 - Unidirectional Transport Cylindrical Coordinates - IV Steady flow in a pipe
Lecture 20 - Unidirectional Transport Cylindrical Coordinates - V Oscillatory flow in a pipe
Lecture 21 - Unidirectional Transport Cylindrical Coordinates - VI Oscillatory flow in a pipe Regular Perturb
Lecture 22 - Unidirectional Transport Cylindrical Coordinates - VII Oscillatory flow in a pipe Singular Pertu
Lecture 23 - Unidirectional Transport Spherical Coordinates - I Balance Equation
Lecture 24 - Unidirectional Transport Spherical Coordinates - II Seperation of Variables
Lecture 25 - Mass & Energy Conservation Cartesian Coordinates
Lecture 26 - Mass & Energy Conservation Cartesian Coordinates Heat Conduction in a Cube
Lecture 27 - Mass & Energy Conservation Spherical Coordinates Balance Laws
Lecture 28 - Mass & Energy Conservation Cylindrical Coordinates
Lecture 29 - Diffusion Equation Spherical Co-ordinates Seperation of Variables

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Lecture 30 - Diffusion Equation Spherical Co-ordinates Seperation of Variables (Continued...)
Lecture 31 - Diffusion Equation Spherical Co-ordinates Effective Conductivity of a Composite
Lecture 32 - Diffusion Equation Spherical Harmonics
Lecture 33 - Diffusion Equation Delta Functions
Lecture 34 - Diffusion Equation Multipole Expansions
Lecture 35 - Diffusion Equation Greens Function Formulations
Lecture 36 - High Peclet Number Transport Flow Past a Flat Plate
Lecture 37 - High Peclet Number Transport Heat Transfer from a Spherical Particle - I
Lecture 38 - High Peclet Number Transport Heat Transfer from a Spherical Particle - II
Lecture 39 - High Peclet Number Transport Heat Transfer from a Gas Bubble
Lecture 40 - Summary

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NPTEL Video Course - Chemical Engineering - Fundamentals of Transport Processes - II

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Fundamentals of Transport Processors I
Lecture 2 - Introduction
Lecture 3 - Vectors and Tensors
Lecture 4 - Vector calculus
Lecture 5 - Vector calculus
Lecture 6 - Curvilinear co-ordinates
Lecture 7 - Kinematics
Lecture 8 - Rate of deformation tensor
Lecture 9 - Mass conservation equation
Lecture 10 - Momentum conservation equation
Lecture 11 - Angular momentum conservation equation
Lecture 12 - Boundary conditions
Lecture 13 - Mechanical energy conservation
Lecture 14 - Unidirectional flow
Lecture 15 - Viscous flows
Lecture 16 - Viscous flows
Lecture 17 - Flow around a sphere
Lecture 18 - Force on moving sphere
Lecture 19 - Torque on rotating sphere
Lecture 20 - Effective viscosity of a suspension
Lecture 21 - Flow in a corner
Lecture 22 - Lubrication flow
Lecture 23 - Lubrication flow
Lecture 24 - Inertia of a low Reynolds number
Lecture 25 - Potential flow
Lecture 26 - Potential flow around a sphere
Lecture 27 - Two-dimensional potential flow
Lecture 28 - Two-dimensional potential flow
Lecture 29 - Flow around a cylinder

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Lecture 30 - Conformal transforms in potential flow
Lecture 31 - Boundary layer theory
Lecture 32 - Boundary layer past a flat plate
Lecture 33 - Stagnation point flow
Lecture 34 - Falkner-Skan Boundary Layer Solutions
Lecture 35 - Falkner-Skan Boundary Layer Solutions
Lecture 36 - Vorticity Dynamics
Lecture 37 - Vorticity Dynamics
Lecture 38 - Turbulence
Lecture 39 - Turbulence
Lecture 40 - Turbulent flow in a channel

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NPTEL Video Course - Chemical Engineering - Modern Instrumental Methods of Analysis

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Modern Instrumental Methods of Analysis
Lecture 2 - Atomic Structure
Lecture 3 - Physical Properties of Electromagnetic Radiation
Lecture 4 - Interaction of Matter with Radiation
Lecture 5 - Ultraviolet and Visible Spectrophotometry-1 (i. Theoretical Aspects)
Lecture 6 - Ultraviolet and Visible Spectrophotometry-2 (ii. Theoretical Aspects)
Lecture 7 - Ultraviolet and Visible Spectrophotometry-3 (iii. Theoretical Aspects)
Lecture 8 - Ultraviolet and Visible Spectrophotometry-4 (iv. Instrumentation)
Lecture 9 - Ultraviolet and Visible Spectrophotometry-5 (v. Instrumentation)
Lecture 10 - Ultraviolet and Visible Spectrophotometry-6 (vi. Applications)
Lecture 11 - Fluorescence and Phosphorescence Spectrophotometry-1 (i. Theoretical Aspects)
Lecture 12 - Fluorescence and Phosphorescence Spectrophotometry-2 (ii. Instrumentation)
Lecture 13 - Fluorescence and Phosphorescence Spectrophotometry-3 (iii. Application)
Lecture 14 - Atomic Fluorescence (i. Theoretical aspects)
Lecture 15 - X- Ray Analytical Techniques-1 (ii. Instrumentation)
Lecture 16 - X- Ray Analytical Techniques-2 (iii. Applications)
Lecture 17 - Atomic Absorption Spectrometry-1 (i. Theoretical Aspects)
Lecture 18 - Atomic Absorption Spectrometry-2 (ii.Theoretical Aspects)
Lecture 19 - Atomic Absorption Spectrometry-3 (iii. Instrumentation)
Lecture 20 - Atomic Absorption Spectrometry-4 (iv. Instrumentation)
Lecture 21 - Atomic Absorption Spectrometry-5 (v. Instrumentation)
Lecture 22 - Atomic Absorption Spectrometry-6 (vi. Signal handling)
Lecture 23 - Atomic Absorption Spectrometry-7 (vii. Interferences)
Lecture 24 - Atomic Absorption Spectrometry-8 (viii. Hydride Generation AAS)
Lecture 25 - Atomic Absorption Spectrometry-9 (ix.Cold Vapour Mercury AAS)
Lecture 26 - Electrothermal Atomic Absorption Spectrometry-10 (x. Electrothermal Aspects)
Lecture 27 - Electrothermal Atomic Absorption Spectrometry-11 (xi. Practical Aspects)
Lecture 28 - Inductively Coupled Plasma Atomic Emission Spectrometry-1 (i. Theoretical Aspects)
Lecture 29 - Inductively Coupled Plasma Atomic Emission Spectrometry-2 (ii. Instrumentation)

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Lecture 30 - Inductively Coupled Plasma Atomic Emission Spectrometry-3 (iii. Comparison of ICP & AAS)
Lecture 31 - Infrared Spectroscopy-1 (i. Theoretical Aspects)
Lecture 32 - Infrared Spectroscopy-2 (ii. Practical Aspects)
Lecture 33 - Infrared Spectroscopy-3 (iii. Nondispensive IR, Mass spectrometer)
Lecture 34 - Introduction to Mass Spectrometry
Lecture 35 - Introduction to Nuclear Magnetic Resonance Spectroscopy
Lecture 36 - Fundamentals of Electrochemical Techniques-1 (i. Introduction)
Lecture 37 - Fundamentals of Electrochemical Techniques-2 (ii. Introduction) (Continued...)
Lecture 38 - Polarography-1 (i. Introduction)
Lecture 39 - Polarography-2 (ii. Applications)
Lecture 40 - Chromatography-1 (i. Introduction)
Lecture 41 - Gas chromatography-1 (i. Instrumentation)
Lecture 42 - Gas chromatography-2 (ii. Applications)
Lecture 43 - Gas chromatography-3 (iii. Applications)

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NPTEL Video Course - Chemical Engineering - NOC:Transport Processes I: Heat and Mass Transfer

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Transport by convection and diffusion
Lecture 2 - Non-dimensional analysis of beams
Lecture 3 - Dimensional analysis: Force on a particle settling in a fluid
Lecture 4 - Dimensional analysis: Heat transfer in a heat exchanger
Lecture 5 - Dimensional analysis: Mass transfer from a particle suspended in a fluid
Lecture 6 - Dimensional analysis: Power of an impeller
Lecture 7 - Dimensional analysis: Scaling up of an impeller
Lecture 8 - Dimensional analysis: Convection and diffusion
Lecture 9 - Dimensional analysis: Physical interpretation of dimensionless groups
Lecture 10 - Dimensional analysis: Correlations for dimensionless groups
Lecture 11 - Dimensional analysis: Natural and forced convection
Lecture 12 - Continuum description of fluids
Lecture 13 - Conservation equations and constitutive relations
Lecture 14 - Diffusion: Mechanism of mass diffusion in gases
Lecture 15 - Diffusion: Estimation of mass diffusion coefficient
Lecture 16 - Diffusion: Momentum diffusion coefficient
Lecture 17 - Diffusion: Thermal diffusion coefficient
Lecture 18 - Unidirectional transport: Conservation equation for heat and mass transfer
Lecture 19 - Unidirectional transport: Conservation equation for momentum transfer
Lecture 20 - Unidirectional transport: Similarity solution for infinite domain
Lecture 21 - Unidirectional transport: Similarity solution for infinite domain (Continued...)
Lecture 22 - Unidirectional transport: Similarity solution for mass transfer into a falling film
Lecture 23 - Unidirectional transport: Similarity solution for decay of a pulse
Lecture 24 - Unidirectional transport: Similarity solution for decay of a pulse (Continued...)
Lecture 25 - Unidirectional transport: Separation of variables for transport in a finite domain
Lecture 26 - Unidirectional transport: Separation of variables for transport in a finite domain (Continued...
Lecture 27 - Unidirectional transport: Separation of variables for transport in a finite domain (Continued...
Lecture 28 - Unidirectional transport: Separation of variables for transport in a finite domain (Continued...
Lecture 29 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Heat transfer across the wal

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Lecture 30 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction fro
Lecture 31 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction fro
Lecture 32 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction fro
Lecture 33 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Similarity solution for heat
Lecture 34 - Unidirectional transport: Effect of body force in momentum transfer. Falling film
Lecture 35 - Unidirectional transport: Effect of pressure in momentum transfer. Flow in a pipe
Lecture 36 - Unidirectional transport: Friction factor for flow in a pipe
Lecture 37 - Unidirectional transport: Laminar and turbulent flow in a pipe
Lecture 38 - Unidirectional transport: Laminar and turbulent flow in a pipe
Lecture 39 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables
Lecture 40 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables
Lecture 41 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables (Continue
Lecture 42 - Unidirectional transport: Oscillatory flow in a pipe. Low and high Reynolds number solutions
Lecture 43 - Unidirectional transport: Spherical co-ordiantes. Heat conduction from a sphere
Lecture 44 - Mass and energy balance equations in Cartesian co-ordinates
Lecture 45 - Mass and energy balance equations in Cartesian co-ordinates
Lecture 46 - Mass and energy balance equations in spherical co-ordinates
Lecture 47 - Mass and energy balance equations in spherical co-ordinates
Lecture 48 - Momentum balance: Incompressible Navier-Stokes equations
Lecture 49 - Balance equation: Convection and diffusion dominated regimes
Lecture 50 - Diffusion equation: Heat conduction in a rectangular solid
Lecture 51 - Diffusion equation: Heat conduction in a rectangular solid (Continued...)
Lecture 52 - Diffusion equation: Heat conduction around a sphereical inclusion
Lecture 53 - Diffusion equation: Heat conduction around a spherial inclusion
Lecture 54 - Diffusion equation: Effective conductivity of a composite
Lecture 55 - Diffusion equation: Spherical harmonic solutions
Lecture 56 - Diffusion equation: Conduction from a point source
Lecture 57 - Diffusion equation: Method of Greens functions
Lecture 58 - Diffusion equation: Method of images
Lecture 59 - Diffusion equation: Equivalence of spherical harmonics and multipole expansion
Lecture 60 - High Peclet number forced convection: Boundary layer in flow past a heated plate
Lecture 61 - High Peclet number forced convection: Boundary layer in flow past a heated plate (Continued...)
Lecture 62 - High Peclet number forced convection: Flow past a heated sphere
Lecture 63 - High Peclet number forced convection: Flow past a heated sphere (Continued...)
Lecture 64 - High Peclet number forced convection: Transport to a falling film
Lecture 65 - High Peclet number forced convection: Transport to a spherical bubble
Lecture 66 - High Peclet number forced convection: Solutions for an arbitrary geometry
Lecture 67 - High Peclet number forced convection: Taylor dispersion
Lecture 68 - Natural convection: Boussinesq equations for heat transfer

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Lecture 69 - Natural convection: Boundary layer equations
Lecture 70 - Natural convection: Boundary layer equations convection
Lecture 71 - Natural convection: Heat transfer correlations

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NPTEL Video Course - Chemical Engineering - NOC:Atomic and Molecular Absorption Spectrometry for Pollution Mo

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Atomic structure
Lecture 3 - Interaction of EM radiation with matter
Lecture 4 - Atomic and molecular orbitals
Lecture 5 - Interaction of EM radiation with matter - I
Lecture 6 - Interaction of EM radiation with matter - II
Lecture 7 - Interaction of interaction of EM radiation with matter - III
Lecture 8 - Emission and absorption spectra
Lecture 9 - MO theory
Lecture 10 - Structure Â property relationship of organic compounds
Lecture 11 - Woodword Fieser rules, structure Â property relationship
Lecture 12 - Beer-Lamberts law
Lecture 13 - Deviations from Beer-Lamberts law, relative concentration error, instrumentation - I
Lecture 14 - UV-Visible spectrophotometry, instrumentation - II
Lecture 15 - UV-Visible spectrophotometry, instrumentation - III
Lecture 16 - UV-Visible spectrophotometry, instrumentation - IV
Lecture 17 - Quantitative analysis Â I
Lecture 18 - Quantitative analysis Â II
Lecture 19 - Quantitative analysis Â III
Lecture 20 - Quantitative analysis Â IV
Lecture 21 - Fluorescence spectrophotometry Â I
Lecture 22 - Fluorescence spectrophotometry - II
Lecture 23 - Fluorescence spectrophotometry - III
Lecture 24 - Instrumentation
Lecture 25 - Chemical analysis, applications
Lecture 26 - Chemiluminiscence, principles
Lecture 27 - Status of spectrophotometry vis a vis environment
Lecture 28 - Separations methods
Lecture 29 - Method development

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Lecture 30 - Boron, chloride
Lecture 31 - Fluoride
Lecture 32 - Phenols
Lecture 33 - Arsenic, Free chlorine
Lecture 34 - Magnesium
Lecture 35 - Nonionic surfactants, iron, phosphate
Lecture 36 - Nitrite , manganese
Lecture 37 - Cadmium, copper, lead
Lecture 38 - Total hardness, zinc
Lecture 39 - Nitrate, chromium
Lecture 40 - Determination of aluminum, cyanide, sulphate
Lecture 41 - Sulphate, ammonia, Conclusions

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NPTEL Video Course - Chemical Engineering - NOC:Trace and Ultra-trace Analysis of Metals using Atomic Absorpt

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Atomic structure - I
Lecture 3 - Atomic structure - II
Lecture 4 - Electronic arrangement in the Elements - I
Lecture 5 - Electronic arrangement in the Elements - II
Lecture 6 - Interaction of EM radiation with matter - I
Lecture 7 - Interaction of EM radiation with matter - II
Lecture 8 - Interaction of EM radiation with matter - III
Lecture 9 - Interaction of EM radiation with matter - IV
Lecture 10 - Theoretical basis of AAS - I
Lecture 11 - Theoretical basis of AAS - II
Lecture 12 - Theoretical basis of AAS - III
Lecture 13 - Theoretical basis of AAS - IV
Lecture 14 - Instrumentation in AAS - I
Lecture 15 - Instrumentation in AAS - I (Continued...) Radiation Sources
Lecture 16 - Instrumentation in AAS Radiation Sources
Lecture 17 - Instrumentation in AAS - III
Lecture 18 - Instrumentation in AAS - IV
Lecture 19 - Instrumentation in AAS - V
Lecture 20 - Instrumentation in AAS - VI
Lecture 21 - Instrumentation in AAS - VII
Lecture 22 - Interferences in AAS
Lecture 23 - Background correction on flame AAS - I
Lecture 24 - Interferences in AAS - II
Lecture 25 - Interferences in AAS - III
Lecture 26 - Hydride Generation AAS - I
Lecture 27 - Hydride Generation AAS and Cold Vapour Hg AAS
Lecture 28 - Cold vapor Hg AAS Flame Emission
Lecture 29 - Mercury cold vapour technique, FAES and Electrothermal AAS

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Lecture 30 - Electrothermal AAS - II
Lecture 31 - GF AAS Interferences - I
Lecture 32 - GF AAS Interferences - II
Lecture 33 - Interference in ETAAS GF AAS
Lecture 34 - Individual Elements AAS
Lecture 35 - Methods, Nomenclature and techniques
Lecture 36 - Technology and Applications - I
Lecture 37 - Technology and Applications - II
Lecture 38 - Conclusions

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NPTEL Video Course - Chemical Engineering - NOC:Inductive Couple Plasma Atomic Emmission Spectrometry for Pol

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course introduction and atomic structure - I
Lecture 2 - Course introduction and atomic structure - II
Lecture 3 - Course introduction and atomic structure - III
Lecture 4 - Course introduction and atomic structure - IV
Lecture 5 - Course introduction and atomic structure - V
Lecture 6 - Course introduction and atomic structure - VI
Lecture 7 - Nature of electromagnetic radiation
Lecture 8 - Interaction of EM radiation with matter - I
Lecture 9 - Interaction of EM radiation with matter - II
Lecture 10 - Instrumentation for ICP AES - I
Lecture 11 - Instrumentation for ICP AES - II
Lecture 12 - Instrumentation for ICP AES - III
Lecture 13 - Instrumentation for ICP AES - IV - Optical mountings
Lecture 14 - Instrumentation for ICP AES - V - Detectors
Lecture 15 - Instrumentation for ICP AES - VI - ICP Torches
Lecture 16 - Instrumentation for ICP AES - VII - Plasma characteristics
Lecture 17 - Instrumentation for ICP AES - VIII - Instruments
Lecture 18 - Practice and Applications of ICP AES - I - Nebulizers
Lecture 19 - Practice and Applications of ICP AES - II - Sample handling
Lecture 20 - Practice and Applications of ICP AES - III - Chemical analysis
Lecture 21 - Practice and Applications of ICP AES - IV - Chemical analysis
Lecture 22 - Practice and Applications of ICP AES - V - Chemical analysis

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NPTEL Video Course - Chemical Engineering - NOC:Infrared Spectroscopy for Pollution Monitoring

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Analytical Science and Infrared Spectroscopy
Lecture 2 - Environmental Analytical Science
Lecture 3 - Techniques of Elemental Analysis
Lecture 4 - Atomic Structure - I
Lecture 5 - Atomic Structure - II
Lecture 6 - Atomic Structure - III
Lecture 7 - Atomic Structure - IV
Lecture 8 - Interaction of electromagnetic radiation with matter - I
Lecture 9 - Interaction of electromagnetic radiation with matter - II
Lecture 10 - Interaction of electromagnetic radiation with matter - III
Lecture 11 - Interaction of electromagnetic radiation with matter - IV
Lecture 12 - Interaction of electromagnetic radiation with matter - V
Lecture 13 - Interaction of electromagnetic radiation with matter - VI
Lecture 14 - Infrared spectroscopy - Introduction
Lecture 15 - Infra Red Instrumentation
Lecture 16 - Fourier Transform Infrared Spectroscopy
Lecture 17 - Sample Handling in IR
Lecture 18 - Instrumentation in IR
Lecture 19 - Applications of IR
Lecture 20 - IR Spectra Interpretation
Lecture 21 - IR Gas Analysers

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NPTEL Video Course - Chemical Engineering - NOC:Electrochemical Technology in Pollution Control

Subject Co-ordinator - Prof. J. R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Electrochemical technology in Pollution Control
Lecture 2 - Atomic structure - 1
Lecture 3 - Atomic structure - 2
Lecture 4 - Properties of solution - 1
Lecture 5 - Properties of solution - 2
Lecture 6 - Properties of solution - 3
Lecture 7 - Electrogravimetry
Lecture 8 - Conductometry - 1
Lecture 9 - Conductometry - 2
Lecture 10 - Potentiometry - Electrolytic cells - 1
Lecture 11 - Potentiometry - Types of electrode - 2
Lecture 12 - Potentiometry - 3
Lecture 13 - Potentiometry - 4
Lecture 14 - Potentiometry - 5
Lecture 15 - Potentiometry - 6
Lecture 16 - Voltametry and Polarography - 1
Lecture 17 - Voltametry and Polarography - 2
Lecture 18 - Voltametry and Polarography - 3
Lecture 19 - Voltametry and Polarography - 4
Lecture 20 - Karl-Fisher titration - 1, Ion selective electrodes - 1
Lecture 21 - Ion selective electrodes - 2
Lecture 22 - Ion selective electrodes - 3
Lecture 23 - Electrochemical sensors - 1
Lecture 24 - Electrochemical sensors - 2
Lecture 25 - Process waste handling - 1
Lecture 26 - Process waste handling - 2
Lecture 27 - Process waste handling - 3
Lecture 28 - Electroplating - 1
Lecture 29 - Electroplating - 2

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Lecture 30 - Electroplating - 3
Lecture 31 - Electroplating - 4
Lecture 32 - Batteries and fuel cells - 1
Lecture 33 - Batteries and fuel cells - 2
Lecture 34 - Batteries and fuel cells - 3
Lecture 35 - Zero liquid discharge

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NPTEL Video Course - Chemical Engineering - NOC:Transport Processes

Subject Co-ordinator - Prof. V Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Dimensions and units
Lecture 2 - Dimensions and units, dimension of an equation
Lecture 3 - Dimensional analysis, settling sphere
Lecture 4 - Dimensional analysis, Brownian diffusivity, torque on a particle
Lecture 5 - Mass transfer to suspended particles
Lecture 6 - Heat transfer in a heat exchanger
Lecture 7 - Momentum transfer, flow in a pipe, friction factor
Lecture 8 - Dimensionless groups - ratio of convection and diffusion
Lecture 9 - Dimensionless fluxes, other dimensionless groups
Lecture 10 - Laminar and turbulent flow in a pipe
Lecture 11 - Flow past flat plate
Lecture 12 - Correlations for drag coefficient
Lecture 13 - Correlations for drag coefficient
Lecture 14 - Flow through packed column
Lecture 15 - Unit operations for mixing
Lecture 16 - Droplet breakup
Lecture 17 - Heat and mass transfer, Colburn and Reynolds analogy
Lecture 18 - Low Peclet number heat/mass transfer, high Peclet number laminar flow
Lecture 19 - High Peclet number laminar/turbulent flows. Flow in pipe, flow past flat plate
Lecture 20 - High Peclet number laminar/turbulent flows. Flow past particle
Lecture 21 - Flow past mobile interfaces, flow in packed column
Lecture 22 - Natural convection
Lecture 23 - Mass diffusion in gases
Lecture 24 - Mass diffusion in gases
Lecture 25 - Mass diffusion in liquids
Lecture 26 - Thermal diffusion
Lecture 27 - Momentum diffusion
Lecture 28 - Dispersion
Lecture 29 - Turbulent dispersion, dispersion in packed column, Taylor dispersion

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Lecture 30 - Unidirectional transport. Shell balance
Lecture 31 - Unidirectional transport. Common form of transport equations
Lecture 32 - Steady solutions, constant diffusivity, parallel and series conduction
Lecture 33 - Steady solutions, internal source, viscous heating
Lecture 34 - Steady solutions, flow down inclined plane
Lecture 35 - Steady solutions, internal source, electrokinetic flow
Lecture 36 - Steady solutions, internal source, electrokinetic flow
Lecture 37 - Steady solutions, internal source, diffusion-reaction
Lecture 38 - Binary diffusion
Lecture 39 - Binary diffusion
Lecture 40 - Correlations in balance equations. Transport by diffusion
Lecture 41 - Correlations in balance equations. Transport by diffusion
Lecture 42 - Correlations in balance equations. Forced convection
Lecture 43 - Correlations in balance equations. Forced convection
Lecture 44 - Correlations in balance equations. Natural convection
Lecture 45 - Correlations in balance equations. Packed column
Lecture 46 - Cylindrical co-ordinates. Balance equation
Lecture 47 - Cylindrical co-ordinates. Steady conduction
Lecture 48 - Cylindrical co-ordinates. Heat transfer resistance
Lecture 49 - Cylindrical co-ordinates. Examples
Lecture 50 - Spherical co-ordinates. Balance equation
Lecture 51 - Spherical co-ordinates. Heat transfer resistance
Lecture 52 - Laminar flow in a pipe. Momentum balance
Lecture 53 - Laminar flow in a pipe. Velocity profile. Friction factor
Lecture 54 - Laminar flow in a pipe. Friction factor correlation
Lecture 55 - Laminar flow in a pipe. Examples
Lecture 56 - Laminar flow in a pipe. Examples
Lecture 57 - Turbulence. Instability and transition
Lecture 58 - Turbulent flow in a pipe. Dissipation rate, turbulence scales
Lecture 59 - Turbulent flow in a pipe. Turbulence cascade
Lecture 60 - Turbulent flow in a pipe. Structure of turbulence

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NPTEL Video Course - Chemical Engineering - NOC:Advanced Transport Processes

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Conservation equations Cartesian co-ordinates
Lecture 2 - Conservation equations Spherical co-ordinates
Lecture 3 - Conservation equations Spherical co-ordinates
Lecture 4 - Conservation equations Gradient, divergence, curl
Lecture 5 - Conservation equations Gradient, divergence, curl
Lecture 6 - Conservation equations Mass conservation
Lecture 7 - Conservation equations Stress tensor
Lecture 8 - Conservation equations Stress tensor
Lecture 9 - Conservation equations Stress tensor
Lecture 10 - Conservation equation Rate of deformation tensor
Lecture 11 - Conservation equation Rate of deformation tensor
Lecture 12 - Conservation equation Rate of deformation tensor
Lecture 13 - Conservation equation Rate of deformation tensor
Lecture 14 - Conservation equation Navier-Stokes equation Potential flow
Lecture 15 - Transport in infinite medium
Lecture 16 - Transport in infinite medium
Lecture 17 - Transport in infinite medium
Lecture 18 - Decay of a pulse
Lecture 19 - Decay of a pulse
Lecture 20 - Time dependent length scale
Lecture 21 - Heat conduction from a wire
Lecture 22 - Separation of variables: Cartesian co-ordinates
Lecture 23 - Separation of variables: Diffusion into finite medium
Lecture 24 - Separation of variables: Cylindrical co-ordinates
Lecture 25 - Separation of variables: Cylindrical co-ordinates
Lecture 26 - Separation of variables: Spherical co-ordinates
Lecture 27 - Oscillatory flow in a pipe
Lecture 28 - Oscillatory flow in a pipe: Low Reynolds number
Lecture 29 - Oscillatory flow in a pipe: High Reynolds number

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Lecture 30 - Separation of variables: Cartesian co-ordinates - Part I
Lecture 31 - Separation of variables: Cartesian co-ordinates - Part II
Lecture 32 - Separation of variables: Spherical co-ordinates - Part I
Lecture 33 - Separation of variables: Spherical co-ordinates - Part II
Lecture 34 - Separation of variables: Spherical co-ordinates - Part III
Lecture 35 - Separation of variables: Spherical co-ordinates - Part IV
Lecture 36 - Separation of variables: Spherical co-ordinates - Part V
Lecture 37 - Separation of variables: Spherical co-ordinates - Part VI
Lecture 38 - Separation of variables: Spherical co-ordinates - Part VII
Lecture 39 - Separation of variables: Spherical co-ordinates - Part VIII
Lecture 40 - Separation of variables: Multipole expansion
Lecture 41 - Multipole expansion: Point dipole
Lecture 42 - Mulitpole expansion: Point quadrupole
Lecture 43 - Mulitpole expansion: Point quadrupole, distributed source
Lecture 44 - Mulitpole expansion: Distributed source
Lecture 45 - Multipole expansion: Method of images
Lecture 46 - Forced convection: Flow past rigid surface - Part I
Lecture 47 - Forced convection: Flow past rigid surface - Part II
Lecture 48 - Forced convection: Flow in pipe, Stagnation point flow
Lecture 49 - Forced convection: Stagnation point flow
Lecture 50 - Forced convection: Flow past particle - Part I
Lecture 51 - Forced convection: Flow past particle - Part II
Lecture 52 - Forced convection: General flow fields with rigid surface
Lecture 53 - Forced convection: Flow past gas bubble
Lecture 54 - Forced convection: General flow field with mobile surface
Lecture 55 - Forced convection: Taylor dispersion
Lecture 56 - Natural convection: Boussinesq approximation - Part I
Lecture 57 - Natural convection: Boussinesq approximation - Part II
Lecture 58 - Natural convection: High Grashof number
Lecture 59 - Natural convection: High Grashof number, low Peclet number
Lecture 60 - Natural convection: High Grashof number, high Peclet number

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Organo Metallic Chemistry

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Organometallic Chemistry
Lecture 2 - Counting of Electrons
Lecture 3 - Ligand Substitution Reactions
Lecture 4 - Oxidative Addition [1.Concerted Mechanism]
Lecture 5 - Oxidative Addition [2.SN2 Mechanism]
Lecture 6 - Oxidative Addition [3. Radical Mechanism]
Lecture 7 - Reductive Elimination
Lecture 8 - Migratory Insertion and Elimination Reactions
Lecture 9 - Migration and Insertion Reactions
Lecture 10 - Alpha-Migratory Insertion and alpha-Elimination Reactions
Lecture 11 - Beta-Migratory Insertion
Lecture 12 - Beta-Elimination Reaction
Lecture 13 - Alpha-Abstraction and beta-Abstraction
Lecture 14 - 4-Center Reactions; [2+2] Reactions
Lecture 15 - External Attack by a Ligand and Reductive Coupling
Lecture 16 - Hydrogenation Reaction
Lecture 17 - Hydrogenation Reaction [Dihydride Catalyst]
Lecture 18 - Stereoselective Hydrogenation Reaction
Lecture 19 - Carbonylation Reaction [1. Monsanto Acetic Acid Process 2. Hydroformylation 3. Hydrocarboxylatic
Lecture 20 - Carbonylation Reaction [1. Hydroformylation 2. Hydrocarboxylation 3. Hydrocyanation]

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical and Biological Thermodynamics: Principles to A

Subject Co-ordinator - Prof. Nand Kishore

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Chemical thermodynamics
Lecture 2 - Work
Lecture 3 - Tutorial-1
Lecture 4 - First Law of Thermodynamics
Lecture 5 - Tutorial-2
Lecture 6 - Adiabatic processes
Lecture 7 - Entropy
Lecture 8 - Entropy and Second Law
Lecture 9 - Entropy and Second Law
Lecture 10 - Third Law of Thermodynamics
Lecture 11 - Discussion on Helmholtz energy
Lecture 12 - Discussion on Gibbs Energy
Lecture 13 - Maxwell relations, Properties of Gibbs energy
Lecture 14 - Further discussion on properties of Gibbs energy
Lecture 15 - Fugacity
Lecture 16 - Tutorial session
Lecture 17 - Tutorial session
Lecture 18 - Chemical potential of a substance in mixture
Lecture 19 - Chemical potential of Liquids, Raoultâ s Law, Henryâ s Law
Lecture 20 - Thermodynamics of mixing, Excess functions
Lecture 21 - Partial molar volume
Lecture 22 - Activities (Accounting for deviations from Ideal behaviour)
Lecture 23 - Tutorial on thermodynamics of mixing and deviations from ideality
Lecture 24 - Further discussion on relation between C p and C v
Lecture 25 - Chemical Equilibrium
Lecture 26 - Perfect gas equilibria
Lecture 27 - Equilibrium constant
Lecture 28 - Effect of pressure on equilibrium constant and equilibrium composition
Lecture 29 - Effect of temperature on equilibria

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Lecture 30 - Biological standard states and pH
Lecture 31 - Tutorial 1 - Equilibrium constant
Lecture 32 - Tutorial 2 - Equilibrium constant
Lecture 33 - Acids and bases and Equilibrium concepts
Lecture 34 - pH Scale Strong and weak acids and bases
Lecture 35 - Strong and weak acids and bases
Lecture 36 - Acid-base titrations
Lecture 37 - pH curve for titration of weak acid with strong base Buffers and indicators
Lecture 38 - Thermodynamics in systems of biological interest
Lecture 39 - Calorimetry
Lecture 40 - Differential scanning calorimetry (DSC)
Lecture 41 - Further discussion on Differential Scanning Calorimetry (DSC)
Lecture 42 - Explaining Differential Scanning Calorimetric Profiles (DSC Profiles)
Lecture 43 - Applications of DSC in thermal unfolding of proteins and protein-solvent interactions
Lecture 44 - Further discussion on applications of DSC in thermal unfolding of proteins and protein-solvent i
Lecture 45 - Isothermal Titration calorimetry (ITC)
Lecture 46 - Further discussion on Isothermal Titration calorimetry (ITC)
Lecture 47 - ITC Experimental Design and Isothermal Titration Calorimetry (ITC) in Drug Design
Lecture 48 - Isothermal Titration Calorimetry (ITC) in Drug Design
Lecture 49 - Isothermal Titration Calorimetry (ITC) in Engineering Binding Affinity
Lecture 50 - Calorimetry in identifying partially folded states of proteins (Molten Globule State)
Lecture 51 - Thermodynamic Characterization of Partially Folded States of Proteins
Lecture 52 - Quantitative Thermodynamic Characterization of Partially Folded States of Proteins
Lecture 53 - ITC in Drug-Protein Interactions
Lecture 54 - Identifying sites for Drug-Protein Interactions by ITC
Lecture 55 - Identifying sites for Drug-Protein Interactions, DSC of Protein-Ligand Complexes. Enthalpy-Entro
Lecture 56 - Estimation of Binding Constants in Strong to Ultratight Protein-Ligand, Interactions Using Diffe
Lecture 57 - Continuation of discussion on... Estimation of Binding Constants in Strong to UltratightProtein-
Lecture 58 - Thermal unfolding of protein by non-calorimetric methods, Addressing thermodynamics of the proce
Lecture 59 - Titration Calorimetry as a tool to determine thermodynamic and Kinetic parameters of enzymes
Lecture 60 - Summary of the course on

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry of Main Group Elements

Subject Co-ordinator - Prof. M. S. Balakrishna

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Classification of Elements and Periodic Properties
Lecture 2 - Periodic Properties, Periodic Trends and Classification of Main Group Compounds
Lecture 3 - Classification of Main Group Compounds
Lecture 4 - Effective Nuclear Charge
Lecture 5 - Structure and Bonding Aspects
Lecture 6 - Structure and Bonding Aspects
Lecture 7 - Structure and Bonding Aspects
Lecture 8 - Structure and Bonding Aspects
Lecture 9 - Structure and Bonding Aspects
Lecture 10 - Structure and Bonding Aspects
Lecture 11 - Structure and Bonding Aspects
Lecture 12 - Structure and Bonding Aspects
Lecture 13 - Chemistry of Hydrogen
Lecture 14 - Chemistry of Hydrogen
Lecture 15 - Chemistry of Hydrogen, Hydrides and Hydrogen Bonding
Lecture 16 - Chemistry of Group 1 Elements
Lecture 17 - Chemistry of Group 1 Elements
Lecture 18 - Chemistry of Group 1 Elements
Lecture 19 - Chemistry of Group 1 Elements
Lecture 20 - Chemistry of Group 2 Elements
Lecture 21 - Chemistry of Group 2 Elements
Lecture 22 - Chemistry of Group 2 Elements
Lecture 23 - Chemistry of Group 2 Elements
Lecture 24 - Chemistry of Group 2 Elements
Lecture 25 - Chemistry of Group 13 Elements
Lecture 26 - Chemistry of Group 13 Elements
Lecture 27 - Chemistry of Group 13 Elements
Lecture 28 - Chemistry of Group 13 Elements
Lecture 29 - Chemistry of Group 13 Elements

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Lecture 30 - Wades Rules
Lecture 31 - Chemistry of Group 13 Elements
Lecture 32 - Chemistry of Group 14 Elements
Lecture 33 - Chemistry of Group 14 Elements
Lecture 34 - Chemistry of Group 14 Elements
Lecture 35 - Chemistry of Group 14 Elements
Lecture 36 - Chemistry of Group 14 Elements
Lecture 37 - Chemistry of Group 14 Elements
Lecture 38 - Chemistry of Group 14 Elements
Lecture 39 - Chemistry of Group 15 Elements
Lecture 40 - Chemistry of Group 15 Elements
Lecture 41 - Chemistry of Group 15 Elements
Lecture 42 - Chemistry of Group 15 Elements
Lecture 43 - Chemistry of Group 15 Elements
Lecture 44 - Chemistry of Group 15 Elements
Lecture 45 - Chemistry of Group 15 Elements
Lecture 46 - Chemistry of Group 15 Elements
Lecture 47 - Chemistry of Group 16 Elements
Lecture 48 - Chemistry of Group 16 Elements
Lecture 49 - Chemistry of Group 16 Elements
Lecture 50 - Chemistry of Group 16 Elements
Lecture 51 - Chemistry of Group 16 Elements
Lecture 52 - Chemistry of Group 17 Elements
Lecture 53 - Chemistry of Group 17 Elements
Lecture 54 - Chemistry of Group 18 Elements
Lecture 55 - Chemistry of Group 12 Elements
Lecture 56 - Organometallic Compounds of Main Group Elements
Lecture 57 - Organometallic Compounds of Main Group Elements
Lecture 58 - Organometallic Compounds of Main Group Elements
Lecture 59 - Organometallic Compounds of Main Group Elements
Lecture 60 - Overall Summary

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Transition Metal Organometallic Chemistry - Principles

Subject Co-ordinator - Prof. P. Ghosh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Organometallic Compounds
Lecture 2 - Polarity and Reactivity of Mâ C bonds
Lecture 3 - Reactivity of Organometallic Compounds
Lecture 4 - Reactivity of Organometallic Compounds
Lecture 5 - 18 Valence Electron Rule and Classification
Lecture 6 - 18 Valence Electron Rule and Classification
Lecture 7 - Reactivity and types of Organometallic compounds
Lecture 8 - Sigma-Donor Ligands
Lecture 9 - Preparation of Sigma-Alkyl Compounds
Lecture 10 - Preparation and Properties of Sigma-Alkyl Compounds
Lecture 11 - Properties of Sigma-Alkyl Compounds
Lecture 12 - Î²â elimination in Sigma-Alkyl Compounds
Lecture 13 - Î²â elimination in Detail
Lecture 14 - TM Sigma-Alkyl Complexes and its Application
Lecture 15 - TM Sigma-Alkyl Complexes and its Application
Lecture 16 - Câ H Activation
Lecture 17 - Câ H Activation in Details
Lecture 18 - Câ H Activation in Details
Lecture 19 - Characterization of Câ H Activation
Lecture 20 - Bonding in Câ H Activation
Lecture 21 - Câ C Bond Activation
Lecture 22 - Câ C Bond Activation
Lecture 23 - Câ C Bond Activation in Details
Lecture 24 - Transition Metal Perfluoroalkyl (RFâ TM) Complexes
Lecture 25 - Preparation of Transition Metal Perfluoroalkyl (RFâ TM) Complexes
Lecture 26 - Câ F Activation
Lecture 27 - Transition Metal Alkenyl/Aryl Complexes
Lecture 28 - Transition Metal Aryl Complexes
Lecture 29 - Transition Metal Aryl/Alkyne Complexes

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Lecture 30 - Transition Metal Alkyne/Carbene Complexes
Lecture 31 - Transition Metal Carbene Complexes
Lecture 32 - Transition Metal Carbene Complexes
Lecture 33 - Transition Metal Carbene Complexes
Lecture 34 - Transition Metal Carbene Complexes
Lecture 35 - Transition Metal Carbene Complexes
Lecture 36 - Transition Metal Carbene Complexes
Lecture 37 - Reactivity of Schrock type Carbene Complexes and Transition Metal Carbynes
Lecture 38 - Transition Metal Carbynes
Lecture 39 - Transition Metal Carbynes
Lecture 40 - Transition Metal Carbynes
Lecture 41 - Properties of Transition Metal Carbynes And Transition Metal Carbonyls
Lecture 42 - Transition Metal Carbonyls
Lecture 43 - Transition Metal Carbonyls
Lecture 44 - Transition Metal Carbonyls
Lecture 45 - Transition Metal Carbonyls
Lecture 46 - Transition Metal Carbonyls
Lecture 47 - Transition Metal Carbonyls
Lecture 48 - Transition Metal Carbonyl Hydrides
Lecture 49 - Application of Carbonyl Metallates and Metal Halides
Lecture 50 - Application of Metal Halides and Metal Alkenes
Lecture 51 - Transition Metal Olefin Complexes
Lecture 52 - Transition Metal Olefin Complexes
Lecture 53 - Transition Metal Olefin Complexes
Lecture 54 - Bonding Properties in Olefin Complexes
Lecture 55 - Transition Metal Diolefin Complexes
Lecture 56 - Transition Metal Diolefin and Alkyne Complexes
Lecture 57 - Transition Metal Alkyne Complexes
Lecture 58 - Transition Metal Alkyne Complexes
Lecture 59 - Transition Metal Alkyne Complexes
Lecture 60 - Summary

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Metal Mediated Synthesis-I

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Assymetric Hydrogenation
Lecture 2 - Transition Metal Carbenes Fischerand Schrock Carbenes
Lecture 3 - Olefin Metathesis
Lecture 4 - Alkyne Metathesis
Lecture 5 - Cyclopropanation Reaction
Lecture 6 - Catalytic Cyclopropanation Reaction and Introduction to Cross Coupling Reaction
Lecture 7 - Kumada Coupling Reaction
Lecture 8 - Suzuki Coupling Reaction
Lecture 9 - Stille Coupling Reaction
Lecture 10 - Assymetric Suzuki Coupling Reaction
Lecture 11 - Sonogashira Coupling Reaction
Lecture 12 - Heck Coupling Reaction
Lecture 13 - Assymetric Heck Reaction Introduction to Buchwald-Hartwig Coupling Reaction
Lecture 14 - Buchwald-Hartwig Coupling Reaction
Lecture 15 - Role of Ligands its Influence in Buchwald-Hartwig Coupling Reaction
Lecture 16 - Oxidative Cyclization Process
Lecture 17 - Application of Oxidative Cyclization in Natural Product Synthesis
Lecture 18 - Synthesis of Reactive Metallacycle Intermediate Via-Beta-Abstraction and their Applications
Lecture 19 - Kulinkovich Reaction and its Mechanism
Lecture 20 - Pausonâ Khand Reaction

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Inorganic Chemistry of Life: Principles and Perspective

Subject Co-ordinator - Prof. C.P. Rao

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of inorganic chemistry of life
Lecture 2 - Elements in biology and or life
Lecture 3 - Selection and criteria for elements
Lecture 4 - Biomolecules
Lecture 5 - Coordination in enzymes
Lecture 6 - Amino acids, peptides and proteins - An introduction
Lecture 7 - Nucleoside, nucleotide and nucleic acids and DNA
Lecture 8 - General introduction of metalloproteins
Lecture 9 - Coordination chemistry aspects - An introduction
Lecture 10 - Stability and lability
Lecture 11 - Techniques used inorganic chemistry life
Lecture 12 - Techniques used inorganic chemistry life (Continued...)
Lecture 13 - Techniques used inorganic chemistry life (Continued...)
Lecture 14 - Techniques used inorganic chemistry life (Continued...)
Lecture 15 - Recap on metalloenzymes
Lecture 16 - Role of Alkali, Alkaline earth elements in life
Lecture 17 - Role of Alkali, Alkaline earth elements in life (Continued...)
Lecture 18 - Role of Alkali, Alkaline earth elements in life (Continued...) Ion transport and ionophores
Lecture 19 - Role of Alkali, Alkaline earth elements in life (Continued...) Ion transport and ionophores
Lecture 20 - Functioning of ATPases and nucleases [Na,K]ATPase
Lecture 21 - Role of vanadium in life - General perspectives
Lecture 22 - Role of vanadium in life - Haloperoxidases
Lecture 23 - Enzymes based on manganese in life
Lecture 24 - Role of Iron in life - General perspectives
Lecture 25 - Role of Iron in life - Transport systems
Lecture 26 - Role of Iron in life - Transport and Storage systems
Lecture 27 - Role of Iron in life - Electron transfer
Lecture 28 - Role of Iron in life - Perspectives of electron transfer proteins
Lecture 29 - Role of Iron in life - Monooxygenases

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Lecture 30 - Role of Iron in life - Mono-and di-oxygenases
Lecture 31 - Role of Iron in life - Reductases
Lecture 32 - Role of Iron in life - Reductases and Phosphatases
Lecture 33 - Role of Iron in life - Reductases and Phosphatases (Continued...)
Lecture 34 - Role of Cobalt in life
Lecture 35 - Role of Nickel in life - General perspectives
Lecture 36 - Role of Nickel in life - Hydrolase, hydrogenase and SOD
Lecture 37 - Role of Nickel in life - Carbonmonoxide dehydrogenase (CODH)
Lecture 38 - Role of Copper in life - General perspectives
Lecture 39 - Role of Copper in life - Type I and Type 2 copper enzymes
Lecture 40 - Role of Copper in life - Multicenter copper oxidases and SOD
Lecture 41 - Role of Zinc in life - General perspectives including oxidoreductases and hydrolases
Lecture 42 - Role of Zinc in life - Carbonic anhydrase and carboxypeptidase
Lecture 43 - Role of Zinc in life - Transferases, ligages and isomerases
Lecture 44 - Role of Molybdenum in life - Introductory aspects
Lecture 45 - Role of Molybdenum in life - Nitrogenase
Lecture 46 - Role of Molybdenum in life - Oxidoreductases
Lecture 47 - Role of Mercury in the environment - Mercury reductase
Lecture 48 - Role of Selenium in life - Glutathione perioxidase
Lecture 49 - Inorganics in medicine - Introductory aspects and cis-platin
Lecture 50 - Inorganics in medicine - Apoptosis
Lecture 51 - Inorganics in medicine - PDT, MRI and Barium tests
Lecture 52 - Inorganics in medicine - Titanium in biomedical
Lecture 53 - Highlights of the course - Part I
Lecture 54 - Highlights of the course - Part II
Lecture 55 - Highlights of the course - Part III
Lecture 56 - Highlights of the course - Part IV
Lecture 57 - Tutorials - Part I
Lecture 58 - Tutorials - Part II
Lecture 59 - Tutorials - Part III
Lecture 60 - Tutorials - Part IV and overall

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry and Group Theory

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Symmetry point group
Lecture 2 - Symmetry point group
Lecture 3 - Symmetry point group
Lecture 4 - Symmetry point group
Lecture 5 - Symmetry point group
Lecture 6 - Transformation matrices and Matrix representation
Lecture 7 - More on Matrix representation
Lecture 8 - Matrix representation
Lecture 9 - Introduction to Group Theory
Lecture 10 - Group Multiplication Tables
Lecture 11 - Groups and subgroups
Lecture 12 - Classes, Similarity transformations
Lecture 13 - Introduction to Matrices
Lecture 14 - Application of matrices in solution of simultaneous equations
Lecture 15 - Matrix eigenvalue equation
Lecture 16 - Matrix eigenvalue equation
Lecture 17 - Similarity Transformations
Lecture 18 - Back to transformation matrices
Lecture 19 - Matrix representation revisited
Lecture 20 - Function space and Transformation Operators
Lecture 21 - Transformation Operators form the same group as transformation matrices
Lecture 22 - Transformation Operators form a unitary representation for orthonormal basis
Lecture 23 - Transformation Operators
Lecture 24 - Equivalent representations
Lecture 25 - Unitary Transformation
Lecture 26 - Unitary Transformations (Continued...)
Lecture 27 - Reducible and Irreducible Representations
Lecture 28 - Irreducible Representations and Great Orthogonality Theorem
Lecture 29 - Character Tables

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Lecture 30 - Character Tables
Lecture 31 - Practice Session
Lecture 32 - Reducible to Irreducible Representations
Lecture 33 - Character Tables of Cyclic Groups
Lecture 34 - Symmetry of Normal Modes
Lecture 35 - Symmetry of Normal Modes
Lecture 36 - Symmetry of Normal Modes
Lecture 37 - Recap
Lecture 38 - Contribution of internal motion to normal modes
Lecture 39 - Normal mode analysis
Lecture 40 - Infrared and Raman spectroscopy
Lecture 41 - IR and Raman activity
Lecture 42 - IR and Raman activity
Lecture 43 - Symmetry Adapted Linear Combinations (SALC)
Lecture 44 - SALC
Lecture 45 - SALC
Lecture 46 - SALC
Lecture 47 - Projection Operators
Lecture 48 - Projection Operators (Continued...)
Lecture 49 - Generating SALCâ s using Projection Operators
Lecture 50 - Generating SALCâ s using Projection Operators (Continued...)
Lecture 51 - Oh complex and Group-subgroup relation
Lecture 52 - Group-Subgroup Relation
Lecture 53 - SALCs as Pi-MO andCyclopropenyl group
Lecture 54 - SALCs as Pi-MO, Cyclopropenyl group
Lecture 55 - SALCs as Pi-MO, Benzene
Lecture 56 - LCAO Huckel approximation
Lecture 57 - Huckel approximation
Lecture 58 - Stationary states, Multiplicity, Ethylene
Lecture 59 - Napthalene - I
Lecture 60 - Napthalene - II
Lecture 61 - Napthalene - III
Lecture 62 - Transition Metal Complexes
Lecture 63 - Jahn-Teller Theorem, Tetragonal Distortion MOT
Lecture 64 - MOT approach of bonding,H2O,Ferrocene
Lecture 65 - MOT approach of bonding,H2O,Ferrocene
Lecture 66 - Derivation
Lecture 67 - Derivation
Lecture 68 - Derivation

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Computational Chemistry and Classical Molecular Dynamic

Subject Co-ordinator - Prof. B.L. Tembe

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computational Chemistry
Lecture 2 - Writing Simple Programs
Lecture 3 - Programming Techniques 1 - Evaluating the sine function
Lecture 4 - Programming Techniques 2 - Do loops and if statements
Lecture 5 - Programming Techniques 3 - Roots of a quadratic equation and arrays
Lecture 6 - Programming Techniques 4 - Arrays and matrices
Lecture 7 - Practical Session of Programming 1
Lecture 8 - Programming Techniques 5 - Formats, Functions and Subroutines
Lecture 9 - Programming Techniques 6 - Functions and Subroutines, arranging numbers in as ascending order
Lecture 10 - Programming Techniques 7 - Functions and Subroutines, and the common statement
Lecture 11 - Numerical Methods. Analysis of errors
Lecture 12 - Practical Session on Programming 2 - The exponential function
Lecture 13 - Practical Session on Programming 3 - Functions and Subroutines
Lecture 14 - Interpolation Methods-1
Lecture 15 - Interpolation Methods-2
Lecture 16 - Errors in interpolation, Matrix operations
Lecture 17 - Gauss elimination method for matrix inversion
Lecture 18 - Matrix diagonalization, Similarity transformations
Lecture 19 - Matrix inversion, Matrix diagonalization
Lecture 20 - Curve fitting, Newton Raphson method
Lecture 21 - Random numbers, Numerical integration using Simpsonâ s rule
Lecture 22 - Numerical Integration and Differential Equations
Lecture 23 - Practical Session on Programming 3
Lecture 24 - Scilab-2
Lecture 25 - Scilab-3
Lecture 26 - Scilab-4
Lecture 27 - Scilab-5
Lecture 28 - Scilab-6
Lecture 29 - Classical Molecular Dynamics-2, Force Fields and Equations of Motion

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Lecture 30 - Classical Molecular Dynamics-3, Force Fields and MD Algorithms
Lecture 31 - Classical MD-4 Thermodynamic Properties and Distribution Functions.
Lecture 32 - Classical MD-5, Execution of programs on liquid argon
Lecture 33 - Molecular Dynamics using Gromacs-1
Lecture 34 - Molecular Dynamics using Gromacs-2
Lecture 35 - Molecular Dynamics using Gromacs-3
Lecture 36 - Molecular Dynamics using Gromacs-4
Lecture 37 - Molecular Dynamics using Gromacs-5
Lecture 38 - Molecular Dynamics using Gromacs-6
Lecture 39 - Molecular Dynamics using Gromacs-7
Lecture 40 - Molecular Dynamics using Gromacs-8
Lecture 41 - Molecular Dynamics using Gromacs-9

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Molecular Spectroscopy: A Physical Chemists Perspective

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Frequency Domain Spectroscopy
Lecture 2 - Schematics of Instrumentation for FD Spectroscopy
Lecture 3 - Sensitivity Light Collection and Signal to Noise Ratio
Lecture 4 - Time Domain Spectroscopy
Lecture 5 - Frequency Modulation for Fourier Transform Spectroscopy
Lecture 6 - Rigid Rotor Model for Diatomic Molecules
Lecture 7 - Recapitulation of Quantum Mechanics
Lecture 8 - Conditions for Microwave Activity - I
Lecture 9 - Conditions for Microwave Activity - II
Lecture 10 - Microwave Spectra
Lecture 11 - Simple Harmonic Oscillator
Lecture 12 - Selection Rule
Lecture 13 - High Resolution IR Spectra
Lecture 14 - Anharmonic Oscillator and Raman Effect
Lecture 15 - Semi Classical Treatment
Lecture 16 - Time Dependent Perturbation Theory
Lecture 17 - Transition Moment Integral
Lecture 18 - Transition Probability and Natural Linewidth
Lecture 19 - Einstein Treatment
Lecture 20 - Relationship Between Theoretical and Experimental Quantities
Lecture 21 - Level System
Lecture 22 - Level System
Lecture 23 - Laser Basic
Lecture 24 - Applications of Laser in Spectroscopy
Lecture 25 - Laser in Spectroscopy
Lecture 26 - Snapshot of Bond Breaking
Lecture 27 - Raman Effect
Lecture 28 - Raman Spectroscopy
Lecture 29 - Raman Spectroscopy and Beyond Dipole Approximation

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Lecture 30 - Symmetry in Chemistry
Lecture 31 - Symmetry Operations
Lecture 32 - Representations Reducible and Irreducible
Lecture 33 - Matrix Representation of Symmetry Point Group
Lecture 34 - Group Theory
Lecture 35 - Character Table
Lecture 36 - Mulliken Nomenclature, 2D Irreducible Representations and Bases
Lecture 37 - Character Tables for Different Symmetry Point Groups
Lecture 38 - Wave Functions as Basis
Lecture 39 - Symmetry of Atomic and Molecular Orbitals
Lecture 40 - Polyatomic Molecules
Lecture 41 - Determination of Symmetries of Normal Modes of Vibration - I
Lecture 42 - Determination of Symmetries of Normal Modes of Vibration - II
Lecture 43 - A Shortcut to Symmetry of Normal Modes
Lecture 44 - Normal Modes
Lecture 45 - IR and Raman Activity - I
Lecture 46 - IR and Raman Activity - II
Lecture 47 - Electronic Spectroscopy
Lecture 48 - Electronic Spectra
Lecture 49 - Rotational Fine Structure
Lecture 50 - Symmetry of Electronic States
Lecture 51 - Electronic States of Oxygen
Lecture 52 - Electronic States and Transitions of Benzene
Lecture 53 - Vibronic Coupling
Lecture 54 - Electronic Spectrum of Benzene
Lecture 55 - Basics of NMR Spectroscopy - I
Lecture 56 - Basics of NMR Spectroscopy - II
Lecture 57 - Spin Spin Coupling- AX systems
Lecture 58 - Coupling in A2 systems
Lecture 59 - Coupling in A2 systems (Continued...)
Lecture 60 - NMR
Lecture 61 - FT NMR 1800 Pulses and Relaxation Phenomenon
Lecture 62 - Relaxation Phenomenon

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Advanced Transition Metal Organometallic Chemistry

Subject Co-ordinator - Prof. P. Ghosh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Transition Metal Allyl and Enyl Complexes
Lecture 2 - Transition Metal Allyl and Enyl complexes
Lecture 3 - Transition Metal Allyl and Enyl complexes
Lecture 4 - Transition Metal Allyl and Enyl Complexes
Lecture 5 - Types of Transition Metal Sandwich Complexes
Lecture 6 - Transition Metal Cyclobutadiene Complexes
Lecture 7 - Transition Metal Cyclobutadiene Complexes
Lecture 8 - Transition Metal Cyclobutadiene Complexes
Lecture 9 - Transition Metal Cyclopentadiene Complexes
Lecture 10 - Transition Metal Cyclopentadiene Complexes
Lecture 11 - Transition Metal Cyclopentadiene Complexes
Lecture 12 - Transition Metal Cyclopentadiene Complexes
Lecture 13 - Transition Metal Cyclopentadiene Complexes
Lecture 14 - Transition Metal Cyclopentadiene Complexes
Lecture 15 - Transition Metal Cyclopentadienyl Carbonyl Complexes
Lecture 16 - Transition Metal Cyclopentadienyl Carbonyl Complexes
Lecture 17 - Transition Metal Cyclopentadienyl Nitrosyl Complexes
Lecture 18 - Transition Metal Cyclopentadienyl Hydride Complexes
Lecture 19 - Transition Metal Cyclopentadienyl Hydride and Halide Complexes
Lecture 20 - Transition Metal Cyclopentadienyl Halide Complexes
Lecture 21 - Transition Metal Cyclopentadienyl Halide and Transition Metal Arene Complexes
Lecture 22 - Transition Metal Arene Complexes
Lecture 23 - Transition Metal Arene Complexes
Lecture 24 - Transition Metal Arene Complexes
Lecture 25 - Transition Metal Arene Complexes
Lecture 26 - Transition Metal Arene Carbonyl Complexes
Lecture 27 - Transition Metal Arene Carbonyl Complexes
Lecture 28 - Transition Metal Arene Cyclopentadienyl Complexes
Lecture 29 - Transition Metal Arene Cyclopentadienyl and C7H7 Complexes

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Lecture 30 - Transition Metal C7H7 Complexes
Lecture 31 - Transition Metal C7H7 Complexes
Lecture 32 - Transition Metal C8H8 and C7H7 Complexes
Lecture 33 - Transition Metal C8H8 Complexes
Lecture 34 - Transition Metal Ã•â ¬- complexes of heterocycles
Lecture 35 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 36 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 37 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 38 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 39 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 40 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 41 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 42 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 43 - Hydrocyanation Reactions
Lecture 44 - CÃ¢Ë â heteroatom Coupling
Lecture 45 - CÃ¢Ë â heteroatom Coupling
Lecture 46 - CÃ¢Ë â Heteroatom Coupling
Lecture 47 - CÃ¢Ë â Heteroatom Coupling
Lecture 48 - CÃ¢Ë â Heteroatom Coupling
Lecture 49 - Organometallic Catalysis Reactions
Lecture 50 - Organometallic Catalysis Reactions
Lecture 51 - Organometallic Catalysis Reactions
Lecture 52 - Organometallic Catalysis Reactions
Lecture 53 - Organometallic Catalysis Reactions
Lecture 54 - Organometallic Catalysis Reactions
Lecture 55 - Organometallic Catalysis Reactions
Lecture 56 - Organometallic Catalysis Reactions
Lecture 57 - Organometallic Catalysis Reactions
Lecture 58 - Organometallic Catalysis Reactions
Lecture 59 - Organometallic Catalysis Reactions
Lecture 60 - Summary of Advanced Transition Metal Organometallic Chemistry

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Mechanisms in Organic Chemistry

Subject Co-ordinator - Prof. Nandita Madhavan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Reaction Mechanisms
Lecture 2 - Writing Reaction Mechanisms
Lecture 3 - Types of Polar Reactions
Lecture 4 - The Radical Reactions
Lecture 5 - Reaction Co-ordinate Diagrams
Lecture 6 - The Hammond Postulate
Lecture 7 - Kinetic versus Thermodynamic Control
Lecture 8 - Curtin-Hammett Principle
Lecture 9 - An Introduction to Reaction Kinetics
Lecture 10 - Deriving the Rate Laws
Lecture 11 - Distinguishing Reaction Mechanisms Using Rate Laws
Lecture 12 - Methods to Monitor a Reaction
Lecture 13 - The Hammett Equation
Lecture 14 - Linear Free Energy Relationships (LFER)
Lecture 15 - Hammett Plots for Electronic Effects
Lecture 16 - Scales used in Hammett Plots
Lecture 17 - Deviation from Linear Free Energy Relationships
Lecture 18 - LFER for Sterics
Lecture 19 - Solvent Effects - Part A
Lecture 20 - Solvent Effects - Part B
Lecture 21 - Kinetic Isotope Effect
Lecture 22 - Primary Kinetic Isotope Effect
Lecture 23 - Secondary Kinetic Isotope Effect - Part A
Lecture 24 - Secondary Kinetic Isotope Effect - Part B
Lecture 25 - Heavy Atom Isotope Effects
Lecture 26 - Equilibrium Isotope Effects
Lecture 27 - Isotope Labelling
Lecture 28 - Trapping Intermediates - Part A
Lecture 29 - Trapping Intermediates - Part B

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Lecture 30 - Trapping Intermediates - Part C
Lecture 31 - Checking for Common Intermediates
Lecture 32 - Catalysis - Part A
Lecture 33 - Catalysis - Part B
Lecture 34 - Specific Catalysis
Lecture 35 - General Catalysis - Part A
Lecture 36 - General Catalysis - Part B
Lecture 37 - Enzyme Catalysis
Lecture 38 - Electrophilic Catalysis
Lecture 39 - Other Types of Catalysis
Lecture 40 - Course Summary

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Metals in Biology

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of metals in biology
Lecture 2 - Choice, uptake and assembly of metal ions in cells
Lecture 3 - Control and use of metal ions concentration in biological systems
Lecture 4 - Metal mediated folding of biopolymers
Lecture 5 - Study of binding mode of calcium and zinc in proteins
Lecture 6 - Electron transfer (ET) in living systems
Lecture 7 - Oxygen transport and activation
Lecture 8 - Hydrolytic Enzymes - Part I - Carbonic anhydrase and Liver alcohol dehydrogenase
Lecture 9 - Hydrolytic Enzymes - Part II - Carbopeptidase
Lecture 10 - Hydrolytic Enzymes - Part III - Arginase and Urease
Lecture 11 - Hemerythrin and azidomethemerythrin
Lecture 12 - Dioxygen reactivity in copper
Lecture 13 - Cu-O2 intermediates
Lecture 14 - Copper-Oxygen chemistry - Part I - Mononuclear copper-oxygen
Lecture 15 - Copper-Oxygen chemistry - Part II - Cu-O2 complexes
Lecture 16 - Copper-Oxygen chemistry - Part III - Reactivity summary
Lecture 17 - Iron Catalyzed oxidation of unactivated sp3 C-H bonds - Part I
Lecture 18 - Iron catalyzed oxidation of unactivated sp3 C-H bonds - Part II
Lecture 19 - Iron catalyzed oxidation of unactivated sp3 C-H bonds - Part III
Lecture 20 - Nitrous oxide reductase and its model complex
Lecture 21 - Cytochrome C-oxidase
Lecture 22 - Systematic variations in O-O stretch in Iron-oxo-copper ligand complex
Lecture 23 - Mononuclear nonheme iron (NHI) enzymes
Lecture 24 - Alpha-Keto Glutarate dependent Halogenases
Lecture 25 - Cytochrome P450 - Part I - Introduction
Lecture 26 - Cytochrome P450 - Part II - Reactions
Lecture 27 - Cytochrome P450 - Part III - Mechanism
Lecture 28 - Cytochrome P450 - Part IV - Role of Cystine ligand and distal charge relay
Lecture 29 - Methane monooxygenase

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Lecture 30 - Dinuclear Iron active sites for CH4 to CH4OH conversion and its Mechanism
Lecture 31 - Concerted Vs radical pathway for CH4 to CH4OH conversion
Lecture 32 - Photosynthesis - Part I
Lecture 33 - Photosynthesis - Part II
Lecture 34 - Pumps and channels
Lecture 35 - Quick summary on O2 transport
Lecture 36 - Summary of Dioxygen reactivity in copper
Lecture 37 - Summary of Dioxygen reactivity in iron
Lecture 38 - Summary of Fe-O2 chemistry

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NPTEL Video Course - Chemistry and Biochemistry - NOC:NMR Spectroscopy for Chemists and Biologists

Subject Co-ordinator - Prof. Ashutosh Kumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts
Lecture 2 - Resonance absorption
Lecture 3 - Bloch Equations
Lecture 4 - Relaxation
Lecture 5 - Introduction to Chemical Shift
Lecture 6 - Factors affecting Isotropic Chemical Shifts
Lecture 7 - Spin-Spin Coupling
Lecture 8 - Interpretation of multiplet structure using first order analysis
Lecture 9 - Analysis of NMR spectra of molecules
Lecture 10 - Quantum Mechanical Analysis - Part I
Lecture 11 - Quantum Mechanical Analysis - Part II
Lecture 12 - Dynamic effects in the NMR Spectra
Lecture 13 - Fourier Transform NMR
Lecture 14 - Theorems on Fourier Transform
Lecture 15 - Practical aspects of Fourier Transform NMR spectra
Lecture 16 - Data Processing in Fourier Transform NMR
Lecture 17 - Dynamic range in Fourier Transform NMR
Lecture 18 - Spin Echo and Solvent Suppression
Lecture 19 - Spin Decoupling in FT NMR and Relaxation Measurements
Lecture 20 - Polarization Transfer
Lecture 21 - Nuclear Overhauser Effect
Lecture 22 - Steady state NOE and Transient NOE
Lecture 23 - Distance and NOE
Lecture 24 - Selective Population Inversion
Lecture 25 - INEPT and Sensitivity Enhancement
Lecture 26 - Rotating Frame Experiments
Lecture 27 - Density matrix description of NMR - I
Lecture 28 - Density matrix description of NMR - II
Lecture 29 - Density matrix description of NMR - III

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Lecture 30 - Time evolution of density operator
Lecture 31 - Density matrix description of NMR - IV
Lecture 32 - Evolution of density operator in the presence of RF
Lecture 33 - Product operator formalism
Lecture 34 - Product operator formalism (Continued...)
Lecture 35 - Product operator formalism (Continued...)
Lecture 36 - Time evolution of basis operators
Lecture 37 - Observable and Non-observable basis operators, Spin echo
Lecture 38 - Spin echo (Continued...)
Lecture 39 - INEPT
Lecture 40 - Multidimensional NMR Spectroscopy
Lecture 41 - Two Dimensional NMR - Part I
Lecture 42 - Two Dimensional NMR - Part II
Lecture 43 - Types of 2D NMR Spectra
Lecture 44 - Two Dimensional Separation of Interaction in NMR
Lecture 45 - Two Dimensional Correlation Experiments - I
Lecture 46 - Two Dimensional Correlation Experiments - II
Lecture 47 - Two Dimensional Correlation Experiments - III
Lecture 48 - Double Quantum Filtered COSY (DQF-COSY)
Lecture 49 - Two Dimensional Nuclear Overhauser Effect Spectroscopy (2D- NOESY)
Lecture 50 - Constant-time COSY
Lecture 51 - Scaling in 2D NMR
Lecture 52 - Total Correlation Spectroscopy
Lecture 53 - 2D Heteronuclear Experiment - I
Lecture 54 - 2D Heteronuclear Experiment - II
Lecture 55 - Multidimensional NMR
Lecture 56 - Structure Determination of Peptides by NMR - I
Lecture 57 - Structure Determination of Peptides by NMR - II
Lecture 58 - Protein-Ligand Interaction - I
Lecture 59 - Protein-Ligand Interaction - II
Lecture 60 - Diffusion Ordered Spectroscopy

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Basics in Inorganic Chemistry

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Effective Nuclear Charge
Lecture 2 - Electronic Configuration of Elements
Lecture 3 - Properties of Elements (Size, IE, EA and EN)
Lecture 4 - Extraction of Metals
Lecture 5 - Ellingham Diagram
Lecture 6 - Thermit Process and Zone Refining
Lecture 7 - Coordination Chemistry
Lecture 8 - Crystal Field Theory
Lecture 9 - Crystal Field Theory
Lecture 10 - Crystal Field Theory
Lecture 11 - Application of CFSE
Lecture 12 - Introduction to Molecular Magnetism
Lecture 13 - Problem Solving Approach
Lecture 14 - Magnetism
Lecture 15 - Spectroscopic Term Symbol
Lecture 16 - Magnetic States of Matter
Lecture 17 - Introduction to Bio-Inorganic Chemistry
Lecture 18 - Metalloprotein (Hb, Mb, Transferrin) and Metalloenzyme (Plastocyanin)
Lecture 19 - Oxygen Transportation Mechanism

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Ultrafast Laser Spectroscopy

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Steady State Spectra
Lecture 3 - Spectro Photometer
Lecture 4 - How to record Absorption and Emission Spectra
Lecture 5 - Excited state processes
Lecture 6 - TCSPC for picosecond- Nanosecond Time Domain
Lecture 7 - TCSPC for picosecond- Nanosecond Time Domain (Continued...)
Lecture 8 - TCSPC Lab
Lecture 9 - Data Fitting 1
Lecture 10 - Data Fitting 2
Lecture 11 - Femtosecond Fluorescence Upconversion - 1
Lecture 12 - Femtosecond Fluorescence Upconversion - 2
Lecture 13 - Femtosecond Fluorescence Upconversion - 3
Lecture 14 - FOG Lab
Lecture 15 - Gate Detectors and Streak Camera - Part 1
Lecture 16 - Gate Detectors and Streak Camera - Part 2
Lecture 17 - Stimulated Emission
Lecture 18 - Two Level System
Lecture 19 - 3 and 4 level system
Lecture 20 - From CW to Pulsed Laser
Lecture 21 - Longitudinal modes
Lecture 22 - Modelocking for short pulses
Lecture 23 - Modelocking for short pulses (Continued...)
Lecture 24 - Kerr lens Modelocking for femtosecond pulses
Lecture 25 - Titanium Sapphire lasers
Lecture 26 - Active and Passive Modelocking
Lecture 27 - Modelocking and cavity damping
Lecture 28 - Ti
Lecture 29 - Cavity Dumping

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Lecture 30 - Cavity dumping (Continued...)
Lecture 31 - Q switching
Lecture 32 - Stretching and compressing ultrafast laser pulses
Lecture 33 - Pulse stretcher/Compressor
Lecture 34 - Chirped pulsed amplification
Lecture 35 - Oscillators and Amplifier
Lecture 36 - Alexandrite and fibril lasers
Lecture 37 - Regenerative amplifier in our lab
Lecture 38 - Brief overview of nonlinear optical phenomena
Lecture 39 - Brief overview of nonlinear optical phenomena (Continued...)
Lecture 40 - Brief overview of nonlinear optical phenomena (Continued...)
Lecture 41 - SFG and SHG with ultrafast pulses
Lecture 42 - SFG and SHG with ultrafast pulses (Continued...)
Lecture 43 - Optical parametric generation and amplification
Lecture 44 - OPA in our lab TOPAS C - Part 1
Lecture 45 - OPA in our lab TOPAS C - Part 2
Lecture 46 - OPA in our lab TOPAS C - Part 3
Lecture 47 - Snapshots of bond breaking
Lecture 48 - Twisted Intramolecular Charge Transfer - Part 1
Lecture 49 - Twisted Intramolecular Charge Transfer - Part 2
Lecture 50 - Solvation dynamics - Part 1
Lecture 51 - Solvation dynamics - Part 2
Lecture 52 - Vibrational energy transfer in water
Lecture 53 - Excited state proton transfer
Lecture 54 - Excited state double proton transfer of 7-Azaindole dimer - 1
Lecture 55 - Excited state double proton transfer of 7-Azaindole dimer - 2
Lecture 56 - Excited state double proton transfer of 7-Azaindole dimer - 3
Lecture 57 - Plasmonic nanoparticles - 1
Lecture 58 - Plasmonic nanoparticles - 2
Lecture 59 - Nanoclusters
Lecture 60 - Semiconductor Nanocrystals - Part 1
Lecture 61 - Semiconductor nanocrystals - Part 2
Lecture 62 - Radiative and Nonradiative Relaxation Pathways in CdSe Nanocrystals - Part 1
Lecture 63 - Radiative and Nonradiative Relaxation Pathways in CdSe Nanocrystals - Part 2
Lecture 64 - Multiexciton in semiconductor nanocrystals - Part 1
Lecture 65 - Multiexciton in semiconductor nanocrystals - Part 2
Lecture 66 - Two dimensional Infrared spectroscopy
Lecture 67 - 2DIR

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Transition Metal Organometallics in Catalysis and Biolo

Subject Co-ordinator - Prof. Prasenjit Ghosh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Reppe Synthesis (Introduction)
Lecture 3 - Reppe Reactions - Part 1
Lecture 4 - Reppe Reactions - Part 2
Lecture 5 - Reppe Reactions - Part 3
Lecture 6 - Metallative and Conventional Reppeand Metathesis Reaction (Introduction)
Lecture 7 - Origin of Olefin Metathesis
Lecture 8 - Mechanistic approaches of Metathesis Reaction - Part 1
Lecture 9 - Mechanistic approaches of Metathesis Reaction - Part 2
Lecture 10 - Mechanistic approaches of Metathesis Reaction - Part 3
Lecture 11 - Mechanistic approaches of Metathesis Reaction - Part 4
Lecture 12 - Types of Carbenes
Lecture 13 - Types of Metathesis Reactions
Lecture 14 - Alkyne Metathesis
Lecture 15 - Catalysis Development Aspect of Olefin Metathesis - Part 1
Lecture 16 - Catalysis Development Aspect of Olefin Metathesis - Part 2
Lecture 17 - Catalysis Development Aspect of Olefin Metathesis - Part 3
Lecture 18 - Catalysis Development Aspect of Olefin Metathesis - Part 4
Lecture 19 - Cross Metathesis - Part 1
Lecture 20 - Cross Metathesis - Part 2
Lecture 21 - Cross Metathesis - Part 3
Lecture 22 - Ring Opening Metathesis - Part 1
Lecture 23 - Ring Opening Metathesis - Part 2
Lecture 24 - Ring Opening Metathesis - Part 3
Lecture 25 - Ring Closing Metathesis - Part 1
Lecture 26 - Ring Closing Metathesis - Part 2
Lecture 27 - Ring Closing Metathesis - Part 3
Lecture 28 - Alkyne Metathesis
Lecture 29 - Alkene Alkyne Metathesis - Part 1

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Lecture 30 - Alkene Alkyne Metathesis - Part 2
Lecture 31 - Alkene Alkyne Metathesis - Part 3
Lecture 32 - Ring Closing Eneyne Metathesis (RCEYM) - Part 1
Lecture 33 - Ring Closing Eneyne Metathesis (RCEYM) - Part 2
Lecture 34 - Ring Closing Eneyne Metathesis (RCEYM) and Alkenes and Alkynes oligomerization reactions
Lecture 35 - Oligomerization of alkenes and alkynes - Part 1
Lecture 36 - Oligomerization of alkenes and alkynes - Part 2
Lecture 37 - Oligomerization of alkenes and alkynes - Part 3
Lecture 38 - Oligomerization of alkenes and alkynes - Part 4
Lecture 39 - Alkene oligomerization and Polymerization.
Lecture 40 - Olefin Polymerization - Part 1
Lecture 41 - Olefin Polymerization - Part 2
Lecture 42 - Olefin Polymerization - Part 3
Lecture 43 - Olefin Polymerization - Part 4
Lecture 44 - Olefin Polymerization - Part 5
Lecture 45 - Olefin Polymerization - Part 6
Lecture 46 - Olefin Polymerization - Part 7
Lecture 47 - Olefin Polymerization - Part 8
Lecture 48 - Olefin Polymerization - Part 9
Lecture 49 - Olefin Polymerization - Part 10
Lecture 50 - Olefin Polymerization - Part 11
Lecture 51 - Olefin Polymerization - Part 12
Lecture 52 - Olefin Polymerization - Part 13
Lecture 53 - Olefin Polymerization - Part 14
Lecture 54 - Olefin Polymerization - Part 15
Lecture 55 - Olefin Polymerization - Part 16
Lecture 56 - Homo and Copolymerization; Functionalized olefins, Cycloolefins and Diolefins
Lecture 57 - Non- Group IV Metal based olefin polymerization catalysts
Lecture 58 - Non- Group IV Metal based olefin polymerization catalysts
Lecture 59 - Bioorganometallic Chemistry
Lecture 60 - Overall summary of Transition metal organometallics in catalysis and biology

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantum Chemistry of Atoms and Molecules

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Introduction
Lecture 2 - Bohr Model and Beyond
Lecture 3 - The wave nature of matter
Lecture 4 - Ground Rules
Lecture 5 - Ground Rules
Lecture 6 - Particle in a box - Part I
Lecture 7 - Particle in a box - Part II
Lecture 8 - Particle in a box - Part III
Lecture 9 - Particle in a box - Uncertainity Priciple
Lecture 10 - Particle in a box - Uncertainity Priciple (Continued...)
Lecture 11 - Quantum Mechanical Tunneling
Lecture 12 - Harmonic Oscillator - Part 1
Lecture 13 - Harmonic Oscillator - Part 2
Lecture 14 - Harmonic Oscillator - Part 3
Lecture 15 - Harmonic Oscillators - Wave Functions and Recursion formulae
Lecture 16 - Harmonic Oscillators - Wave Functions and Recursion formulae (Continued...)
Lecture 17 - Harmonic Oscillators
Lecture 18 - Rigid Rotor - Part 1
Lecture 19 - Rigid Rotor - Part 2
Lecture 20 - Rigid Rotor - Part 3
Lecture 21 - Polar Plots of Spherical Harmonics
Lecture 22 - Angular Momentum
Lecture 23 - Angular Momentum (Continued...)
Lecture 24 - Hydrogen Atom
Lecture 25 - Hydrogen Atom
Lecture 26 - Hydrogen atom
Lecture 27 - Radial Probability distribution functions
Lecture 28 - Hydrogen atom wavefunctions
Lecture 29 - 2s orbital

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Lecture 30 - 2p orbitals
Lecture 31 - 3pz and 3d orbitals
Lecture 32 - Atomic orbitals and orbital approximation
Lecture 33 - Multi electron atoms
Lecture 34 - He atom wavefunction
Lecture 35 - Excited states of many electron atoms
Lecture 36 - Introduction to Perturbation theory
Lecture 37 - Scope of Perturbation theory
Lecture 38 - Application of Perturbation theory
Lecture 39 - Higher order perturbations
Lecture 40 - Perturbation theory for non-degenerate states
Lecture 41 - Perturbation Theory for degenerate states
Lecture 42 - Application of Perturbation Theory for degenerate States
Lecture 43 - Variation Method
Lecture 44 - Variational Method (Continued...)
Lecture 45 - Variational calculations for Harmonic Oscillator and Particle in a Box
Lecture 46 - Secular equations in Variational calculations
Lecture 47 - Secular equations for particle in a box
Lecture 48 - Variational calculation for particle in a box (Continued...)
Lecture 49 - Perturbation theory for many electron atoms
Lecture 50 - Variational method for many electron atoms
Lecture 51 - Hartree-Fock Equations and Self Consistent Fields
Lecture 52 - Hartree-Fock Equations for He - Part 1
Lecture 53 - Hartree-Fock Equations for He - Part 2
Lecture 54 - Electronic Wavefunctions of He atom
Lecture 55 - Valance Bond Theory and homonuclear diatomics - Part 1
Lecture 56 - Valance Bond Theory and homonuclear diatomics - Part 2
Lecture 57 - Molecular shape and hybrid orbitals
Lecture 58 - sp2 hybridization
Lecture 59 - sp3 hybridization
Lecture 60 - Non-equivalent hybrid orbitals
Lecture 61 - Molecular Orbital Theory for H2+
Lecture 62 - Molecular orbital theory for homonuclear diatomic molecules
Lecture 63 - Beyond Homonuclear diatomic molecules
Lecture 64 - MOT for polyatomic molecules
Lecture 65 - Huckel MOT-1
Lecture 66 - Huckel MOT-2
Lecture 67 - The last word

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Basic Statistical Mechanics

Subject Co-ordinator - Prof. Biman Bagchi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why Study Statistical Mechanics?
Lecture 2 - Thermodynamics
Lecture 3 - Probability Theory - Part 1
Lecture 4 - Probability Theory - Part 2
Lecture 5 - Fundamental concepts and Postulates of Statistical Mechanics - Part 1
Lecture 6 - Fundamental concepts and Postulates of Statistical Mechanics - Part 2
Lecture 7 - From Postulates to Formulation
Lecture 8 - Microcanonical Ensemble
Lecture 9 - Relation with Thermodynamics in Microcanonical Ensemble - Part 1
Lecture 10 - Relation with Thermodynamics in Microcanonical Ensemble - Part 2
Lecture 11 - Canonical Ensemble - Part 1
Lecture 12 - Canonical Ensemble - Part 2
Lecture 13 - Thermodynamic Potential for Canonical ensemble
Lecture 14 - Grand Canonical Ensemble
Lecture 15 - Thermodynamic Potentials for Grand Canonical and Isothermal-Isobaric ensembles
Lecture 16 - Fluctuations and Response Function - Part 1
Lecture 17 - Fluctuations and Response Function - Part 2
Lecture 18 - Ideal Monatomic Gas
Lecture 19 - Ideal Monatomic Gas
Lecture 20 - Ideal Monatomic Gas
Lecture 21 - Ideal Monatomic Gas
Lecture 22 - Ideal Monatomic Gas
Lecture 23 - Ideal Gas of Diatomic Molecules
Lecture 24 - Ideal Gas of Diatomic Molecules
Lecture 25 - Ideal Gas of Diatomic Molecules
Lecture 26 - Ideal Gas of Diatomic Molecules
Lecture 27 - Ideal Gas of Polyatomic molecules
Lecture 28 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 1
Lecture 29 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 2

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Lecture 30 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 3
Lecture 31 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 4
Lecture 32 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 5
Lecture 33 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 6
Lecture 34 - Phase Transition and Landau Theory - Part 1
Lecture 35 - Phase Transition and Landau Theory - Part 2
Lecture 36 - Phase Transition and Landau Theory - Part 3
Lecture 37 - Comments on some important Concepts of Statistical Mechanics
Lecture 38 - Nucleation Part 1
Lecture 39 - Nucleation Part 2
Lecture 40 - Nucleation Part 3
Lecture 41 - Nucleation Part 4
Lecture 42 - Spinodal Decomposition and Pattern Formation
Lecture 43 - Spinodal Decomposition and Pattern Formation
Lecture 44 - Ising Model and Other Lattice Models - Part 1
Lecture 45 - Ising Model and Other Lattice Models - Part 2
Lecture 46 - Ising Model and Other Lattice Models - Part 3
Lecture 47 - Ising Model and Other Lattice Models - Part 4
Lecture 48 - Ising Model and Other Lattice Models - Part 5
Lecture 49 - Binary Mixtures
Lecture 50 - Binary Mixtures
Lecture 51 - Theory of Liquids - Part 1
Lecture 52 - Theory of Liquids - Part 2
Lecture 53 - Theory of Liquids - Part 3
Lecture 54 - Theory of Liquids - Part 4
Lecture 55 - Polymers in Solution and Polymer Collapse - Part 1
Lecture 56 - Polymers in Solution and Polymer Collapse - Part 2
Lecture 57 - Polymers in Solution and Polymer Collapse - Part 3
Lecture 58 - Polymers in Solution and Polymer Collapse - Part 4
Lecture 59 - Computer Simulation Methods in Statistical Mechanics - Part 1
Lecture 60 - Computer Simulation Methods in Statistical Mechanics - Part 2
Lecture 61 - Conclusion

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantum Mechanics and Molecular Spectroscopy

Subject Co-ordinator - Prof. Naresh Patwari

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to quantum Mechanics - Part 1
Lecture 2 - Introduction to quantum Mechanics - Part 2
Lecture 3 - Introduction to quantum Mechanics - Part 3
Lecture 4 - Time Dependant Perturbation Theory of Two states - Part 1
Lecture 5 - Time Dependent Perturbation Theory of Two States - Part 2
Lecture 6 - Time Dependent Perturbation Theory of Two States - Part 3
Lecture 7 - Time Dependent Perturbation Theory of Many States - Part 1
Lecture 8 - Time Dependent Perturbation Theory of Many States - Part 2
Lecture 9 - First-Order Correction to Time- Dependent Perturbation Theory
Lecture 10 - Properties of Light (Classical Treatment)
Lecture 11 - Interaction Hamiltonian - Part 1
Lecture 12 - Interaction Hamiltonian - Part 2
Lecture 13 - Interaction Hamiltonian - Part 3
Lecture 14 - Transition Moment Integral
Lecture 15 - Absorption Probability - Part 1
Lecture 16 - Absorption Probability - Part 2
Lecture 17 - Transition to Continuum States
Lecture 18 - Einsteinâ s Coefficient - Part 1
Lecture 19 - Einsteinâ s Coefficient - Part 2
Lecture 20 - Einsteinâ s Coefficient - Part 3
Lecture 21 - Spontaneous Emission Lifetime
Lecture 22 - Relationship between Transition Dipole and Extinction Coefficient
Lecture 23 - Spectral Lineshapes
Lecture 24 - Selection Rules
Lecture 25 - Molecular Rotations - Part 1
Lecture 26 - Molecular Rotations - Part 2
Lecture 27 - Molecular Rotations - Part 3
Lecture 28 - Rotational Selection Rules
Lecture 29 - Rotational Spectrum

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Lecture 30 - Molecular Vibrations - Part 1
Lecture 31 - Molecular Vibrations - Part 2
Lecture 32 - Vibrational Selection rules
Lecture 33 - Electronic Transition
Lecture 34 - Rotations of Polyatomic Molecules - Part 1
Lecture 35 - Rotations of Polyatomic Molecules - Part 2
Lecture 36 - Selection Rules for particle in a box
Lecture 37 - Interpretation of Rotational Spectra
Lecture 38 - Features of vibrational and electronic spectroscopy

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Essentials of Oxidation, Reduction and C_C Bond Formati

Subject Co-ordinator - Prof. Yashwant D Vankar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to organic synthesis-Importance of selectivity, stereochemistry and Mechanism
Lecture 2 - Sulfur based oxidations of alcohols
Lecture 3 - Sulfur based oxidations and Pummerer rearrangement
Lecture 4 - Further aspects of sulfur and selenium based oxidations
Lecture 5 - Organoselenium chemistry and SeO2 based oxidations
Lecture 6 - SeO2 based oxidation of ketones and Sulfoxide- Sulfenate rearrangement (Mislow-Evans rearrangemer
Lecture 7 - Mechanistic and stereochemical aspects of Mislow-Evans rearrangement and synthetic applications
Lecture 8 - Further synthetic applications of Mislow-Evans rearrangement and Saegusa-Ito oxidation
Lecture 9 - 1,2-Ketone transpositions, Shapiro reaction and Dauben-Michno rearrangement (a case of 1,3-enone
Lecture 10 - Dess-Martin periodinane oxidation
Lecture 11 - Iodoxybenzoic acid (IBX) based oxidations
Lecture 12 - Silver based oxidations: Prevost reaction and use of Fetizonâ s reagent
Lecture 13 - Further aspects of oxidations using Fetizonâ s reagent: Mechanism and Stereochemistry
Lecture 14 - Ruthenium tetroxide (and RuCl3/NaIO4) mediated oxidations
Lecture 15 - Tetra-n-propylammonium perruthenate (TPAP) based oxidations, and Tamao-Fleming oxidation
Lecture 16 - Further synthetic and mechanistic aspects of Tamao-Fleming oxidations
Lecture 17 - Oxidations with dimethyl dioxirane (DMDO)
Lecture 18 - Mechanistic aspects of DMDO based oxidations and oxaziridine mediated alpha-hydroxylations of ke
Lecture 19 - Asymmetric alpha-hydroxylations using oxaziridine based reactions
Lecture 20 - Barton and related reactions (oxidation at unfunctionalised carbons) and synthetic applications
Lecture 21 - beta-Cleavage in Barton and related reactions and miscellaneous oxidations such as TEMPO based c
Lecture 22 - Reductions in organic chemistry: Metal hydride (NaBH4 and LiAlH4) mediated reduction
Lecture 23 - Reductions using diisobutylaluminum hydride (DIBAL-H)
Lecture 24 - Further aspects of DIBAL-H based reductions and comparison with mixed chloride hydrides
Lecture 25 - Reductions with Red-Al, and Luche Reductions
Lecture 26 - Further aspects of Luche reduction, stereochemistry in reductions and reduction with LiBH4
Lecture 27 - Reductions with Zn(BH4)2, LiBHEt3 (superhydride) and L and K-selectrides
Lecture 28 - Reductions with LS/KS selectrides and NaCNBH3
Lecture 29 - Dissolving metal reductions (Na, K, Mg) and McMurry coupling using Ti(0)

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Lecture 30 - Stereochemistry and mechanistic aspects of McMurry coupling and metal mediated reductions of alp
Lecture 31 - Silanes [R3SiH, including polymethylhydrosiloxanes (PMHS)] as reducing agents
Lecture 32 - Further aspects of silanes as reducing agents and Barton-McCombie deoxygenation
Lecture 33 - Tributyltinhydride (n-Bu3SnH) based radical based reductions and C-C bond formations
Lecture 34 - Asymmetric synthesis: An introduction
Lecture 35 - Sharpless asymmetric epoxidation: Mechanism, stereochemistry and kinetic resolution
Lecture 36 - Synthetic utility of chiral 2,3-epoxy alcohols obtained from Sharpless epoxidation
Lecture 37 - Katsuki-Jacobsen epoxidation: Mechanism and stereochemistry
Lecture 38 - Further aspects of Katsuki-Jacobsen epoxidation, and Introduction to Sharpless Asymmetric Dihydr
Lecture 39 - Mechanism, stereochemical aspects and synthetic applications of Sharpless Asymmetric Dihydroxyla
Lecture 40 - Asymmetric hydrogenations and reductions using rhodium and ruthenium derived chiral catalysts
Lecture 41 - Asymmetric reduction with oxazaborilidines
Lecture 42 - C-C bond formations: Introduction to enolate, enamine and enol silyl ether based chemistry
Lecture 43 - C-C bond formations using enol silyl ether and imine based chemistry including SAMP and RAMP bas
Lecture 44 - Asymmetric C-C bond formations using Oppolzerâ s camphorsultams and introduction to directed Al
Lecture 45 - Further aspects of Aldol chemistry including the use of boron and silicon enolates
Lecture 46 - C-C bond formations using Evansâ oxazolidinone based chemistry
Lecture 47 - Ireland-Claisen rearrangement: Emphasis of enolate geometry on the stereochemical outcome, and C
Lecture 48 - Aromatic Claisen rearrangement, Johnson-Claisen rearrangement and Eschenmoser-Claisen rearrangem
Lecture 49 - Bellus-Claisen rearrangement, Aza-Claisen rearrangement, Thia-Claisen rearrangement, Chen-Mapp r
Lecture 50 - Zwitterionic-Claisen rearrangement, Overmann rearrangement, Bamford- Stevens and Shapiro reactio
Lecture 51 - Introduction to allyl metal additions for C-C bond formation
Lecture 52 - Allylindium chemistry: Mechanism, stereochemistry and synthetic applications
Lecture 53 - Allyltin chemistry: Mechanism, stereochemistry and synthetic applications
Lecture 54 - Chemistry of allylsilanes: Mechanism, stereochemistry and synthetic applications - Part 1
Lecture 55 - Further synthetic aspects of the chemistry of allylsilanes - Part 2
Lecture 56 - Further synthetic aspects of the chemistry of allylsilanes - Part 3
Lecture 57 - Chemistry of Vinylsilanes: Mechanism, Stereochemistry and Synthetic Applications
Lecture 58 - Peterson olefination and further synthetic aspects of vinylsilane chemistry
Lecture 59 - Simmons Smith cyclopropanation: Mechanism, stereochemistry and synthetic applications
Lecture 60 - Course Summary and Conclusion

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Kinetics and Transition State Theory

Subject Co-ordinator - Prof. Amber Jain

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rate: the reaction velocity
Lecture 2 - Its elementary - rate law equations
Lecture 3 - Arrhenius equation: what's the fuss about?
Lecture 4 - Dance of atoms: from Newton to Hamilton
Lecture 5 - Boltzmann distribution: a story of Hamilton, Liouville and Boltzmann
Lecture 6 - Maxwell Boltzmann distribution: how fast are molecules moving?
Lecture 7 - Kinetic theory of collisions: initial estimate
Lecture 8 - Boltzmann distribution and kinetic theory of collisions
Lecture 9 - Kinetic theory of collisions: a discussion
Lecture 10 - Kinetic theory of collisions: reactive cross section
Lecture 11 - Problem solving session - 1
Lecture 12 - Problem solving session - 2
Lecture 13 - Kinetic theory of collision and equilibrium constant
Lecture 14 - Critique of kinetic theory of collisions
Lecture 15 - Transition state theory and partition functions
Lecture 16 - Partitioning the partition function
Lecture 17 - Translating, rotating and vibrating quantum mechanically
Lecture 18 - Partition function and equilibrium constant
Lecture 19 - What is a transition state?
Lecture 20 - A puzzle: cars on highway
Lecture 21 - Transition state theory: derivation 1
Lecture 22 - Practical calculation of TST rate
Lecture 23 - Calculating TST rate for the reaction H+HBr
Lecture 24 - Collision theory as a special case of TST
Lecture 25 - TST: an intuitive proof in one dimension
Lecture 26 - Rate as a flux across a dividing surface
Lecture 27 - Transition state theory: derivation 2 from dynamical perspective
Lecture 28 - Discussion of the assumptions of TST
Lecture 29 - Thermodynamic formulation of TST

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Lecture 30 - Problem solving session - 3
Lecture 31 - Problem solving session - 4
Lecture 32 - Hills and valleys of potential energy surfaces
Lecture 33 - Molecular dynamics: rolling spheres on potential energy surfaces
Lecture 34 - Predictions from potential energy surfaces - rotational vs vibrational energies
Lecture 35 - Free energy and potential of mean force
Lecture 36 - Transmission coefficient and molecualr dynamics
Lecture 37 - Problem solving session - 5
Lecture 38 - Microcanonical rate constant: putting balls in jars
Lecture 39 - Microcanonical rate constant: RRK model
Lecture 40 - Microcanonical rate constant: magic of Marcus - RRKM model
Lecture 41 - Canonical TST from micrononical RRKM model
Lecture 42 - Sum and density of states
Lecture 43 - Unimolecular decay - revisited
Lecture 44 - Unimolecular decay: RRK's approach
Lecture 45 - Unimolecular decay: RRKM's approach
Lecture 46 - Problem solving session - 6

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Concepts of Chemistry for Engineering

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to quantum theory
Lecture 2 - Schrodinger's theory
Lecture 3 - Laws of quantum mechanics
Lecture 4 - Wave functions
Lecture 5 - Quantum mechanics of a free particle
Lecture 6 - Particle in 1D box
Lecture 7 - Particle in 2D box
Lecture 8 - Spherical polar coordinates and angular momentum
Lecture 9 - Developing Hydrogen atom orbitals - 1
Lecture 10 - Developing Hydrogen atom orbitals - 2
Lecture 11 - Developing Hydrogen atom orbitals - 3
Lecture 12 - Visualizing molecular orbitals
Lecture 13 - Molecular orbital theory 1: Introduction
Lecture 14 - Molecular orbital theory 2: Diatomic molecules
Lecture 15 - Molecular orbital theory 3: Homo-diatomic molecules - I
Lecture 16 - Molecular orbital theory 4: Homo-diatomic molecules - II
Lecture 17 - Molecular orbital theory 5: Hetero-diatomic molecules
Lecture 18 - Molecular orbital theory 6: Polyatomic molecules
Lecture 19 - Molecular orbital theory 7: Ethylene (Introduction to Huckel's theory) - I
Lecture 20 - Molecular orbital theory 8: Ethylene (Introduction to Huckel's theory) - II
Lecture 21 - Molecular orbital theory 9: Butadiene - I
Lecture 22 - Molecular orbital theory 9: Butadiene - II
Lecture 23 - Concept of effective nuclear charge
Lecture 24 - Electronic configuration of elements
Lecture 25 - Properties of Elements (Size, IE, EA and EN)
Lecture 26 - Polarizability
Lecture 27 - Hard soft acid base
Lecture 28 - Predicting molecular structures: VSEPR theory
Lecture 29 - Coordination Chemistry: 18 electron rule and VBT

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Lecture 30 - Crystal Field Theory: Octahedral Complex
Lecture 31 - Crystal Field Theory: Tetrahedral Complex
Lecture 32 - Crystal Field Theory: Octahedral vs. Tetrahedral Complex
Lecture 33 - Application of CFSE: Spinel and J-T Distortion
Lecture 34 - Introduction to Molecular Magnetism
Lecture 35 - Problem Solving Approach
Lecture 36 - Magnetism
Lecture 37 - Spectroscopic Term Symbol
Lecture 38 - Magnetic States of Matter: Paramagnetic, Ferro and Antiferromagnetic
Lecture 39 - Band structures of solid materials
Lecture 40 - Density of states and doping in semiconductors
Lecture 41 - Introduction to molecular spectroscopy
Lecture 42 - Rotational spectroscopy
Lecture 43 - Vibrational spectroscopy
Lecture 44 - Electronic Spectroscopy - I
Lecture 45 - Electronic Spectroscopy - II
Lecture 46 - Electronic Spectroscopy - III
Lecture 47 - Fluorescence Spectroscopy
Lecture 48 - Fundamentals of NMR spectroscopy and MRI
Lecture 49 - Surface characterization techniques
Lecture 50 - Introduction to thermodynamics: Work, heat and energy
Lecture 51 - First law of thermodynamics: Diathermic and adiabatic systems,exothermic and endothermic process
Lecture 52 - Enthalpy, Hess's law
Lecture 53 - Second law of thermodynamics: Entropy and third law of thermodynamics
Lecture 54 - Helmholtz and Gibbs free energies, Concept of spontaneity
Lecture 55 - Electrochemical equilibrium, Nernst equation
Lecture 56 - Acid base and solubility equilibria
Lecture 57 - Corrosion
Lecture 58 - Extraction of metals
Lecture 59 - Ellingham Diagram
Lecture 60 - Problems From Thermodynamics
Lecture 61 - Intermolecular forces: Electrostatic and Ion-Dipole Interaction
Lecture 62 - Intermolecular forces: Dipole-dipole, hydrogen bonding
Lecture 63 - Real gases - Part 1
Lecture 64 - Real gases - Part 2
Lecture 65 - Introduction to Potential Energy Surfaces
Lecture 66 - Potential energy surface of H3 system
Lecture 67 - Salient features of H3 potential energy surface
Lecture 68 - Potential Energy Surfaces of HCN and H2F system

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Lecture 69 - Representation of three dimensional structures
Lecture 70 - Structural isomers and stereoisomers
Lecture 71 - Configurations, Symmetry and Chirality
Lecture 72 - Enantiomers and Diastereomers
Lecture 73 - Optical activity, Conformational analysis, and absolute configuration
Lecture 74 - Substitution reactions
Lecture 75 - Elimination reactions
Lecture 76 - Addition, Oxidation and Reduction reactions
Lecture 77 - Synthesis of a drug molecule

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Classics in Total Synthesis-I

Subject Co-ordinator - Prof. Krishna P Kaliappan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview - 1
Lecture 2 - Overview - 2
Lecture 3 - Overview - 3
Lecture 4 - Illudin M (Kinder) Illudin C (Funk)
Lecture 5 - Total Synthesis of FR900848 (Barrett)
Lecture 6 - Total Synthesis of Cubane
Lecture 7 - Total Synthesis of Endiandric acids
Lecture 8 - Total Synthesis of Penicilin
Lecture 9 - Total Synthesis of Thienamycin
Lecture 10 - Total Synthesis of Prostaglandin (Corey)
Lecture 11 - Total Synthesis of Prostaglandin (Johnson and Stork)
Lecture 12 - Total Synthesis of Biotin and Lactacystin (i) Corey, (ii) Baldwin
Lecture 13 - Total Synthesis of Triquinanes: Isocomene 1) M. Pirrung 2) Fitjer
Lecture 14 - Total Synthesis of Triquinanes: Isocomene and Silphipherfol-6-en-5-one (Rawal)
Lecture 15 - Total synthesis of Triquinanes by radical cyclisation - I (Curran)
Lecture 16 - Total synthesis of Triquinanes by radical cyclisation - II
Lecture 17 - Total synthesis of Triquinanes by photochemical reaction - I
Lecture 18 - Total synthesis of Triquinanes by photochemical reaction - II
Lecture 19 - Total synthesis of Triquinanes by Thermal Metathesis (Mehta)
Lecture 20 - Total synthesis of Triquinanes by other reactions
Lecture 21 - Total synthesis of Longifolene (Corey and Oppolzer)
Lecture 22 - Total synthesis of Carpanone (Chapman)
Lecture 23 - Total synthesis of Mevinolin (Clive)
Lecture 24 - Total synthesis of Gibberellic Acid (Corey)
Lecture 25 - Total synthesis of Gibberellic Acid (Yamada)
Lecture 26 - Total synthesis of Perhydrohistrionicotoxin (Corey)
Lecture 27 - Total synthesis of Strychnine (Woodward)
Lecture 28 - Total synthesis of Strychnine (Rawal and Overman)
Lecture 29 - Total synthesis of Strychnine (Kuehne)

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Lecture 30 - Total synthesis of Reserpine (Woodward)
Lecture 31 - Total synthesis of Yohimbine (Tamelen and Momose)
Lecture 32 - Total synthesis of Quinine (Woodward and Stork)
Lecture 33 - Total synthesis of Dendrobine (Livinghouse)
Lecture 34 - Total synthesis of Morphine (Gates and Overman)
Lecture 35 - Total synthesis of Morphine (Parker and White)
Lecture 36 - Total synthesis of Methylhomosecodaphniphyllate (Heathcock)
Lecture 37 - Total synthesis of Lysergic acid (Woodward and Oppolzer)
Lecture 38 - Total synthesis of Galanthamine (Barton and Kirby)
Lecture 39 - Total synthesis of Epibatidine (Trost and Evans)
Lecture 40 - Total synthesis of Swainsonine (Hashimoto)
Lecture 41 - Total synthesis of Staurosporine (Danishefsky and Wood)
Lecture 42 - Total synthesis of Manzamine A (Winkler)
Lecture 43 - Total synthesis of Progesterone (Johnson)
Lecture 44 - Total synthesis of Progesterone from Diosgenin (Marker)
Lecture 45 - Total synthesis of Estrone (Torgov)
Lecture 46 - Total synthesis of Taxol (Nicolaou)
Lecture 47 - Total synthesis of Taxol (Holton)
Lecture 48 - Total synthesis of Taxol (Danishefsky)
Lecture 49 - Total synthesis of Taxol (Wender)
Lecture 50 - Total synthesis of Eleutherobin (Nicolaou)
Lecture 51 - Total synthesis of Eleutherobin (Danishefsky)
Lecture 52 - Total synthesis of Phorbol (Wender)
Lecture 53 - Total synthesis of Periplanone (Still and Schreiber)
Lecture 54 - Total synthesis of Discodermolide (Schreiber)
Lecture 55 - Total synthesis of Epothilones I (Nicolaou)
Lecture 56 - Total synthesis of Epothilones II (Schinzer and Danishefsky)
Lecture 57 - Total synthesis of Vineomycinone B2 (Tius and Danishefsky)
Lecture 58 - Total synthesis of Zaragozic acid C (Carreira)

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Circular Dichroism (CD) and Mossbauer Spectroscopy for

Subject Co-ordinator - Prof. Arnab Dutta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - CD Spectroscopy: Introduction
Lecture 2 - Symmetry and Molecular properties
Lecture 3 - Symmetry elements - I
Lecture 4 - Symmetry elements - II
Lecture 5 - Symmetry and point groups - I
Lecture 6 - Symmetry and point groups - II
Lecture 7 - Point group determination tutorial
Lecture 8 - Chirality and point group - I
Lecture 9 - Chirality and point group - II
Lecture 10 - Chirality and point group - III tutorial
Lecture 11 - Chirality and biology - I
Lecture 12 - Chirality and biology - II
Lecture 13 - Chirality and biology - III
Lecture 14 - Chirality and biology - IV
Lecture 15 - Chirality and biology - V
Lecture 16 - Origin of chirality
Lecture 17 - The physical background of chiral response - I
Lecture 18 - The physical background of chiral response - II
Lecture 19 - The physical background of chiral response - III
Lecture 20 - The physical background of chiral response - IV
Lecture 21 - The physical background of chiral response - IV
Lecture 22 - The physical background of chiral response - V
Lecture 23 - The physical background of chiral response - VI
Lecture 24 - Circular Dichroism Spectra
Lecture 25 - Examples of Circular Dichroism - I
Lecture 26 - Examples of Circular Dichroism - II
Lecture 27 - Examples of Circular Dichroism - III
Lecture 28 - Examples of Circular Dichroism - IV
Lecture 29 - Applications of CD spectroscopy - I

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Lecture 30 - Applications of CD spectroscopy - II
Lecture 31 - Applications of CD spectroscopy - III
Lecture 32 - Applications of CD spectroscopy - IV
Lecture 33 - Applications of CD spectroscopy - V
Lecture 34 - Applications of CD spectroscopy - VI
Lecture 35 - CD spectroscopy: Conclusion
Lecture 36 - MÃ Â¶ssbauer Spectroscopy: Introduction
Lecture 37 - MÃ Â¶ssbauer Spectroscopy Fundamentals - I
Lecture 38 - MÃ Â¶ssbauer Spectroscopy
Lecture 39 - MÃ Â¶ssbauer Spectroscopy Fundamentals - II
Lecture 40 - MÃ Â¶ssbauer Spectroscopy Fundamentals - III
Lecture 41 - MÃ Â¶ssbauer Spectroscopy Fundamentals - IV
Lecture 42 - MÃ Â¶ssbauer Spectroscopy: Isomer shift - I
Lecture 43 - MÃ Â¶ssbauer Spectroscopy: Isomer shift - II
Lecture 44 - MÃ Â¶ssbauer Spectroscopy: Isomer shift - III
Lecture 45 - MÃ Â¶ssbauer Spectroscopy: Quadrupolar splitting - I
Lecture 46 - MÃ Â¶ssbauer Spectroscopy: Quadrupolar splitting - II
Lecture 47 - MÃ Â¶ssbauer Spectroscopy: Applications - I
Lecture 48 - MÃ Â¶ssbauer Spectroscopy: Applications - II
Lecture 49 - MÃ Â¶ssbauer Spectroscopy: Applications - III
Lecture 50 - MÃ Â¶ssbauer Spectroscopy: Data measurement
Lecture 51 - MÃ Â¶ssbauer Spectroscopy: Applications - IV
Lecture 52 - MÃ Â¶ssbauer Spectroscopy: Effect of ligands - I
Lecture 53 - MÃ Â¶ssbauer Spectroscopy: Effect of ligands - II
Lecture 54 - MÃ Â¶ssbauer Spectroscopy: Applications - V
Lecture 55 - MÃ Â¶ssbauer Spectroscopy: Probing ferrocenes - I
Lecture 56 - MÃ Â¶ssbauer Spectroscopy: Probing ferrocenes - II
Lecture 57 - MÃ Â¶ssbauer Spectroscopy: Probing ferrocenes - III
Lecture 58 - MÃ Â¶ssbauer Spectroscopy: Mixed valent complexes - I
Lecture 59 - MÃ Â¶ssbauer Spectroscopy: Mixed valent complexes - II
Lecture 60 - MÃ Â¶ssbauer Spectroscopy: Mixed valent complexes - III
Lecture 61 - Conclusion section: CD spectroscopy
Lecture 62 - Conclusion section: MÃ Â¶ssbauer Spectroscopy

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NPTEL Video Course - Chemistry and Biochemistry - NOC:NMR Spectroscopy for Structural Biology

Subject Co-ordinator - Prof. Ashutosh Kumar, Prof. R. V Hosur

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - NMR Basic Concepts - I
Lecture 2 - NMR Basic Concepts - II
Lecture 3 - NMR Basic Concepts - III
Lecture 4 - NMR Basic Concepts - IV
Lecture 5 - NMR Spectra of Molecules
Lecture 6 - Chemical Shifts and Coupling constant
Lecture 7 - Fine Structures in NMR Spectra
Lecture 8 - Pulse Excitation and FT-NMR
Lecture 9 - Practical Aspects of FT-NMR - 1
Lecture 10 - Practical Aspects of FT-NMR - 2
Lecture 11 - Practical Aspects of FT-NMR - 3
Lecture 12 - Practical Aspects of FT-NMR - 4
Lecture 13 - Polarization Transfer Technique - 1
Lecture 14 - Polarization Transfer Technique - 2
Lecture 15 - General Concept of Multidimensional NMR - 1
Lecture 16 - General Concept of Multidimensional NMR - 2
Lecture 17 - 2-D NMR or 2-D Co-relation spectroscopy : General concept - 1
Lecture 18 - 2-D NMR or 2-D Co-relation spectroscopy : General concept - 2
Lecture 19 - 2-D NMR or 2-D Co-relation spectroscopy : General concept - 3
Lecture 20 - Introduction to NOESY and HSQC - 1
Lecture 21 - Introduction to NOESY and HSQC - 2
Lecture 22 - Introduction to NOESY and HSQC - 3
Lecture 23 - Introduction to NOESY and HSQC - 4
Lecture 24 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 1
Lecture 25 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 2
Lecture 26 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 3
Lecture 27 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 4
Lecture 28 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 5
Lecture 29 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 6

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Lecture 30 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 7
Lecture 31 - Determination of Structure and Dynamics of Proteins - 1
Lecture 32 - Determination of Structure and Dynamics of Proteins - 2
Lecture 33 - Determination of Structure and Dynamics of Proteins - 3
Lecture 34 - Determination of Structure and Dynamics of Proteins - 4
Lecture 35 - Determination of Structure and Dynamics of Proteins - 5
Lecture 36 - Determination of Structure and Dynamics of Proteins - 6
Lecture 37 - NMR Analysis of Protein Dynamics - I
Lecture 38 - NMR Analysis of Protein Dynamics - II
Lecture 39 - NMR Analysis of Protein Dynamics - III
Lecture 40 - NMR Analysis of Protein Dynamics - IV
Lecture 41 - Protein-Ligand and Protein-Protein Interaction
Lecture 42 - NMR Analysis of Ligand specific parameters in a Protein-Ligand Interaction - I
Lecture 43 - NMR Analysis of Ligand specific parameters in a Protein-Ligand Interaction - II
Lecture 44 - NMR Analysis of Protein Specific Parameters in a Protein-Ligand Interaction - I
Lecture 45 - NMR Analysis of Protein Specific Parameters in a Protein-Ligand Interaction - II
Lecture 46 - NMR in Drug Design
Lecture 47 - NMR in Drug Discovery
Lecture 48 - NMR in Drug metabolism - I
Lecture 49 - NMR in Drug metabolism - II
Lecture 50 - NMR in Drug metabolism - III
Lecture 51 - Probing Protein Dynamics by NMR Spectroscopy - I
Lecture 52 - Probing Protein Dynamics by NMR Spectroscopy - II
Lecture 53 - Probing Protein Dynamics by NMR Spectroscopy - III
Lecture 54 - Probing Protein Dynamics by NMR Spectroscopy - IV
Lecture 55 - Probing Protein Dynamics by NMR Spectroscopy - V
Lecture 56 - Basics of solid state NMR spectroscopy - I
Lecture 57 - Basics of solid state NMR spectroscopy - II
Lecture 58 - Basics of solid state NMR spectroscopy - III
Lecture 59 - Basics of solid state NMR spectroscopy - IV
Lecture 60 - Basics of solid state NMR spectroscopy - V

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Transition Metal Chemistry

Subject Co-ordinator - Prof. M S Balakrishna

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Periodic Table - 1
Lecture 2 - History of Periodic Table - 2
Lecture 3 - History of Periodic Table - 3
Lecture 4 - Introduction to Transition elements - 1
Lecture 5 - Introduction to Transition elements - 2
Lecture 6 - Introduction to Transition elements - 3
Lecture 7 - Introduction to Transition elements - 4
Lecture 8 - Coordination Theory
Lecture 9 - WernerÃ¢s Coordination Theory
Lecture 10 - Early Bonding Concepts
Lecture 11 - Valence Bond Theory (VBT) - 1
Lecture 12 - Valence Bond Theory (VBT) - 2
Lecture 13 - Background To Crystal Field Theory (CFT)
Lecture 14 - Crystal Field Theory (CFT) Jahn-Teller Theorem
Lecture 15 - Crystal Field Theory (CFT) - 1
Lecture 16 - Crystal Field Theory (CFT) - 2
Lecture 17 - Ligand Field Theory (LFT) - 1
Lecture 18 - Ligand Field Theory (LFT) - 2
Lecture 19 - Ligand Field Theory (LFT) - 3
Lecture 20 - Ligand Field Theory (LFT) - 4
Lecture 21 - 18 Electron Rule
Lecture 22 - 18 Electron Rule
Lecture 23 - MetalÃ¢ Metal Multiple Bonds
Lecture 24 - MetalÃ¢ Metal Multiple Bonds [Quadruple and Quintuple Bonding]
Lecture 25 - Preparation of metal Complexes
Lecture 26 - Preparation of metal Complexes
Lecture 27 - Classification of ligands by donor atoms
Lecture 28 - Classification of ligands by donor atoms - Hydrogen
Lecture 29 - Classification of ligands by donor atoms - Carbon - 1

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Lecture 30 - Classification of ligands by donor atoms - Carbon - 2
Lecture 31 - Classification of ligands by donor atoms - Carbon - 3
Lecture 32 - Classification of ligands by donor atoms - Carbon - 4
Lecture 33 - Classification of ligands by donor atoms - Nitrogen - 1
Lecture 34 - Classification of ligands by donor atoms - Nitrogen - 2
Lecture 35 - Classification of ligands by donor atoms - Nitrogen - 3
Lecture 36 - Classification of ligands by donor atoms - Oxygen, Phosphorus
Lecture 37 - Classification of ligands by donor atoms - Phosphorus - 1
Lecture 38 - Classification of ligands by donor atoms - Phosphorus - 2
Lecture 39 - Classification of ligands by donor atoms - Phosphorus - 3
Lecture 40 - Classification of ligands by donor atoms - Halogens
Lecture 41 - Oxidative addition and reductive elimination reactions - 1
Lecture 42 - Oxidative addition and reductive elimination reactions - 2
Lecture 43 - Oxidative addition and reductive elimination reactions - 3
Lecture 44 - Oxidative addition and reductive elimination reactions - 4
Lecture 45 - Inorganic Reaction Mechanisms
Lecture 46 - Inorganic Reaction Mechanisms Square planar complexes
Lecture 47 - Trans-Effect
Lecture 48 - Substitution Reactions in Square Planar Complexes, Trans-Effect
Lecture 49 - Substitution Reactions in Octahedral Complexes
Lecture 50 - Substitution Reactions in Octahedral Complexes; Stereochemistry of Products
Lecture 51 - Electron-Transfer Processes
Lecture 52 - Electron-Transfer Processes
Lecture 53 - Methods of Characterization UV-Visible Spectroscopy
Lecture 54 - Methods of Characterization UV-Visible Spectroscopy
Lecture 55 - UV-Visible Spectroscopy
Lecture 56 - UV-Visible Spectroscopy
Lecture 57 - NMR Spectroscopy
Lecture 58 - NMR Spectroscopy
Lecture 59 - NMR and IR Spectroscopy
Lecture 60 - Summary and Conclusion

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Nuclear and Radiochemistry

Subject Co-ordinator - Prof. B.S.Tomar, Prof. P.K.Mohapatra

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Radioactivity
Lecture 2 - Radioactive decay
Lecture 3 - Radioactive decay chain
Lecture 4 - Radioactive equilibria
Lecture 5 - Nuclear structure and stability
Lecture 6 - Nuclear force and nuclear properties
Lecture 7 - Liquid drop model
Lecture 8 - Applications of Liquid drop model
Lecture 9 - Nuclear Shell model
Lecture 10
Lecture 11 - Alpha decay
Lecture 12 - Beta decay
Lecture 13 - Gamma decay
Lecture 14 - Interaction of radiations with matter
Lecture 15 - Interaction of fast electrons with matter
Lecture 16 - Interaction of electromegnetic radiations with matter
Lecture 17 - Principles of radiation detectors
Lecture 18 - Gas filled detectors
Lecture 19 - Scintillator detectors
Lecture 20 - Semiconductor detectors
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26 - Compound nucleus reactions
Lecture 27 - Nuclear fission
Lecture 28 - Nuclear fusion
Lecture 29 - Production of radioisotopes using neutrons

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Lecture 30 - Radioisotope production using charged particles
Lecture 31 - Radiochemical practices
Lecture 32 - Radioanalytical techniques and applications
Lecture 33 - Nuclear analytical techniques
Lecture 34 - Applications of neutron activation analysis
Lecture 35 - Ion beam analysis
Lecture 36 - Nuclear reaction analysis and particle induced gamma emission
Lecture 37 - Nuclear Probes: Positron annihilation spectroscopy
Lecture 38 - Perturbed angular corelation
Lecture 39 - Radioisotope applications in healthcare
Lecture 40 - Radioisotope applications in Industry, agriculture and food technology
Lecture 41 - History of actinides
Lecture 42 - Actinide concept
Lecture 43 - Actinide ionic species in water
Lecture 44 - Actinide hydration and Hydrolysis
Lecture 45 - pH-pE concept
Lecture 46 - Ln/An absorption spectroscopy - I
Lecture 47 - Ln/An absorption spectroscopy - II
Lecture 48 - Ln/An emission spectroscopy - I
Lecture 49 - Ln/An emission spectroscopy - II
Lecture 50 - Solution chemistry Actinides
Lecture 51 - Complexation of actinides - I
Lecture 52 - Complexation of actinides - II
Lecture 53 - Solvent extraction of actinides - I
Lecture 54 - Solvent extraction of actinides - II
Lecture 55 - Actinide partitioning
Lecture 56 - Analytical chemistry of actinides
Lecture 57 - Transactinides
Lecture 58 - Fast radiochemical separations
Lecture 59 - Actinides in the environment
Lecture 60 - Actinides sorption and migration

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Fundamentals of Statistical Thermodynamics

Subject Co-ordinator - Prof. Nand Kishore

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General introduction to Statistical Thermodynamics
Lecture 2 - Configuration and Weights
Lecture 3 - Configuration and Weights (Continued...)
Lecture 4 - Boltzmann Distribution
Lecture 5 - The Molecular Partition Function
Lecture 6 - The Molecular Partition Function of a uniform ladder of energy levels
Lecture 7 - The partition function for a particle of mass m free to move in a 1D container
Lecture 8 - The partition function for a particle of mass m free to move in a 3D container
Lecture 9 - Numerical Problems Set-I (based on partition function)
Lecture 10 - Numerical Problems Set-II
Lecture 11 - The Internal Energy
Lecture 12 - Obtaining expression for beta
Lecture 13 - The Statistical Entropy
Lecture 14 - Connecting partition function with entropy
Lecture 15 - Solving numerical problems based on Internal energy and Entropy
Lecture 16 - Solving numerical problems based on Internal energy and Entropy
Lecture 17 - Negative Temperature
Lecture 18 - Further discussion on q (Partition function), U (Internal energy) and S (Entropy)
Lecture 19 - The Canonical Partition Function
Lecture 20 - Relating Canonical Partition Function Internal Energy and Entropy
Lecture 21 - Recovering molecular partition function q from canonical partition function Q
Lecture 22 - Entropy of a monatomic gas
Lecture 23 - Further discussion on entropy of a monatomic gas - I
Lecture 24 - Further discussion on entropy of a monatomic gas - II
Lecture 25 - The Thermodynamic Functions (Pressure)
Lecture 26 - The Thermodynamic Functions (Enthalpy)
Lecture 27 - The Thermodynamic Functions (The Gibbs Energy)
Lecture 28 - The Thermodynamic Functions (The Molecular Partition Function)
Lecture 29 - The Rotational Contribution to Molecular Partition Function

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Lecture 30 - The Rotational Contribution to Molecular Partition Function (Nonlinear Rotor)
Lecture 31 - The Rotational Contribution to Molecular Partition Function
Lecture 32 - Rotational Partition Function
Lecture 33 - Vibrational Partition Function - I
Lecture 34 - Vibrational Partition Function - II
Lecture 35 - Vibrational Partition Function - Applications
Lecture 36 - Electronic Partition Function
Lecture 37 - Mean Energies
Lecture 38 - Mean Energies (Continued...)
Lecture 39 - Heat Capacity
Lecture 40 - Heat Capacity (Continued...)
Lecture 41 - Mean Energies (Applications)
Lecture 42 - Problem Solving
Lecture 43 - Residual Entropy
Lecture 44 - Residual Entropy (Continued...)
Lecture 45 - Relation between equilibrium constant K and partition function q
Lecture 46 - Relation between equilibrium constant K and partition function q (Continued...)
Lecture 47 - Relation between equilibrium constant K and partition function q (Applications-1)
Lecture 48 - Relation between equilibrium constant K and partition function q (Applications-2)
Lecture 49 - Contributions to equilibrium constant
Lecture 50 - Contributions to equilibrium constant (Continued...)
Lecture 51 - Contributions to equilibrium constant (Continued...) and Problems Solving
Lecture 52 - Problem Solving
Lecture 53 - Problem Solving (Continued...)
Lecture 54 - Equations of state
Lecture 55 - Bose-Einstein Statistics
Lecture 56 - Problem Solving
Lecture 57 - FERMI-DIRAC Statistics
Lecture 58 - Radial Distribution Function
Lecture 59 - Recap - 1
Lecture 60 - Recap - 2

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Interpretative Molecular Spectroscopy

Subject Co-ordinator - Prof. M. S. Balakrishna

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Various Analytical Techniques and their applications
Lecture 2 - Introduction to 1H NMR Spectroscopy
Lecture 3 - NMR signals and magnetic shielding
Lecture 4 - Introduction to the concept of Chemical Shifts in NMR spectra
Lecture 5 - Chemical Shifts for different type of protons
Lecture 6 - N+1 Rule and Pascal's Triangle
Lecture 7 - Coupling constants for different types of molecules
Lecture 8 - Second Order Coupling
Lecture 9 - Introduction to 13C NMR Spectroscopy
Lecture 10 - Introduction to 31P NMR Spectroscopy
Lecture 11 - Chemical Shift Range in 31P NMR Spectroscopy
Lecture 12 - Examples explaining Multinuclear NMR Spectroscopy - 1
Lecture 13 - Examples explaining Multinuclear NMR Spectroscopy - 2
Lecture 14 - Examples explaining Multinuclear NMR Spectroscopy - 3
Lecture 15 - Examples explaining Multinuclear NMR Spectroscopy - 4
Lecture 16 - Examples explaining Multinuclear NMR Spectroscopy - 5
Lecture 17 - Monitoring reaction through 31P NMR Spectroscopy
Lecture 18 - 19F, 14N and 15N NMR Spectroscopy
Lecture 19 - 6Li and 7Li NMR Spectroscopy
Lecture 20 - 11B, 10B and 199Hg NMR Spectroscopy
Lecture 21 - Introduction to UV Spectroscopy
Lecture 22 - Types of Electronic Transitions and Woodward-Fieser Rules
Lecture 23 - Spin Orbit Coupling and Term Symbols
Lecture 24 - Ground State Term Symbol
Lecture 25 - Calculating microstates for different electronic configuration
Lecture 26 - Selection Rule of Electronic Transition
Lecture 27 - Orgel Level Diagrams
Lecture 28 - Racah Parameters and Tanabe-Sugano Diagrams
Lecture 29 - Introduction to IR Spectroscopy - 1

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Lecture 30 - Introduction to IR Spectroscopy - 2
Lecture 31 - Interpretation of IR Spectra
Lecture 32 - IR stretching frequencies for various functional groups
Lecture 33 - Hook's Law - Numericals
Lecture 34 - IR Spectra of carbonyl compounds - 1
Lecture 35 - IR Spectra of carbonyl compounds - 2
Lecture 36 - Numerical Problems related to IR Spectroscopy - 1
Lecture 37 - Numerical Problems related to IR Spectroscopy - 2
Lecture 38 - Introduction to Mass Spectrometry
Lecture 39 - Isotope Peaks in Mass Spectrometry
Lecture 40 - Hydrogen deficiency Index
Lecture 41 - EI Mass Spectra of various molecules - 1
Lecture 42 - EI Mass Spectra of various molecules - 2
Lecture 43 - EI Mass Spectra of various molecules - 3
Lecture 44 - Types of Mass Spectrometry
Lecture 45 - Introduction to EPR Spectroscopy - 1
Lecture 46 - Introduction to EPR Spectroscopy - 2
Lecture 47 - Hyperfine Interactions
Lecture 48 - Examples of Hyperfine Interactions
Lecture 49 - Introduction to MÃ Â¶ssbauer Spectroscopy (MÃ Â¶s)
Lecture 50 - More discussion, problems and solutions (MÃ Â¶s)
Lecture 51 - Problems and Solutions - 1
Lecture 52 - Problems and Solutions - 2
Lecture 53 - Problems and Solutions - 3
Lecture 54 - Problems and Solutions - 4
Lecture 55 - Problems and Solutions - 5
Lecture 56 - Rule of Thirteen and Nitrogen Rule
Lecture 57 - Problems and Solutions - 6
Lecture 58 - Problems and Solutions - 7
Lecture 59 - Problems and Solutions - 8
Lecture 60 - Summary and conclusion

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Many Body Methods in Quantum Chemistry

Subject Co-ordinator - Prof. Sourav Pal, Prof. Achintya Kumar Dutta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Failure of classical mechanics
Lecture 2 - Postulates of quantum mechanics
Lecture 3 - Postulate 5 and 6
Lecture 4 - Overview of exactly solvable system
Lecture 5 - Introduction to many electron problem
Lecture 6 - Non-interacting and interacting quantum particles
Lecture 7 - Spin orbital concept
Lecture 8 - Slater determinant introduction
Lecture 9 - Form of exact wave function for interacting particles
Lecture 10 - A brief introduction to Configuration Interaction (CI)
Lecture 11 - Variational method and Rayleigh-Ritz variation
Lecture 12 - Linear variation method
Lecture 13 - Hartree-Fock theory introduction
Lecture 14 - Slater rules for matrix elements
Lecture 15 - Spin integrated for closed shell determinant
Lecture 16 - Examples of spin integrated determinants
Lecture 17 - Introduction to Lagrange variation
Lecture 18 - General lagrange variation
Lecture 19 - Lagrange variation to minimize the the Hartree-Fock energy
Lecture 20 - Non-canonical HF equation
Lecture 21 - Interpretation of coulomb and exchange terms
Lecture 22 - Unitary transformation of non-canonical HF equation
Lecture 23 - Canonical Hartree-Fock equation
Lecture 24 - Koopmans' approximation for IP
Lecture 25 - Koopmans' approximation for EA
Lecture 26 - Spin integrated Hartree-Fock for closed shell system (RHF)
Lecture 27 - Molecular Hartree-Fock introduction
Lecture 28 - Hartree-Fock Rothaan Hall equation
Lecture 29 - Symmetry of two electron integrals

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Lecture 30 - HF Roothan equation in terms of atomic orbitals
Lecture 31 - Koopmans' IP for molecules
Lecture 32 - Koopmans' EA for molecules
Lecture 33 - Roothaan equation in orthonormalized basis
Lecture 34 - Review of Hartree-Fock theory
Lecture 35 - Charge density, Bond order and Population analysis
Lecture 36 - Dipole Moment
Lecture 37 - Introduction to basis set
Lecture 38 - Dunning and Pople basis set
Lecture 39 - Polarization and diffuse function
Lecture 40 - Brillouin's theorem and Slater's rule type-2
Lecture 41 - Slater rule type-2
Lecture 42 - Spin adapted determinant
Lecture 43 - Dissociation of Hydrogen molecule problem
Lecture 44 - Inadequacies of restricted Hartree-Fock theory
Lecture 45 - Hartree-Fock perturbation theory and correlation correction
Lecture 46 - Hartree-Fock perturbation theory (Continued...)
Lecture 47 - Introduction of 2nd order perturbation theory
Lecture 48 - Intermediate normalization and an expression for the Correlation energy
Lecture 49 - Slater rule -3 and derivation of 2-nd order perturbation energy
Lecture 50 - Physical insight of pair correlation theory
Lecture 51 - Introduction to configuration intercation (CI)
Lecture 52 - Determine the parameter of CI
Lecture 53 - Construction of CIS hamiltonian matrix
Lecture 54 - Importance of doubly excited determinants in correlation contribution
Lecture 55 - Intermediate normalization and an expression for the Correlation energy
Lecture 56 - CI equation in terms of Normal-Ordered hamiltonian
Lecture 57 - Doubly excited CI function (D-CI)
Lecture 58 - Matrix structure of CISD (singly and doubly excited CI)
Lecture 59 - Some illustrative example
Lecture 60 - Effects of singly excited determinant in the calculation
Lecture 61 - D-CI for non-interacting hydrogen molecules
Lecture 62 - Size consistency problem in truncated CI
Lecture 63 - N-dependence of D-CI correlation energy
Lecture 64 - problem of truncating CI
Lecture 65 - Introduction of second quantization operator in quantum mechanics
Lecture 66 - Creation and annihilation operator and their properties
Lecture 67 - Operators in second quantization
Lecture 68 - Some basic examples related with second quantization operator

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Lecture 69 - Hole-Particle formalism
Lecture 70 - Hugenholtz rule for diagrammatic construction of MP perturbation theory
Lecture 71 - Linked cluster diagram
Lecture 72 - Energy expression for higher order Moller-Plasset perturbation theory
Lecture 73 - Diagrammatic representation of MP3 energy and some practice problem
Lecture 74 - Overview of the some other correlation calculation method
Lecture 75 - A brief introduction to Coupled cluster theory

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Cycloaddition

Subject Co-ordinator - Prof. Krishna P Kaliappan

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to [4+2] Cycloaddition
Lecture 2 - Stereochemical Outcome of [4+2] Cycloaddition
Lecture 3 - Regiochemical Outcome of [4+2] Cycloaddition
Lecture 4 - Selected Examples of Diels-Alder Reaction
Lecture 5 - Hetero Diels-Alder reaction
Lecture 6 - IMDA-Type I Diels-Alder Reaction
Lecture 7 - IMDA-Type II Diels-Alder Reaction
Lecture 8 - Retro Diels-Alder, Alder Rickert and Dehydro Diels-Alder Reaction
Lecture 9 - Lewis Acid Efffect and Asymmetric Diels-Alder reaction
Lecture 10 - Introduction to 1,3-Dipolar Cycloaddition
Lecture 11 - Nitrones in 1,3-Dipolar Cycloaddition
Lecture 12 - Carbonyl Ylides in 1,3-Dipolar Cycloaddition
Lecture 13 - Azomethine Ylides and Nitrile Oxides in 1,3-Dipolar Cycloaddition
Lecture 14 - Azides in 1,3-Dipolar Cycloaddition and Click Chemistry
Lecture 15 - Diazoalkanes, Nitrile Imines, Azomethine Imines and Nitrile Ylides in 1,3-Dipolar Cycloaddition
Lecture 16 - Thermal [2+2] Cycloaddition Reaction
Lecture 17 - Photochemical [2+2] Cycloaddition Reaction
Lecture 18 - Cubane Synthesis, DeMayo and PaternÃ²-BÃ¼chi Reaction
Lecture 19 - Mechanistic Approaches of Cycloaddition Reaction
Lecture 20 - Summary of Cycloaddition Reactions

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Biomolecular Spectroscopy

Subject Co-ordinator - Prof. Ashutosh Kumar, Prof. Priyatosh Ranjan

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Theory of absorption of light by molecules: propagation of an electromagnetic wave through space
Lecture 2 - Theory of absorption of light by molecules: propagation of an electromagnetic wave through space
Lecture 3 - Jablonski diagram - I
Lecture 4 - Jablonski diagram - II
Lecture 5 - Instrumentation, Beer's law and the extinction coefficient and Chromophore: factors affecting the
Lecture 6 - Solvent-induced heterogeneity, red-shifts and blue shifts; polarity vs polarizability of the medi
Lecture 7 - Solvent-induced heterogeneity, red-shifts and blue shifts; polarity vs polarizability of the medi
Lecture 8 - Spectral shifts in rhodopsin and vision
Lecture 9 - Structural studies DNA using absorption spectroscopy Helix coil transition of double stranded DNA
Lecture 10 - Melting curve of DNA: Hyperchromicity and hypochromicity
Lecture 11 - Structural studies of proteins using absorption spectroscopy
Lecture 12 - Practical Considerations: Spectral bandwidth, wavelength error and stray light
Lecture 13 - Structural studies of proteins using absorption spectroscopy
Lecture 14 - Theory of fluorescence spectroscopy - I
Lecture 15 - Photoluminescence, emission, and absorption Stokes Shift
Lecture 16 - Theory of fluorescence spectroscopy - II
Lecture 17 - Advanced Application of Flourescence Spectroscopy
Lecture 18 - Solvent and Environmental Effects on Fluorescence
Lecture 19 - Inner Filter Effect in Fluorescence
Lecture 20 - Flourescence Lifetime
Lecture 21 - Fluorescence resonance energy transfer
Lecture 22 - Introduction to InfraRed Spectroscopy
Lecture 23 - Introduction to Vibrational Spectroscopy: Infrared Spectroscopy
Lecture 24 - Fundamerntal of FT-IR
Lecture 25 - Introduction to Raman Spectroscopy
Lecture 26 - Fundamental and Application of Raman Spectroscopy
Lecture 27 - Biological application of FT-IR
Lecture 28 - Introduction Linearly and circularly polarized light
Lecture 29 - Instrumentation of Circular Dichroism (CD) Spectroscopy

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Lecture 30 - Experimental: sample concentration and cell pathlength Solvent effects
Lecture 31 - Characteristics of CD and ORD (optical rotatory dispersion) spectroscopy: Cotton Effect
Lecture 32 - Identification of known optical isomers
Lecture 33 - Determination of protein secondary structure
Lecture 34 - Detection of molten globule like structure of proteins
Lecture 35 - Applications of CD spectroscopy in studying amyloid based neurodegenerative disorders
Lecture 36 - Determination of nucleic acid conformations
Lecture 37 - Use of CD spectroscopy to study stacking orientation of the base pairs
Lecture 38 - Application of Spectroscopy in Biopharma Setting - I
Lecture 39 - Application of Spectroscopy in Biopharma Setting - II
Lecture 40 - Application of Raman Spectroscopy in Pharma and Biopharma Industry - I
Lecture 41 - Application of Raman Spectroscopy in Pharma and Biopharma Industry - II
Lecture 42 - Fluorescence Spectroscopy Application for various Pharmaceutical products

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NPTEL Video Course - Chemistry and Biochemistry - Bio-Physical Chemistry

Subject Co-ordinator - Dr. P.K. Chowdhury

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Course on Bio-physical Chemistry
Lecture 2 - Protein Structure
Lecture 3 - Secondary Structure of Proteins
Lecture 4 - Secondary Structure of Proteins (Continued...)
Lecture 5 - Tertiary Structure
Lecture 6 - Forces in Protein Folding
Lecture 7 - Forces in Protein Folding (Continued...)
Lecture 8 - Electrostatics (Continued...)
Lecture 9 - Intermolecular Interactions
Lecture 10 - Dipole-Dipole Interaction
Lecture 11 - Electrostatics (Continued...)
Lecture 12 - Hydrophobic Effect
Lecture 13 - Hydrophobic Effect (Continued...)
Lecture 14 - Hydrogen Bonding
Lecture 15 - Protein Stability Curves
Lecture 16 - Thermodynamics of Protein Unfolding
Lecture 17 - Thermodynamics of Protein Unfolding (Continued...)
Lecture 18 - Mechanism of Chemical Denaturation
Lecture 19 - Pressure Induced Denaturation (The P-T Diagram)
Lecture 20 - Protein Folding Pathways and Energy Landscapes
Lecture 21 - Diffusion
Lecture 22 - Diffusion (Continued...)
Lecture 23 - Diffusion (Continued...)
Lecture 24 - Langevin Equation and Brownian Motion
Lecture 25 - Langevin Equation and Brownian Motion (Continued...)
Lecture 26 - Langevin Equation and Brownian Motion (Continued...)
Lecture 27 - Protein Folding
Lecture 28 - Protein Folding
Lecture 29 - Protein Folding

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Lecture 30 - Protein Folding
Lecture 31 - Protein Folding Kinetics
Lecture 32 - Protein Folding Kinetics
Lecture 33 - Protein Folding Kinetics
Lecture 34 - Protein Folding Kinetics
Lecture 35 - Experimental Tools
Lecture 36 - Spectroscopy
Lecture 37 - Spectroscopy
Lecture 38 - Electronic Spectroscopy Absorption and Fluorescence
Lecture 39 - Fluorescence
Lecture 40 - Fluorescence Quenching
Lecture 41 - Infrared Spectroscopy of Proteins
Lecture 42 - Infrared Spectroscopy of Proteins (Continued...)

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Spectroscopic Techniques for Pharmaceutical and Biophar

Subject Co-ordinator - Dr. Shashank Deep

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Spectroscopy - I
Lecture 2 - Introduction to Spectroscopy - II
Lecture 3 - Introduction to Spectroscopy - III
Lecture 4 - Introduction to Spectroscopy - IV
Lecture 5 - Introduction to Spectroscopy - V
Lecture 6 - Introduction to Spectroscopy - VI
Lecture 7 - Rotational, rotational Raman Spectroscopy theory and Application - I
Lecture 8 - Rotational, rotational Raman Spectroscopy theory and Application - II
Lecture 9 - Vibrational Spectroscopy Theory and Application - I
Lecture 10 - Vibrational, Rotational-Vibrational, Raman Spectroscopy - II
Lecture 11 - Vibrational, Rotational-Vibrational, Raman Spectroscopy - III
Lecture 12 - Problems on Rotational, Vibrational and Raman Spectroscopy
Lecture 13 - Atomic Spectroscopy - I
Lecture 14 - Atomic Spectroscopy - II
Lecture 15 - Atomic Spectroscopy - III
Lecture 16 - Atomic Spectroscopy - IV
Lecture 17 - Atomic and Molecular Spectroscopy
Lecture 18 - Electronic Spectra of Diatomic Molecules and UV-Vis Spectroscopy
Lecture 19 - UV-Visible Spectroscopy of Conjugated Molecules
Lecture 20 - UV-Vis Spectroscopy and its Applications - I
Lecture 21 - UV-Vis Spectroscopy and its Applications - II
Lecture 22 - UV-Vis and Fluorescence Spectroscopy
Lecture 23 - Fluorescence Spectroscopy (Continued...)
Lecture 24 - Application of Fluorescence Spectroscopy
Lecture 25 - Application of Steady-State Fluorescence
Lecture 26 - Time- resolved Fluorescence Spectroscopy
Lecture 27 - Microscopy
Lecture 28 - Contrast in Microscopy, Fluorescence Microscopy
Lecture 29 - Fluorescence Microscopy and Application

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Lecture 30 - Principle of NMR
Lecture 31 - NMR data processing and Chemical shift
Lecture 32 - Structure Informations from NMR
Lecture 33 - Structure Calculation and 2D-NMR Spectroscopy
Lecture 34 - Mass Spectroscopy

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Introductory Non-Linear Dynamics

Subject Co-ordinator - Prof. Ramakrishna Ramaswamy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Stability, Phase Space and Invariant Sets - 1
Lecture 2 - Introduction, Stability, Phase Space and Invariant Sets - 2
Lecture 3 - Introduction, Stability, Phase Space and Invariant Sets - 3
Lecture 4 - Maps and Flows. Simple Examples of Dynamics Systems - 1
Lecture 5 - Maps and Flows. Simple Examples of Dynamics Systems - 2
Lecture 6 - Logistic map. Simple Examples of Bifurcations
Lecture 7 - Bifurcation Diagrams. Period 3 Implies Chaos. Characterizing Chaos
Lecture 8 - Characterizing The Period-Doubling Route to Chaos
Lecture 9 - Lyapunov Exponents; Invariant measures
Lecture 10 - Intermittency. Crises
Lecture 11 - Fractals
Lecture 12 - Chaos in Flows. The Lorenz and Rossler Systems
Lecture 13 - The Baker and Horseshoe Maps
Lecture 14 - Hamiltonian Chaos - 1
Lecture 15 - Hamiltonian Chaos - 2

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Principles of Organic Synthesis

Subject Co-ordinator - Prof. T. Punniyamurthy

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Aldol Reaction
Lecture 2 - Perkin, Claisen and Thorpe Reactions
Lecture 3 - Reaction of Enolates
Lecture 4 - Mannich Reaction
Lecture 5 - Reaction of Alkenes and Carbonyl Compounds
Lecture 6 - Friedel-Crafts and Prins Reactions
Lecture 7 - Grignard Reagents
Lecture 8 - Organolithium Reagents
Lecture 9 - Organocopper, Organozinc and Organomercury Reagents
Lecture 10 - Ritter Reaction and Gabriel Synthesis
Lecture 11 - Reactions of imines and enamines, synthesis of alkaloids and amino acids
Lecture 12 - Reactions of electrophilic and nucleophilic nitrogens, synthesis of amino acids and peptides
Lecture 13 - Principles, effect of substituents and carbon-carbon bond formation
Lecture 14 - Formylation/acylation and related reactions
Lecture 15 - Nitration, Sulfonation and other reactions
Lecture 16 - Principle, Substitution mechanism and reactions of Benzyne
Lecture 17 - Schiemann Reaction, Ullmann reaction and Stephens-Castro coupling
Lecture 18 - Ziegler Alkylation, Chichibabin Reaction, Von Richter Rearrangement, Smiles Rearrangement, Bambe
Lecture 19 - Preparation, properties and reactions
Lecture 20 - Coupling reactions, Japp-Klingemann reaction and Tiffeneau-Demjanov rearrangement
Lecture 21 - Applications of diazonium salts
Lecture 22 - Wagner-Meerwein rearrangment, Pinacol rearrangment, Benzilic acid rearrangment and Arndt-Eistert
Lecture 23 - Rearrangement of halogen, oxygen, sulfur and nitrogen containing centre
Lecture 24 - Rearrangement to electron-Rich carbon
Lecture 25 - Reactivity and several reactions
Lecture 26 - Reactions of sulfur and silicon containing reagents
Lecture 27 - Preparation and reactions of organoborane and organotin reagents
Lecture 28 - Formation of carbon-carbon and carbon-halogen bonds
Lecture 29 - Cu, Mn, Sm, and Sn Based Reactions, Acyloin Condensation

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Lecture 30 - C-N, C-O bond formation and decarboxylation

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Reagents in Organic Synthesis

Subject Co-ordinator - Prof.Subhas Chandra

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Chromium Based Reagents for Oxidation
Lecture 2 - Non-metal based Reagents for Oxidation
Lecture 3 - Organic Peroxides
Lecture 4 - Oxidation Mediated by DDQ, CAN and SeO2
Lecture 5 - Oxidation Mediated by Mn and Ag
Lecture 6 - Oxidation by Ru, Hypervalent Iodine, Al and Na based Reagents
Lecture 7 - Na and Li Metal based Reduction
Lecture 8 - Hydride based Reduction
Lecture 9 - Hydrogenation
Lecture 10 - Al, Zn and Li Based Reagents for Reduction
Lecture 11 - Reduction With Boranes, Diimide and Trialkylsilanes
Lecture 12 - Li Based Reagents in Organic Synthesis
Lecture 13 - Mg and Na Based Reagents in Organic Synthesis
Lecture 14 - B Based Reagents in Organic Synthesis
Lecture 15 - B and Al Based Reagents in Organic Synthesis
Lecture 16 - S Based Reagents in Organic Synthesis
Lecture 17 - P Based Reagents in Organic Synthesis
Lecture 18 - Si and Pb Based Reagents in Organic Synthesis
Lecture 19 - Sn and Bi Based Reagents in Organic Synthesis
Lecture 20 - Ti Based Reagents in Organic Synthesis
Lecture 21 - Ru Based Reagents in Organic Synthesis
Lecture 22 - Pd Based Reagents in Organic Synthesis
Lecture 23 - Cu Based Reagents in Organic Synthesis
Lecture 24 - Cr and Mn Based Reagents in Organic Synthesis
Lecture 25 - Zn and Hg Based Reagents in Organic Synthesis
Lecture 26 - Au Based Reagents in Organic Synthesis
Lecture 27 - Fe and Co Based Reagents in Organic Synthesis
Lecture 28 - Ag and Rh Based Reagents in Organic Synthesis
Lecture 29 - Ni, Pt and Ir Based Reagents in Organic Synthesis

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Lecture 30 - Introduction to Lanthanides and Sm Based Reagents
Lecture 31 - Samarium(Ii) Iodide Based Reagents in Organic Synthesis
Lecture 32 - Sm and Yb Based Reagents in Organic Synthesis

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Thermodynamics: Classical to Statistical

Subject Co-ordinator - Prof. Sandip Paul

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Cocepts of heat and work; First Law of Thermodynamics
Lecture 2 - Concepts of enthalpy and heat capacity
Lecture 3 - Introduction to entropy
Lecture 4 - Calculation of entropy for various processes
Lecture 5 - Gibbs and Helmholtz free energy
Lecture 6 - Introduction to chemical potential
Lecture 7 - Clapeyron equation and phase transition; concept of fugacity
Lecture 8 - Calculation of fugacity; free energy of mixing
Lecture 9 - Partial molar quantities; excess thermodynamic quantities
Lecture 10 - Concept of activity and activity coefficients; Debye-Huckel limiting law
Lecture 11 - Phase Diagram of one component systems
Lecture 12 - Phase Diagram of two component systems
Lecture 13 - Phase Diagram of three component system; one dimensional random walk
Lecture 14 - Macroscopic and microscopic states; Boltzmann distribution; Canonical partition function
Lecture 15 - Calculation of different thermodynamical quantities using canonical partition function
Lecture 16 - Introduction to molecular partition function
Lecture 17 - Translational, electronic and nuclear partition function
Lecture 18 - Rotational partition function
Lecture 19 - Vibrational partitition function; Introduction to grand canonical ensemble
Lecture 20 - Grand canonical distribution; Introduction to microcanonical ensemble
Lecture 21 - Problems on classical thermodynamics - 1
Lecture 22 - Problems on classical thermodynamics - 2
Lecture 23 - Problems on statistical thermodynamics - 1
Lecture 24 - Problems on statistical thermodynamics - 2
Lecture 25 - Problems on statistical thermodynamics - 3
Lecture 26 - Fermi-Dirac and Bose-Einstein statistics
Lecture 27 - Ideal Fermi gas
Lecture 28 - Ideal Bose gas;Introduction to Bose-Einstein condensation
Lecture 29 - Bose-Einstein condensations

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Lecture 30 - Nuclear spin statistics; Ortho- and para-hydrogens
Lecture 31 - Specific Heats of solids
Lecture 32 - Problems on statistical thermodynamics - 4
Lecture 33 - Advance problems - 1
Lecture 34 - Advance Problems - 2
Lecture 35 - Advance Problems - 3
Lecture 36 - Advance Problems - 4
Lecture 37 - Advance Problems - 5

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Essentials of Biomolecules: Nucleic Acids and Peptides

Subject Co-ordinator - Prof. Lal Mohan Kundu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of Biomolecules
Lecture 2 - DNA double helix
Lecture 3 - DNA and Proteins
Lecture 4 - Amino acids and Proteins
Lecture 5 - Protein 3D structures, folding and denaturation
Lecture 6 - Chemical synthesis pyrimidine nucleobases
Lecture 7 - Chemical synthesis purine nucleobases, Prebiotic chemistry
Lecture 8 - Synthesis of nucleosides
Lecture 9 - Solid phase DNA synthesis
Lecture 10 - Chemistry and Biology of DNA Replication
Lecture 11 - Chemistry of Polymerase Chain Reaction
Lecture 12 - Major components and steps involved in Polymerase chain reaction
Lecture 13 - DNA sequencing
Lecture 14 - DNA sequencing
Lecture 15 - Numerical Problem-1
Lecture 16 - Sugar Chemistry
Lecture 17 - Chemistry behind DNA damage and mutation
Lecture 18 - Chemistry behind DNA damage and mutation
Lecture 19 - DNA repair
Lecture 20 - Transcription - The transfer of genetic information from DNA to mRNA
Lecture 21 - Translation - The transfer of genetic information from mRNA to protein I
Lecture 22 - Translation - The transfer of genetic information from mRNA to protein II
Lecture 23 - Role of Ribosome in protein synthesis and the concept of codon
Lecture 24 - Protein sequencing using Sanger's and Edman's degradation methods
Lecture 25 - Mass spectroscopy and other sequencing methods for large proteins
Lecture 26 - Solution phase peptide synthesis
Lecture 27 - Peptide coupling agents, Solid phase synthesis, peptide based therapeutics
Lecture 28 - Spectroscopic techniques
Lecture 29 - Spectrospic techniques - II and Purification technique-I of biomolecules

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Lecture 30 - Purification techniques - II and Characteriation techniques of biomolecules
Lecture 31 - Molecular probes
Lecture 32 - Molecular Probes
Lecture 33 - Carbohydrate chemistry - I
Lecture 34 - Carbohydrate chemistry - II
Lecture 35 - Carbohydrate chemistry - III

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Physical Chemistry for Undergraduates

Subject Co-ordinator - Prof. Sandip Paul

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Atomic Theory and Mole Concept - Part 1
Lecture 2 - Atomic Theory and Mole Concept - Part 2
Lecture 3 - The Gaseous State - Part 1
Lecture 4 - The Gaseous State - Part 2
Lecture 5 - The Gaseous State - Part 3
Lecture 6 - The Gaseous State - Part 4
Lecture 7 - Thermodynamics 1 - Part 1
Lecture 8 - Thermodynamics 1 - Part 2
Lecture 9 - Thermodynamics 1 - Part 3
Lecture 10 - Thermodynamics 2 - Part 1
Lecture 11 - Thermodynamics 2 - Part 2
Lecture 12 - Thermodynamics 2 - Part 3
Lecture 13 - Thermodynamics 2 - Part 4
Lecture 14 - Chemical Kinetics - Part 1
Lecture 15 - Chemical Kinetics - Part 2
Lecture 16 - Chemical Kinetics - Part 3
Lecture 17 - Chemical Kinetics - Part 4
Lecture 18 - Chemical Equilibrium - Part 1
Lecture 19 - Chemical Equilibrium - Part 2
Lecture 20 - Phase Equilibria - Part 1
Lecture 21 - Phase Equilibria - Part 2
Lecture 22 - Phase Equilibria - Part 3
Lecture 23 - Phase Equilibria - Part 4
Lecture 24 - Dilute Solutions: Colligative Properties - Part 1
Lecture 25 - Dilute Solutions: Colligative Properties - Part 2
Lecture 26 - Dilute Solutions: Colligative Properties - Part 3
Lecture 27 - Dilute Solutions: Colligative Properties - Part 4
Lecture 28 - Dilute Solutions: Colligative Properties - Part 5
Lecture 29 - Dilute Solutions: Colligative Properties - Part 6

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Lecture 30 - Dilute Solutions: Colligative Properties - Part 7
Lecture 31 - Ionic Equilibrium - Part 1
Lecture 32 - Ionic Equilibrium - Part 2
Lecture 33 - Ionic Equilibrium - Part 3
Lecture 34 - Ionic Equilibrium - Part 4
Lecture 35 - Ionic Equilibrium - Part 5
Lecture 36 - Ionic Equilibrium - Part 6
Lecture 37 - Ionic Equilibrium - Part 7
Lecture 38 - Electrochemical Cells - Part 1
Lecture 39 - Electrochemical Cells - Part 2
Lecture 40 - Electrochemical Cells - Part 3
Lecture 41 - Electrochemical Cells - Part 4
Lecture 42 - Electrochemical Cells - Part 5
Lecture 43 - Electrochemical Cells - Part 6
Lecture 44 - Electrochemical Cells - Part 7
Lecture 45 - The Colloidal State - Part 1
Lecture 46 - The Colloidal State - Part 2
Lecture 47 - The Colloidal State - Part 3
Lecture 48 - The Solid State - Part 1
Lecture 49 - The Solid State - Part 2
Lecture 50 - The Solid State - Part 3
Lecture 51 - The Solid State - Part 4
Lecture 52 - The Solid State - Part 5

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NPTEL Video Course - Chemistry and Biochemistry - Chemistry of Materials

Subject Co-ordinator - Prof. S. Sundar Manoharan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Materials Chemistry
Lecture 2 - Preparative routes
Lecture 3 - Preparative routes
Lecture 4 - Preparative routes
Lecture 5 - Preparative routes
Lecture 6 - Preparative routes
Lecture 7 - Preparative routes
Lecture 8 - Preparative routes
Lecture 9 - Preparative routes
Lecture 10 - Molecular Beam Epitaxy
Lecture 11 - Pulsed Laser Deposition
Lecture 12 - Pulsed Electron Deposition
Lecture 13 - Sputtering deposited thin films and applications
Lecture 14 - Crystal growth-Single crystals.
Lecture 15 - Applications of X-ray diffraction
Lecture 16 - Applications of X-ray Photoelectron spectroscopy
Lecture 17 - Applications of X-ray Absorption spectroscopy
Lecture 18 - Applications of Thermal analysis techniques
Lecture 19 - Applications of Scanning Tunneling microscopy
Lecture 20 - Applications of Electron Microscopy
Lecture 21 - Case Study of ZnO
Lecture 22 - Magnetic materials - I
Lecture 23 - Magnetic Materials - II
Lecture 24 - Magnetic Materials - III & Related Phenomena
Lecture 25 - Shape Memory Materials
Lecture 26 - Spintronic Materials - I Colossal Magentoresistive Oxides
Lecture 27 - Spintronic Materials - II Giant Magnetoresistive Materials
Lecture 28 - Spintronic Materials - III Tunelling Magnetoresistive Materials
Lecture 29 - Spintronic Materials - IV Dilute Magnetic Semicondcutors

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Lecture 30 - High Tc Superconductors
Lecture 31 - The New Carbon family - I - Fullerenes and Nanotubes
Lecture 32 - The New Carbon family - II - Graphene
Lecture 33 - Optoelectronic Materials - I - OLEDS
Lecture 34 - Optoelectronic Materials - II - OLEDS
Lecture 35 - Inorganic Phosphors - I
Lecture 36 - Inorganic Phosphors - II
Lecture 37 - Phosphor Materials
Lecture 38 - Solar Cells
Lecture 39 - Interview with C N R Rao and Interview with E C Subba Rao
Lecture 40 - Perceptions & Projections

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NPTEL Video Course - Chemistry and Biochemistry - Mathematics for Chemistry

Subject Co-ordinator - Dr. Madhav Ranganathan, Dr. P.P. Thankachan

Co-ordinating Institute - IIT - Kanpur | IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mathematics for Chemistry
Lecture 2 - Mathematics for Chemistry
Lecture 3 - Mathematics for Chemistry
Lecture 4 - Mathematics for Chemistry
Lecture 5 - Mathematics for Chemistry
Lecture 6 - Mathematics for Chemistry
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Lecture 29 - Mathematics for Chemistry

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Lecture 37 - Mathematics for Chemistry
Lecture 38 - Mathematics for Chemistry
Lecture 39 - Mathematics for Chemistry
Lecture 40 - Mathematics for Chemistry

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NPTEL Video Course - Chemistry and Biochemistry - Advance Analytical Course

Subject Co-ordinator - Dr. Padma S Vankar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Advance Analytical Course
Lecture 2 - Advance Analytical Course
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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Applications of Symmetry and Group Theory

Subject Co-ordinator - Prof. Manabendra Chandra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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NPTEL Video Course - Chemistry and Biochemistry - NOC:Mathematics for Chemistry

Subject Co-ordinator - Dr. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Errors, precision and accuracy
Lecture 2 - Probability and distributions
Lecture 3 - Gaussian distribution and integrals
Lecture 4 - Gaussian distribution, integrals, averages
Lecture 5 - Practice problems 1
Lecture 6 - Vectors and Vector Spaces
Lecture 7 - Linear Independence
Lecture 8 - Scalar and vector fields
Lecture 9 - Gradient, divergence and curl
Lecture 10 - Practice problems 2
Lecture 11 - Line integrals, Potential Theory
Lecture 12 - Surface and Volume Integrals
Lecture 13 - Matrices
Lecture 14 - Linear Systems, Cramer's Rule
Lecture 15 - Practice Problems 3
Lecture 16 - Rank and Inverse of a Matrix
Lecture 17 - Eigenvalues and Eigenvectors
Lecture 18 - Special matrices
Lecture 19 - Spectral decomposition and Normal modes
Lecture 20 - Practice Problems 4
Lecture 21 - Differential equations, Order
Lecture 22 - Exact and Inexact differentials
Lecture 23 - Integrating Factors
Lecture 24 - System of 1st order ODEs, matrix methods
Lecture 25 - Practice Problems 5
Lecture 26 - Types of 2nd order ODEs, nature of solutions
Lecture 27 - Homogeneous 2nd order ODEs
Lecture 28 - Homogeneous and nonhomogeneous equations
Lecture 29 - Nonhomogeneous equations Â Variation of parameters

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Lecture 30 - Practice Problems 6
Lecture 31 - Power series method for solving Legendre DE
Lecture 32 - Properties of Legendre Polynomials
Lecture 33 - Associated Legendre Polynomials, Spherical Harmonics
Lecture 34 - Hermite Polynomials, Solution of Quantum Harmonic Oscillator
Lecture 35 - Practice Problems 7
Lecture 36 - Conditions for power series solution
Lecture 37 - Frobenius Method, Bessel Functions
Lecture 38 - Properties of Bessel Functions, circular boundary problems
Lecture 39 - Leguerre Polynomials, solution to radial part of H-atom
Lecture 40 - Practice Problems 8

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantum Computing

Subject Co-ordinator - Prof. Debabrata Goswami

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Motivation and Overview
Lecture 2 - Introduction - Technical Details
Lecture 3 - Introduction - Basic tools
Lecture 4 - Computational Tools
Lecture 5 - Quantum Measurement and Teleportation
Lecture 6 - Quantum Teleportation and Cryptography
Lecture 7 - DJ Algorithm and Implementation Aspects
Lecture 8 - Grover's Algorithm
Lecture 9 - Basics of Shor's Algorithm
Lecture 10 - Shor's Algorithm and Quantum Fourier Transform (QFT)
Lecture 11 - Basics of Quantum Mechanics
Lecture 12 - Modern look at Quantum Mechanics
Lecture 13 - Basics of NMR
Lecture 14 - Concepts in NMR Quantum Computing
Lecture 15 - Laser Basics
Lecture 16 - Continuous Wave Lasers
Lecture 17 - Pulsed Lasers
Lecture 18
Lecture 19
Lecture 20
Lecture 21 - Optical Implementation
Lecture 22 - Solutions to problem set - 1
Lecture 23 - Basics of Ion Traps
Lecture 24 - Applications of Ion Traps in QIQC
Lecture 25 - Reviewing Concepts and clarifying problems - 1
Lecture 26 - Reviewing Concepts and clarifying problems - 2
Lecture 27 - Qubits used in Commercial Quantum Computing
Lecture 28 - Spintronics Quantum Computing
Lecture 29 - Back to Basics - I

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Lecture 30 - Back to Basics - II
Lecture 31 - Understanding Implementation Issues from the Basics - I
Lecture 32 - Understanding Implementation Issues from the Basics - II
Lecture 33 - Implementation with Solid-State Super conducting Qubits
Lecture 34 - Concept of Density Matrix for Quantum Computing
Lecture 35 - Understanding the ensemble of Qubits from Density Matrix
Lecture 36 - Understanding Quantum Measurement, Entanglement etc. in Quantum Computing using Density Matrix
Lecture 37 - Principles
Lecture 38 - Measurements
Lecture 39 - Working of Quantum Computers
Lecture 40 - Academic Development in Quantum Computing - I
Lecture 41 - Academic Development in Quantum Computing - II
Lecture 42 - Commercial Development in Quantum Computing Implementation
Lecture 43 - Use of Atomic Quibts in Quantum Computing
Lecture 44 - Futuristic Aspects in Implementing Quantum Computing - I
Lecture 45 - Futuristic Aspects in Implementing Quantum Computing - II

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Basics of Fluroscence Spectroscopy

Subject Co-ordinator - Prof. Pratik Sen

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Laser: Fundamentals and Applications

Subject Co-ordinator - Prof. Manabendra Chandra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Unique properties of LASERs and their applications
Lecture 2 - LASER and its history
Lecture 3 - Interaction of Light with matter
Lecture 4 - Einsteins Concept of stimulated emission
Lecture 5 - Calculation of Einsteins coefficient
Lecture 6 - Population inversion, 2-level system and 3-level system
Lecture 7 - 3-level System and 4-level system
Lecture 8 - Components of LASERs
Lecture 9 - Modes of LASER cavity and standing waves
Lecture 10 - Transverse Modes of LASER cavity
Lecture 11 - Threshold Condition
Lecture 12 - Properties of Laser
Lecture 13 - Properties of Laser
Lecture 14 - Continuous and Pulsed Lasers
Lecture 15 - Some Numerical problem
Lecture 16 - Cavity Dumping
Lecture 17 - Q-switching
Lecture 18 - Q-switching and Pockels effect
Lecture 19 - Passive Q-switching, Mode-Locking
Lecture 20 - Mode Locking
Lecture 21 - Mode - locking
Lecture 22 - Mode - locking (Continued...)
Lecture 23 - Passive Mode - locking and Types of LASERs
Lecture 24 - Solid state LASERs
Lecture 25 - Semiconductor LASERs and Gas LASERs
Lecture 26 - Gas LASERs
Lecture 27 - Chemical and Dye LASERs
Lecture 28 - Introduction to Non Linear Optics
Lecture 29 - Non Linear Optics

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Lecture 30 - 2nd order Nonlinear optics
Lecture 31 - Non-linear optical processes
Lecture 32 - Aspects of SHG and Application of non-linear optics
Lecture 33 - Application of LASER
Lecture 34 - Application of Laser
Lecture 35 - Application of Laser
Lecture 36 - Laser Induced Chemistry
Lecture 37 - Laser Induced Chemistry and Ultrafast chemical Dynamics
Lecture 38 - Lasers in Medical Sciences
Lecture 39 - Lasers in Material sciences and engineering and Optical Communications
Lecture 40 - Laser safety and summary

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Advanced Mathematical Methods for Chemistry

Subject Co-ordinator - Prof. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vectors, Vector Operations and Linear Independence
Lecture 2 - Vector Operations, Generalization of Vectors
Lecture 3 - Vector Differentiation, Vector Transformations
Lecture 4 - Vector Integration, Line, Surface and Volume Integrals
Lecture 5 - Practice Problems
Lecture 6 - Matrix as a vector transformation, linear system
Lecture 7 - Special Matrices
Lecture 8 - Rotational Matrices, Eigenvalues and Eigenvectors
Lecture 9 - Determinants, Matrix Inverse
Lecture 10 - Practice Problems
Lecture 11 - Step Function, Delta Function
Lecture 12 - Gamma Function, Error Function
Lecture 13 - Spherical Polar Coordinates
Lecture 14 - Cylindrical Polar Coordinates, Integrals
Lecture 15 - Recap of Module 3, Practice Problems
Lecture 16 - ODEs and PDEs, First order ODEs, system of 1st order ODEs
Lecture 17 - First order ODEs, exact integrals, integrating factors
Lecture 18 - System of first order ODEs, Linear first order ODEs
Lecture 19 - General solution of a system of linear first order ODEs with constant coefficients
Lecture 20 - Recap of Module 4, Practice problems
Lecture 21 - Homogeneous 2nd Order ODE, Basis Functions
Lecture 22 - Nonhomogeneous 2nd Order ODE
Lecture 23 - Power Series Method of Solving ODEs
Lecture 24 - Frobenius Method / Power Series Method
Lecture 25 - Time-independent Schrodinger Equation for H-atom
Lecture 26 - Maxima and Minima, Taylor Series
Lecture 27 - Taylor Series for functions of several variables
Lecture 28 - Critical Points of Functions
Lecture 29 - Lagranges Method of Undetermined Multipliers

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Lecture 30 - Recap of Module 6, Practice Problems
Lecture 31 - Nonlinear Differential Equations
Lecture 32 - Phase Plane of A Pendulum
Lecture 33 - Stability of Critical Points
Lecture 34 - Population Dynamics Models
Lecture 35 - Recap of Module 7, Practice Problems
Lecture 36 - Fourier Series, Fourier Expansion of Periodic Functions
Lecture 37 - (Part A)
Lecture 38 - (Part B)
Lecture 39 - Orthogonal Eigenfunctions, Sturm-Liouville Theory
Lecture 40 - Recap of Module 8, Practice Problems
Lecture 41 - Fourier Transforms
Lecture 42 - Properties of Fourier Transforms
Lecture 43 - Fourier Transforms and Partial Differential Equations
Lecture 44 - Laplace Transforms
Lecture 45 - Recap of Module 9, Practice Problems
Lecture 46 - Partial Differential Equations, Boundary Conditions
Lecture 47 - Separation of Variables
Lecture 48 - (Part A)
Lecture 49 - (Part B)
Lecture 50 - Recap of Module 10, Practice Problems
Lecture 51 - Discrete and Continuous Random Variables
Lecture 52 - Probability Distribution Functions
Lecture 53 - Poisson Distribution, Gaussain Distribution
Lecture 54 - Error Estimates, Least Square Fit, Correlation Functions
Lecture 55 - Recap of Module 11, Practice Problems

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Solid State Chemistry

Subject Co-ordinator - Prof. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Nature of solid state and the solid state materials
Lecture 2 - Thermodynamics of solids
Lecture 3 - Crystallisation Kinetics
Lecture 4 - Synthetic Strategy
Lecture 5 - Review of week 1 and Practice problems
Lecture 6 - Unit Cells
Lecture 7 - Conventional Unit Cell and Primitive Unit Cell
Lecture 8 - Bravais Lattices
Lecture 9 - Bravais Lattices, Basis and crystal
Lecture 10 - Summery of week 2 and Practices Problems
Lecture 11 - Symmetry In Crystals, Point Symmetries
Lecture 12 - Reflections, Inversions and Rotoinversions
Lecture 13 - Schonflies and Hermann-Mauguin Conventions
Lecture 14 - Fractional Coordinates, Planer Visualization
Lecture 15 - Review of week 3 And Practice Problems
Lecture 16 - Combining symmetry operations, translational symmetries
Lecture 17 - Screw Axis
Lecture 18 - Glide Planes
Lecture 19 - Symmetry and Symmetry Notations
Lecture 20 - Summary of week 4 and Practice Problems
Lecture 21 - Crystal Systems
Lecture 22 - Crystal Systems and Unit Cells
Lecture 23 - Point Groups
Lecture 24 - Space Groups
Lecture 25 - Week 5 Summary and Practice Problems
Lecture 26 - 32 Crystal Classes Based on Symmetry
Lecture 27 - Notation for 32 Crystal Classes
Lecture 28 - Short Form of Hermann-Mauguin Notations
Lecture 29 - Hermann - Mauguin notation for Space Groups

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Lecture 30 - Summary and Practice Problems
Lecture 31 - Coordination number, Voids
Lecture 32 - Lattice Imperfections and Crystals
Lecture 33 - Line Planner and Bulk defects and crystals
Lecture 34 - Thermodynamics of defects in crystals
Lecture 35 - Review of Week 7,Practice Problems
Lecture 36 - Miller Planes, Miller Indices
Lecture 37 - Miller Indices for Hexagonal Systems, Distance between Planes
Lecture 38 - X-ray diffraction, Bragg's Law, Reciprocal Lattice
Lecture 39 - Reciprocal Lattice, XRD instrumentation
Lecture 40 - Review of week 8, Practice Problems
Lecture 41 - XRD - Analysis of Pattern
Lecture 42 - Geometric Structure Factor - Missing Peaks
Lecture 43 - X-Ray Crystallography
Lecture 44 - Electron Microscopy
Lecture 45 - Review of Week 9. Practice Problems
Lecture 46 - Closed - Packed Structures and Voids
Lecture 47 - Crystal Structures of Binary Compounds
Lecture 48 - Perovskites and Spinals
Lecture 49 - Space filling Polyhedra, Alloys
Lecture 50 - Summary of Week 10 and Practice Problems
Lecture 51 - Free electron Models
Lecture 52 - Bloch Theorem
Lecture 53 - Band Theory of Solids
Lecture 54 - Bands in Higher Dimensions
Lecture 55 - Summary of Week 11 and Practice Problems
Lecture 56 - More about Band Theory, Crystal Momentum
Lecture 57 - Density of States
Lecture 58 - Metals, Insulators and Semiconductors
Lecture 59 - Band Gap and Optical Properties
Lecture 60 - Summary of Week 12 and Practice Problems

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Bioinorganic Chemistry

Subject Co-ordinator - Prof. S. P. Rath

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction and Prospects
Lecture 2 - Metals in Biology
Lecture 3 - Metals in Biology
Lecture 4 - Metals in Biology
Lecture 5 - Metals in Biology
Lecture 6 - Design Principles Used in Chemical Biology
Lecture 7 - Design Principles Used in Chemical Biology
Lecture 8 - Design Principles Used in Chemical Biology
Lecture 9 - Design Principles Used in Chemical Biology
Lecture 10 - Life with Oxygen
Lecture 11 - Life with Oxygen
Lecture 12 - Life with Oxygen
Lecture 13 - Life with Oxygen
Lecture 14 - Life with Oxygen
Lecture 15 - Life with Oxygen
Lecture 16 - Life with Oxygen
Lecture 17 - Life with Oxygen
Lecture 18 - Life with Oxygen
Lecture 19 - Metals in Medicine
Lecture 20 - Metals in Medicine

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry and Physics of Surfaces and Interfaces

Subject Co-ordinator - Prof. Thiruvancheril G. Gopakumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro-Chemistry and Physics of Surfaces and Interfaces
Lecture 2 - Historic perspective to surface science
Lecture 3 - Creating surfaces from bulk lattices
Lecture 4 - Reconstruction of surfaces
Lecture 5 - Hexagonal lattice and miller bravais indices
Lecture 6 - Introduction to ultra-high Vaccum and Preparation of Clean Surfaces
Lecture 7 - Adsorption and the Energetic of Adsorption
Lecture 8 - Nomenclature and types of Adlayers
Lecture 9 - Thermal Desorption Spectroscopy
Lecture 10 - Different types of Preparation methods for Thin Films
Lecture 11 - Examples of PVD and CVD
Lecture 12 - Moire Pattern at Solid-Solid Interface
Lecture 13 - Growth Modes of Adlayers
Lecture 14 - Energies that Control the Growth of Adlayers
Lecture 15 - Kinetic and Thermodynamic Control in Adlayer Growth
Lecture 16 - Molecular Adsorbates: Preparation
Lecture 17 - Molecular Adsorbates: Factors Controlling Molecular Adlayer Formation - I
Lecture 18 - Molecular Adsorbates: Factors Controlling Molecular Adlayer Formation - II
Lecture 19 - Molecular Adsorbates: Factors Controlling Molecular Adlayer Formation - III
Lecture 20 - Scanning Tunneling Microscopy
Lecture 21 - Tip-vaccum Tunneling Junction
Lecture 22 - Scanning Tunneling Spectroscopy - I
Lecture 23 - Scanning Tunneling Spectroscopy - II
Lecture 24 - Scanning Tunneling Spectroscopy: Applications - I
Lecture 25 - Scanning Tunneling Spectroscopy: Applications - II
Lecture 26 - Imaging Molecules and Atom Manipulation on Surfaces
Lecture 27 - Single Molecule Manipulation on Surfaces
Lecture 28 - Inelastic Tunneling Spectroscopy
Lecture 29 - Ultra-violet Photo-electron Spectroscopy (UPS)

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Lecture 30 - Ultra-violet Photo-electron Spectroscopy (UPS): Applications
Lecture 31 - X-ray Photo-electron Spectroscopy (XPS)
Lecture 32 - X-Ray Photo-electron Spectroscopy (XPS): Applications - 1
Lecture 33 - X-Ray Photo-electron Spectroscopy (XPS): Applications - 2
Lecture 34 - 2D Molecular Materials on Surface - 1
Lecture 35 - 2D Molecular Materials on Surface - 2
Lecture 36 - Atomic Force Microscopy (AFM) - I
Lecture 37 - Atomic Force Microscopy (AFM) - II
Lecture 38 - Atomic Force Microscopy (AFM) - III
Lecture 39 - Dynamics of Atoms on Surfaces
Lecture 40 - Summary

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Supramolecular Chemistry-I

Subject Co-ordinator - Prof. Parimal Kanti Bharadwaj

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Chemistry and Biochemistry - Bio-inorganic chemistry

Subject Co-ordinator - Prof. D. Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Iron Storage and Transport - I
Lecture 3 - Iron Storage and Transport - II
Lecture 4 - Iron Storage and Transport - III
Lecture 5 - Electron Transport Proteins - I
Lecture 6 - Electron transport Proteins - II
Lecture 7 - Electron Transport Proteins - III
Lecture 8 - Electron Transport Proteins - IV
Lecture 9 - Electron Transport Proteins - V
Lecture 10 - Electron Transport Proteins - VI
Lecture 11 - Electron Transport Proteins - VII
Lecture 12 - Electron Transport Proteins - VIII
Lecture 13 - Electron Transport Proteins - IX
Lecture 14 - Electron Transfer in Photosynthesis - I
Lecture 15 - Electron Transfer in Photosynthesis - II
Lecture 16 - Manganese Enzymes
Lecture 17 - Nickel Enzymes - I
Lecture 18 - Nickel Enzymes - II
Lecture 19 - Nickel Enzymes - III
Lecture 20 - Nickel Enzymes - IV
Lecture 21 - Nickel Enzymes - V
Lecture 22 - Molybdenum Enzymes - I
Lecture 23 - Molybdenum Enzymes - II
Lecture 24 - Molybdenum Enzymes - III
Lecture 25 - Molybdenum Enzymes - IV
Lecture 26 - Molybdenum Enzymes - V
Lecture 27 - Molybdenum Enzymes - VI
Lecture 28 - Molybdenum and Tungsten in Biology
Lecture 29 - Tungsten Enzymes - I

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Lecture 30 - Tungsten Enzymes - II
Lecture 31 - Tungsten Enzymes - III
Lecture 32 - Tungsten Enzymes - IV
Lecture 33 - Vanadium Enzymes - I
Lecture 34 - Vanadium Enzymes - II
Lecture 35 - Vanadium Enzymes - III
Lecture 36 - Vanadium Enzymes - IV
Lecture 37 - Non-metals in Biology - I
Lecture 38 - Non-metals in Biology - II
Lecture 39 - Non-metals in Biology - III
Lecture 40 - Non-metals in Biology - IV

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NPTEL Video Course - Chemistry and Biochemistry - Co-ordination chemistry (chemistry of transition elements)

Subject Co-ordinator - Prof. D. Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Definition
Lecture 3 - Classification of Ligands - I
Lecture 4 - Classification of Ligands - II
Lecture 5 - Ligands - III and Nomenclature - I
Lecture 6 - Nomenclature - II
Lecture 7 - Coordination Number - I
Lecture 8 - Coordination Number - II
Lecture 9 - Coordination Number - III
Lecture 10 - Coordination Number - IV
Lecture 11 - Isomerism - I
Lecture 12 - Isomerism - II
Lecture 13 - Coordination Equilibria - I
Lecture 14 - Coordination Equilibria - II
Lecture 15 - Bonding in Complexes - I
Lecture 16 - Bonding in Complexes - II
Lecture 17 - Bonding in Complexes - III
Lecture 18 - Bonding in Complexes - IV
Lecture 19 - Jahn-Teller Effect
Lecture 20 - Spin Crossover and Colour
Lecture 21 - Optical Spectra
Lecture 22 - d-d Transitions
Lecture 23 - Charge Transfer
Lecture 24 - Orgel Diagram
Lecture 25 - Tanabe Sugano Diagram
Lecture 26 - MLCT Transitions
Lecture 27 - Application of CFT
Lecture 28 - Spinels
Lecture 29 - Magnetochemistry

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Lecture 30 - Magnetic Properties
Lecture 31 - Magnetic Measurements
Lecture 32 - Ligand Field Theory
Lecture 33 - Sigma Orbitals
Lecture 34 - Pi Orbitals
Lecture 35 - Reaction Mechanism - I
Lecture 36 - Reaction Mechanism - II
Lecture 37 - Reaction Mechanism - III
Lecture 38 - Reaction Mechanism - IV
Lecture 39 - Reaction Mechanism - V
Lecture 40 - Biological Inorganic Chemistry

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NPTEL Video Course - Chemistry and Biochemistry - Heterocyclic Chemistry

Subject Co-ordinator - Prof. D.R. Mal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition and Scope
Lecture 2 - Single - Step Methods for IVPs
Lecture 3 - Systematic Nomenclature
Lecture 4 - Nomenclature (Continued...) and Important Names
Lecture 5 - Overview of Structure Determination in Heterocyclic Chemistry
Lecture 6 - 15N NMR in Heterocyclic Chemistry
Lecture 7 - Effects of Ring Nitrogen - A
Lecture 8 - Effects of Ring Nitrogen - B
Lecture 9 - Effects of Ring Nitrogen - C
Lecture 10 - Oxidation in Heterocyclic Chemistry
Lecture 11 - Oxidation in Heterocyclic Chemistry (Continued...)
Lecture 12 - Reduction in Heterocyclic Chemistry
Lecture 13 - Radicals in Heterocylic Chemistry - I
Lecture 14 - Radicals in Heterocylic Chemistry - II
Lecture 15 - Lithiation for 5-membered heterocycles
Lecture 16 - Lithiation for 5-membered heterocycles (Continued...)
Lecture 17 - Lithiation of 6-membered heterocycle and non-aromatic heterocycles
Lecture 18 - Magnetiation and Zincation in Heterocyclic Chemistry
Lecture 19 - Transition metal catalyzed cross coupling
Lecture 20 - Transition metal catalyzed cross coupling (Continued...)
Lecture 21 - Dehydrogenative (Oxidative) cross coupling
Lecture 22 - Tert-amino effect in heterocycle synthesis
Lecture 23 - [4 plus 2] cycloaddition in heterocyclic chemistry
Lecture 24 - [4 plus 2] cycloaddition in heterocyclic chemistry (Continued...)
Lecture 25 - [3 plus 2] Cycloaddition in heterocyclic chemistry
Lecture 26 - Cycloaddition
Lecture 27 - [4 plus 3] Cycloaddition
Lecture 28 - [5 plus 2] Cycloaddition
Lecture 29 - [2 plus 2 plus 2] Cycloaddition

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Lecture 30 - Pyrrole Synthesis - I
Lecture 31 - Pyrrole Synthesis - II
Lecture 32 - Indole Synthesis - I
Lecture 33 - Indole Synthesis - II
Lecture 34 - Furan Synthesis
Lecture 35 - Thiophene Synthesis
Lecture 36 - Oxazole, Imidazole and Thiazole Synthesis
Lecture 37 - Pyridine Synthesis
Lecture 38 - Synthesis of Quinolines and Isoquinolines
Lecture 39 - Bycyclic Polyheteroatomic Heterocycles
Lecture 40 - Heterocyclic Rearrangements

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NPTEL Video Course - Chemistry and Biochemistry - Organic photochemistry and pericyclic reactions

Subject Co-ordinator - Dr. N.D. Pradeep Singh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organic Photochemistry
Lecture 2 - Introduction to Organic Photochemistry (Continued...)
Lecture 3 - Reactivity of n-pi*
Lecture 4 - Î± - cleavage - I
Lecture 5 - Î± - cleavage - II
Lecture 6 - Î± - cleavage - III
Lecture 7 - Î² - cleavage
Lecture 8 - Intramolecular Hydrogen Abstraction - I
Lecture 9 - Intramolecular Hydrogen Abstraction - II
Lecture 10 - Intramolecular Hydrogen Abstraction - III
Lecture 11 - Intramolecular Hydrogen Abstraction
Lecture 12 - Addition to Î - System
Lecture 13 - Intramolecular Paterno-Buchi Reaction
Lecture 14 - Energy of Electron Transfer Reaction
Lecture 15 - Reactivity of Î - Î *
Lecture 16 - Addition Reaction of Î - Î *
Lecture 17 - Addition Reaction of Î - Î * (Continued...)
Lecture 18 - Di-Pi Methane Rearrangement
Lecture 19 - Photochemistry of Cyclohexanone
Lecture 20 - Singlet Oxygen Chemistry
Lecture 21 - Carbenes and Nitrenes
Lecture 22 - Remote Functionalisation
Lecture 23 - Introduction to Pericyclic Reaction
Lecture 24 - Sigmatropic Reactions - I
Lecture 25 - Sigmatropic Reactions - II
Lecture 26 - Sigmatropic Reactions - III
Lecture 27 - Cycloaddition Reactions - I
Lecture 28 - Cycloaddition Reactions - II
Lecture 29 - Cycloaddition - Diels-Alder Reactions

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Lecture 30 - Cycloaddition - Diels-Alder Reactions (Continued...)
Lecture 31 - Cycloaddition - Ene Reactions
Lecture 32 - 1,3 Dipolar Cycloaddition - I
Lecture 33 - 1,3 Dipolar Cycloaddition - II
Lecture 34 - Electrocyclic Reaction - I
Lecture 35 - Electrocyclic Reaction - II
Lecture 36 - Practice Problems in Pericyclic Reaction - I
Lecture 37 - Practice Problems in Pericyclic Reaction - II
Lecture 38 - Practice Problems in Pericyclic Reaction - III
Lecture 39 - Chelotropic Reaction
Lecture 40 - Application of Photochemistry

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NPTEL Video Course - Chemistry and Biochemistry - Polymer Chemistry

Subject Co-ordinator - Dr. D. Dhara

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Polymers
Lecture 2 - Introduction to Polymers (Continued...)
Lecture 3 - Introduction to Polymers (Continued...)
Lecture 4 - Step - growth Polymerization
Lecture 5 - Step - growth Polymerization (Continued...)
Lecture 6 - Step - growth Polymerization (Continued...)
Lecture 7 - Step - growth Polymerization (Continued...)
Lecture 8 - Step - growth Polymerization (Continued...)
Lecture 9 - Radical Chain Polymerization
Lecture 10 - Radical Chain Polymerization (Continued...)
Lecture 11 - Radical Chain Polymerization (Continued...)
Lecture 12 - Radical Chain Polymerization (Continued...)
Lecture 13 - Radical Chain Polymerization (Continued...)
Lecture 14 - Radical Chain Polymerization (Continued...)
Lecture 15 - Radical Chain Polymerization (Continued...)
Lecture 16 - Radical Chain Polymerization (Continued...)
Lecture 17 - Ionic Chain Polymerization
Lecture 18 - Ionic Chain Polymerization (Continued...)
Lecture 19 - Ionic Chain Polymerization (Continued...) and Chain Copolymerization
Lecture 20 - Chain Copolymerization (Continued...)
Lecture 21 - Chain Copolymerization (Continued...)
Lecture 22 - Chain Copolymerization (Continued...) and Ring Opening Polymerization
Lecture 23 - Polymer Stereochemistry and Coordination Polymerization
Lecture 24 - Polymer Stereochemistry and Coordination Polymerization (Continued...)
Lecture 25 - Polymer Solutions
Lecture 26 - Polymer Solutions (Continued...)
Lecture 27 - Polymer Solutions (Continued...)
Lecture 28 - Polymer Solutions (Continued...) and Chain Dimensions
Lecture 29 - Chain Dimensions (Continued...) and Frictional Properties of Solution

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Lecture 30 - Frictional Properties of Solutions (Continued...) and Determination of Molecular Weight
Lecture 31 - Determination of Molecular Weight of Polymers (Continued...)
Lecture 32 - Determination of Molecular Weight of Polymers (Continued...)
Lecture 33 - Determination of Molecular Weight of Polymers (Continued...)
Lecture 34 - Structural Analysis of Polymers by Spectroscopic Methods
Lecture 35 - Amorphous and Crystalline State
Lecture 36 - Amorphous and Crystalline State
Lecture 37 - Polymer Properties and Evaluation
Lecture 38 - Polymer Properties and Evaluation
Lecture 39 - Other Properties (Continued...) and Polymer Additives
Lecture 40 - Polymer Additives (Continued...)
Lecture 41 - Polymer Additives (Continued...), Blends, Concluding Remarks

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NPTEL Video Course - Chemistry and Biochemistry - Rate processes

Subject Co-ordinator - Dr. M. Halder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rate Processes
Lecture 2 - Reaction Rates and Rate Laws
Lecture 3 - Effect of Temperature on Reaction Rate
Lecture 4 - Effect of Temperature on Reaction Rate (Continued...)
Lecture 5 - Complex Reaction
Lecture 6 - Complex Reaction (Continued...)
Lecture 7 - Complex Reaction (Continued...)
Lecture 8 - Complex Reaction (Continued...)
Lecture 9 - Theories of Reaction Rate
Lecture 10 - Theories of Reaction Rate (Continued...)
Lecture 11 - Theories of Reaction Rate (Continued...)
Lecture 12 - Theories of Reaction Rate (Continued...)
Lecture 13 - Theories of Reaction Rate (Continued...)
Lecture 14 - Kinetics of Some Specific Reactions
Lecture 15 - Kinetics of Some Specific Reactions (Continued...)
Lecture 16 - Enzyme Inhibition
Lecture 17 - Oscillatory Reactions
Lecture 18 - Acid Base Catalysis
Lecture 19 - Acid Base Catalysis (Continued...)
Lecture 20 - Kinetic Isotope Effects
Lecture 21 - Fast Reactions
Lecture 22 - Fast Reactions (Continued...)
Lecture 23 - Magneto Kinetics
Lecture 24 - Reactions in Solutions
Lecture 25 - Reactions in Solutions (Continued...)
Lecture 26 - Kinetics at Electrodes
Lecture 27 - Kinetics at Electrodes (Continued...)
Lecture 28 - Ultrafast Process
Lecture 29 - Ultrafast Process (Continued...)

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Lecture 30 - Ultrafast Process (Continued...)
Lecture 31 - Reaction Dynamics
Lecture 32 - Reaction Dynamics (Continued...)
Lecture 33 - Reaction Dynamics (Continued...)
Lecture 34 - Reaction Dynamics
Lecture 35 - Reaction Dynamics
Lecture 36 - Reaction Dynamics
Lecture 37 - Reaction Dynamics
Lecture 38 - Reaction Dynamics
Lecture 39 - Reaction Dynamics
Lecture 40 - Concluding Remarks

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Biochemistry

Subject Co-ordinator - Prof. S. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Amino Acid - I
Lecture 2 - Amino Acid - II
Lecture 3 - Protein Structure - I
Lecture 4 - Protein Structure - II
Lecture 5 - Protein Structure - III
Lecture 6 - Protein Structure - IV
Lecture 7 - Enzymes - I
Lecture 8 - Enzymes - II
Lecture 9 - Enzymes - III
Lecture 10 - Enzyme Mechanisms - I
Lecture 11 - Enzyme Mechanisms - II
Lecture 12 - Myoglobin and Hemoglobin
Lecture 13 - Lipids and Membranes - I
Lecture 14 - Lipids and Membranes - II
Lecture 15 - Membrane Transport
Lecture 16 - Nucleic Acids - I
Lecture 17 - Nucleic Acids - II
Lecture 18 - Nucleic Acids - III
Lecture 19 - Vitamins and Coenzymes - I
Lecture 20 - Vitamins and Coenzymes - II
Lecture 21 - Carbohydrates - I
Lecture 22 - Carbohydrates - II
Lecture 23 - Bioenergetics - I
Lecture 24 - Bioenergetics - II
Lecture 25 - Metabolism - I
Lecture 26 - Metabolism - II
Lecture 27 - Metabolism - III

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Analytical Chemistry

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Chemicals and Materials Analysis
Lecture 2 - Methods
Lecture 3 - Methods (Continued...)
Lecture 4 - Methods (Continued...)
Lecture 5 - Methods (Continued...)
Lecture 6 - Role of Analytical Chemistry
Lecture 7 - Techniques, Wet Ashing
Lecture 8 - Apparatus and Weighing
Lecture 9 - Filtration, Ignition
Lecture 10 - Crucibles, Filter Papers and their Uses
Lecture 11 - Chemical Equilibria
Lecture 12 - Chemical Equilibria (Continued...)
Lecture 13 - Chemical Equilibria (Continued...)
Lecture 14 - Chemical Equilibria (Continued...)
Lecture 15 - Chemical Equilibria (Continued...)
Lecture 16 - Spectrochemic Methods - I
Lecture 17 - Spectrochemic Methods - I (Continued...)
Lecture 18 - Spectrochemic Methods - I (Continued...)
Lecture 19 - Spectrochemic Methods - I (Continued...)
Lecture 20 - Spectrochemic Methods - I (Continued...)
Lecture 21 - Spectrochemical Methods - II
Lecture 22 - Spectrochemical Methods - II (Continued...)
Lecture 23 - Spectrochemical Methods - II (Continued...)
Lecture 24 - Spectrochemical Methods - II (Continued...)
Lecture 25 - Spectrochemical Methods - II (Continued...)
Lecture 26 - Spectrochemical Methods - III
Lecture 27 - Spectrochemical Methods - III (Continued...)
Lecture 28 - Spectrochemical Methods - III (Continued...)
Lecture 29 - Spectrochemical Methods - III (Continued...)

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Lecture 30 - Spectrochemical Methods - III (Continued...)
Lecture 31 - Thermal Methods of Analysis - I
Lecture 32 - Thermal Methods of Analysis - I (Continued...)
Lecture 33 - Thermal Methods of Analysis - I (Continued...)
Lecture 34 - Thermal Methods of Analysis - I (Continued...)
Lecture 35 - Thermal Methods of Analysis - I (Continued...)
Lecture 36 - Thermal Methods of Analysis - II
Lecture 37 - Thermal Methods of Analysis - II (Continued...)
Lecture 38 - Thermal Methods of Analysis - II (Continued...)
Lecture 39 - Thermal Methods of Analysis - II (Continued...)
Lecture 40 - Thermal Methods of Analysis - II (Continued...)
Lecture 41 - Electrochemical Methods - I
Lecture 42 - Electrochemical Methods - I (Continued...)
Lecture 43 - Electrochemical Methods - I (Continued...)
Lecture 44 - Electrochemical Methods - I (Continued...)
Lecture 45 - Electrochemical Methods - I (Continued...)
Lecture 46 - Electrochemical Methods - II
Lecture 47 - Electrochemical Methods - II (Continued...)
Lecture 48 - Electrochemical Methods - II (Continued...)
Lecture 49 - Electrochemical Methods - II (Continued...)
Lecture 50 - Electrochemical Methods - II (Continued...)
Lecture 51 - Electrochemical Methods - III
Lecture 52 - Electrochemical Methods - III (Continued...)
Lecture 53 - Electrochemical Methods - III (Continued...)
Lecture 54 - Electrochemical Methods - III (Continued...)
Lecture 55 - Electrochemical Methods - III (Continued...)
Lecture 56 - Applications
Lecture 57 - Applications (Continued...)
Lecture 58 - Applications (Continued...)
Lecture 59 - Applications (Continued...)
Lecture 60 - Applications (Continued...)

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Co-ordination Chemistry (Chemistry of Transition Elemer

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Definition
Lecture 3 - Classification of Ligands - I
Lecture 4 - Classification of Ligands - II
Lecture 5 - Ligands- III and Nomenclature - I
Lecture 6 - Nomenclature - II
Lecture 7 - Coordination Number - I
Lecture 8 - Coordination Number - II
Lecture 9 - Coordination Number - III
Lecture 10 - Coordination Number - IV
Lecture 11 - Isomerism - I
Lecture 12 - Isomerism - II
Lecture 13 - Co-ordination Equilibria - I
Lecture 14 - Co-ordination Equilibria - II
Lecture 15 - Bonding in Complexes - I
Lecture 16 - Bonding in Complexes - II
Lecture 17 - Bonding in Complexes - III
Lecture 18 - Bonding in Complexes - IV
Lecture 19 - Jahn - Teller Effect
Lecture 20 - Spin Crossover and Colour
Lecture 21 - Optical Spectra
Lecture 22 - d-d Transitions
Lecture 23 - Charge Transfer
Lecture 24 - Orgel Diagram
Lecture 25 - Tanabe Sugano Diagram
Lecture 26 - MLCT Transitions
Lecture 27 - Application of CFT
Lecture 28 - Spinels
Lecture 29 - Magnetochemistry

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Lecture 30 - Magnetic Properties
Lecture 31 - Magnetic Measurements
Lecture 32 - Ligand Field Theory
Lecture 33 - Sigma Orbitals
Lecture 34 - Pi Orbitals
Lecture 35 - Reaction Mechanism - I
Lecture 36 - Reaction Mechanism - II
Lecture 37 - Reaction Mechanism - III
Lecture 38 - Reaction Mechanism - IV
Lecture 39 - Reaction Mechanism - V
Lecture 40 - Biological Inorganic Chemistry

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Stereochemistry

Subject Co-ordinator - Prof. A. Basak

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Constitution and Configuration
Lecture 2 - Chirality, Symmetry Elements
Lecture 3 - Project Ion Formulae Rules for Drawing
Lecture 4 - Chirotopicity and Stereogenicity
Lecture 5 - Newmann Projection, Saw Horse Projection, Wedge Formula
Lecture 6 - Chirotopicity and Stereogenicity
Lecture 7 - Absolute Configuration
Lecture 8 - Absolute Configuration (Continued...)
Lecture 9 - Problems on the above topics
Lecture 10 - Topicity
Lecture 11 - Axial Chirality in Allenes, Biphenyls
Lecture 12 - Relative Configuration, Prochiral Faces and Prochiral Centres
Lecture 13 - Chirality in Heteroatom Systems
Lecture 14 - Conformations and Conformers
Lecture 15 - Conformational Analysis of Acyclic Molecules
Lecture 16 - Conformational Analysis of Acyclic Molecules (Continued...)
Lecture 17 - Conformations of Acyclic Molecues Containing Heteroatoms
Lecture 18 - Conformations of Cyclic Systems
Lecture 19 - Conformations of Cyclic Systems (Continued...)
Lecture 20 - Conformation of Cyclobutane and Cyclopentane
Lecture 21 - Conformation of Cyclohexane
Lecture 22 - Energy Changes During Flipping
Lecture 23 - Energy Comparison between Chair and Boat Conformations
Lecture 24 - Conformational Analysis of Substituted Cyclohexanes
Lecture 25 - Conformational Analysis of Substituted Cyclohexanes (Continued...)
Lecture 26 - Conformational Analysis of Substituted Cyclohexanes (Continued...)
Lecture 27 - Conformational Analysis of Substituted Cyclohexanes (Continued...)
Lecture 28 - Conformational Analysis of Systems with Preference for Axial Groups
Lecture 29 - Conformation and Reactivity

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Lecture 30 - Conformation and Reactivity (Continued...)
Lecture 31 - Conformation and Reactivity (Continued...)
Lecture 32 - Stereoelectronic Effects
Lecture 33 - Stereoelectronic Effects (Continued...)
Lecture 34 - Substitution and Elimination in Cyclohexane Systems
Lecture 35 - Stereospecific and Stereoselective Reactions and Asymmetric Synthesis (Elementary Idea)
Lecture 36 - Asymmetric Induction
Lecture 37 - Asymmetric Induction
Lecture 38 - Asymmetric Induction (Continued...)
Lecture 39 - Facial Selectivity and Examples of Asymmetric Synthesis
Lecture 40 - Revisiting the Contents Covered

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NPTEL Video Course - Chemistry and Biochemistry - NOC:A Study Guide in Organic Retrosynthesis - Problem Solvi

Subject Co-ordinator - Prof. Samik Nanda

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Remarks
Lecture 2 - Introductory remarks (Continued...)
Lecture 3 - Introductory remarks and some rapid fire quiz
Lecture 4 - Retro Quiz based on simple Transformation
Lecture 5 - Transformation based strategy for a given target
Lecture 6 - Tf/Fg/SM based strategy and its exploratioin
Lecture 7 - Tf/SM/Fg based approaches to solve some basic problems
Lecture 8 - Tf/SM/Fg based strategy and its exploration
Lecture 9 - Tf/SM/Fg based strategy and its exploration for some simple target molecules
Lecture 10 - Tf/SM/Fg based strategy and its exploration
Lecture 11 - Tf/SM/Fg based strategies and its exploration
Lecture 12 - Tf/Fg/SM based strategies and its exploration
Lecture 13 - Tf/Fg/SM based approaches and its exploration
Lecture 14 - Tf/Fg/SM based strategies and its exploration
Lecture 15 - Multiple Tf based strategy for small molecule disconnection
Lecture 16 - Multiple Tf based strategies
Lecture 17 - Specific Tf such as Barton's nitrile ester photolysis
Lecture 18 - Specific transformation
Lecture 19 - Selective transformations
Lecture 20 - Functional Group (Fg) based strategies
Lecture 21 - Functional group based strategy
Lecture 22 - Fg based strategy
Lecture 23 - Fg based strategy
Lecture 24 - Fg based strategy based on protecting groups
Lecture 25 - Fg based strategy
Lecture 26 - Protecting group based strategic disconnection
Lecture 27 - Fg group based strategy
Lecture 28 - Fg based strategy
Lecture 29 - Fg based strategies

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Lecture 30 - Fg based strategy
Lecture 31 - Fg based strategy
Lecture 32 - Fg based strategy
Lecture 33 - Starting material (SM) based strategy
Lecture 34 - Fg/Tf/SM based strategies
Lecture 35 - Fg/Tf/SM based strategies
Lecture 36 - Fg/Tf/SM based strategies
Lecture 37 - Fg based strategies
Lecture 38 - Fg based strategies in combination with SM and Tf
Lecture 39 - Fg/SM/Tf based combined strategies
Lecture 40 - Fg/SM/Tf based combined strategies
Lecture 41 - Fg based strategies
Lecture 42 - Fg based strategies
Lecture 43 - Symmetry based strategy
Lecture 44 - Symmetry based strategies
Lecture 45 - Symmetry based strategies
Lecture 46 - Symmetry based strategy
Lecture 47 - Symmetry based strategies
Lecture 48 - Symmetry based strategies
Lecture 49 - Topological based strategies
Lecture 50 - Topological strategies
Lecture 51 - Topological strategies
Lecture 52 - Stereochemical strategies
Lecture 53 - Stereochemical strategies
Lecture 54 - Stereochemical strategies
Lecture 55 - Stereochemical Strategies
Lecture 56 - Stereochemical strategies
Lecture 57 - Stereochemical strategies
Lecture 58 - Stereochemical strategies
Lecture 59 - Synthon concept revisited
Lecture 60 - Concluding remarks

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Introduction to Molecular Thermodynamics

Subject Co-ordinator - Prof. Srabani Taraphder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Classical Thermodynamics - Part I
Lecture 2 - Review of Classical Thermodynamics - Part II
Lecture 3 - Thermodynamic potentials - Part 1
Lecture 4 - Thermodynamic potentials - Part 2
Lecture 5 - Microstates of a system
Lecture 6 - Microstates of a System (Continued...)
Lecture 7 - Microstates of a system (Continued...)
Lecture 8 - Microstates of a system (Continued...)
Lecture 9 - Microstates of a system
Lecture 10 - Microstates of a system
Lecture 11 - Microstates of a system (Continued...)
Lecture 12 - Microstates of a system (Continued...)
Lecture 13 - Microstates of a System (Continued...)
Lecture 14 - Fundamentals of Statistical Mechanics
Lecture 15 - Statistical Ensembles
Lecture 16 - Microstates of a system
Lecture 17 - Canonical ensemble - Part I
Lecture 18 - Canonical Ensemble - Part I (Continued...)
Lecture 19 - Canonical Ensemble - Part II
Lecture 20 - Canonical Ensemble - Part III
Lecture 21 - Ideal gas
Lecture 22 - Ideal gases (Continued...)
Lecture 23 - Ideal gases (Continued...)
Lecture 24 - Ideal gases (Continued...)
Lecture 25 - Statistical thermodynamics of ideal gases (Continued...)
Lecture 26 - Statistical Thermodynamics of ideal gases (Continued...)
Lecture 27 - Statistical thermodynamics of ideal gases (Continued...)
Lecture 28 - Statistical thermodynamics of ideal gases (Continued...)
Lecture 29 - Statistical thermodynamics of ideal gases (Continued...)

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Lecture 30 - Statistical thermodynamics of diatomic ideal gases
Lecture 31 - Statistical thermodynamics of ideal gas
Lecture 32 - Chemical reaction equilibrium
Lecture 33 - Specific heat of solids
Lecture 34 - Application of Molecular Thermodynamics
Lecture 35 - Introduction to classical statistical mechanics
Lecture 36 - Introduction to classical statistical mechanics (Continued...)
Lecture 37 - Classical Statistical Mechanics
Lecture 38 - Classical Statistical Mechanics
Lecture 39 - Classical Statistical Mechanics
Lecture 40 - Rate of Chemical Reaction

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Molecules in Motion

Subject Co-ordinator - Prof. Amita Pathak Mahanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Kinetic theory of gases
Lecture 2 - Kinetic theory of gases (Continued...)
Lecture 3 - Kinetic theory of gases (Continued...)
Lecture 4 - Kinetic theory of gases (Continued...)
Lecture 5 - Kinetic theory of gases (Continued...)
Lecture 6 - Kinetic theory of gases (Continued...)
Lecture 7 - Kinetic theory of gases (Continued...)
Lecture 8 - Kinetic theory of gases (Continued...)
Lecture 9 - Kinetic theory of gases (Continued...)
Lecture 10 - Kinetic theory of gases (Continued...)
Lecture 11 - Transport properties
Lecture 12 - Transport properties (Continued...)
Lecture 13 - Transport properties of gases
Lecture 14 - Molecular motion in Liquids
Lecture 15 - Molecular motion in Liquids (Continued...)
Lecture 16 - Molecular motion in Liquids (Continued...)
Lecture 17 - Molecular motion in Liquids (Continued...)
Lecture 18 - Molecular motion in Liquids (Continued...)
Lecture 19 - Molecular motion in Liquids (Continued...)
Lecture 20 - Molecular motion in Liquids (Continued...)
Lecture 21 - Molecular motion in Liquids (Continued...)
Lecture 22 - Molecular motion in Liquids (Continued...)
Lecture 23 - Molecular motion in Liquids (Continued...)
Lecture 24 - Molecular motion in Liquids (Continued...)
Lecture 25 - Molecular motion in Liquids (Continued...)
Lecture 26 - Molecular motion in Liquids (Continued...)
Lecture 27 - Molecular motion in Liquids (Continued...)
Lecture 28 - Molecular motion in Liquids (Continued...)
Lecture 29 - Molecular motion in Liquids (Continued...)

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Lecture 30 - Molecular motion in Liquids (Continued...)
Lecture 31 - Molecular motion in Liquids (Continued...)
Lecture 32 - Molecular motion in Liquids (Continued...)
Lecture 33 - Molecular motion in Liquids (Continued...)
Lecture 34 - Molecular motion in Liquids (Continued...)
Lecture 35 - Molecular motion in Liquids (Continued...)
Lecture 36 - Molecular motion in Liquids (Continued...)
Lecture 37 - Molecular motion in Liquids (Continued...)
Lecture 38 - Molecular motion in gases
Lecture 39 - Molecular motion in gases
Lecture 40 - Molecular motion in gases

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Experimental Biochemistry

Subject Co-ordinator - Prof. Soumya De, Prof. Swagata Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Buffers
Lecture 3 - Introduction to Biochemistry Laboratory Equipments and Safety Measures
Lecture 4 - Practical Aspects of Making Buffer
Lecture 5 - Making Tris Buffer (pH=8.2)
Lecture 6 - Making Phosphate Buffer (100mM)
Lecture 7 - Amino Acids and Their Properties
Lecture 8 - Amino Acid Titrations
Lecture 9 - pI Determination of Glycine
Lecture 10 - pI Determination of Lysine
Lecture 11 - Summary
Lecture 12 - UV and Visible Spectroscopy
Lecture 13 - Fluorescence Spectroscopy
Lecture 14 - UV/Visible Spectra of Amino Acids and Proteins
Lecture 15 - Fluorescence Spectra of Amino Acids and proteins
Lecture 16 - Spectroscopic Techniques Summary
Lecture 17 - Protein Folding and Denaturation - I
Lecture 18 - Protein Folding and Denaturation - II
Lecture 19 - Urea denaturation of HSA studied by UV/Vis absorbance
Lecture 20 - Temperature denaturation of HSA studied by UV/Vis absorbance
Lecture 21 - Denaturation of HSA by GdnHCl studied by Trp fluorescence
Lecture 22 - Protein Folding and Denaturation Summary
Lecture 23 - Chromatographic Techniques - I
Lecture 24 - Chromatographic Techniques - II
Lecture 25 - Protein Purification by Size Exclusion Chromatography (SEC)
Lecture 26 - Protein Purification by Affinity Chromatography
Lecture 27 - Gel Electrophoresis of DNA and Proteins - Part I
Lecture 28 - Gel Electrophoresis of DNA and Proteins - Part II
Lecture 29 - Gel Electrophoresis of DNA and Proteins - Part II

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Lecture 30 - Isolation and Characterization of Proteins Part - I
Lecture 31 - Isolation and Characterization of Proteins Part - II
Lecture 32 - Isolation and Purification of Proteins
Lecture 33 - Quality and Quantity of the Isolated Protein
Lecture 34 - Enzyme Kinetics - I
Lecture 35 - Enzyme Kinetics - II
Lecture 36 - Enzyme Kinetics (by using enzyme from apple juice)
Lecture 37 - Enzyme Kinetics (by using enzyme from apple juice) (Continued...)
Lecture 38 - Isolation and Characterization of DNA Part - I
Lecture 39 - Isolation and Characterization of DNA Part - II
Lecture 40 - Bacterial Culture for Plasmid DNA Isolation
Lecture 41 - Isolation of Plasmid DNA
Lecture 42 - Isolation and Characterization of DNA Summary
Lecture 43 - Basics of rDNA Technology Part - I
Lecture 44 - Basics of rDNA Technology Part - II
Lecture 45 - Cloning
Lecture 46 - DNA Transformation
Lecture 47 - Protein-Ligand Interaction
Lecture 48 - Protein-Ligand Interaction (Continued...)
Lecture 49 - Interaction study of HSA protein with Curcumin and Gallic acid using UV-Vis spectroscopy
Lecture 50 - Interaction study of HSA protein with Circumin and Gallic acid using UV-Vis spectroscopy (Contir
Lecture 51 - Analysis of the Structure of Protein ligand complex
Lecture 52 - Immunoassay Techniques
Lecture 53 - Western Blotting Technique

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Industrial Inorganic Chemistry

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Importance of chemical industry, chemicals from materials
Lecture 3 - Bulk and commodity chemicals
Lecture 4 - Fine and speciality chemicals
Lecture 5 - Water
Lecture 6 - Hydrogen
Lecture 7 - Inorganic peroxide compounds
Lecture 8 - Nitrogen compounds
Lecture 9 - Chloramine and Hydroxylamine
Lecture 10 - Nitric acid, Ostwald process and uses
Lecture 11 - Phosphorus and its components
Lecture 12 - Phosphoric acid salts
Lecture 13 - Tetrapotassium diphosphate preparation
Lecture 14 - Hydroxy apatite
Lecture 15 - P4S10 and phosphide preparation
Lecture 16 - Sulfur and copper (1) phosphide
Lecture 17 - Sulfur compounds and sulfur from H2S and SO2
Lecture 18 - Sulfuric acid, catalyst and S2Cl2, applications
Lecture 19 - Sulfur dichloride, thionyl chloride
Lecture 20 - Thiosulfates and dithionite
Lecture 21 - Sodium hydroxyl methanesulfinate and hydrogen sulfide
Lecture 22 - Halogen and halogen compounds
Lecture 23 - Fluorine and inorganic fluorides
Lecture 24 - Hydrogen fluoride and aluminum fluoride
Lecture 25 - Cryolite and other industrially important fluoride salts
Lecture 26 - Electrochemical fluorination, sulfonyl fluorides
Lecture 27 - Chloralkali electrolysis
Lecture 28 - Ion conduction membrane in electrolysis
Lecture 29 - Hydrochloric acid manufacture

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Lecture 30 - Bromine and bromine compounds
Lecture 31 - Hydrogen bromide and alkali bromates
Lecture 32 - Iodine and iodine compounds
Lecture 33 - Mineral fertilizers
Lecture 34 - Nitrogen fertilizer and Urea
Lecture 35 - Potassium fertilizer
Lecture 36 - Metals and their compounds
Lecture 37 - Sodium and its compounds
Lecture 38 - Potassium and its compounds
Lecture 39 - Magnesium and its compounds
Lecture 40 - Calcium and its compounds
Lecture 41 - Barium and its compounds
Lecture 42 - Chromium and its compounds
Lecture 43 - Manganese and its industrially important compounds
Lecture 44 - Silicon and its compounds
Lecture 45 - Organosilicon compounds, organoalkoxysilanes
Lecture 46 - Organomercapto silanes and silicones
Lecture 47 - Silicone rubber
Lecture 48 - Inorganic solids
Lecture 49 - Zeolites
Lecture 50 - Inorganic Fibres
Lecture 51 - Glass fibre production and construction materials
Lecture 52 - Ceramics and its manufacturing processes
Lecture 53 - Specialty ceramic products
Lecture 54 - Ferrites and porcelain enamel
Lecture 55 - Layers of enamelling
Lecture 56 - Carbon modifications
Lecture 57 - Activated carbon
Lecture 58 - Metallic hard materials
Lecture 59 - Fillers and inorganic pigments
Lecture 60 - Oxide pigments, luminescent pigments, corrosion protection pigments, magnetic pigments

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Reactive Intermediates Carbene and Nitrene

Subject Co-ordinator - Prof. Rajarshi Samanta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Structure and Geometry of Carbenes
Lecture 3 - Structure and Geometry of Carbenes (Continued...)
Lecture 4 - Generation of Carbene
Lecture 5 - Generation of Carbene (Continued...)
Lecture 6 - Generation of Carbene (Continued...)
Lecture 7 - Reaction of Carbene
Lecture 8 - Reaction of Carbene (Continued...)
Lecture 9 - Reaction of Carbene (Continued...)
Lecture 10 - Reaction of Carbene (Continued...)
Lecture 11 - Reaction of Carbene (Continued...)
Lecture 12 - Reaction of Carbene (Continued...)
Lecture 13 - Reaction of Carbene (Continued...)
Lecture 14 - Reaction of Carbene (Continued...)
Lecture 15 - Reaction of Carbene (Continued...)
Lecture 16 - Nitrene
Lecture 17 - Nitrene (Continued...)
Lecture 18 - Reaction of Nitrene
Lecture 19 - Reaction of Nitrene (Continued...)
Lecture 20 - Reaction of Nitrene (Continued...)

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Organic Chemistry in Biology and Drug Development

Subject Co-ordinator - Prof. A. Basak

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A brief introduction to Molecules of Life
Lecture 2 - Biological Macromolecules and Small molecules
Lecture 3 - Amino Acids
Lecture 4 - Amino acids
Lecture 5 - Method of determination of Amino acid sequence
Lecture 6 - Selective peptide bond cleavage
Lecture 7 - Peptide synthesis
Lecture 8 - Peptide synthesis (Continued...) Protection, coupling and deprotection method
Lecture 9 - Recent development of coupling agents; Merrifieldâ s method of solid phase peptide synthesis
Lecture 10 - Hierarchial structure of proteins
Lecture 11 - Ramachandran plot and protein purification techniques
Lecture 12 - Protein purification techniques (Continued...)
Lecture 13 - Introduction to Enzymes and its kinetics
Lecture 14 - Enzyme catalysed reactions and introduction to catalytic activity of proteases
Lecture 15 - Enzyme Kinetics (Continued...)
Lecture 16 - Concept of Enzyme Inhibition
Lecture 17 - Concept of Enzyme Inhibition (Continued...)
Lecture 18 - Problems on Enzyme Kinetics and Enzyme Inhibition
Lecture 19 - Synthetic Biology
Lecture 20 - Synthetic Biology (Continued...)
Lecture 21 - Synthetic Biology (Continued...)
Lecture 22 - Nucleic Acid
Lecture 23 - Nucleic Acid (Continued...)
Lecture 24 - DNA sequencing method
Lecture 25 - DNA sequencing method (Continued...)
Lecture 26 - DNA sequencing method (Continued...)
Lecture 27 - Synthesis of oligonucleotide
Lecture 28 - Central dogma
Lecture 29 - Central dogma

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Lecture 30 - Central dogma
Lecture 31 - Central dogma
Lecture 32 - Central dogma
Lecture 33 - Molecular Biology
Lecture 34 - Molecular Biology (Continued...)
Lecture 35 - Chemistry of cofactors/coenzymes
Lecture 36 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 37 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 38 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 39 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 40 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 41 - Introduction to Drug Discovery Process
Lecture 42 - Fundamental Principles of Drug Development Process
Lecture 43 - Combinatorial chemistry
Lecture 44 - Neurotransmitters
Lecture 45 - Catechol amine based and GABA neurotransmitters
Lecture 46 - Hypertension
Lecture 47 - Inhibitor design of angiotensin converting enzyme
Lecture 48 - Antimicrobial drugs
Lecture 49 - Chemistry of penicillins
Lecture 50 - Resistance to beta-lactam antibiotics
Lecture 51 - Mechanistic studies of beta-lactamase
Lecture 52 - Non beta-lactam antibiotics
Lecture 53 - Mechanistic enzymology of Isopenicillin N synthase
Lecture 54 - Polyketide Biosynthesis
Lecture 55 - Biosynthesis of macrolide polyketides and introduction to virus
Lecture 56 - Anti-viral drugs
Lecture 57 - Cancer and Chemotherapy
Lecture 58 - Anti-cancer drugs (Continued...)
Lecture 59 - Aromatase inhibition and Anti-ulcer drugs
Lecture 60 - Cholesterol lowering agents
Lecture 61 - Cholesterol Biosynthesis
Lecture 62 - Pharmakinetics and pharmadynamics
Lecture 63 - QSAR principles

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Introduction to Polymer Science

Subject Co-ordinator - Dr. D. Dhara

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of Polymer Science and Brief Historical background
Lecture 2 - Definitions/Terminologies, Classifications
Lecture 3 - Classifications, Nomenclature
Lecture 4 - Classification by Polymerization Mechanism, Nomenclature
Lecture 5 - Molecular Weight, Big Picture of Polymer Science, Common Polymers
Lecture 6 - Examples of Step Polymers, Linear Step Polymerization
Lecture 7 - Linear Step Polymerization
Lecture 8 - Linear Step Polymerization
Lecture 9 - Linear Step Polymerization
Lecture 10 - Types of Chain polymerization, Mechanism and Kinetics of Radical Chain Polymerization
Lecture 11 - Kinetics of Radical Chain Polymerization (Continued...), Various Types of Initiators
Lecture 12 - Thermal Initiation (Continued...), Molecular Weight and Kinetic Chain Length, Other Types of Rad
Lecture 13 - Transfer Reactions, Effect of Temperature on Rate and MW, MW Distribution, ceiling Temperature
Lecture 14 - Energetics and Thermodynamics of Chain Polymerization, MW Distribution, Common Polymers
Lecture 15 - Thermodynamics of Chain Polymerization, MW Distribution, Common Polymers
Lecture 16 - Process Conditions, Emulsion Polymerization
Lecture 17 - Emulsion Polymerization (Continued...), Common Polymers by Radical Chain Polymerization, RDRP
Lecture 18 - Reversible - Deactivation Radical Polymerizations (RDRP)
Lecture 19 - RAFT Polymerization (Continued...), Ionic Polymerization
Lecture 20 - Polymer Stereochemistry and Zeigler - Natta Coordination Polymerization
Lecture 21 - Ring Opening Polymerization, Copolymers
Lecture 22 - Copolymerization (Continued...)
Lecture 23 - Polymers in Solution
Lecture 24 - Polymers in Solution
Lecture 25 - Polymers in Solution
Lecture 26 - Polymers Chain Dimensions
Lecture 27 - Frictional Properties of Polymer Molecules in Dilute Solution, Determination of Polymer MW (Over
Lecture 28 - Membrane Osmometry, End Group Analysis, Dilute Solution Viscometry
Lecture 29 - Dilute Solution Viscometry, Light Scattering Techniques for MW

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Lecture 30 - Gel Permeation Chromatography
Lecture 31 - Light Scattering Techniques for MW and Size Measurements (Continued...)
Lecture 32 - Mass Spectroscopy of Polymers
Lecture 33 - Polymer Processing
Lecture 34 - Mechanical Properties, Amorphous State
Lecture 35 - Thermal Properties
Lecture 36 - Thermal Properties
Lecture 37 - Thermal Properties
Lecture 38 - Thermomechanical Properties, Viscoelasticity
Lecture 39 - Thermomechanical Properties, Viscoelasticity (Continued...)
Lecture 40 - Optical, Electrical, Barrier Properties; Chemical Resistance and Weathering of Polymers
Lecture 41 - Polymer Additives
Lecture 42 - Polymer Blends, Concluding Remarks

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Structure, Stereochemistry and Reactivity of Organic Co

Subject Co-ordinator - Prof. A. Basak

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to structure and stereochemistry of organic molecules: salient features of symmetry
Lecture 2 - Introduction to point group notation, classification, symmetry number and order
Lecture 3 - Examples of various point group notations, chiral and achiral point groups, examples of various p
Lecture 4 - Solving problems on point groups (Cn, Cnv, Cnh, Dnd)
Lecture 5 - Conformational Analysis of Perhydrophenanthrene
Lecture 6 - Concept Clearing Session on Achiral Point Groups
Lecture 7 - Axial, Planar and Helical Chirality, assignment of absolute configuration to such molecules
Lecture 8 - Concept of pseudoasymmetry; Reflection variance/invariance problem; methods of nomenclature syste
Lecture 9 - Conformational analysis of bicyclic systems: the Decalins
Lecture 10 - Conformational analysis of Perhydrophenanthrene
Lecture 11 - Conformational analysis of Perhydroanthracene
Lecture 12 - Revisiting conformational analysis of Perhydrophenanthrene
Lecture 13 - Revisiting conformational analysis of Perhydroanthracene
Lecture 14 - Introduction to Linear Polarized light and interaction with chiral materials; Circular Birefring
Lecture 15 - ORD, CD and Cotton Effect (CE); Empirical rule to determine the sign of CE, 2-axial haloketone r
Lecture 16 - Octant rule: application to substituted cyclohexanone and decalone system
Lecture 17 - Application of Octant rule to tricyclic system; drawing of octant projection
Lecture 18 - Application of Octant rule to steroidal ketones; drawing of octant projection
Lecture 19 - Stereoelectronic effects on conformation and reactivity
Lecture 20 - Examples of anomeric effect and Stereoelectronic effect
Lecture 21 - Baldwin rules
Lecture 22 - Cyclization in enolic systems
Lecture 23 - Problem solving on Baldwin rules
Lecture 24 - Reactive Functionalities: Chemistry of Alkynes
Lecture 25 - Reactive Functionalities: Chemistry of Alkynes (Continued...), arynes and enediynes
Lecture 26 - Reactive Functionalities: Enediynes (Continued...), allenes and Ketenes
Lecture 27 - Beta - Lactam Synthesis
Lecture 28 - Chemistry of radicals
Lecture 29 - Reactivity of radicals: Frontier orbital approach.

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Lecture 30 - Radical mediated C-C bond formation
Lecture 31 - Radical mediated C-C bond formation (Continued...).
Lecture 32 - Radical mediated decarboxylation and deoxygenation
Lecture 33 - Dynamic Stereochemistry: Conformationally rigid and mobile systems
Lecture 34 - Dynamic Stereochemistry: Conformational analysis of elimination and addition
Lecture 35 - Dynamic Stereochemistry: Stereoselectivity in carbonyl reduction
Lecture 36 - Dynamic Stereochemistry: Reactivity of unsaturated carbonyl and enolate systems
Lecture 37 - Dynamic Stereochemistry: Enolate as nucleophile
Lecture 38 - Dynamic Stereochemistry: stereochemical issues in cyclohexenone reduction and alpha-electrophili
Lecture 39 - Dynamic Stereochemistry: Asymmetric aldol reactions
Lecture 40 - Dynamic Stereochemistry: Asymmetric aldol reaction (Continued...)

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Approximate Methods in Quantum Chemistry

Subject Co-ordinator - Prof. Sabyashachi Mishra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Quantum Chemistry
Lecture 2 - Postulates of Quantum Mechanics - I
Lecture 3 - Postulates of Quantum Mechanics - II
Lecture 4 - Exactly Solvable Models - I
Lecture 5 - Exactly Solvable Models - II
Lecture 6 - Exactly Solvable Models - II (Continued...)
Lecture 7 - Variational Principle - I
Lecture 8 - Variational Principle - II
Lecture 9 - Variational Method: Applications - I
Lecture 10 - Linear Variational Method
Lecture 11 - Applications of Linear Variational Method
Lecture 12 - Variational Method in Chemical Bonding - I
Lecture 13 - Variational Method in Chemical Bonding - II
Lecture 14 - Variational Method in Chemical Bonding - III
Lecture 15 - Molecular Orbital Treatment of Polyatomics
Lecture 16 - Molecular Orbital Treatment of Polyatomics
Lecture 17 - Perturbation Theory
Lecture 18 - Examples of Perturbation Theory - I
Lecture 19 - Examples of Perturbation Theory - II
Lecture 20 - Molecular Response to Electric Field - I
Lecture 21 - Molecular Response to Electric Field - II
Lecture 22 - Degenerate Perturbation Theory
Lecture 23 - Excited States of He Atom - I
Lecture 24 - Excited States of He Atom - II
Lecture 25 - Slater Determinants - I
Lecture 26 - Slater Determinants - II
Lecture 27 - Energy Expectation Value with Slater Determinants - I
Lecture 28 - Energy Expectation Value with Slater Determinants - II
Lecture 29 - Self-Consistent Field Method

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Lecture 30 - Canonical HF Equations
Lecture 31 - Hartree-Fock Energy
Lecture 32 - Hartree-Fock-Roothan Equations
Lecture 33 - The Density Matrix
Lecture 34 - Evaluation of Molecular Properties
Lecture 35 - Basis Sets - I
Lecture 36 - Basis Sets - II
Lecture 37 - Electron Correlation and Post HF Methods
Lecture 38 - Time-Dependent Perturbation Theory - I
Lecture 39 - Time-Dependent Perturbation Theory - II
Lecture 40 - Slowly Switched Constant Perturbation
Lecture 41 - Oscillating Perturbation
Lecture 42 - Einsteinâ s Coefficients

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Biological Inorganic Chemistry

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Metal Ions In Biological Systems
Lecture 2 - Metallobiosite structures
Lecture 3 - Biomolecular structure and molecular biology component
Lecture 4 - Structures of nucleic acids
Lecture 5 - Coordination Chemistry in action
Lecture 6 - Coordination of peptide building blocks
Lecture 7 - Occurrence and availability
Lecture 8 - Potential ligands of different types
Lecture 9 - Metal ion insertion
Lecture 10 - Organic cofactors and siderophores
Lecture 11 - Introduction
Lecture 12 - CD and Raman spectroscopy
Lecture 13 - EPR
Lecture 14 - NMR and X-ray
Lecture 15 - Electrochemical methods
Lecture 16 - Metal ion assimilation
Lecture 17 - Transport of metal ions in bacteria and plants
Lecture 18 - Transport of metal ions in fungi and mammals
Lecture 19 - Homeostasis in bacteria and plants
Lecture 20 - Homeostasis in fungi and mammals
Lecture 21 - Transport across membranes
Lecture 22 - Ion channels and ion pumps
Lecture 23 - (K+) channels
Lecture 24 - (Na+) channels
Lecture 25 - (Na+)-(K+) ATPase
Lecture 26 - (Mg2+) dependent enzymes and kinases
Lecture 27 - Phosphatases and enolases
Lecture 28 - Photoreception and enzymes
Lecture 29 - (Ca2+) transporting, binding and sensor proteins

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Lecture 30 - Cell signaling by (Ca2+) binding and sensing
Lecture 31 - Functions of iron ions and iron ion proteins
Lecture 32 - Heme proteins for (O2) transport and storage
Lecture 33 - Activators of (O2) and electron transport proteins
Lecture 34 - Iron-sulfur proteins
Lecture 35 - Mononuclear and dinuclear non-heme enzymes
Lecture 36 - Oxygen transport and SOD activity
Lecture 37 - Type 1 blue copper proteins
Lecture 38 - Type 2 non-blue copper proteins
Lecture 39 - Type 3 dinuclear copper proteins
Lecture 40 - Multicopper and mixed-copper enzymes
Lecture 41 - Coordination chemistry and function of zinc ions
Lecture 42 - Carbonic anhydrase and lyases
Lecture 43 - Carboxypeptidase and metalloproteinases
Lecture 44 - Alcohol dehydrogenase and Beta-lactamase
Lecture 45 - Redox catalysis by manganese ions
Lecture 46 - Redox catalysis by manganese ions
Lecture 47 - Catalysis by manganese and cobalt ions
Lecture 48 - Cobalt ion dependent proteins and enzymes
Lecture 49 - Nickel proteins and enzymes
Lecture 50 - More nickel ion bearing enzymes
Lecture 51 - Carbon, hydrogen and oxygen
Lecture 52 - Nitrogen and Silicon
Lecture 53 - Phosphorus
Lecture 54 - Sulfur and Selenium
Lecture 55 - Chlorine and Iodine
Lecture 56 - Brain and blood-brain barrier (BBB)
Lecture 57 - Zinc and copper ions
Lecture 58 - Iron ions
Lecture 59 - Metal ion based drugs and metallotherapeutics
Lecture 60 - Chemotherapy, radiotherapy and contrast agents

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Principles and Applications of Enolate Alkylation

Subject Co-ordinator - Prof. Samik Nanda

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Enolate generation, structure of enolates and related topic - I
Lecture 2 - Enolate generation, structure of enolates and related topic - II
Lecture 3 - Enolate generation, structure of enolates and related topic - III
Lecture 4 - Different mode of asymmetric induction in enolate alkylation
Lecture 5 - Revisit again, Different mode of asymmetric induction in enolate alkylation
Lecture 6 - Substrate directed stereocontrol in acyclic and cyclic system
Lecture 7 - Substrate directed enolate alkylation in bicyclic system
Lecture 8 - SeebachÃ¢'s SRS principle and related systems - I
Lecture 9 - SeebachÃ¢'s SRS principle and related systems - II
Lecture 10 - SeebachÃ¢'s SRS principle and related systems - III
Lecture 11 - Evans oxazolidinone and related systems - I
Lecture 12 - Evans oxazolidinone and related systems - II
Lecture 13 - Evans oxazolidinone and related systems - III
Lecture 14 - Evans oxazolidinone and related systems - IV
Lecture 15 - Evans oxazolidinone and related systems - V
Lecture 16 - HelmchenÃ¢'s auxiliary, OppolzerÃ¢'s sultam based auxiliary
Lecture 17 - Camphor based N-acyloxazolidinones as chiral auxiliary
Lecture 18 - MyerÃ¢'s ephedrine, Chiral Weinreb amide equivalents and related systems
Lecture 19 - MyerÃ¢'s ephedrine and related systems
Lecture 20 - Chiral Weinreb amide equivalents and related systems
Lecture 21 - MeyerÃ¢'s oxazoline based alkylation - I
Lecture 22 - MeyerÃ¢'s oxazoline based alkylation - II
Lecture 23 - MeyerÃ¢'s bicyclic lactam based enolate alkylation
Lecture 24 - MeyerÃ¢'s bicyclic lactam based alkylation
Lecture 25 - MeyerÃ¢'s bicyclic lactams, GleasonÃ¢'s bicyclic thioglycolate lactam based systems
Lecture 26 - Few problem solving from MeyerÃ¢'s oxazoline/bicyclic lactam based alkylation
Lecture 27 - SchollkopfÃ¢'s bis-lactim ether and related systems; Auxiliary induced chiral relay
Lecture 28 - Chiral relay systems in amino acid derived enolate alkylation
Lecture 29 - Wiliams oxazinone, Yamada's chiral glycine enolate and related system

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Lecture 30 - Tricycloiminolactone as chiral glycine equivalents
Lecture 31 - Najera's auxiliary, Davies diketopoperazine and related system
Lecture 32 - EnderÃ¢'s RAMP/SAMP,ColtartÃ¢'s cyclic carbamate hydrazone,EllmanÃ¢'s sulfinamide and related
Lecture 33 - EnderÃ¢'s RAMP/SAMP based systems
Lecture 34 - EnderÃ¢'s RAMP/SAMP based systems
Lecture 35 - EnderÃ¢'s RAMP/SAMP, ColtartÃ¢'s cyclic carbamate hydrazone,EllmanÃ¢'s sulfinamide
Lecture 36 - ColtartÃ¢'s cyclic carbamate hydrazone and its exploration
Lecture 37 - Memory of chirality in enolate alkylation
Lecture 38 - Organocatalytic methods for enolate alkylation (SOMO activation)
Lecture 39 - Enantioselective alkylation with chiral PTC
Lecture 40 - Overall analysis of the entire discussion

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Overview and Integration of Cellular Metabolism

Subject Co-ordinator - Dr. Arindam Ghosh, Dr. Aritri Bir

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Bioenergetics: Understanding the significance in Biological Systems
Lecture 2 - Regulation of Enzyme Activity
Lecture 3 - Digestion and Absorption of Carbohydrates
Lecture 4 - Glycolysis, alcohol and lactic acid fermentation
Lecture 5 - Biochemistry of TCA Cycle (I)
Lecture 6 - TCA Cycle (II) - Regulation and special characteristics
Lecture 7 - Neoglucogenesis
Lecture 8 - Regulation of Glycolysis and Neoglucogenesis - I
Lecture 9 - Regulation of Glycolysis and Neoglucogenesis - II Cori Cycle, Rapoport Leubering
Lecture 10 - Hexose Monophosphate Shunt : Steps and Phases
Lecture 11 - Hexose Monophosphate Shunt : Regulation and Significance
Lecture 12 - Glycogen Metabolism - I
Lecture 13 - Glycogen Metabolism - II
Lecture 14 - Glycogen Metabolism - III
Lecture 15 - Glycogen Metabolism - IV
Lecture 16 - Galactose Metabolism and Associated Disorders
Lecture 17 - Fructose Metabolism and Associated Disorders
Lecture 18 - Regulation of Blood Glucose
Lecture 19 - Diabetes Mellitus and Metabolic Alterations
Lecture 20 - Digestion and absorption of Lipid
Lecture 21 - Lipoprotein Metabolism - I
Lecture 22 - Lipoprotein Metabolism - II
Lecture 23 - Lipoprotein metabolism - III
Lecture 24 - Fatty acid catabolism (Oxidation of Fatty acids) - I
Lecture 25 - Fatty acid catabolism (Oxidation of Fatty acids) - II
Lecture 26 - Fatty acid catabolism (Oxidation of Fatty acids) - III
Lecture 27 - Metabolism of Ketone Bodies
Lecture 28 - Biosynthesis of Fatty acid and its regulation
Lecture 29 - Biosynthesis of triacylglycerol, phosphoglycerides and sphingolipids

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Lecture 30 - Cholesterol Metabolism
Lecture 31 - Digestion and absorption of Protein
Lecture 32 - Transformation of Amino acids
Lecture 33 - Metabolism of Ammonia and ammonia toxicity
Lecture 34 - Urea cycle - Steps, Significance and Energetics
Lecture 35 - Urea Cycle - Regulation and Enzyme Deficiency Disorders
Lecture 36 - Metabolism of Phenylalanine and Associated Disorders
Lecture 37 - Tyrosine Metabolism - I
Lecture 38 - Tyrosine Metabolism - II (Catecholamines)
Lecture 39 - Tyrosine Metabolism - III
Lecture 40 - Tryptophan Metabolism
Lecture 41 - Metabolism of Sulphur containing Amino acids (Methionine and Cysteine)
Lecture 42 - Metabolism of Glycine and its disorders
Lecture 43 - Metabolism of Serine, Threonine and Alanine
Lecture 44 - Branched chain amino acid metabolism and their disorders
Lecture 45 - Metabolism of Histidine, Proline, Arginine and Lysine
Lecture 46 - Heme Metabolism - I (Heme Synthesis and Regulation)
Lecture 47 - Heme Metabolism - II (Disorders of Heme Synthesis - Porphyrias)
Lecture 48 - Heme Metabolism - III (Heme Degradation, Transport and Bilirubin Metabolism)
Lecture 49 - Disorders of Bilirubin Metabolism
Lecture 50 - Nucleotide Metabolism - I (Purine Metabolism)
Lecture 51 - Nucleotide Metabolism - II (Disorders of Purine Metabolism)
Lecture 52 - Nucleotide Metabolism - III (Pyrimidine Metabolism and Disorders)
Lecture 53 - Inborn errors of Metabolism
Lecture 54 - Integration of Metabolism - I (Cellular and Organ level integration)
Lecture 55 - Integration of Metabolism - II (Starve feed cycle)
Lecture 56 - Integration of Metabolism - III (Metabolic Control Analysis)
Lecture 57 - Obesity, Metabolic Syndrome and Role of Adipokines
Lecture 58 - Fatty Liver and alcohol metabolism
Lecture 59 - Energy metabolism and Nutritional disorders, Protein Energy Malnutrition and Dietary
Lecture 60 - Metabolism in Cancer Cells

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Elementary Thermodynamics for All

Subject Co-ordinator - Prof. Srabani Taraphder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - System, Equilibrium States
Lecture 3 - Mathematical foundation - Exact differentials
Lecture 4 - Mathematical foundation - Inexact differentials
Lecture 5 - First law - Introduction to Internal energy
Lecture 6 - First law - Heat and work
Lecture 7 - First law - Pressure-volume work
Lecture 8 - First law - Internal energy revisited
Lecture 9 - First Law - Enthalpy
Lecture 10 - First law - Estimation of change in internal energy and enthalpy
Lecture 11 - Second law - Introduction
Lecture 12 - Second law - Carnot engine and entropy
Lecture 13 - Entropy and Third law
Lecture 14 - Entropy and Spontaneity in isolated systems
Lecture 15 - Spontaneity and equilibrium - Thermodynamic potentials
Lecture 16 - Spontaneity and equilibrium - Non-isolated systems
Lecture 17 - Thermodynamic potentials and Maxwell's relations
Lecture 18 - Application of Maxwell's relations
Lecture 19 - Thermodynamic response functions
Lecture 20 - Using Maxwell's relations to solve numerical problems
Lecture 21 - Fundamental Equation of Chemical Thermodynamics
Lecture 22 - Open systems and chemical potential
Lecture 23 - Chemical potential in one and many component ideal gas
Lecture 24 - Gibbs-Duhem relation and thermodynamics of ideal gas mixture
Lecture 25 - Numerical applications of Gibbs-Duhem relation
Lecture 26 - Phase equilibrium - Part 1
Lecture 27 - Phase equilibrium - Part 2
Lecture 28 - Phase equilibrium - Part 3
Lecture 29 - Phase equilibrium - Part 4

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Lecture 30 - Numerical problems in phase equilibrium
Lecture 31 - Simple non-reactive mixtures - Part 1
Lecture 32 - Simple non-reactive mixtures - Part 2
Lecture 33 - Numerical problems in simple mixtures
Lecture 34 - Numerical problems on phase equilibrium in simple mixtures
Lecture 35 - Chemical potential of real systems - Activity and concentration
Lecture 36 - Numerical problems on chemical potential in real systems
Lecture 37 - Chemical Equilibrium - Part I
Lecture 38 - Chemical Equilibrium - Part II
Lecture 39 - Chemical Equilibrium - Part III
Lecture 40 - Chemical Equilibrium - Part IV
Lecture 41 - Numerical problems on chemical equilibrium
Lecture 42 - Numerical problems on chemical equilibrium (Continued...)
Lecture 43 - Electrochemical equilibrium - Part I
Lecture 44 - Electrochemical equilibrium - Part II
Lecture 45 - Electrochemical equilibrium - Part III
Lecture 46 - Electrochemical equilibrium - Part IV
Lecture 47 - Electrochemical equilibrium - Part V
Lecture 48 - Electrochemical equilibrium - Part VI
Lecture 49 - Numerical problems on electrochemistry
Lecture 50 - Numerical problems on electrochemistry (Continued...)
Lecture 51 - Numerical problems on electrochemistry (Continued...)
Lecture 52 - Numerical problems on electrochemistry (Continued...)
Lecture 53 - Numerical problems on electrochemistry (Continued...)
Lecture 54 - Thermodynamic stability
Lecture 55 - Thermodynamics in action - Part I
Lecture 56 - Thermodynamics in action - Part II
Lecture 57 - Thermodynamics in action - Part III
Lecture 58 - Thermodynamics in action - Part IV
Lecture 59 - Demonstration
Lecture 60 - Concluding Lectuer

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Molecular Rearrangements and Reactive Intermediates in

Subject Co-ordinator - Prof. Santanu Panda

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Carbocation
Lecture 2 - Carbocation (Continued...)
Lecture 3 - Carbocation (Continued...)
Lecture 4 - Carbocation (Continued...)
Lecture 5 - Carbocation (Continued...)
Lecture 6 - Carbanion
Lecture 7 - Carbanion (Continued...)
Lecture 8 - Carbanion (Continued...)
Lecture 9 - Carbanion (Continued...)
Lecture 10 - Carbanion (Continued...)
Lecture 11 - Carbene
Lecture 12 - Carbene (Continued...)
Lecture 13 - Carbene (Continued...)
Lecture 14 - Carbene (Continued...)
Lecture 15 - Nitrene
Lecture 16 - Nitrene(Continued...)
Lecture 17 - Radical
Lecture 18 - Radical (Continued...)
Lecture 19 - Free Radical
Lecture 20 - Radical
Lecture 21 - Radical
Lecture 22 - Free Radical (Continued...)
Lecture 23 - Radical
Lecture 24 - Free Radical Reactions
Lecture 25 - Radical (Continued...)
Lecture 26 - Radical (Continued...)
Lecture 27 - Radical (Continued...)
Lecture 28 - Benzyne
Lecture 29 - Benzyne (Continued...)

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Lecture 30 - Benzyne (Continued...)
Lecture 31 - Benzyne question answer discussion
Lecture 32 - Organolithium
Lecture 33 - Organolithium (Continued...)
Lecture 34 - Organolithium (Continued...)
Lecture 35 - Organolithium (Continued...)
Lecture 36 - Organolithium (Continued...)
Lecture 37 - Grignard
Lecture 38 - Grignard (Continued...)
Lecture 39 - Organocopper
Lecture 40 - Organozinc
Lecture 41 - Organoboron Chemistry
Lecture 42 - Organoboron Chemistry (Continued...)
Lecture 43 - Organoboron Chemistry (Continued...)
Lecture 44 - Organoboron Chemistry (Continued...)
Lecture 45 - Organoboron
Lecture 46 - Organoboron Chemistry
Lecture 47 - Organosilicon Chemistry
Lecture 48 - Organosilicon Chemistry (Continued...)
Lecture 49 - Organosilicon Chemistry (Continued...)
Lecture 50 - Organosulfur Chemistry
Lecture 51 - Organosulfur
Lecture 52 - Organosulfur (Continued...)
Lecture 53 - Organosulfur (Continued...)
Lecture 54 - Organophosphorus Chemistry
Lecture 55 - Organophosphorus Chemistry (Continued...)
Lecture 56 - Tutorial 1
Lecture 57 - Tutorial 2
Lecture 58 - Tutorial 3
Lecture 59 - Tutorial 4
Lecture 60 - Tutorial 5
Lecture 61 - Tutorial 6

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NPTEL Video Course - Chemistry and Biochemistry - Principles and Application of Electron Paramagnetic Resonar

Subject Co-ordinator - Prof. Ranjan Das

Co-ordinating Institute - TIFR

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Remembering the Masters
Lecture 2 - Introduction to EPR spectroscopy
Lecture 3 - Electron-Nuclear Hyperfine Interaction - I
Lecture 4 - Electron-Nuclear Hyperfine Interaction - II
Lecture 5 - Magnetic Moment in Magnetic Field - I
Lecture 6 - Magnetic Moment in Magnetic Field - II
Lecture 7 - EPR Instrumentations - I
Lecture 8 - EPR Instrumentations - II
Lecture 9 - EPR Instrumentations - III
Lecture 10 - EPR Instrumentations - IV
Lecture 11 - Quantum Mechanical Description of EPR - I
Lecture 12 - Quantum Mechanical Description of EPR - II
Lecture 13 - Introduction to Spin Relaxation
Lecture 14 - Theory of First-order EPR Spectra - I
Lecture 15 - Theory of First-order EPR Spectra - II
Lecture 16 - How to Analyse First-order EPR Spectra
Lecture 17 - How to Record EPR Spectra
Lecture 18 - Second-order Effects on EPR Spectra
Lecture 19 - Photochemistry and EPR Spectroscopy
Lecture 20 - Electron Spin Polarisation - I
Lecture 21 - Electron Spin Polarisation - II
Lecture 22 - Anisotropic Interactions in EPR Spectroscopy
Lecture 23 - Theoretical Basis of isotropic Hyperfine Coupling
Lecture 24 - Spin Relaxation and Bloch Equations - I
Lecture 25 - Spin Relaxation and Bloch Equations - II

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry-I

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3 - Part I
Lecture 3 - Part II
Lecture 4 - Part I
Lecture 4 - Part II
Lecture 4 - Part III
Lecture 5 - Part I
Lecture 5 - Part II
Lecture 5 - Part III
Lecture 5 - Part IV
Lecture 5 - Part V
Lecture 6 - Part I
Lecture 6 - Part II
Lecture 6 - Part III
Lecture 6 - Part IV
Lecture 7 - Part I
Lecture 7 - Part II
Lecture 8 - Part I
Lecture 8 - Part II
Lecture 8 - Part III
Lecture 9 - Part I
Lecture 9 - Part II
Lecture 9 - Part III
Lecture 10

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry-II

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electromagnetic radiation
Lecture 2 - Interaction of radiation with matter
Lecture 3 - Introduction to chemical applications
Lecture 4 - Analysis of spectra
Lecture 5 - Radiation densities and Einstein's semi classical model
Lecture 6 - Introduction to quantum mechanics - I
Lecture 7 - Introduction to quantum mechanics - II
Lecture 8 - Born-Oppenheimer approximation
Lecture 9 - Beer-Lambert law
Lecture 10 - Diatomic Vibration Spectra Hermonic Model
Lecture 11 - Diatomic Vibration Morse Oscillator Model
Lecture 12 - Normal Vibrational modes Triatomic molecules
Lecture 13 - Normal Vibrational modes Polyatomic molecules
Lecture 14 - Vibrational Polyatomic Infrared Spectroscopy Local Modes and Group Frequencies
Lecture 15 - Microwave spectra of di-atomic molecules
Lecture 16 - Diatomic Molecules Microwave Energies and Transitions
Lecture 17 - Methodology of solving problems
Lecture 18 - Rotational and Vibrational Line Intensities
Lecture 19 - Microwave Spectra of Polyatomic molecules (Symmetric tops)
Lecture 20 - Video Tutorial 2
Lecture 21 - Video Tutorial 2
Lecture 22 - Introduction to Tensors
Lecture 23 - Polarizability Tensor
Lecture 24 - Introduction to Rotational Raman Spectra.
Lecture 25 - Review of basic concepts in Molecular Spectroscopy
Lecture 26 - Review of Microwave Spectroscopy
Lecture 27 - Review of Elementary Vibrational Spectroscopy

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Application of Spectroscopic Methods in Molecular Struc

Subject Co-ordinator - Prof. S. Sankararaman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module 1
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NPTEL Video Course - Chemistry and Biochemistry - NOC:Pericyclic Reactions and Organic Photochemistry

Subject Co-ordinator - Prof. S. Sankararaman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Activation of chemical reactions. Thermal and photochemical methods
Lecture 2 - MOs of polyene and their symmetry properties and methods of analyzing pericyclic reactions
Lecture 3 - Introduction to electrocyclic reactions and Woodward Hoffmann rules
Lecture 4 - Electrocyclic reactions Â examples of 3, 4 and 5 membered ring systems (2e and 4e systems)
Lecture 5 - Electrocyclic reactions Â examples of 6 and larger ring systems (6e and more)
Lecture 6 - Tutorial session 1
Lecture 7 - Cycloaddtion reactions - Introduction and Woodward Hoffmann rules - [2+2] cycloadditions
Lecture 8 - Cycloaddition reactions Â ketene cycloadditions
Lecture 9 - Cycloaddition reactions Â Diels-Alder reaction - Woodward Hoffmann rule - Regiochemistry and Ste
Lecture 10 - Diels Alder reaction - synthetic applications
Lecture 11 - Diels Alder reaction continued - Hetero diene and dienophile - Lewis acid mediated - asymmetric
Lecture 12 - 1,3-Dipolar cycloaddition reactions
Lecture 13 - 1,3-Dipolar cycloaddition reactions (Continued...)
Lecture 14 - [4pi+4pi], [4pi+6pi] and higher order cycloaddition reactions
Lecture 15 - Tutorial session 2 on cycloaddition reactions
Lecture 16 - Pericyclic reactions Â Sigmatropic rearrangements Â Introduction and [1,3] migrations
Lecture 17 - Pericyclic reactions Â Sigmatropic rearrangements (Continued...) [1,5] H and C migrations and C
Lecture 18 - Pericyclic reactions Â Sigmatropic rearrangements (Continued...) oxy Cope and Claisen Rearrange
Lecture 19 - Pericyclic reactions Â Sigmatropic rearrangements (Continued...)
Lecture 20 - Pericyclic reactions Â Sigmatropic rearrangements (Continued...) [2,3] sigmatropic shifts and h
Lecture 21 - Pericyclic reactions Â Sigmatropic rearrangements (Continued...) Wittig rearrangement and highe
Lecture 22 - Pericyclic reactions Â Chelotropic reactions - introduction, SO2 extrusion reactions
Lecture 23 - Pericyclic reactions Â Tutorial session 3 - Problems on sigmatropic reactions
Lecture 24 - Chelotropic reactions 2
Lecture 25 - The Ene Reaction
Lecture 26 - Tutorial session - 4
Lecture 27 - Introduction to organic photochemistry
Lecture 28 - Photochemistry of alkenes cis-trans isomerization
Lecture 29 - Photochemistry of alkenes (Continued...)

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Lecture 30 - Photochemistry of carbonyl compounds, Norrish type1 and 2 reactions
Lecture 31 - Photochemistry of carbonyl compounds, enone and dienone photochemistry
Lecture 32 - Photochemistry of Nitrogen compounds
Lecture 33 - Photochemistry of aromatic compounds
Lecture 34 - Photoinduced electron transfer reactions

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry I:Introduction To Quantum Chemistry And Molec

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1 - Historical context and experiments: Introducing the SchrÃ¶dinger equation
Lecture 2 - Lecture 2 - Bohr's atom, De Broglie Matter Waves and Schrodinger equation
Lecture 3 - Lecture 3 - Electromagnetic Radiation
Lecture 4 - Lecture 4 - Interaction of Radiation with Matter
Lecture 5 - Lecture 5 - Molecular Spectroscopy
Lecture 6 - Lecture 6 - Elementary Mathematical Functions 1
Lecture 7 - Lecture 7 - Review of Properties of Elementary Functions II
Lecture 8 - Lecture 8 - Time Dependent SchrÃ¶dinger Equation & Time Independent SchrÃ¶dinger Equation
Lecture 9 - Lecture 9 - SchrÃ¶dinger Equation Particle in a One-dimensional Box : Part I
Lecture 10 - Lecture 10 - SchrÃ¶dinger Equation Particle in a One-dimensional Box : Part II
Lecture 11 - Lecture 11 - SchrÃ¶dinger Equation Particle in Two-dimensional Box : Part I
Lecture 12 - Lecture 12 - Particle in Two-dimensional Box : Part II Uncertainty Principle
Lecture 13 - Lecture 13 - Particle in Two-dimensional Box : Part III Expectation Values
Lecture 14 - Lecture 14 - The Quantum Mechanics of Hydrogen Atom - Part I
Lecture 15 - Lecture 15 - The Quantum Mechanics of Hydrogen Atom - Part II
Lecture 16 - Lecture 16 - The Quantum Mechanics of Hydrogen Atom - Part III
Lecture 17 - Lecture 17 - The Quantum Mechanics of Hydrogen Atom - Part IV
Lecture 18 - Lecture 18 - The Quantum Mechanics of Hydrogen Atom - Part V
Lecture 19 - Lecture 19A - Assignment 1 Solution/Hints
Lecture 20 - Lecture 19B - Assignment 1 Solution/Hints
Lecture 21 - Lecture 19C - Assignment 1 Solution/Hints
Lecture 22 - Lecture 19D - Assignment 1 Solution/Hints
Lecture 23 - Lecture 19E - Assignment 1 Solution/Hints
Lecture 24 - Lecture 20 Harmonic Oscillator Model - Part I
Lecture 25 - Lecture 21 Harmonic Oscillator Model - Part II
Lecture 26 - Lecture 22 Harmonic Oscillator Model - Part III
Lecture 27 - Lecture 23 Harmonic Oscillator Model - Part IV
Lecture 28 - Lecture 24 Particle on a Ring - Part I
Lecture 29 - Lecture 25 Particle on a Ring - Part II

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Lecture 30 - Lecture 26 - HeisenbergÂ s Uncertainty Relation
Lecture 31 - Lecture 27A - Operators, Commutators, Eigenvalues and Eigenvectors
Lecture 32 - Lecture 27B - Operators, Commutators, Eigenvalues and Eigenvectors
Lecture 33 - Lecture 28 - Introduction to Chemical Applications
Lecture 34 - Lecture 29 - Radiation Densities and EinsteinÂ s Semiclassical model
Lecture 35 - Lecture 30 - Born Oppenheimer Approximation
Lecture 36 - Lecture 31 - Beer Lambert Law
Lecture 37 - Lecture 32 - Diatomic Vibrational Spectra Harmonic Model
Lecture 38 - Lecture 33 - Diatomic Vibration Morse Oscillator Model
Lecture 39 - Lecture 34 - Molecular Vibrations in Polyatomic Molecules - Qualitative Account
Lecture 40 - Lecture 35 - Polyatomic Vibrations - Illustrative examples of normal vibrations

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Introduction to Chemical Thermodynamics and Kinetics

Subject Co-ordinator - Prof.Arijit Kumar De

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Chemical Thermodynamics and Kinetics
Lecture 2 - Properties of gases - Part 1
Lecture 3 - Properties of gases - Part 2
Lecture 4 - Introduction - Part 1
Lecture 5 - Introduction - Part 2
Lecture 6 - First law - Part 1
Lecture 7 - First law - Part 2
Lecture 8 - First law - Part 3
Lecture 9 - First law - Part 4
Lecture 10 - First law - Part 5
Lecture 11 - Second law - Part 1
Lecture 12 - Second law - Part 2
Lecture 13 - Spontaneity and equilibrium - Part 1
Lecture 14 - Spontaneity and equilibrium - Part 2
Lecture 15 - Spontaneity and equilibrium - Part 3
Lecture 16 - Phase equilibrium - Part 1
Lecture 17 - Phase equilibrium - Part 2
Lecture 18 - Phase equilibrium - Part 3
Lecture 19 - Phase equilibrium - Part 4
Lecture 20 - Phase equilibrium - Part 5
Lecture 21 - Phase equilibrium - Part 6
Lecture 22 - Phase equilibrium - Part 7
Lecture 23 - Mixtures - Part 1
Lecture 24 - Mixtures - Part 2
Lecture 25 - Mixtures - Part 3
Lecture 26 - Mixtures - Part 4
Lecture 27 - Mixtures - Part 5
Lecture 28 - Chemical Equilibrium - Part 1
Lecture 29 - Chemical Equilibrium - Part 2

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Lecture 30 - Chemical Equilibrium - Part 3
Lecture 31 - Chemical Equilibrium - Part 4
Lecture 32 - Chemical Equilibrium - Part 5
Lecture 33 - Chemical equilibrium - Part 2B
Lecture 34 - Chemical equilibrium - Part 2C
Lecture 35 - Electrochemistry - Part 1
Lecture 36 - Electrochemistry - Part 2
Lecture 37 - Electrochemistry - Part 3
Lecture 38 - Surfaces and interfaces
Lecture 39 - Chemical Kinetics: Rate laws - Part 1
Lecture 40 - Chemical Kinetics: Rate laws - Part 2
Lecture 41 - Chemical Kinetics: Rate laws - Part 3
Lecture 42 - Chemical Kinetics: Rate laws - Part 4
Lecture 43 - Chemical Kinetics: Mechanisms - Part 1
Lecture 44 - Chemical Kinetics: Mechanisms - Part 2
Lecture 45 - Chemical Kinetics: Mechanisms - Part 3
Lecture 46 - Chemical Kinetics: Mechanisms - Part 4
Lecture 47 - Chemical Kinetics: Mechanisms - Part 5
Lecture 48 - Chemical Kinetics: Mechanisms - Part 6
Lecture 49 - Reaction dynamics - Part 1
Lecture 50 - Reaction dynamics - Part 2
Lecture 51 - Reaction dynamics - Part 3
Lecture 52 - Reaction dynamics - Part 4
Lecture 53 - Reaction dynamics - Part 5
Lecture 54 - Reaction dynamics - Part 6
Lecture 55 - Reaction dynamics - Part 7

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Crystallography

Subject Co-ordinator - Prof.Angshuman Roy Choudhury

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to X-Ray Crystallography
Lecture 2 - Sources of X-Rays, Crystal Systems and Bravais lattices
Lecture 3 - Crystallographic Symmetries
Lecture 4 - Equivalent Points and 1D Lattices
Lecture 5 - 5 Fold Symmetry and 2D Lattices
Lecture 6 - 2D Space Lattices
Lecture 7 - Crystallographic Point Groups
Lecture 8 - Stereographic Projections of Point Groups
Lecture 9 - Understanding of Crystallographic Space Groups
Lecture 10 - 2D Projection of Space Groups
Lecture 11 - Tutorial - 01
Lecture 12 - 3D Space Groups and Equivalent Points
Lecture 13 - Obtaining Equivalent Points by Shifting of Origin
Lecture 14 - Representation of Orthorhombic and Tetragonal Space Groups
Lecture 15 - Miller Indices for Crystallographic Directions and Planes
Lecture 16 - Miller Indices and Planar Densities
Lecture 17 - Tutorial - 02
Lecture 18 - Cubic Structues and atomic packing factors
Lecture 19 - Ceramic Structures
Lecture 20 - Theory of X-Ray Diffraction
Lecture 21 - Tutorial - 03
Lecture 22 - Origin of Reciprocal Lattice
Lecture 23 - Bragg's Law in Reciprocal Lattice and Origin of Systematic Absences
Lecture 24 - Systematic Absences and Crystallisation Methods
Lecture 25 - Special Method of Crystallisation
Lecture 26 - Tutorial
Lecture 27 - Single Crystal X-Ray Diffraction Data Collection
Lecture 28 - Diffractometers
Lecture 29 - Diffractometers and Detectors

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Lecture 30 - Laue's and Bragg's Analysis
Lecture 31 - Experimental Methods and Theoretical Understanding of X-Ray Diffraction
Lecture 32 - Derivation of Friedel's Law from Structure Factor by Vector Space Diagram
Lecture 33 - Structure Fcator and Electron Density
Lecture 34 - Systematic Absence Conditions from Special Structure Factor Expression
Lecture 35 - Structure Refinement
Lecture 36 - Single Crystal X-Ray Diffractometer
Lecture 37 - Understanding the X-Ray Data
Lecture 38 - Data Handling (Solution and Refinement) using Various Crystallographic Packages
Lecture 39 - Structure Solution using Apex II (Bruker Diffractometer)
Lecture 40 - Direct Methods - Part 1
Lecture 41 - Direct Methods - Part 2
Lecture 42 - Disorder Treatment using Olex 2
Lecture 43 - Cambridge Structure Database and its Application
Lecture 44 - Data Reduction - Absorption Correction
Lecture 45 - Data Reduction - Lorentz and Polarization Correction
Lecture 46 - Data Reduction - Scale and Temperature Factor
Lecture 47 - Identification from Intensity Statistics the Correct Crystal System and Presence of Inversion Ce
Lecture 48 - Identification from Intensity Statistics the presence of 2 fold axis in Lattice
Lecture 49 - Phase Problem
Lecture 50 - Direct Methods - Part 1
Lecture 51 - Direct Methods - Part 2
Lecture 52 - Sigma 1 and Triplet Relationship
Lecture 53 - Patterson Method
Lecture 54 - Powder X-Ray Diffractometer - Theory
Lecture 55 - Powder X-Ray Diffractometer - Lab
Lecture 56 - Polymorphs
Lecture 57 - Polymorphs
Lecture 58 - Review of Reciprocal Lattice
Lecture 59 - Review of Reciprocal Lattice
Lecture 60 - Review of Reciprocal Lattice and Bragg's Law in Reciprocal Lattice
Lecture 61 - Ewald's Sphere and Limiting Sphere
Lecture 62 - Origin of/Introduction to Systematic absences

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Advanced Chemical Thermodynamics and Kinetics

Subject Co-ordinator - Prof.Arijit Kumar De

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Classical Thermodynamics - 1
Lecture 2 - Review of Classical Thermodynamics - 2
Lecture 3 - Review of Classical Thermodynamics - 3
Lecture 4 - Review of Classical Thermodynamics - 4
Lecture 5 - Review of Classical Thermodynamics - 5
Lecture 6 - Molecular Interactions - 1
Lecture 7 - Molecular Interactions - 2
Lecture 8 - Molecular Interactions - 3
Lecture 9 - Molecular Interactions - 4
Lecture 10 - Molecular Interactions - 5
Lecture 11 - Transport Phenomena - 1
Lecture 12 - Transport Phenomena - 2
Lecture 13 - Transport Phenomena - 3
Lecture 14 - Review of Chemical Kinetics - 1
Lecture 15 - Review of Chemical Kinetics - 2
Lecture 16 - Review of Chemical Kinetics - 3
Lecture 17 - Review of Chemical Kinetics - 4
Lecture 18 - Review of Chemical Kinetics - 5
Lecture 19 - Advanced Topic in Chemical Kinetics - 1
Lecture 20 - Advanced Topic in Chemical Kinetics - 2
Lecture 21 - Advanced Topic in Chemical Kinetics - 3
Lecture 22 - Introduction to statistical thermodynamics - 1
Lecture 23 - Introduction to statistical thermodynamics - 2
Lecture 24 - Introduction to statistical thermodynamics - 3
Lecture 25 - Introduction to bimolecular reaction dynamics - 1
Lecture 26 - Introduction to bimolecular reaction dynamics - 2
Lecture 27 - Introduction to bimolecular reaction dynamics - 3
Lecture 28 - Introduction to bimolecular reaction dynamics - 4
Lecture 29 - Unimolecular reaction - 1

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Lecture 30 - Unimolecular reaction - 2
Lecture 31 - Introduction to solution phase reactions dynamics - 1
Lecture 32 - Introduction to solution phase reactions dynamics - 2
Lecture 33 - Introduction to solution phase reactions dynamics - 3
Lecture 34 - Introduction to solution phase reactions dynamics - 4
Lecture 35 - Introduction to solution phase reactions dynamics - 5
Lecture 36 - Non-ideal solutions, Activity of ions (Debye-Huckel theory) - 1
Lecture 37 - Non-ideal solutions, Activity of ions (Debye-Huckel theory) - 2
Lecture 38 - Electrochemistry
Lecture 39 - Electrochemistry
Lecture 40 - Reaction Dynamics
Lecture 41 - Chemical Kinetics
Lecture 42 - Transport Phenomena
Lecture 43 - Equilibrium constant using partition method
Lecture 44 - Photochemistry

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry: Atomic Structure and Chemical Bonding

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Welcome
Lecture 2 - Elementary Mathematical Functions Used in Our Course
Lecture 3 - Schrodinger Equation
Lecture 4 - Particle in a One dimensional Box
Lecture 5 - Elementary Mathematics
Lecture 6 - Elementary Mathematics
Lecture 7 - Elementary Mathematics
Lecture 8 - Elementary Mathematics
Lecture 9 - Particle in a Two Dimensional Box (Infinite Barrier)
Lecture 10 - Heisenbergâ s Uncertainty Principle
Lecture 11 - Expectation Values and Postulates in Quantum Mechanics
Lecture 12 - Problems and Solutions for Particle in One and Two Dimensional Boxes
Lecture 13 - Linear Vector Spaces
Lecture 14 - Linear Vector Spaces and Operators
Lecture 15 - Simple Harmonic Oscillator
Lecture 16 - Simple Harmonic Oscillator
Lecture 17 - Simple Harmonic Oscillator
Lecture 18 - Simple Harmonic Oscillator
Lecture 19 - Particle on a Ring
Lecture 20 - Particle on a Ring
Lecture 21 - Coordinate Transformation
Lecture 22 - Problems and Solutions for Harmonic Oscillator
Lecture 23 - Hydrogen Atom
Lecture 24 - Hydrogen Atom
Lecture 25 - Hydrogen Atom
Lecture 26 - Hydrogen Atom
Lecture 27 - Hydrogen Atom
Lecture 28 - Power Series Method for Differential Equation - I
Lecture 29 - Hermiteâ s Differential Equation

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Lecture 30 - Legendre and Associated Legendre Equation
Lecture 31 - Born-Oppenheimer Approximation
Lecture 32 - Introduction to Angular Momentum
Lecture 33 - Spin Â½ Angular Momentum
Lecture 34 - Spin Angular Momentum and Coupling of Two Spin-1/2 Angular Momenta
Lecture 35 - Coupling of Two Angular Momenta
Lecture 36 - Video Tutorial for Hermite polynomials and hydrogen atom - Part 1
Lecture 37 - Video Tutorials - Part 2
Lecture 38 - Variational Principle in Quantum Chemistry
Lecture 39 - Introduction to Variational Principle in Quantum Chemistry
Lecture 40 - Variational Method
Lecture 41 - Hydrogen Molecule Ion
Lecture 42 - Hydrogen Molecule Ion
Lecture 43 - Hydrogen Molecule
Lecture 44 - Hydrogen Molecule
Lecture 45 - Video Tutorials on Angular Momentum (Orbital and Spin) and Variational Method - Part 1
Lecture 46 - Video Tutorials on Angular Momentum (Orbital and Spin) and Variational Method - Part 2
Lecture 47 - Introduction to Quantum Mechanical Perturbation Theory
Lecture 48 - First Order Time Independent perturbation Theory for Non-Degenerate states
Lecture 49 - First and Second Order Time Independent Perturbation Theory for Non-Degenerate States
Lecture 50 - First and Second Order Time Independent Perturbation Theory
Lecture 51 - Time Independent Perturbation Theory for Degenerate States
Lecture 52 - General MO method for Homonuclear Diatomic Molecules
Lecture 53 - General MO method for Heteronuclear Diatomic Molecules
Lecture 54 - Introduction to Hybridization and Valence Bond for Polyatomic Molecules
Lecture 55 - HÃ ckel Molecular Orbital Theory - I
Lecture 56 - HÃ ckel Molecular Orbital Theory - II

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Electrochemical Impedance Spectroscopy

Subject Co-ordinator - Dr. S. Ramanathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electrochemistry, double layer, 3 electrode systems, supporting electrolyte
Lecture 2 - Rate constant, concept of impedance, Z of electrical elements, differential impedance
Lecture 3 - Time domain results
Lecture 4 - Graphical representation of data (Complex plane, Bode)
Lecture 5 - Introduction to other techniques
Lecture 6 - Tutorial 01
Lecture 7 - Type of analyzers, single and multi sine
Lecture 8 - FFT details, frequency range and resolution, cross correlation
Lecture 9 - Multi sine, odd harmonic, non-harmonics, crest factor, spectral leakage
Lecture 10 - Windowing
Lecture 11 - Tutorial 02
Lecture 12 - Introduction to KKT
Lecture 13 - Linearity, causality, stability, impedance vs. admittance, measurement model
Lecture 14 - Linear KKT illustration
Lecture 15 - Tutorial 03
Lecture 16 - Introduction to EEC, Choice of circuits, confidence intervals, AIC
Lecture 17 - EEC fitting, initial values, distinguishability
Lecture 18 - Zero/pole representation, Rt and Rp
Lecture 19 - Maxwell, Voigt, Ladder circuits, choice of initial values illustrated
Lecture 20 - Tutorial 04
Lecture 21 - Simple electron transfer reaction
Lecture 22 - Two step reaction with an intermediate (1 of 3)
Lecture 23 - Two step reaction with an intermediate (2 of 3)
Lecture 24 - Two step reaction with an intermediate (3 of 3)
Lecture 25 - E-EAR reaction, negative resistance (1 of 2)
Lecture 26 - E-EAR reaction, negative resistance (2 of 2)
Lecture 27 - Three step reaction with two adsorbed intermediates
Lecture 28 - Catalytic mechanism
Lecture 29 - Examples with Frumkin or Temkin isotherms

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Lecture 30 - Challenges in RMA
Lecture 31 - Patterns Reported in Experiments
Lecture 32 - Warburg part - 1
Lecture 33 - Warburg part - 2
Lecture 34 - Warburg part - 3
Lecture 35 - Bounded Warburg
Lecture 36 - CPE
Lecture 37 - Porous electrodes
Lecture 38 - Films, PDM
Lecture 39 - PDM
Lecture 40 - Applications
Lecture 41 - NLEIS. Introduction and mathematical background
Lecture 42 - Electron Transfer reaction
Lecture 43 - Two step reaction
Lecture 44 - Two step reaction (Continued...)
Lecture 45 - Rt and Rp estimation
Lecture 46 - Galvanostatic simulations
Lecture 47 - Instabilities
Lecture 48 - Solution resistance effects
Lecture 49 - Detection on nonlinearities using KKT
Lecture 50 - Frumkin and Temkin isotherms
Lecture 51 - NLEIS Experimental aspects. FFT, PSD, THD
Lecture 52 - Application - other techniques HA, EFM

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Medicinal Chemistry

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Medicinal Chemistry - Part I
Lecture 2 - Introduction to Medicinal Chemistry - Part II
Lecture 3 - Intermolecular Binding Forces
Lecture 4 - Protein Structure and Function
Lecture 5 - Tutorial 1 - Acidity, Basicity and Related concepts
Lecture 6 - Tutorial 2 - Basic Concepts of Thermodynamics and Kinetics
Lecture 7 - Enzyme Catalysis - Part I
Lecture 8 - Enzyme Catalysis - Part II
Lecture 9 - Tutorial 3 - Binding Forces, Protein Structure and Function
Lecture 10 - Introduction to Receptors
Lecture 11 - Receptor Types and Functions
Lecture 12 - Tutorial 4 - Receptors, Binding Interactions, Ion Channels
Lecture 13 - Nucleic Acids
Lecture 14 - RNA and Protein Synthesis
Lecture 15 - Tutorial 5 - Nucleic acids, and Basics of Molecular Biology
Lecture 16 - Enzymes as Drug Targets
Lecture 17 - Enzyme Kinetics and Inhibition
Lecture 18 - Tutorial 6 - Enzyme Kinetics, Various Modes of Inhibition etc.
Lecture 19 - Receptors as Drug Targets - Part I
Lecture 20 - Receptors as Drug Targets - Part II
Lecture 21 - Tutorial 7 - Receptor-Drug Interactions, Stereochemistry, Chirality, Nomenclature
Lecture 22 - Receptor-Drug Interactions.
Lecture 23 - Stereochemistry and Conformation
Lecture 24 - Tutorial 8 - Determination of Drug-Receptor Interactions, Conformation of Cyclic and Acyclic Str
Lecture 25 - Nucleic Acids as Drug Targets - Part I
Lecture 26 - Nucleic Acids as Drug Targets - Part II
Lecture 27 - Miscellaneous Drug Targets
Lecture 28 - Tutorial 9 - Nucleic Acids and Related Topics
Lecture 29 - Mechanisms in Biological Chemistry - Part I

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Lecture 30 - Mechanisms in Biological Chemistry - Part II
Lecture 31 - Mechanisms in Biological Chemistry - Part III
Lecture 32 - Pharmacokinetics - Part I
Lecture 33 - Pharmacokinetics - Part II
Lecture 34 - Drug Metabolism - Part I
Lecture 35 - Drug Metabolism - Part II
Lecture 36 - Drug Metabolism - Part III
Lecture 37 - Drug Metabolism - Part IV
Lecture 38 - Tutorial 10 - ADME
Lecture 39 - Drug Administration Routes - Part I
Lecture 40 - Drug Administration Routes - Part II
Lecture 41 - Finding a Lead - Part I
Lecture 42 - Finding a Lead - Part II
Lecture 43 - Drug Screening
Lecture 44 - Tutorial 11 - Drug administration routes and finding a lead
Lecture 45 - Optimizing Drug-Target Interactions - Part I
Lecture 46 - Optimizing Drug-Target Interactions - Part II
Lecture 47 - Optimizing Drug-Target Interactions - Part III
Lecture 48 - Optimizing Drug-Target Interactions - Part IV
Lecture 49 - Tutorial 12
Lecture 50 - Optimizing Access to the Target
Lecture 51 - Prodrugs
Lecture 52 - Prodrugs and Drug Alliances
Lecture 53 - Endogenous Compounds, Peptidomimetics and Oligonucleotides as Drugs
Lecture 54 - Tutorial 13- Optimizing Access-Prodrugs
Lecture 55 - Combinatorial and parallel synthesis
Lecture 56 - Computer in Medicinal Chemistry
Lecture 57 - Antibacterial agents - 1
Lecture 58 - Antibacterial agents - 2
Lecture 59 - Tutorial14-Combinatorial and parallel synthesis, computers in med chem and anti-bacterial agents
Lecture 60 - Anti-viral agents - 1
Lecture 61 - Anti-viral agents - 2
Lecture 62 - Anti-cancer agents - 1
Lecture 63 - Anti-cancer agents - 2
Lecture 64 - Cholinergics
Lecture 65 - Anti-ulcer agents
Lecture 66 - QSAR - 1
Lecture 67 - QSAR - 2
Lecture 68 - QSAR - 3

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Lecture 69 - Drug Resistance and Synergy

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Principles-II

Subject Co-ordinator - Prof. Arnab Mukherjee

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to The Thermodynamics
Lecture 2 - History of Thermodynamic
Lecture 3 - Thermodynamic Systems and Variables
Lecture 4 - Zeroth Law of Thermodynamic
Lecture 5 - Microscopic Definition of Temperature - Part 1
Lecture 6 - Microscopic Definition of Temperature - Part 2
Lecture 7 - Different Forms of Energy
Lecture 8 - Real Gas and Virial Equation
Lecture 9 - Van der Waals Gas
Lecture 10 - Work and Heat - Part 1
Lecture 11 - Work and Heat - Part 2
Lecture 12 - First Law of Thermodynamics
Lecture 13 - Microscopic Definition of Heat and Work
Lecture 14 - Work done at a Constant Temperature
Lecture 15 - Heat is a path function
Lecture 16 - Joule-Thomson Effect (For Ideal Gases)
Lecture 17 - Joule-Thomson Effect (For Van der Waals gas)
Lecture 18 - Adiabatic Reversible Work
Lecture 19 - Adiabatic Irreversible Work
Lecture 20 - Tutorial Problem - 1
Lecture 21 - Tutorial Problem - 2
Lecture 22 - Thermochemistry - Part 1
Lecture 23 - Thermochemistry - Part 2
Lecture 24 - Second Law of Thermodynamics
Lecture 25 - Statements of the Second Law of Thermodynamics
Lecture 26 - Carnot Cycle and Definition of Entropy
Lecture 27 - Ideal Stirling Engine
Lecture 28 - Gasoline Engine and Diesel Engine
Lecture 29 - CarnotÃ¢â ¬â ¢ Cycle

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Lecture 30 - Thermodynamic Temperature
Lecture 31 - Definition of Entropy
Lecture 32 - Tutorial Problem - 3
Lecture 33 - Tutorial Problem - 4
Lecture 34 - Tutorial Problem - 5
Lecture 35 - Tutorial Problem - 6
Lecture 36 - Tutorial Problem - 7
Lecture 37 - Tutorial Problem - 8
Lecture 38 - Statistical Formulation of the Second Law
Lecture 39 - Probability
Lecture 40 - Microstates and Distributions
Lecture 41 - Permutation and Combination
Lecture 42 - Two-Level Systems
Lecture 43 - Most Probable Distribution
Lecture 44 - Calculation with Multi-Level systems
Lecture 45 - Calculation with Multi-Level systems with fixed energy - Part 1
Lecture 46 - Calculation with Multi-Level systems with fixed energy - Part 2
Lecture 47 - Calculation with Multi-Level systems with fixed energy - Part 3
Lecture 48 - Bose-Einstein, Fermi-Dirac and Maxwell-Boltzmann distribution
Lecture 49 - Most Probable Distribution is the Boltzmann Distribution
Lecture 50 - Demonstration of Boltzmann Distribution
Lecture 51 - Estimating Entropy for Various Processes
Lecture 52 - Microscopic equivalent of Heat and Work
Lecture 53 - Probability and Boltzmann Distribution
Lecture 54 - Thermodynamic Observables
Lecture 55 - Tutorial Problem - 9
Lecture 56 - Tutorial Problem - 10
Lecture 57 - Tutorial Problem - 11
Lecture 58 - Tutorial Problem - 12
Lecture 59 - Thermodynamic free energy
Lecture 60 - Condition for Spontaneity
Lecture 61 - Legendre Transformation of Thermodynamic Potentials
Lecture 62 - Maxwell Relations and Applications
Lecture 63 - Thermodynamic Relations using Jacobian Method - Part 1
Lecture 64 - Thermodynamic Relations using Jacobian Method - Part 2
Lecture 65 - Tutorial Problem - 13
Lecture 66 - Tutorial Problem - 14
Lecture 67 - Tutorial Problem - 15
Lecture 68 - Tutorial Problem - 16

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Lecture 69 - Chemical Principle II - Overview and Road Ahead

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NPTEL Video Course - Chemistry and Biochemistry - Organic Chemistry Lab Certification

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IISER PUNE

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Feedback on Techniques in Organic Chemistry
Lecture 2 - Introduction to Claesen - Condensation
Lecture 3 - Introduction to Claesen - Condensation
Lecture 4 - How to separate different components from a mixture using column chromatography
Lecture 5 - Flurescence phenomenon
Lecture 6 - Reaction Mechanism and Sterochemistry
Lecture 7 - Chemiluminescence Phenomenon
Lecture 8 - Post Lab Questions

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Introductory Organic Chemistry-I

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Structure of atom and molecules
Lecture 2 - Introduction to Molecular Orbital Theory - Part 1
Lecture 3 - Introduction to Molecular Orbital Theory - Part 2
Lecture 4 - Tutorial 01
Lecture 5 - Learning Objectives for week 2
Lecture 6 - Alkanes and Cycloalkanes - Part 1
Lecture 7 - Alkanes and Cycloalkanes - Part 2
Lecture 8 - Conformational Analysis of Cyclohexane - Part 1
Lecture 9 - Conformational Analysis of Cyclohexane - Part 2
Lecture 10 - Physical Properties of Alkanes
Lecture 11 - Nomenclature of Alkanes, Cycloalkanes and Bicycloalkanes
Lecture 12 - Tutorial 02
Lecture 13 - Learning Objectives for week 3
Lecture 14 - Chirality and Stereochemistry - Part 1
Lecture 15 - Chirality and Stereochemistry - Part 2
Lecture 16 - Chirality and Stereochemistry - Part 3
Lecture 17 - Tutorial 03
Lecture 18 - Learning Objectives for week 4
Lecture 19 - Acids and Bases - Part 1
Lecture 20 - Acids and Bases - Part 2
Lecture 21 - Acids and Bases - Part 3
Lecture 22 - Tutorial 04
Lecture 23 - Learning Objectives for week 5
Lecture 24 - Arrow Pushing mechanism in Organic Chemistry
Lecture 25 - Alkenes_Structure, Properties and Nomenclature
Lecture 26 - Reactions of Alkenes - Part 1
Lecture 27 - Reactions of Alkenes - Part 2
Lecture 28 - Reactions of Alkenes - Part 3
Lecture 29 - Tutorial 05 - Part 1

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Lecture 30 - Tutorial 05 - Part 2
Lecture 31 - Learning Objectives for week 6
Lecture 32 - Reactions of Alkenes - Part 4
Lecture 33 - Reactions of Alkenes - Part 5
Lecture 34 - Alkynes
Lecture 35 - Reactions of Alkynes - Part 1
Lecture 36 - Reactions of Alkynes - Part 2
Lecture 37 - Tutorial-6
Lecture 38 - Learning Objectives for week 7
Lecture 39 - Substitution and Elimination - Part 1
Lecture 40 - Substitution and Elimination - Part 2
Lecture 41 - Substitution and Elimination - Part 3
Lecture 42 - Substitution and Elimination - Part 4
Lecture 43 - Substitution and Elimination - Part 5
Lecture 44 - Tutorial-7
Lecture 45 - Learning Objectives for week 8
Lecture 46 - Alcohols - Part 1
Lecture 47 - Alcohols - Part 2
Lecture 48 - Alcohols - Part 3
Lecture 49 - Ethers and Epoxides - Part 1
Lecture 50 - Ethers and Epoxides - Part 2
Lecture 51 - Aromaticity
Lecture 52 - Tutorial-8

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantitative Methods in Chemistry

Subject Co-ordinator - Prof. Aasheesh Srivastava, Prof. Bharathwaj Sathyamoorthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A brief history of the beginnings of quantitation in Chemistry, defining chemical stoichiometry a
Lecture 2 - Defining Molality and Normality, relationship with Molarity
Lecture 3 - Defining other parameters for concentration (%, ppm/ppb, p-value)
Lecture 4 - Relationship between various concentration parameters
Lecture 5 - Problems on acid-base equilibria, calculation of pH of strong and weak acids
Lecture 6 - Brief introduction to normal distribution and statistical analysis
Lecture 7 - Using a spreadsheet towards basic statistical analysis, exact equation of error propagation, accu
Lecture 8 - Error propagation and its application to a few examples, significant figures
Lecture 9 - Introduction to use spreadsheets to analyze errors, reiteration of significant figures, repeats a
Lecture 10 - Classification of errors
Lecture 11 - A look at uncertainties in a measurement taking an example
Lecture 12 - A comprehensive and step-wise look at an experimental protocol towards understanding systematic
Lecture 13 - Introductory Statistics - Part 1
Lecture 14 - Introductory Statistics - Part 2
Lecture 15 - Hypothesis testing and Finding Outliers - Part 1
Lecture 16 - Hypothesis testing and Finding Outliers - Part 2
Lecture 17 - Pooling of data
Lecture 18 - Introduction to Analysis of Variance (ANOVA) and comparing precisions
Lecture 19 - Protocol for undertaking ANOVA - Part 1
Lecture 20 - Protocol for undertaking ANOVA - Part 2
Lecture 21 - ANOVA and Least Significant Difference (LSD)
Lecture 22 - ANOVA and solved Least Significant Difference example
Lecture 23 - Using spreadsheet software to perform data analysis towards calibrating a burette
Lecture 24 - Using spreadsheet to analyze linear dependence between two variables
Lecture 25 - Using spreadsheet and MATLAB towards data analysis with example of rate kinetics
Lecture 26 - Simulating simple straight lines and kinetic curves using MATLAB
Lecture 27 - Simulating the Michaelis Menten kinetics using MATLAB
Lecture 28 - Curve fitting and simulating with variance for the Michaelis Menten kinetics using MATLAB
Lecture 29 - Standards and Volumetric/Gravimetric titrations - Part 1

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Lecture 30 - Standards and Volumetric/Gravimetric titrations - Part 2
Lecture 31 - Standards and Volumetric/Gravimetric titrations - Part 3
Lecture 32 - Standards and Volumetric/Gravimetric titrations - Part 4
Lecture 33 - Standards and Volumetric/Gravimetric titrations - Part 5
Lecture 34 - Analytical Separations - Multistage extractions - Part 1
Lecture 35 - Analytical Separations - Multistage extractions - Part 2
Lecture 36 - Analytical Separations - Chromatography - Part 1
Lecture 37 - Analytical Separations - Chromatography - Part 2
Lecture 38 - Analytical Separations - Electrophoresis, Capillary electrophoresis, Isoelectric Focusing
Lecture 39 - Basics of Chromatography - Part 1
Lecture 40 - Basics of Chromatography - Part 2
Lecture 41 - Chromatography - Concept of Theoretical plates
Lecture 42 - Chromatography - Rate Theory
Lecture 43 - Practice of Chromatography - HPLC
Lecture 44 - Practice of Chromatography - Gas Chromatography
Lecture 45 - Supercritical Fluid Chromatography
Lecture 46 - Detectors employed during chromatographic separations
Lecture 47 - Course Revision
Lecture 48 - Course Revision - Week 1 to 3
Lecture 49 - Course Revision - Week 4 and 5
Lecture 50 - Course Revision - Week 6 and 7
Lecture 51 - Course Revision - Week 8 to 11

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Fundamentals of Spectroscopy

Subject Co-ordinator - Prof. Sayan Bagchi, Prof. Anirban Hazra

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Spectroscopy
Lecture 2 - Introduction to Quantum Mechanics - I
Lecture 3 - Introduction to Quantum Mechanics - II
Lecture 4 - A Simple Quantum Mechanical System
Lecture 5 - Spectroscopic Transitions
Lecture 6 - Intensity of a Transtion Depends on the Transition Dipole Moment - I
Lecture 7 - Intensity of a Transtion Depends on the Transition Dipole Moment - II
Lecture 8 - Comparision between Chemical Reactions and Spectroscopic Transitions
Lecture 9 - Lineshape Analysis
Lecture 10 - Different Forms of Spectroscopy
Lecture 11 - Spectroscopic Timescales
Lecture 12 - Correspondence between Linear Motion and Rotational Motion
Lecture 13 - Diatomic Rigid Rotor
Lecture 14 - Selection Rules and Rotational Spectrum
Lecture 15 - Isotope effect
Lecture 16 - Degeneracy
Lecture 17 - Intensities of Rotational Lines
Lecture 18 - Non Rigid Rotor
Lecture 19 - Polyatomic Molecules - I
Lecture 20 - Polyatomic Molecules - II and Numericals
Lecture 21 - Origin of the Rotational Selection Rule
Lecture 22 - Simple Harmonic Oscillator
Lecture 23 - Energy Levels
Lecture 24 - Selection Rules
Lecture 25 - Anharmonicity
Lecture 26 - Effects of Anharmonicity
Lecture 27 - Ro-vibrational Spectrum - I
Lecture 28 - Ro-vibrational Spectrum - II
Lecture 29 - Harmonic Oscillator Eigenvalues and Eigenfunctions - I

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Lecture 30 - Harmonic Oscillator Eigenvalues and Eigenfunctions - II
Lecture 31 - Vibration of a Diatomic Molecule and Derivation of the Vibrational Selection Rule
Lecture 32 - Ro-vibrational Spectrum - III
Lecture 33 - Vibration of Polyatomic Molecules - I
Lecture 34 - Vibration of Polyatomic Molecules - II
Lecture 35 - Vibration of Polyatomic Molecules - III
Lecture 36 - Normal Mode Coordinates
Lecture 37 - Introduction to Raman Spectroscopy
Lecture 38 - Quantum theory of Raman effect
Lecture 39 - Rotational Raman Spectroscopy
Lecture 40 - Nuclear Spin Statistics
Lecture 41 - Polarizability and Polarizability Ellipsoid
Lecture 42 - Raman Activity of Vibrations
Lecture 43 - Vibrational Raman Spectroscopy
Lecture 44 - Polarization Effects and Numericals
Lecture 45 - Resonance Spectroscopy - Introduction 1
Lecture 46 - Resonance Spectroscopy - Introduction 2
Lecture 47 - NMR Spectroscopy - 1
Lecture 48 - NMR Spectroscopy - 2
Lecture 49 - NMR Spectroscopy - 3
Lecture 50 - NMR Spectroscopy - 4
Lecture 51 - NMR Spectroscopy - 5
Lecture 52 - NMR Spectroscopy - 6
Lecture 53 - ESR Spectroscopy - 1
Lecture 54 - ESR Spectroscopy - 2
Lecture 55 - ESR Spectroscopy - 3
Lecture 56 - ESR Spectroscopy - 4
Lecture 57 - Electronic Spectroscopy - 1
Lecture 58 - Electronic Spectroscopy - 2
Lecture 59 - Electronic Spectroscopy - 3
Lecture 60 - Electronic Spectroscopy - 4
Lecture 61 - Electronic Spectroscopy - 5

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry, Stereochemistry and Applications

Subject Co-ordinator - Prof. Angshuman Roy Choudhury

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to stereochemistry
Lecture 2 - Nomenclature of Various Organic Molecules
Lecture 3 - Nomenclature of Cyclic molecules and other functional groups
Lecture 4 - Nomenclature of some complex molecules
Lecture 5 - Practising naming of molecules
Lecture 6 - Symmetry, Stereochemistry and Applications
Lecture 7 - Symmetry elements in organic molecules
Lecture 8 - Molecular point groups - Part I
Lecture 9 - Molecular point groups - Part II
Lecture 10 - Conformations and Configurations
Lecture 11 - Conformational Analysis - Part I
Lecture 12 - Conformational Analysis - Part II
Lecture 13 - Chair and Boat Conformation of Cyclohexane
Lecture 14 - Conformational Analysis of Disubstituted Cyclohexane Molecules
Lecture 15 - Isomerism and Representation of Isomers
Lecture 16 - Stereoisomerism
Lecture 17 - Drawing One Projection from Another
Lecture 18 - Optical Activity of Organic Molecules and Isomerism
Lecture 19 - Allenes and Biphenyls
Lecture 20 - Absolute Configuration in Biphenyls and D/L Systems
Lecture 21 - Asymmetry and Dissymmetry Molecules
Lecture 22 - Stereoisomerism and Local Symmetry
Lecture 23 - Topicity of Ligands
Lecture 24 - Topicity of Faces
Lecture 25 - Problems on Isomers and Topicity
Lecture 26 - Diastereomerism in Ring System - Part 1
Lecture 27 - Diastereomerism in Ring System - Part 2
Lecture 28 - Diastereomerism in Ring System - Part 3
Lecture 29 - Diastereomerism in PI System

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Lecture 30 - Nucleophilic Reactions
Lecture 31 - Mechanism of Nucleophilic Substitution Reaction
Lecture 32 - Stability of Carbocation
Lecture 33 - Elimination Reactions
Lecture 34 - Substitution VS Elimination Reactions
Lecture 35 - Addition Reactions to Alkenes and Alkynes - Part 1
Lecture 36 - Addition Reactions to Alkenes and Alkynes - Part 2
Lecture 37 - Oxidizing Agents in Organic Chemistry and Organometallic Compounds
Lecture 38 - Some Problems and their Answers in Stereochemistry
Lecture 39 - Dynamic Stereochemistry - Part 1
Lecture 40 - Dynamic Stereochemistry - Part 2
Lecture 41 - Reaction Specificity and Selectivity
Lecture 42 - Cram's Rule and Felkin-Anh Model
Lecture 43 - Kinetics of Organic Reactions
Lecture 44 - Name Reactions and Their Mechanism - Part 1
Lecture 45 - Name Reactions and Their Mechanism - Part 2
Lecture 46 - Modifications of Diels-Alder Reaction
Lecture 47 - Name Reactions and Their Mechanism - Part 3
Lecture 48 - Name Reactions and Their Mechanism - Part 4
Lecture 49 - Rearrangement Reactions in Organic Chemistry - Part 1
Lecture 50 - Rearrangement Reactions in Organic Chemistry - Part 2
Lecture 51 - Rearrangement Reactions in Organic Chemistry - Part 3
Lecture 52 - Rearrangement Reactions in Organic Chemistry - Part 4
Lecture 53 - Brief introduction to crystallographic symmetry
Lecture 54 - Symmetries in X-ray Crystallography
Lecture 55 - 2D lattices and space groups
Lecture 56 - 3D crystallographic point groups and space groups

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry and Group Theory (2021)

Subject Co-ordinator - Prof. Jeetender Chugh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Contents
Lecture 2 - Symmetry and Parity Operator
Lecture 3 - Symmetry Elements and Operations - Part 1
Lecture 4 - Symmetry Elements and Operations - Part 2
Lecture 5 - Planes and Reflections
Lecture 6 - Tutorial - 1
Lecture 7 - Coordinate System and Inversion Center
Lecture 8 - Improper axis and improper rotation
Lecture 9 - Solved Examples of Symmetry Elements and Operations
Lecture 10 - Product of Symmetry Operations
Lecture 11 - Tutorial - 2
Lecture 12 - Symmetry Point Groups - Part 1
Lecture 13 - Symmetry Point Groups - Part 2
Lecture 14 - Symmetry Point Groups - Part 3
Lecture 15 - Dipole Moment and Optical Acitivity
Lecture 16 - Tutorial - 3
Lecture 17 - Point Group Definition and Examples
Lecture 18 - Sub-Group and Classes
Lecture 19 - Matrix Representation of Symmetry Operations
Lecture 20 - Matrix Representation of Point Group
Lecture 21 - Tutorial - 4
Lecture 22 - Matrix Representation of Point Group
Lecture 23 - Reducible and Irreducible Representations
Lecture 24 - Great Orthogonality Theorem
Lecture 25 - Properties of Great Orthogonality Theorem
Lecture 26 - Tutorial - 5
Lecture 27 - Irreducible Representation using GOT
Lecture 28 - Reducible to Irreducible Representation using GoT
Lecture 29 - Character Table and Mulliken Symbols

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Lecture 30 - How to write a complete character table
Lecture 31 - Tutorial - 6
Lecture 32 - Representations of a cyclic group
Lecture 33 - Group Theory and Quantum Mechanics
Lecture 34 - 1) Degenerate Eigen Functions 2) Direct Product
Lecture 35 - Direct Product
Lecture 36 - Tutorial - 7
Lecture 37 - Direct Product Applications - Part 1
Lecture 38 - Direct Product Applications - Part 2
Lecture 39 - Symmetry Adapted Linear Combinations - Part 1
Lecture 40 - Symmetry Adapted Linear Combinations - Part 2
Lecture 41 - Tutorial - 8
Lecture 42 - Incomplete Projection Operator
Lecture 43 - SALC using Projection Operator
Lecture 44 - Symmetry and Chemical Bonding
Lecture 45 - Valence Bond Theory
Lecture 46 - Tutorial - 9
Lecture 47 - Molecular Orbital Theory
Lecture 48 - Localised MO Theory
Lecture 49 - Delocalized MO Theory - Part 1
Lecture 50 - Delocalized MO Theory - Part 2
Lecture 51 - Ascent and Descent in Symmetry - Part 1
Lecture 52 - Ascent and Descent in Symmetry - Part 2
Lecture 53 - Crystal Field Theory - Part 1
Lecture 54 - Crystal Field Theory - Part 2
Lecture 55 - Jahn-Teller Distortion - Part 1
Lecture 56 - Jahn-Teller Distortion - Part 2
Lecture 57 - Introduction to Spectroscopy - Part 1
Lecture 58 - Introduction to Spectroscopy - Part 2
Lecture 59 - Vibrational Spectroscopy
Lecture 60 - 1) Raman Spectroscopy and 2) Atomic Motions
Lecture 61 - Symmetry of Normal Modes of Vibration
Lecture 62 - Visualizing Molecular Vibrations using Internal Coordinates
Lecture 63 - Spectral Transition Probabilities - Part 1
Lecture 64 - Spectral Transition Probabilities - Part 2

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Introductory Organic Chemistry - II

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IISER - Pune

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Essentials of NMR Spectroscopy - Part 1
Lecture 3 - Essentials of NMR Spectroscopy - Part 2
Lecture 4 - Essentials of NMR Spectroscopy - Part 3
Lecture 5 - Electrophilic Aromatic Substitution - Part 1
Lecture 6 - Electrophilic Aromatic Substitution - Part 2
Lecture 7 - Electrophilic Aromatic Substitution - Part 3
Lecture 8 - Tutorial - 1
Lecture 9 - Introduction - 2
Lecture 10 - Electrophilic Aromatic Substitution in Phenols
Lecture 11 - EAS_Effect of Electron Donating group
Lecture 12 - EAS_Effect of Electron Withdrawing group
Lecture 13 - Nucleophilic aromatic substitution - Part 1
Lecture 14 - Nucleophilic aromatic substitution - Part 2
Lecture 15 - Special Topic_Hammond's Postulate
Lecture 16 - Tutorial-2 - Part 1
Lecture 17 - Tutorial-2 - Part 2
Lecture 18 - Essentials of IR Spectroscopy
Lecture 19 - Introduction - 3
Lecture 20 - Basics of Carbonyl Compounds
Lecture 21 - Addition Reactions on Carbonyl functional group
Lecture 22 - Addition Reactions on Carbonyl functional group
Lecture 23 - Nucleophilic Addition Reactions and its stereochemistry
Lecture 24 - Nucleophilic Addition Reactions and its Stereochemistry
Lecture 25 - Tutorial - 3
Lecture 26 - Introduction - 4
Lecture 27 - Carboxylic acid and its derivatives - Part 1
Lecture 28 - Carboxylic acid and its derivatives - Part 2
Lecture 29 - Reactions of Carboxylic acid and its derivatives

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Lecture 30 - Alcohols, Ethers, and Epoxides
Lecture 31 - Tutorial - 4
Lecture 32 - Special Topic - E1CB reaction
Lecture 33 - Introduction - 5
Lecture 34 - Enols and Enolates_Intro
Lecture 35 - Enols and Enolates_Molecular Orbital Picture
Lecture 36 - Reactions of Enols and Enolates
Lecture 37 - Tutorial - 5A
Lecture 38 - Tutorial - 5B
Lecture 39 - Introduction - 6
Lecture 40 - Active methylene group
Lecture 41 - Aldol and related Reactions
Lecture 42 - Aldol Reactions: Specific enol equivalents - Part 1
Lecture 43 - Aldol Reactions: Specific enol equivalents - Part 2
Lecture 44 - Tutorial - 6
Lecture 45 - Introduction - 7
Lecture 46 - Conjugate Addition:1,2-addition and 1,4-addition
Lecture 47 - Conjugate Addition: Kinetic versus thermodynamic products
Lecture 48 - Conjugate Addition: Hard and Soft nucleophiles
Lecture 49 - Enol and Enolate alkylation
Lecture 50 - Regioselectivity of alkylation reactions
Lecture 51 - Acylation of enol/enolates and related Name Reactions
Lecture 52 - Tutorial-7: Felkin-Ahn Problems
Lecture 53 - Introduction - 8
Lecture 54 - Rearrangements - Part 1
Lecture 55 - Rearrangements - Part 2
Lecture 56 - Rearrangements - Part 3
Lecture 57 - Rearrangements - Part 4
Lecture 58 - Named Reactions - Part 1
Lecture 59 - Named Reactions - Part 2
Lecture 60 - Tutorial - 8
Lecture 61 - Conclusion

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Elementary Electrochemistry

Subject Co-ordinator - Prof. Angshuman Roy Choudhury

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Elementary Electrochemistry
Lecture 2 - The Laws of Electrochemistry and Electrolysis
Lecture 3 - Applications of Faraday's Laws of Electrolysis
Lecture 4 - Electrolytic Conduction: Arrhenius Theory of Electrolytic Dissociation
Lecture 5 - Electrochemical/Galvanic Cell: Construction and Cell Reactions
Lecture 6 - Numerical Problems on Faraday's Laws of Electrolysis
Lecture 7 - Estimation of EMF of a Cell Using Potentiometer
Lecture 8 - EMF of a Cell and Free Energy Change of a Reaction
Lecture 9 - EMF of a Cell and Equilibrium Constant of a Reaction: The Nernst Equation
Lecture 10 - Various Types of Electrodes (Glass,SHE,Calomel) in Electrochemistry
Lecture 11 - Electrode Potential and Applications of Nernst Equation
Lecture 12 - Numerical Problems: Nernst Equation, EMF of Half Cell Reactions
Lecture 13 - Measurement of Cell EMF
Lecture 14 - Electrochemical Cells: Liquid Junction Potential
Lecture 15 - Electrolytic Solutions: Determination of Activity Coefficient
Lecture 16 - Theory of Potentiometric Titrations
Lecture 17 - Preparation of Primary Standard and Standardization of NaOH
Lecture 18 - Potentiometric Titration of Strong Acid and Strong Base
Lecture 19 - Potentiometric Titration of Weak Acid with Strong Base
Lecture 20 - Potentiometric Titration of Dibasic Acid with Strong Base
Lecture 21 - Experimental Calculation of Potentiometric Titrations
Lecture 22 - Conductance and Conductivity of the Solution
Lecture 23 - Experimental Methods to Determine Transport Number
Lecture 24 - Experimental Method to Calculate Transport Number
Lecture 25 - Electrolytic Solutions
Lecture 26 - Conductance Measurement
Lecture 27 - Variation of Conductance with Concentration
Lecture 28 - Ionic Mobilities in terms of ion Conductivities
Lecture 29 - Application of Conductance Measurement - Part 1

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Lecture 30 - Application of Conductance Measurement - Part 2
Lecture 31 - Activities in Electrolytic Solutions
Lecture 32 - Ionic Strength of an Electrolyte and its Importance
Lecture 33 - Hydration of Ions and Their Ionic Mobility
Lecture 34 - Solubility and Activity Product
Lecture 35 - Applications of EMF and Conductance Measurement
Lecture 36 - Dissociation Constant of Weak Acids
Lecture 37 - Conductometric Titrations of Strong Acid with Strong Base
Lecture 38 - Conductometric Titrations of Weak Acid with Strong Base
Lecture 39 - Estimation of HCl and Ammonium Chloride in a Triple Mixture using NaOH
Lecture 40 - Estimation of Total Chloride ion Concentration in Triple Mixture using Primary Standard AgNO3
Lecture 41 - Validation of Ostwald Dilution Law using HCl
Lecture 42 - Validation of Ostwald Dilution Law using Acetic Acid
Lecture 43 - Calculation and Graph Plotting for Conductometric Experiments

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Organic Chemistry-I (Tamil)

Subject Co-ordinator - Prof. Srinivasan Venkataraman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Phenols Structure, Preparation, Properties and Reactions - Part 1
Lecture 2 - Phenols Structure, Preparation, Properties and Reactions - Part 2
Lecture 3 - Phenols Structure, Preparation, Properties and Reactions - Part 3
Lecture 4 - Phenols Structure, Preparation, Properties and Reactions - Part 4
Lecture 5 - Phenols Structure, Preparation, Properties and Reactions - Part 5
Lecture 6 - Phenols Structure, Preparation, Properties and Reactions - Part 6
Lecture 7 - Phenol Assignment I and II - Part 7
Lecture 8 - Carbonyl Compounds - Part 1
Lecture 9 - Carbonyl Compounds - Part 2 (Continued...)
Lecture 10 - Carbonyl Compounds - Part 3 (Continued...)
Lecture 11 - Carbonyl Compounds - Part 4 (Continued...)
Lecture 12 - Carbonyl Compounds Assignment I and II - Part 5
Lecture 13 - Carboxylic Acids - Part 1
Lecture 14 - Functional Derivatives - Part 2
Lecture 15 - Appendices I and II - Part 3
Lecture 16 - Carboxylic Acids - Assignment I and II - Part 4
Lecture 17 - Nitro Compounds
Lecture 18 - Amines Structure, Preparation and Properties - Part 1
Lecture 19 - Amines Appendices I to IV - Part 1 (Continued...)
Lecture 20 - Assignments I to II - Part 2
Lecture 21 - Green Chemistry Introduction - Part 1
Lecture 22 - Green Chemistry Terminologies and strategies in green chemistry - Part 2 (Continued...)
Lecture 23 - Approches to Less Polluting Reactions - Part 3
Lecture 24 - Biocatalysis - Part 4
Lecture 25 - Microwave mediated and photochemical reactions and conclusion - Part 5
Lecture 26 - Acknowledgement

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Fundamentals and Applications of Supramolecular Chemist

Subject Co-ordinator - Prof. Deepak Chopra

Co-ordinating Institute - IISER Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Chemical Forces, Ion-Ion, Ion-Dipole and Dipole-Dipole Interactions
Lecture 2 - Induced Dipole and Dispersive Interactions
Lecture 3 - van der Waals Radius
Lecture 4 - Modelling of Dispersive Interactions, Introduction to H-bonds
Lecture 5 - Problem solving and examples in Chemical Forces
Lecture 6 - Aromatic Interactions
Lecture 7 - Understanding of sigma and pai-hole directed interactions
Lecture 8 - Halogen---pai, anion...pai and cation...pai interactions
Lecture 9 - Cation-pai, Role of close packing v/s H-bonding
Lecture 10 - Competition involving interactions in close packing of solids
Lecture 11 - Concept of Host and Guest in Supramolecular Chemistry
Lecture 12 - Lock and Key Principle and Chelate Effect
Lecture 13 - Factors affecting Chelate Effect,Thermodynamics of binding
Lecture 14 - Thermodynamics of Host-Guest Complexation, Role of Solvent
Lecture 15 - Host-Guest Complexation, Thermodynamic and Kinetic Selectivity
Lecture 16 - Cation complexation in podands, corands and lariat ethers
Lecture 17 - Cation complexation in cryptands, spherands, Molecular Conformation
Lecture 18 - Phase Transfer Catalyst, Kinetic and Thermodynamic Template Effect
Lecture 19 - Host Guest Complexation in Calixarenes
Lecture 20 - Host Guest Complexation in Cyclodextrins
Lecture 21 - Host Guest Complexation in Clathrates, Properties of Gas Hydrates
Lecture 22 - Structures of Gas Hydrates
Lecture 23 - Supramolecular Host Strategy: Trimesic Acid and Dianin's Compound
Lecture 24 - Crystal Engineering, Chemical Reaction in Solids
Lecture 25 - Solid State Reactivity and Topology of H-bonded solids
Lecture 26 - Polymorphism in Molecular Crystals
Lecture 27 - Characterization of Polymorphs
Lecture 28 - Properties and Thermodynamics of Polymorphism
Lecture 29 - Case Studies on Polymorphism, Cocrystallization, Applications to Pharmaceutical Cocrystals

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Lecture 30 - Properties of Pharmaceutical Cocrystals
Lecture 31 - Understand Nucleation and Growth processes in Crystallization
Lecture 32 - Nucleation Model, Kinetic and Thermodynamic Crystal, Phase Transitions
Lecture 33 - Types of Phase Transition
Lecture 34 - Stimuli Driven Processes in Molecular Crystals
Lecture 35 - Stimuli Driven Processes in Artificial Molecular Machines
Lecture 36 - Supramolecular chemistry of complexation of Organic Cations
Lecture 37 - Supramolecular chemistry of complexation of Anions
Lecture 38 - Examples of anion binding
Lecture 39 - Anion binding in Proteins and Transport processes in biology
Lecture 40 - Ion transport processes
Lecture 41 - Self Assembly Processes
Lecture 42 - Self Assembly in Metal-Ligand systems forming Racks, Grids and Ladders
Lecture 43 - Self Assembly in Helicates, Formation and Structure of DNA
Lecture 44 - Design of Enzyme Mimics
Lecture 45 - Role of Secondary Coordination Sphere in Chemical Transformations
Lecture 46 - Supramolecular chemistry of surfactants
Lecture 47 - Properties, Structures and Phase Diagram of Surfactants
Lecture 48 - Supramolecular Amphiphiles-Structure and Applications
Lecture 49 - Liquid Crystals-Types, Structure and Phase transitions in Liquid Crystals
Lecture 50 - Supramolecular Gelators
Lecture 51 - Supramolecular Catalysis via Self Assembled Molecular Cages
Lecture 52 - Applications of Supramolecular Coordination Cages to Organic Transformations
Lecture 53 - Applications of Molecular Barrels, Self Sorting Process
Lecture 54 - Principles and Applications of Supramolecular Photochemistry
Lecture 55 - Supramolecular Photochemistry and Organocatalysis
Lecture 56 - Applications in Photophysical processes
Lecture 57 - Molecular Wire and Cable, Molecular Switches and Non linear optical (NLO) materials
Lecture 58 - Supramolecular Chirality
Lecture 59 - Systems Chemistry
Lecture 60 - Applications of Systems Chemistry

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NPTEL Video Course - Chemistry and Biochemistry - Essentials in Immunolgy

Subject Co-ordinator - Prof. Anjali Karande, Dr. Dipankar Nandi, Dr. R. Manjunath

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the immune system
Lecture 2 - Cells and Organs of the immune system - Part 1
Lecture 3 - Cells and Organs of the immune system - Part 2
Lecture 4 - Cells and Organs of the immune system - Part 3
Lecture 5 - Innate immunity - Part 1
Lecture 6 - Innate immunity - Part 2
Lecture 7 - Development and differentiation of B cells - Part 1
Lecture 8 - Signaling in B cells
Lecture 9 - Organization of immunoglobulin genes and Mechanism of immunoglobulin gene rearrangement
Lecture 10 - Generation of antibody diversity
Lecture 11 - Immunoglobulin class switching Regulation of Immunoglobulin gene regulation
Lecture 12 - Structures and functions of Immunoglobulinâ s
Lecture 13 - The three complement pathways
Lecture 14 - Hypersensitivity type 1
Lecture 15 - Hypersensitivity types 2, 3 ,4 and Autoimmunity
Lecture 16 - Autoimmunity Autoimmuno-deficiencies f the B cells
Lecture 17 - Autoimmuno-deficiencies f the B cells
Lecture 18 - Cancer
Lecture 19 - The major histocompatibility complex - Part 1
Lecture 20 - The major histocompatibility complex - Part 2
Lecture 21 - The major histocompatibility complex - Part 3
Lecture 22 - The Major Histocompatibility Complex
Lecture 23 - The Major Histocompatibility Complex
Lecture 24 - The Major Histocompatibility Complex
Lecture 25 - T cell receptors
Lecture 26 - T cell Activation
Lecture 27 - T cell Activation / Differentiation
Lecture 28 - T cell synapse, motility and subsets
Lecture 29 - T cell survival

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Lecture 30 - Cytokines - Part 1
Lecture 31 - Cytokines - Part 2
Lecture 32 - Autoimmunity
Lecture 33 - Immunodeficiency
Lecture 34 - Host response mechanisms during infectious diseases - Part 1
Lecture 35 - Host response mechanisms during infectious diseases - Part 2
Lecture 36 - Transplantation immunology
Lecture 37 - Vaccines
Lecture 38 - Antigens and Immunogens
Lecture 39 - Synthetic vaccines
Lecture 40 - Evolution of the immune system

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NPTEL Video Course - Chemistry and Biochemistry - Eukaryotic Gene Expression - basics and benefits

Subject Co-ordinator - Prof. P.N. Rangarajan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Eukaryotic RNA polymerases and basal transcription factors
Lecture 2 - Diversity in core promoter elements
Lecture 3 - Diversity in general transcription factors
Lecture 4 - Proximal & Distal Promoter Elements, Enhancers and Silencers, Gene-specific Regulators
Lecture 5 - Transcription factors - DNA binding domains
Lecture 6 - Transcription factors - Transcription activation domain
Lecture 7 - Role of chromatin in eukaryotic gene regulation
Lecture 8 - Role of histones in eukaryotic gene regulation
Lecture 9 - Role of DNA methylation in eukaryotic gene regulation
Lecture 10 - Chromatin remodelling & gene regulation
Lecture 11 - mRNA processing - Role of RNA Pol II in mRNA capping and mRNA splicing
Lecture 12 - mRNA processing - Role of RNA Pol II in polyadenylation & mRNA editing
Lecture 13 - Regulation of RNA Pol I transcription
Lecture 14 - Regulation of RNA Pol III transcription
Lecture 15 - Signal Transduction Pathways - Introduction
Lecture 16 - Regulation of gene expression by cyclicAMP
Lecture 17 - Regulation of gene expression by second messengers other than cAMP
Lecture 18 - Regulation of gene expression by Protein Kinase C
Lecture 19 - Regulation of gene expression by Growth factors
Lecture 20 - Regulation of gene expression by cytokines
Lecture 21 - Regulation of gene expression by steroid hormones
Lecture 22 - Regulation of gene expression by type II nuclear receptors
Lecture 23 - Mechanism of transcriptional activation by nuclear receptors
Lecture 24 - Gene Regulation during Drosophila Development
Lecture 25 - Signal transduction pathways involved in embryonic development
Lecture 26 - Homeotic genes
Lecture 27 - Epigenetic regulation of gene expression during development
Lecture 28 - Embryonic stem cells and Transcription factor-mediated epigenetic reprogramming
Lecture 29 - Cloning and Expression vectors

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Lecture 30 - Eukaryotic protein expression systems - I
Lecture 31 - Eukaryotic protein expression systems - II
Lecture 32 - Eukaryotic protein expression systems - III
Lecture 33 - Human Gene Therapy
Lecture 34 - DNA vaccines
Lecture 35 - Transgenic animals
Lecture 36 - Transgenic plants
Lecture 37 - Knockout mic
Lecture 38 - Regulation of Eukaryotic Gene Expression by Small RNAs (RNA Interference, RNAi)
Lecture 39 - Genomics & Proteomics
Lecture 40 - Metabolic Engineering & Synthetic Biology

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NPTEL Video Course - Chemistry and Biochemistry - Introductory Quantum Chemistry

Subject Co-ordinator - Prof. K.L. Sebastian

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Wave Paticle Duality
Lecture 2 - Standing Waves
Lecture 3 - Path Integrals and Schrodinger Equation
Lecture 4 - Postulates - Part 1
Lecture 5 - Postulates - Part 2
Lecture 6 - Postulates - Part 3
Lecture 7 - Separting Variables and Particle in a Box - Part 1
Lecture 8 - Particle in a box - Part 2
Lecture 9 - Particle in a box - Part 3
Lecture 10 - Particle in a box-time dependent states-Expectations values and time dependent states
Lecture 11 - Particle in a 3 dimensional box
Lecture 12 - Particle in a well of finite depth
Lecture 13 - Finite well, Delta and Step Functions
Lecture 14 - Finite well (Continued...)
Lecture 15 - Tunneling - Part 1
Lecture 16 - Tunneling - Part 2
Lecture 17 - Schrodinger equation for Harmonic Oscillator
Lecture 18 - Harmonic Oscillator - The Series Solution
Lecture 19 - Harmonic Oscillator - Generating function
Lecture 20 - Harmonic Oscillator - Orthogonality of Eigenfunctions
Lecture 21 - Hydrogen Atom
Lecture 22 - Hydrogen Atom
Lecture 23 - Hydrogen atom continued
Lecture 24 - Hydrogen atom
Lecture 25 - Finding R(r)
Lecture 26 - Atomic Orbitals - Part 1
Lecture 27 - Atomic Orbitals - Part 2
Lecture 28 - Atomic Orbitals - Part 3
Lecture 29 - Atomic Orbitals - Part 4 and Hermitian Operators

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Lecture 30 - Measurement, Uncertainty Principle
Lecture 31 - Generalized Uncertainty Principle
Lecture 32 - Generalized Uncertainty Principle (Continued...)
Lecture 33 - Angular Momentum
Lecture 34 - Angular Momentum (Continued...)
Lecture 35 - Angular Momentum (Continued...) and Spin
Lecture 36 - Pertubation Theory
Lecture 37 - Pertubation Theory (Continued...)
Lecture 38 - Variation Method - Introduction
Lecture 39 - Variation Method - Proof and Illustration
Lecture 40 - He atom wave function with spin included - Paulis principle
Lecture 41 - Hydrogen Molecular ion - Linear variation method
Lecture 42 - Hydrogen Molecular ion (Continued...)
Lecture 43 - Hydrogen Molecular ion (Continued...)
Lecture 44 - Molecuar Orbitals The Hydrogen Molecule
Lecture 45 - MO and VB theory
Lecture 46 - MO theory of diatoms
Lecture 47 - Di-atomics (Continued...)
Lecture 48 - Hybridization Huckel theory
Lecture 49 - Huckel MO Theory (Continued...)

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NPTEL Video Course - Chemistry and Biochemistry - Introduction to Organometallic Chemistry

Subject Co-ordinator - Prof. A.G. Samuelson

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organometallic chemistry
Lecture 2 - Metal carbonyl complexes
Lecture 3 - Metal carbonyls - Part II
Lecture 4 - Ligand substitution reactions
Lecture 5 - Substitutes for carbonyl ligands
Lecture 6 - Carbene complexes
Lecture 7 - Carbene complexes (Continued...)
Lecture 8 - Non-Carbon Ancillary ligands
Lecture 9 - Non-Carbon Ancillary ligands (Continued...)
Lecture 10 - Metal alkyl complexes
Lecture 11 - Ligand Insertion Reactions
Lecture 12 - Metal alkene complexes
Lecture 13 - Alkynes ?2 bonding
Lecture 14 - Metal dihydrogen and hydrides
Lecture 15 - Migratory Insertion reaction with alkynes
Lecture 16 - Î·m (m=4 dienes and m=2n,polyenes)
Lecture 17 - Oxidative addition & Vaskas complex mechanism
Lecture 18 - Reductive elimination
Lecture 19 - Reductive Elimination mechanism
Lecture 20 - Oxidative coupling with C-C bond formation
Lecture 21 - Metathesis reactions
Lecture 22 - Metal-allyls - ? 3 complexes-synthesis, bonding
Lecture 23 - Metal-allyls - Î· 3 complexes-fluxionality, reactivity
Lecture 24 - C-C single bond forming reactions
Lecture 25 - ? 5 Cyclopentadienyl - complexes
Lecture 26 - Î·6 arene Metal complexes
Lecture 27 - Half sandwich complexes
Lecture 28 - Reactivity changes in coordinated ligands
Lecture 29 - The isolobal analogy

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Lecture 30 - Fluxional Properties of Organometallics
Lecture 31 - Quantifying Steric and electronic factors
Lecture 32 - Hydrogenation reactions
Lecture 33 - Addition of HX to olefins
Lecture 34 - Reactions with CO insertion
Lecture 35 - Organometallics promoted C-X coupling
Lecture 36 - Organometallic polymerization
Lecture 37 - C-H activation
Lecture 38 - Asymmetric Catalysis
Lecture 39 - Medicinal applications of organometallic complexes
Lecture 40 - Special Properties and Applications

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Principles and Applications of NMR Spectroscopy

Subject Co-ordinator - Prof. Hanudatta S. Atreya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to NMR spectroscopy
Lecture 2 - The alignment of nuclear spins in presence of magnetic field
Lecture 3 - Introduction to rotating frame
Lecture 4 - Free induction decay and Fourier transformation of FID
Lecture 5 - NMR Hardware
Lecture 6 - The concept of chemical shift
Lecture 7 - Factors that affect chemical shifts
Lecture 8 - Chemical shift referencing
Lecture 9 - J-coupling
Lecture 10 - Recap of basics
Lecture 11 - Introduction to general one dimensional NMR experiment
Lecture 12 - Practical aspects of recording a 1D NMR experiment - I
Lecture 13 - Practical aspects of recording a 1D NMR experiment - II
Lecture 14 - Practical aspects of recording a 1D NMR experiment - III
Lecture 15 - NMR Data processing
Lecture 16 - Basic aspects of 1D proton NMR analysis
Lecture 17 - Analysis of an example 1D proton spectrum
Lecture 18 - Analysis of 1D 1H NMR spectra of molecules - I
Lecture 19 - Analysis of 1D 1H NMR spectra of molecules - II
Lecture 20 - 1D 13C NMR
Lecture 21 - Why do we need 2D NMR
Lecture 22 - A qualitative explanation of how 2D NMR experiment works
Lecture 23 - Principles of 2D COSY and Total correlation spectroscopy (2D TOCSY)
Lecture 24 - 2D NOE-spectroscopy
Lecture 25 - 2D NOESY and 2D ROESY
Lecture 26 - What is heteronuclear correlation NMR spectroscopy
Lecture 27 - Sensitivity enhancement of heternuclei via polarization transfer
Lecture 28 - Heteronucler multiple quantum NMR spectroscopy (2D HMQC) and Heteronuclear single quantum NMR sp
Lecture 29 - Practical aspects of recording and processing 2D HMQC or HSQC

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Lecture 30 - HMBC and its utility
Lecture 31 - 2D HSQC TOCSY and its analysis with examples
Lecture 32 - Structure determination of molecules by NMR
Lecture 33 - Structure determination of peptides - I
Lecture 34 - Structure determination of peptides - II
Lecture 35 - Structure determination of peptides - III
Lecture 36 - Chemical exchange
Lecture 37 - Hydrogen or deuterium exchange
Lecture 38 - Diffusion ordered spectroscopy DOSY I
Lecture 39 - DOSY II
Lecture 40 - STD NMR for drug target interactions

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Multidimensional NMR Spectroscopy for Structural Studie

Subject Co-ordinator - Prof. Hanudatta S. Atreya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to NMR spectroscopy
Lecture 2 - Energy levels in NMR spectroscopy
Lecture 3 - Observing the NMR signal
Lecture 4 - Basic concepts in 1D NMR
Lecture 5 - Basic concepts in 1D NMR
Lecture 6 - Basic concepts in 2D NMR spectroscopy
Lecture 7 - Principles of 2D correlation spectroscopy COSY
Lecture 8 - Principles of 2D Total correlation spectroscopy (TOCSY)
Lecture 9 - 2D Nuclear Overhauser Effect Spectroscopy (NOESY)
Lecture 10 - 2D NOESY and 2D ROESY
Lecture 11 - Principles of 2D Heteronuclear NMR
Lecture 12 - 2D Heteronuclear NMR
Lecture 13 - Heteronuclear multiple quantum coherence (HMQC) and single quantum coherence (HSQC) - Part I
Lecture 14 - Heteronuclear multiple quantum coherence (HMQC) and single quantum coherence (HSQC) - Part II
Lecture 15 - 2D HSQC-TOCSY
Lecture 16 - 3D NMR Spectroscopy - Part I
Lecture 17 - 3D NMR Spectroscopy - Part II
Lecture 18 - 3D HNCA and 3D HNCO
Lecture 19 - 3D HNCACB and 3D HN(CO)CACB
Lecture 20 - Protein Backbone resonance assignment and side chain resonance assignment
Lecture 21 - Basic concepts of protein structure
Lecture 22 - Introduction to Structure Determination of Bio-Molecules by NMR
Lecture 23 - Over-expression of proteins in Bacteria
Lecture 24 - Isotope labeling of proteins for NMR studies - Part I
Lecture 25 - Isotope labeling of proteins for NMR studies - Part II
Lecture 26 - Isotope labeling of proteins for NMR studies - Part III
Lecture 27 - Isotope labeling of proteins for NMR studies - Part IV
Lecture 28 - Resonance assignments of Proteins - Part I
Lecture 29 - Resonance assignments of Proteins - Part II

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Lecture 30 - Resonance assignments of Proteins - Part III
Lecture 31 - Determination of protein secondary structure from NMR data
Lecture 32 - Determination of protein secondary structure from NMR data
Lecture 33 - Determination of protein tertiary structure from NMR data - Part I
Lecture 34 - 3D NOESY HSQC
Lecture 35 - Determination of protein tertiary structure from NMR data - Part II
Lecture 36 - Understanding Protein ligand interaction by NMR
Lecture 37 - Understanding Protein ligand interaction by NMR
Lecture 38 - Understanding Protein ligand interaction by NMR
Lecture 39 - Understanding Protein ligand interaction by NMR
Lecture 40 - Understanding Protein ligand interaction by NMR
Lecture 41 - Understanding Protein ligand interaction by NMR
Lecture 42 - Understanding Protein ligand interaction by NMR

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry and Structure in the Solid State

Subject Co-ordinator - Prof. T. N. Guru Row

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Symmetry in 3D World
Lecture 2 - Two Fold Axis Representation with the Help of Esher Diagrams
Lecture 3 - Pure Rotation Axes
Lecture 4 - Properties of Crystal
Lecture 5 - Point Group Generation
Lecture 6 - Combination ofSymmetry Elements
Lecture 7 - Arrangement of Symmetry Equivalent Objects
Lecture 8 - Introduction to Plane Lattices
Lecture 9 - Bravais Lattices
Lecture 10 - Details of Stereographic Projections
Lecture 11 - Stereographic Projections (Continued)
Lecture 12 - Point Group and Crystal Systems - 1
Lecture 13 - Point Group and Crystal Systems - 2
Lecture 14 - Point Groups to Space Groups
Lecture 15 - Translation componentsin Monoclinic System
Lecture 16 - Additional Symmetry Elements
Lecture 17 - Additional Symmetry Elements (Continued...)
Lecture 18 - Space Groups - 1
Lecture 19 - Space Groups - 2
Lecture 20 - Space Groups - 3
Lecture 21 - Space Groups - 4
Lecture 22 - Additional Information on Space Groups
Lecture 23 - Details of Space Groups - 1
Lecture 24 - Details of Space Groups - 2
Lecture 25 - Details of Space Groups - 3
Lecture 26 - Details of Space Groups - 4
Lecture 27 - Crystal Structure of Calcium Carbonate
Lecture 28 - Crystal Structure of Some Minerals
Lecture 29 - Atoms in the Crystal

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Lecture 30 - Crystallographic Directions and Planes
Lecture 31 - Interference of Waves
Lecture 32 - X Ray Scattering ; optical Analogy
Lecture 33 - X Ray Scattering ; Fourier transforms
Lecture 34 - X Ray Scattering ; Deriving Laue Conditions from scattering theory
Lecture 35 - X Ray Scattering ; Laue conditions to Bragg Ã¢â ¬Ë s Law, Introduction to Reciprocal lattice
Lecture 36 - Bragg's Law in Reciprocal Space - 1
Lecture 37 - Bragg's Law in Reciprocal Space - 2
Lecture 38 - Calculation of Intensities - 1
Lecture 39 - Calculation of Intensities - 2
Lecture 40 - Conversion from Direct to reciprocal space, the inverse relations
Lecture 41 - Diffraction and Reciprocal Space (Continued...)
Lecture 42 - Limits of Resolution
Lecture 43 - Concept of Structure Factors
Lecture 44 - Systematic Absences - 1
Lecture 45 - Systematic Absences - 2
Lecture 46 - Systematic Absences - 3
Lecture 47 - Friedel's Law and Laue classes
Lecture 48 - Experimental Aspects of Data Collection
Lecture 49 - Structure Determination - 1
Lecture 50 - Structure Determination - 2
Lecture 51 - Data Reduction
Lecture 52 - Fourier Syntheses
Lecture 53 - Patterson Method - 1
Lecture 54 - Patterson Method - 2
Lecture 55 - Direct Method
Lecture 56 - Powder Diffraction - 1
Lecture 57 - Powder Diffraction - 2
Lecture 58 - Powder Diffraction - 3
Lecture 59 - Quantum Crystallography - 1
Lecture 60 - Quantum Crystallography - 2
Lecture 61 - Intermolecular Interactions

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Ultrafast Optics and Spectroscopy

Subject Co-ordinator - Prof. Atanu Bhattacharya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8 - Nonlinear Effects
Lecture 9 - Nonlinear Effects (Continued...)
Lecture 10 - Nonlinear Effects (Continued...)
Lecture 11 - Nonlinear Effects (Continued...)
Lecture 12 - Nonlinear Effects (Continued...)
Lecture 13 - Nonlinear Effects (Continued...)
Lecture 14 - Nonlinear Effects (Continued...)
Lecture 15 - Dispersion Effects
Lecture 16 - Nonlinear and Dispersion Effects (Continued...)
Lecture 17 - Nonlinear and Dispersion Effects (Continued...)
Lecture 18 - Transverse Electromagnetic Mode
Lecture 19 - Transverse Electromagnetic Mode (Continued...)
Lecture 20 - Construction of Ultrafast Laser
Lecture 21 - Construction of Ultrafast Laser (Continued...)
Lecture 22 - Construction of Ultrafast Laser (Continued...)
Lecture 23 - Measurement of Ultrafast Pulse
Lecture 24 - Measurement of Ultrafast Pulse (Continued...)
Lecture 25 - Measurement Techniques in Ultrafast Spectroscopy
Lecture 26 - Kinetic Model of Ultrafast Spectroscopy
Lecture 27 - Kinetic Model of Ultrafast Spectroscopy (Continued...)
Lecture 28 - Quantum Mechanical Model of Ultrafast Spectroscopy
Lecture 29 - Ultrafast Physical Chemistry

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Lecture 30 - Ultrafast Physical Chemistry
Lecture 31 - Ultrafast Physical Chemistry
Lecture 32 - Maxwellâ s Equations
Lecture 33 - Maxwellâ s Equations (Continued...)
Lecture 34 - Ab Initio Molecular Dynamics - 1
Lecture 35 - Ab Initio Molecular Dynamics - 2
Lecture 36 - Ab Initio Molecular Dynamics - 3
Lecture 37 - Ab Initio Molecular Dynamics - 4
Lecture 38 - Attosecond Chemical Dynamics - 1
Lecture 39 - Attosecond Chemical Dynamics - 2
Lecture 40 - Attosecond Chemical Dynamics - 3
Lecture 41 - Attosecond Chemical Dynamics - 4
Lecture 42 - Femtochemistry of Nanocatalysis - 1
Lecture 43 - Femtochemistry of Nanocatalysis - 2

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NPTEL Video Course - Chemistry and Biochemistry - NOC:One and two dimensional NMR Spectroscopy for Chemists

Subject Co-ordinator - Prof. N. Suryaprakash

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - NMR an historical perspective and NMR active nuclei
Lecture 2 - Spin Angular Momentum and Magnetic moment
Lecture 3 - Interaction of Spins with the magnetic field
Lecture 4 - Larmor Precession and Energy of interaction
Lecture 5 - NMR detection and sensitivity
Lecture 6 - Inducing Resonance and Bulk Magnetization
Lecture 7 - Signal detection and Rotating Frame Concept
Lecture 8 - Pulse phase and signal phase
Lecture 9 - FID and Fourier Transformation
Lecture 10 - Selection rules and transitions
Lecture 11 - External and Internal interactions in NMR
Lecture 12 - Chemical Shifts
Lecture 13 - NMR Spectrum and chemical equivalence
Lecture 14 - Conversion of frequency and ppm
Lecture 15 - Field dependence and factors affecting chemical shift
Lecture 16 - Factors contributing to chemical shifts - 1
Lecture 17 - Factors contributing to chemical shifts - 2
Lecture 18 - Scalar Couplings - 1
Lecture 19 - Scalar Couplings - 2
Lecture 20 - Energy levels of coupled spins
Lecture 21 - Spin system classification and multiplicity
Lecture 22 - Multiplicity pattern of coupled spins
Lecture 23 - Active and passive coupling
Lecture 24 - Coupling among equivalent spins - 1
Lecture 25 - Coupling among equivalent spins - 2
Lecture 26 - Coupling among non-equivalent spins
Lecture 27 - Geminal and Vicinal couplings
Lecture 28 - Spin system Nomenclature
Lecture 29 - Isotope effect

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Lecture 30 - Analysis of Strongly coupled spin systems
Lecture 31 - Eigen values of A2 and AMX spin systems
Lecture 32 - Analysis of Three spin coupled systems
Lecture 33 - Analysis of Proton NMR spectra - 1
Lecture 34 - Analysis of Proton NMR spectra - 2
Lecture 35 - Analysis of Proton NMR spectra - 3
Lecture 36 - Basics of 13C-NMR
Lecture 37 - Coupled and Decoupled 13C-Spectra
Lecture 38 - Broadband decoupling in 13C-NMR
Lecture 39 - Analysis of 13C spectra and DEPT
Lecture 40 - Heteronuclear couplings and satellite analysis - 1
Lecture 41 - Heteronuclear couplings and satellite analysis - 2
Lecture 42 - Coupling among magnetic equivalent nuclei and isotope effect
Lecture 43 - Analysis of spectra of other nuclei
Lecture 44 - Spin Echoes
Lecture 45 - Polarization transfer techniques
Lecture 46 - INEPT and DEPT
Lecture 47 - Decoupling and NOE
Lecture 48 - NOE-2
Lecture 49 - Introduction to 2D NMR
Lecture 50 - Two-dimensional NMR
Lecture 51 - Two dimensional NMR
Lecture 52 - Two dimensional COSY
Lecture 53 - COSY and examples
Lecture 54 - Variants of COSY and TOCSY spectra
Lecture 55 - Heteronuclear correlation and inverse detection
Lecture 56 - Coupled and decoupled HSQC and HMBC
Lecture 57 - NMR data acquisition - 1
Lecture 58 - NMR data acquisition - 2
Lecture 59 - Practical considerations of 1D NMR
Lecture 60 - NMR Data processing
Lecture 61 - NMR Data processing
Lecture 62 - NMR Instrumentation - 1
Lecture 63 - NMR Instrumentation - 2
Lecture 64 - Relaxation processes - 1
Lecture 65 - Relaxation processes - 2

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NPTEL Video Course - Chemistry and Biochemistry - NOC:Time Dependent Quantum Chemistry

Subject Co-ordinator - Prof. Atanu Bhattacharya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to TDSE
Lecture 2 - Solution to TDSE, Stationary and Non-stationary States
Lecture 3 - Electron and Vibrational Superposition States
Lecture 4 - Optical Analogy to Quantum Superposition
Lecture 5 - Introdution to Python Programming
Lecture 6 - Simple Computation with Python Programming
Lecture 7 - Plotting Graph with Python Programming
Lecture 8 - Meaning of Probability Density
Lecture 9 - Time Evolution of Normalization Constant
Lecture 10 - Expectation Value and its Time Evolution
Lecture 11 - Equation of Continuity
Lecture 12 - Bohmian Mechanics
Lecture 13 - Bohmian Mechanics and Standard Interpretation
Lecture 14 - Grid Representation of Wavefunction
Lecture 15 - Normalizing the Discretized Wavefunction and Finding Expectation Value
Lecture 16 - Plane Matter Wave and Wavepacket
Lecture 17 - Wavepacket
Lecture 18 - Stationary Gaussian Wavepacket
Lecture 19 - Travelling Gaussian Wavepacket
Lecture 20 - General Form of the Gaussian Wavepacket
Lecture 21 - Fourer Transform of a wavefunction
Lecture 22 - x-grid to k-grid
Lecture 23 - Fourier Transform using fft
Lecture 24 - Hilbert Space and Its Properties
Lecture 25 - Basis Set Approach to Quantum Mechanics
Lecture 26 - Matrix Algebra
Lecture 27 - Eigenvalue and Eigenfunction
Lecture 28 - Matrix Representation of Operators
Lecture 29 - Matrix Representation of Hamiltonian Operator

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Lecture 30 - Python Tutorial 4 (Eigenvalue and Eigenfunction)
Lecture 31 - Python Tutorial 4 (Eigenvalue and Eigenfunction)
Lecture 32 - Time Evolution Operator
Lecture 33 - Split Operator Metho
Lecture 34 - Numerical Implementation of Split Operator Method
Lecture 35 - Wavepacket Dynamics under zero interaction potential
Lecture 36 - Wavepacket Dynamics under zero interaction potential (Continued...)
Lecture 37 - Wavepacket Dynamics under linear interaction potential
Lecture 38 - Quantum Adiabatic Theory
Lecture 39 - Formal Derivation of Quantum Adiabat
Lecture 40 - Geometric Phase and Dynamical Phase
Lecture 41 - Nonradiative Transition - Part 1
Lecture 42 - Nonradiative Transition - Part 2
Lecture 43 - Nonradiative Transition
Lecture 44 - Quantum Dissipative Dynamics
Lecture 45 - Quantum Dissipative Dynamics
Lecture 46 - Formal Derivation of Dissipative Quantum Dynamics
Lecture 47 - Classical Description of Light
Lecture 48 - Vector and Scalar Potential
Lecture 49 - Vector and Scalar Potential
Lecture 50 - Master Equation of Light
Lecture 51 - Hamiltonian for Light-Atom Interaction
Lecture 52 - Hamiltonian for Light-Atom Interaction
Lecture 53 - Absorption and Stimulated Emission
Lecture 54 - Absorption and Stimulated Emission
Lecture 55 - Time Correlation Function
Lecture 56 - Fourier Transform of Time Correlation Function

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NPTEL Video Course - Chemistry and Biochemistry - NOC:One and Two Dimensional NMR Spectroscopy: Concepts and

Subject Co-ordinator - Prof. N. Suryaprakash

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Nuclear Spin
Lecture 2 - NMR spin physics - I
Lecture 3 - NMR spin physics - II
Lecture 4 - Energy levels and allowed transitions
Lecture 5 - Transitions in coupled spin systems
Lecture 6 - Interaction parameters
Lecture 7 - Chemical Shifts
Lecture 8 - Shielding and deshielding, ppm and frequency scales
Lecture 9 - Factors affecting the chemical shifts
Lecture 10 - Scalar couplings
Lecture 11 - Scalar couplings
Lecture 12 - Coupling mechanism
Lecture 13 - Splitting patterns
Lecture 14 - Multiplicity patterns
Lecture 15 - Analysis of multiplicity patterns
Lecture 16 - Coupled spin system
Lecture 17 - Nomenclature for coupled spins
Lecture 18 - Energy levels of two and three coupled spins
Lecture 19 - Analysis of 1H NMR spectra - I
Lecture 20 - Analysis of 1H NMR spectra - II
Lecture 21 - Analysis of 1H NMR spectra - III
Lecture 22 - Coupling of 1H with other nuclei - I
Lecture 23 - Coupling of 1H with other nuclei - II
Lecture 24 - 13C-NMR - I
Lecture 25 - 13C-NMR - II
Lecture 26 - 13C-NMR - III
Lecture 27 - 13C-NMR - IV
Lecture 28 - Analysis of 19F spectra
Lecture 29 - 31P NMR

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Lecture 30 - Analysis of spectra of Heteronuclei
Lecture 31 - Heteronuclear spectral analysis
Lecture 32 - Spin Echoes - I
Lecture 33 - Spin Echoes - II
Lecture 34 - Sensitivity enhancement
Lecture 35 - Polarization transfer
Lecture 36 - INEPT
Lecture 37 - 2D NMR - I
Lecture 38 - 2D NMR - II
Lecture 39 - 2D-COSY - I
Lecture 40 - 2D COSY - II
Lecture 41 - Types of COSY spectra
Lecture 42 - TOCSY
Lecture 43 - HSQC - I
Lecture 44 - HSQC - II
Lecture 45 - me-HSQC
Lecture 46 - HSQC and HMBC
Lecture 47 - HMBC - II
Lecture 48 - 2D INADEQUATE
Lecture 49 - 2D-INADEQUATE and 2D J-Resolved
Lecture 50 - Homo and Heteronuclear J-resolved
Lecture 51 - Conceptual understanding of NOE
Lecture 52 - Positive and negative NOE
Lecture 53 - NOE and correlation times
Lecture 54 - Complications in NOE, Steady state NOE
Lecture 55 - ROESY and Tr NOE
Lecture 56 - Combined utility of COSY, TOCSY, HSQC, NOESY
Lecture 57 - Steady State NOE
Lecture 58 - 1D NOE, 1D TOCSY
Lecture 59 - 1D-TOCSY, PURESHIFT
Lecture 60 - PURSHIFT NMR

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NPTEL Video Course - Civil Engineering - Advanced Geotechnical Engineering

Subject Co-ordinator - Dr. B.V.S. Viswanadham

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
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Lecture 6
Lecture 7
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Lecture 9
Lecture 10
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Lecture 13
Lecture 14
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Lecture 22
Lecture 23
Lecture 24
Lecture 25
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Lecture 30
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NPTEL Video Course - Civil Engineering - Soil Dynamics

Subject Co-ordinator - Dr. Deepankar Choudhury

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Degrees of Freedom, SDOF System, Types of Vibrations
Lecture 3 - SDOF System, Types of Vibrations, Free Vibration
Lecture 4 - Problems on Tortional Motion
Lecture 5 - Damped Free Vibrations
Lecture 6 - Damped Free Vibrations, Definition of Critical Damping and problems
Lecture 7 - Decay of Motion
Lecture 8 - Forced Vibrations, Dynamic Magnification Factor
Lecture 9 - Maxwells Diagram of DMF, Discussion on Phase
Lecture 10 - Transmissibility Ratio, Response to Arbitrary, Step and Pulse Excitations
Lecture 11 - Response to Arbitrary, Step and Pulse Excitations, Response to Impact Load
Lecture 12 - Vibration Isolation, Vibrations Measuring Instruments
Lecture 13 - Solutions of Quiz Questions, Multi-Degree of Freedom (MDOF) Systems
Lecture 14 - (MDOF) System
Lecture 15 - 3 Dimensional Wave Propagation, Waves in semi-infinite media, Rayleigh Wave
Lecture 16 - Love Wave, Waves in layered medium, 3D case-Inclined wave, Earthquake Waves
Lecture 17 - Earthquake Waves; P-waves, S-waves, 3 circle method, Estimation of Earthquake Epicentre
Lecture 18 - Stresses in Soil Element, Field Tests, Seismic Reflection Test
Lecture 19 - Seismic Refraction Test, SASW Test, Laboratory & Model Tests
Lecture 20 - Centrifuge Tests Stress Strain Behavior of Cyclically Loaded Soils
Lecture 21 - Estimation of Gmax, Modulus Reduction Curves, Variation of Damping Ratio, Cyclic Plate load Test
Lecture 22 - Liquefaction, Preliminary sceening, Simplified Procedure for Liquefaction
Lecture 23 - Cyclic Stress Ratio, Evaluation of CRR, Correction Factors, Corrections for SPT
Lecture 24 - Becker Penetrometer Test (BPT), Cone Penetrometer Test (CPT), SPT v BPT, SASW Test
Lecture 25 - Types of Machine Foundations, Methods of Analysis, Design of Machine Foundations as per IS
Lecture 26 - Tschebotarioff's
Lecture 27 - Problem on Tschebotarioff's method contd., Mass-Spring-Dashpot (MSD) Model
Lecture 28 - MSD Model- Yawing mode of Vibration, Use of MSD model for analysis
Lecture 29 - Problems on Use of MSD Model for Analysis, Rocking mode of Vibrations

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Lecture 30 - Torsional Mode/Yawing Mode, Constant Force type excitation, EHS Theory
Lecture 31 - EHS Theory, Vibrational Control
Lecture 32 - Use of EHS Theory for analysis
Lecture 33 - Use of EHS Theory for analysis II
Lecture 34 - Liquefaction mitigation methods,Vibro Compaction,Densification Techniques
Lecture 35 - Soil Improvement methods,Dynamic Compaction,Reinforcement Techniques
Lecture 36 - Force-based Analysis,Dynamic analysis using MSD model
Lecture 37 - Behaviour of Subgrade Soil below Rail Track
Lecture 38 - Quiz

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NPTEL Video Course - Civil Engineering - Structural Dynamics

Subject Co-ordinator - Dr. P. Banerji

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Inverse Power Method
Lecture 3 - Dynamics of SDOF Structure
Lecture 4 - SDOF Response to Harmonic Loads
Lecture 5 - Response of SDOF Structure to Harmonic Loading
Lecture 6 - Response to Harmonic Loading
Lecture 7 - Response to Harmonic Loading (Continue...)
Lecture 8 - Transmissibility & Base Isolation
Lecture 9 - Dynamic Characteristics & Periodic Loading
Lecture 10 - Pulse Loading
Lecture 11 - Pulse Load Response Characteristics & Impulse Loading
Lecture 12 - Frequency Domain Response Analysis
Lecture 13 - Methods of Analysis for General Loading
Lecture 14 - Numerical Analysis of Response of Single Degree of Freedom Structure & Time Domain Approaches
Lecture 15 - Response Analysis of Single Degree of Freedom System for Earthquake Loads
Lecture 16 - Earthquake Response Analysis for Single Degree of Freedom Structures
Lecture 17 - Generalized Single Degree of Freedom Systems Equations of Motions
Lecture 18 - Generalized Single Degree of Freedom Systems Equations of Motions
Lecture 19 - Generalized Single Degree of Freedom Systems Equations of Motions
Lecture 20 - Generalized Single Degree of Freedom Systems Equations of Motion & Free Vibrations
Lecture 21 - Equations of Motion for Multi Degree of Freedom Structures
Lecture 22 - Equations of Motion for Multi Degree of Freedom Systems
Lecture 23 - Multi Degree of Freedom Structure Equations of Motions
Lecture 24 - Multi Degree of Freedom Structure Equations of Motions & Free Vibration
Lecture 25 - Free Vibration for Multi Degree of Freedom Structures
Lecture 26 - Free Vibration for Multi Degree of Freedom Structures
Lecture 27 - Practical Free Vibration Analysis
Lecture 28 - Dynamic Response of Multi Degree of Freedom Systems
Lecture 29 - Dynamic Response of Multi Degree of Freedom Structures

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Lecture 30 - Damping for Multi Degree of Freedom Structures
Lecture 31 - Earthquake Response of Multi Degree of Freedom Structures
Lecture 32 - Earthquake Response of Multi Degree of Freedom Structures
Lecture 33 - Dynamic Analysis of Buildings
Lecture 34 - Introduction to Dynamics of Continuous Systems
Lecture 35 - Free Vibration Response of Continuous Systems
Lecture 36 - Free Vibration & Dynamic Response of Continuous Systems
Lecture 37 - Dynamic Response of Continuous Systems
Lecture 38 - Examples for Dynamic Response of Continuous Systems

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NPTEL Video Course - Civil Engineering - Watershed Management

Subject Co-ordinator - Dr. T.I. Eldho

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Watershed Management
Lecture 2 - Watershed Management & Stakeholder Analysis
Lecture 3 - Watershed Management Policies
Lecture 4 - Sustainable Watershed Management
Lecture 5 - Agricultural Practices & Watershed Management
Lecture 6 - Soil Erosion & Conservation
Lecture 7 - Watershed Management in Arid Regions & Strategic Planning
Lecture 8 - Integrated Water Resources Management
Lecture 9 - Conjuctive Use of Water Resources
Lecture 10 - Rainwater Harvesting System
Lecture 11 - Rainwater Harvesting & Roof Catchment System
Lecture 12 - Watershed Characteristics
Lecture 13 - Watershed Delineation & Modeling
Lecture 14 - Hydrologic Processes
Lecture 15 - Watershed Modeling
Lecture 16 - Hydrologic Modeling
Lecture 17 - Numerical Watershed Modeling
Lecture 18 - Subsurface & Groundwater Flows
Lecture 19 - Social & Community Aspects of Watershed Management
Lecture 20 - Socio-economy, Private Sector Participation & Gender Issues
Lecture 21 - Integrated Development, Water Legislation & Implementation Issues
Lecture 22 - GIS & Applications in Watershed Management
Lecture 23 - Remote Sensing & Applications in Watershed Management
Lecture 24 - Decision Support Systems & Applications in Watershed Management
Lecture 25 - Integrated Watershed Modeling Using Numerical Methods, GIS & Remote Sensing
Lecture 26 - Applications of Knowledge Based Models in Watershed Management
Lecture 27 - Surface Water Quality & Pollution Issues
Lecture 28 - Groundwater Pollution Problems & Transport Processes
Lecture 29 - Water Quality Modeling

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Lecture 30 - Environmental Guidelines for Water Quality Management
Lecture 31 - Storm Water Management
Lecture 32 - Urban Drainage System
Lecture 33 - Flood Routing
Lecture 34 - Flood Control & Management
Lecture 35 - Drought Assessment
Lecture 36 - Drought Analysis
Lecture 37 - Drought Mitigation
Lecture 38 - Water Conservation
Lecture 39 - Water Recycling
Lecture 40 - Water Reclaimation & Reuse

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NPTEL Video Course - Civil Engineering - Fluid Mechanics

Subject Co-ordinator - Dr. T.I. Eldho

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fluid Mechanics
Lecture 2 - Fundamental Concepts of Fluid Flow & Fluid Statics
Lecture 3 - Fluid Statics
Lecture 4 - Fluid Statics
Lecture 5 - Fluid Statics
Lecture 6 - Kinematics of Fluid Flow
Lecture 7 - Kinematics of Fluid Flow
Lecture 8 - Kinematics of Fluid Flow
Lecture 9 - Kinematics of Fluid Flow
Lecture 10 - Kinematics of Fluid Flow
Lecture 11 - Kinematics & Dynamics of Fluid Flow
Lecture 12 - Dynamics of Fluid Flow
Lecture 13 - Dynamics of Fluid Flow
Lecture 14 - Dynamics of Fluid Flow
Lecture 15 - Dynamics of Fluid Flow
Lecture 16 - Dynamics of Fluid Flow
Lecture 17 - Laminar and Turbulent Flows
Lecture 18 - Laminar and Turbulent Flows
Lecture 19 - Laminar and Turbulent Flows
Lecture 20 - Laminar and Turbulent Flows
Lecture 21 - Laminar and Turbulent Flows
Lecture 22 - Laminar and Turbulent Flows
Lecture 23 - Dimensional Analysis
Lecture 24 - Dimensional Analysis
Lecture 25 - Dimensional Analysis
Lecture 26 - Navier-Stocks Equations and Applications
Lecture 27 - Navier-Stocks Equations and Applications
Lecture 28 - Navier-Stocks Equations and Applications
Lecture 29 - Navier-Stocks Equations and Applications

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Lecture 30 - Boundary Layer Theory and Applications
Lecture 31 - Boundary Layer Theory and Applications
Lecture 32 - Boundary Layer Theory and Applications
Lecture 33 - Boundary Layer Theory and Applications
Lecture 34 - Boundary Layer Theory and Applications
Lecture 35 - Boundary Layer Theory and Applications
Lecture 36 - Pipe Flow Systems
Lecture 37 - Pipe Flow Systems
Lecture 38 - Pipe Flow Systems
Lecture 39 - Pipe Flow Systems
Lecture 40 - Pipe Flow Systems
Lecture 41 - Pipe Flow Systems
Lecture 42 - Pipe Flow Systems

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NPTEL Video Course - Civil Engineering - Soil Mechanics

Subject Co-ordinator - Dr. B.V.S. Viswanadham

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Soil Mechanics
Lecture 2 - Soil Mechanics
Lecture 3 - Soil Mechanics
Lecture 4 - Soil Mechanics
Lecture 5 - Soil Mechanics
Lecture 6 - Soil Mechanics
Lecture 7 - Soil Mechanics
Lecture 8 - Soil Mechanics
Lecture 9 - Soil Mechanics
Lecture 10 - Soil Mechanics
Lecture 11 - Compaction of Soils - I
Lecture 12 - Soil Mechanics
Lecture 13 - Soil Mechanics
Lecture 14 - Compaction of Soils - IV
Lecture 15 - Compaction of Soils - V
Lecture 16 - Compaction of Soils - VI
Lecture 17 - Effective Stress - I
Lecture 18 - Effective Stress - II
Lecture 19 - Effective Stress - III
Lecture 20 - Flow of water through soils - I
Lecture 21 - Flow of water through soils - II
Lecture 22 - Flow of water through soils - III
Lecture 23 - Flow of water through soils - IV
Lecture 24 - Flow of water through soils - V
Lecture 25 - Flow of water through soils - VI
Lecture 26 - Flow of water through soils - VII
Lecture 27 - Flow of water through soils - VIII
Lecture 28 - Soil Mechanics
Lecture 29 - Soil Mechanics

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Lecture 30 - Soil Mechanics
Lecture 31 - Soil Mechanics
Lecture 32 - Soil Mechanics
Lecture 33 - Soil Mechanics
Lecture 34 - Soil Mechanics
Lecture 35 - Soil Mechanics
Lecture 36 - Soil Mechanics
Lecture 37 - Soil Mechanics
Lecture 38 - Soil Mechanics
Lecture 39 - Soil Mechanics
Lecture 40 - Soil Mechanics
Lecture 41 - Soil Mechanics
Lecture 42 - Soil Mechanics
Lecture 43 - Soil Mechanics
Lecture 44 - Soil Mechanics
Lecture 45 - Soil Mechanics
Lecture 46 - Soil Mechanics
Lecture 47 - Soil Mechanics
Lecture 48 - Soil Mechanics
Lecture 49 - Soil Mechanics
Lecture 50 - Soil Mechanics
Lecture 51 - Soil Mechanics
Lecture 52 - Soil Mechanics
Lecture 53 - Soil Mechanics
Lecture 54 - Soil Mechanics
Lecture 55 - Soil Mechanics
Lecture 56 - Soil Mechanics
Lecture 57 - Soil Mechanics

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NPTEL Video Course - Civil Engineering - Structural Analysis II

Subject Co-ordinator - Dr. P. Banerji

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
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Lecture 27
Lecture 28
Lecture 29

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Lecture 30
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Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Civil Engineering - Geotechnical Earthquake Engineering

Subject Co-ordinator - Dr. Deepankar Choudhury

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geotechnical Earthquake Engineering - Part I
Lecture 2 - Introduction to Geotechnical Earthquake Engineering - Part II
Lecture 3 - Basics of Vibration Theory
Lecture 4 - Engineering Seismology - Part - I
Lecture 5 - Engineering Seismology - Part - II
Lecture 6 - Engineering Seismology - Part - III
Lecture 7 - Engineering Seismology - Part - IV
Lecture 8 - Engineering Seismology - Part - V
Lecture 9 - Engineering Seismology - Part - VI
Lecture 10 - Strong Ground Motion - Part I
Lecture 11 - Strong Ground Motion - Part II
Lecture 12 - Strong Ground Motion - Part III
Lecture 13 - Strong Ground Motion - Part IV
Lecture 14 - Strong Ground Motion - Part V
Lecture 15 - Strong Ground Motion - Part VI
Lecture 16 - Strong Ground Motion - Part VII
Lecture 17 - Wave Propagation - Part I
Lecture 18 - Wave Propagation - Part II
Lecture 19 - Wave Propagation - Part III
Lecture 20 - Wave Propagation - Part IV
Lecture 21 - Dynamic Soil Properties - Part I
Lecture 22 - Dynamic Soil Properties - Part II
Lecture 23 - Seismic Hazard Analysis - Part I
Lecture 24 - Seismic Hazard Analysis - Part II
Lecture 25 - Seismic Hazard Analysis - Part III
Lecture 26 - Seismic Hazard Analysis - Part IV
Lecture 27 - Seismic Hazard Analysis - Part V
Lecture 28 - Seismic Hazard Analysis - Part VI
Lecture 29 - Seismic Hazard Analysis - Part VII

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Lecture 30 - Seismic Hazard Analysis - Part VIII
Lecture 31 - Site Response Analysis - Part I
Lecture 32 - Site Response Analysis - Part II
Lecture 33 - Site Response Analysis - Part III
Lecture 34 - Seismic Analysis and Design of Various Geotechnical Structures - Part I
Lecture 35 - Seismic Analysis and Design of Various Geotechnical Structures - Part II
Lecture 36 - Seismic Analysis and Design of Various Geotechnical Structures - Part III
Lecture 37 - Seismic Analysis and Design of Various Geotechnical Structures - Part IV
Lecture 38 - Seismic Analysis and Design of Various Geotechnical Structures - Part V
Lecture 39 - Seismic Analysis and Design of Various Geotechnical Structures - Part VI
Lecture 40 - Seismic Analysis and Design of Various Geotechnical Structures - Part VII
Lecture 41 - Seismic Analysis and Design of Various Geotechnical Structures - Part VIII
Lecture 42 - Quiz
Lecture 43 - Seismic Analysis and Design of Various Geotechnical Structures - Part IX

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NPTEL Video Course - Civil Engineering - Geosynthetics Engineering: In Theory and Practice

Subject Co-ordinator - Prof. J.N. Mandal

Co-ordinating Institute - IIT - Bombay

Lecture 1 - Introduction
Lecture 2 - Introduction to Reinforced Earth
Lecture 3 - Introduction to Reinforced Earth
Lecture 4 - Introduction to Reinforced Earth
Lecture 5 - Introduction to Reinforced Earth
Lecture 6 - An Overview of Geosynthetics - Part I
Lecture 7 - An Overview of Geosynthetics - Part II
Lecture 8 - An Overview of Geosynthetics - Part III
Lecture 9 - An Overview of Gosynthetics
Lecture 10 - Geosynthetic Properties and Test Methods
Lecture 11 - Geosynthetic Properties and Test Methods
Lecture 12 - Geosynthetic Properties and Test Methods
Lecture 13 - Geosynthetic Properties and Test Methods
Lecture 14 - Geosynthetic Properties and Test Methods
Lecture 15 - Geosynthetic in Filtration, Drainage and Erosion Control
Lecture 16 - Geosynthetic in Filtration, Drainage and Erosion Control
Lecture 17 - Geosynthetic in Filtration, Drainage and Erosion Control
Lecture 18 - Geosynthetic in Filtration, Drainage and Erosion Control
Lecture 19 - Geosynthetic in Filtration, Drainage and Erosion Control
Lecture 20 - Geosynthetic in pavements
Lecture 21 - Geosynthetic in pavements
Lecture 22 - Geosynthetic in pavements
Lecture 23 - Geosynthetic in pavements
Lecture 24 - Geosynthetic in pavements
Lecture 25 - Geosynthetic in pavements
Lecture 26 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 27 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 28 - Geosynthetics for Reinfroced Soil Retaining Walls
Lecture 29 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 30 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 31 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 32 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 33 - Geosynthetics for Reinforced Soil Retaining Walls

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Lecture 34 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 35 - Geosynthetics for Reinforced Soil Retaining Walls
Lecture 36 - Geosynthetic for Steep Slopes
Lecture 37 - Geosynthetic for Steep Slopes
Lecture 38 - Geosynthetic for Steep Slopes
Lecture 39 - Geosynthetic for Steep Slopes
Lecture 40 - Geosynthetic for Embankments on Soft Foundations
Lecture 41 - Geosynthetic for Embankments on Soft Foundations
Lecture 42 - Geosynthetic for Embankments on Soft Foundations
Lecture 43 - Geosynthetic for Ground Improvement
Lecture 44 - Geosynthetic for Ground Improvement
Lecture 45 - Geosynthetic for Ground Improvement
Lecture 46 - Geosynthetic for Ground Improvement
Lecture 47 - Geosynthetic for Ground Improvement
Lecture 48 - Geosynthetic for Ground Improvement
Lecture 49 - Geosynthetic for Ground Improvement
Lecture 50 - Geosynthetic for Improvement in Bearing Capacity
Lecture 51 - Designing with Geotextile Tube
Lecture 52 - Designing with Geotextile Tube
Lecture 53 - Design of Geosynthetic for Landfills
Lecture 54 - Design of Geosynthetic for Landfills
Lecture 55 - Design of Geosynthetic for Landfill
Lecture 56 - Design of Geosynthetic for Landfill
Lecture 57 - Design of Geosynthetic for Landfill
Lecture 58 - Designing With Geofoam
Lecture 59 - Designing With Geofoam
Lecture 60 - Designing With Geofoam
Lecture 61 - Designing With Geofoam
Lecture 62 - Designing With Geofoam
Lecture 63 - Designing With Geofoam

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NPTEL Video Course - Civil Engineering - NOC:Geotechnical Engineering Laboratory

Subject Co-ordinator - Prof. J. N. Mandal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Soil Processing
Lecture 2 - Specific Gravity and Field Density
Lecture 3 - Field Density
Lecture 4 - Grain Size Analysis
Lecture 5 - Grain Size Analysis (Continued...)
Lecture 6 - Grain Size Analysis (Continued...)
Lecture 7 - Atterberg Limit
Lecture 8 - Compaction
Lecture 9 - Compaction (Continued...)
Lecture 10 - Compaction (Continued...)
Lecture 11 - Compaction and Permeability
Lecture 12 - Permeability
Lecture 13 - Permeability and Shear Strength
Lecture 14 - Shear Strength
Lecture 15 - Shear Strength (Continued...)
Lecture 16 - Shear Strength (Continued...)
Lecture 17 - Shear Strength (Continued...)
Lecture 18 - Shear Strength (Continued...)
Lecture 19 - Shear Strength (Continued...)
Lecture 20 - Consolidation
Lecture 21 - Consolidation (Continued...)
Lecture 22 - Consolidation (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Geosynthetics Testing Laboratory

Subject Co-ordinator - Prof. J. N. Mandal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Types of Geosynthetics
Lecture 3 - Functions
Lecture 4 - Tests for Physical Properties and tensile strength of geosynthetics
Lecture 5 - Tensile Modulus
Lecture 6 - Drop Cone Test
Lecture 7 - Puncture Resistance Test
Lecture 8 - Puncture Resistance Test and Burst Strength Test
Lecture 9 - Grab Tensile Test
Lecture 10 - Grab Tensile Test and Triaxial Test
Lecture 11 - Triaxial and Pullout Test
Lecture 12 - Pullout Test
Lecture 13 - Sewn Seam Strength, Permittivity and Transmissivity
Lecture 14 - Hydraulic Properties and abrasion Test of geosynthetics
Lecture 15 - Endurance properties of Geosynthetics
Lecture 16 - Density, Water Absorption and Compressive Properties tests of Geofoam
Lecture 17 - Compressive Properties of Geofoam
Lecture 18 - Compressive and Tensile Properties of Geofoam
Lecture 19 - Tensile and Shear Properties of Geofoam
Lecture 20 - Shear and Flexural Properties of Geofoam
Lecture 21 - Flexural Properties and Flammability Test of Geofoam

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NPTEL Video Course - Civil Engineering - NOC:Environmental Geotechnics

Subject Co-ordinator - Prof. Devendra Narain Singh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview - 1
Lecture 2 - Overview - 2
Lecture 3 - Overview - 3
Lecture 4 - Civil Engineering
Lecture 5 - Recent Trends in civil engineering
Lecture 6 - Recent Trends and Subject organization
Lecture 7 - Civil Engineering and Soil Mechanics
Lecture 8 - Soil mechanics
Lecture 9 - Recent Trends in Soil mechanics
Lecture 10 - Soil contamination
Lecture 11 - Soil Improvement and wastes
Lecture 12 - Contaminant transport in soils
Lecture 13 - Soil- water- Environment Interaction
Lecture 14 - Basic concepts of analysis
Lecture 15 - Particle Energy Field Theory
Lecture 16 - Waste and types
Lecture 17 - Municipal and Industrial solid waste
Lecture 18 - Industrial non-hazardous and Hazardous wastes
Lecture 19 - Application of Industrial by-products
Lecture 20 - Introduction to Characterization of waste
Lecture 21 - Geomaterial characterization - 1
Lecture 22 - Geomaterial characterization - 2 (Morphological and physical characterization)
Lecture 23 - Geomaterial characterization - 3 (Chemical characterization)
Lecture 24 - Geomaterial characterization - 4 (Mercury Intrusive Porosimeter)
Lecture 25 - Geomaterial characterization - 5 (Specific Surface Area - I)
Lecture 26 - Geomaterial characterization - 6 (Specific surface area - II)
Lecture 27 - Geomaterial characterization - 7
Lecture 28 - Geomaterial characterization - 8 (Pore solution studies - I)
Lecture 29 - Geomaterial characterization - 9 (Pore solution studies - II)

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Lecture 30 - Geomaterial characterization - 10 (Assessing soil contamination)
Lecture 31 - Geomaterial characterization - 11
Lecture 32 - Contaminant transport through porous media - 1
Lecture 33 - Contaminant transport through porous media - 2
Lecture 34 - Contaminant transport through porous media - 3
Lecture 35 - Contaminant transport through porous media - 4
Lecture 36 - Contaminant transport through porous media - 5
Lecture 37 - Sorption and Desorption characteristics of geomaterials - 1
Lecture 38 - Sorption and Desorption characteristics of geomaterials - 2
Lecture 39 - Sorption and Desorption characteristics of geomaterials - 3
Lecture 40 - Thermal Characterisation - 1
Lecture 41 - Thermal characterization - 2
Lecture 42 - Thermal characterisation - 3
Lecture 43 - Electrical characterization - 1
Lecture 44 - Electrical characterization - 2
Lecture 45 - Electrical characterization - 3
Lecture 46 - Electrical characterization - 4
Lecture 47 - Electrical characterization - 5
Lecture 48 - Swelling, shrinkage and cracking characteristics of soil - 1
Lecture 49 - Swelling, shrinkage and cracking characteristics of soil - 2
Lecture 50 - Swelling, shrinkage and cracking characteristics of soil - 3
Lecture 51 - Swelling, shrinkage and cracking characteristics of soil - 4
Lecture 52 - Swelling, shrinkage and cracking characteristics of soil - 5
Lecture 53 - Swelling, shrinkage and cracking characteristics of soil - 6

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NPTEL Video Course - Civil Engineering - NOC:Environmental Geomechanics

Subject Co-ordinator - Prof. Devendra Narain Singh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Overview
Lecture 4 - Civil Engineering and Soil Mechanics
Lecture 5 - Soil mechanics
Lecture 6 - Environmental Geomechanics
Lecture 7 - Scope of Environmental Geomechanics - I
Lecture 8 - Scope of Environmental Geomechanics - II
Lecture 9 - Scope of Environmental Geomechanics - III
Lecture 10 - Recent trends - I
Lecture 11 - Recent trends - II
Lecture 12 - Energy Geotechnics
Lecture 13 - Soil
Lecture 14 - Soil- water- environment interaction - I
Lecture 15 - Soil- water- environment interaction - II
Lecture 16 - Soil- water- environment interaction - III
Lecture 17 - Particle energy field theory - I
Lecture 18 - Particle energy field theory - II
Lecture 19 - Particle energy field theory - III
Lecture 20 - Waste
Lecture 21 - Waste
Lecture 22 - Waste
Lecture 23 - Application of industrial by-products - I
Lecture 24 - Application of industrial by-products - II
Lecture 25 - Geomaterial characterization - I (Mineralogical characterization)
Lecture 26 - Geomaterial characterization - II (Mineralogical characterization)
Lecture 27 - Geomaterial characterization - III (Morphological characterization)
Lecture 28 - Geomaterial characterization - IV (Morphological characterization)
Lecture 29 - Geomaterial characterization - V (Specific surface area)

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Lecture 30 - Geomaterial characterization - VI (Chemical characterization)
Lecture 31 - Geomaterial characterization - VII (Chemical characterization)
Lecture 32 - Geomaterial characterization - VIII (Chemical characterization)
Lecture 33 - Geomaterial characterization - IX (Chemical characterization)
Lecture 34 - Geomaterial characterization - X (Chemical characterization)
Lecture 35 - Geomaterial characterization - XI (Chemical characterization)
Lecture 36 - Geomaterial characterization - XII (Corrosion potential of soils)
Lecture 37 - Soil characteristics and environmental variables
Lecture 38 - Corrosion potential of soils
Lecture 39 - Contaminant transport through porous media - I
Lecture 40 - Contaminant transport through porous media - II
Lecture 41 - Contaminant transport through porous media - III
Lecture 42 - Sorption â desorption characteristics - I
Lecture 43 - Sorption â desorption characteristics - II
Lecture 44 - Sorption â desorption characteristics - III
Lecture 45 - Thermal characterization - I
Lecture 46 - Thermal characterization - II
Lecture 47 - Thermal characterization - III
Lecture 48 - Cracking characteristics of fine-grained soils - I
Lecture 49 - Cracking characteristics of fine-grained soils - II
Lecture 50 - Cracking characteristics of fine-grained soils - III
Lecture 51 - Electrical characterization - I
Lecture 52 - Electrical characterization - II
Lecture 53 - Electrical characterization - III
Lecture 54 - Magnetic characterization
Lecture 55 - Pore-structure characterization - I
Lecture 56 - Pore-structure characterization - II

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NPTEL Video Course - Civil Engineering - NOC:Geotechnical Engineering - 1

Subject Co-ordinator - Prof. Devendra Narain Singh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Origin and Definition of Soils
Lecture 3 - Classification of Soils - I
Lecture 4 - Classification of Soils - II
Lecture 5 - Classification of Soils - III and Challenging Situations
Lecture 6 - Soil constituents - I
Lecture 7 - Soil constituents - II
Lecture 8 - Particulate Nature of the Soils
Lecture 9 - Soil Aggregate and Phase Relations
Lecture 10 - Classification of Soils and Sieve Analysis
Lecture 11 - Particle Size Analysis of Finegrained Soils
Lecture 12 - Soil-water Interaction - I
Lecture 13 - Soil-water Interaction - II
Lecture 14 - Compaction Characteristics of Soil - I
Lecture 15 - Compaction Characteristics of Soil - II
Lecture 16 - Permeability of Soil and Ground Water Flow - I
Lecture 17 - Permeability of Soil and Ground Water Flow - II
Lecture 18 - Coefficient of Permeability
Lecture 19 - Seepage Theory
Lecture 20 - Applications of Seepage Theory
Lecture 21 - Flow Net in the Earthen Dam - I
Lecture 22 - Flow Net in the Earthen Dam - II
Lecture 23 - Stresses in the Soil Mass due to External Loadings - I
Lecture 24 - Stresses in the Soil Mass due to External Loadings - II
Lecture 25 - Compression Characteristics of Soils - I
Lecture 26 - Compression Characteristics of Soils - II
Lecture 27 - Consolidation of soils
Lecture 28 - Coefficient of consolidation

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NPTEL Video Course - Civil Engineering - NOC:Remote Sensing: Principles and Applications

Subject Co-ordinator - Prof. Eswar Rajasekaran

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to RS and EMR
Lecture 2 - Introduction to EMR
Lecture 3 - Basic Laws of RS
Lecture 4 - Properties of EMR - Part 1
Lecture 5 - Properties of EMR - Part 2
Lecture 6 - Interaction of EMR with atmosphere
Lecture 7 - Radiometry - Part 1
Lecture 8 - Radiometry - Part 2
Lecture 9 - Radiometry - Part 3
Lecture 10 - Reflectance, albedo and related quantities
Lecture 11 - Interaction of EMR with terrain features - Part 1
Lecture 12 - Interaction of EMR with terrain features - Part 2
Lecture 13 - Radiation reaching sensor - Part 1
Lecture 14 - Radiation reaching sensor - Part 2
Lecture 15 - RS data: From Radiance to reflectance - Part 1
Lecture 16 - RS data: From Radiance to reflectance - Part 2
Lecture 17 - RS data: From Radiance to reflectance - Part 3
Lecture 18 - RS image acquisition and RS systems - Part 1
Lecture 19 - RS image acquisition and RS systems - Part 2
Lecture 20 - RS image acquisition and RS systems - Part 3
Lecture 21 - RS image acquisition and RS systems - Part 4
Lecture 22 - RS image acquisition and RS systems - Part 5
Lecture 23 - RS image acquisition and RS systems - Part 6
Lecture 24 - RS image acquisition and RS systems - Part 7
Lecture 25 - RS image acquisition and RS systems - Part 8
Lecture 26 - RS image acquisition and RS systems - Part 9
Lecture 27 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 1
Lecture 28 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 2
Lecture 29 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 3

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Lecture 30 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 4
Lecture 31 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 5
Lecture 32 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 6
Lecture 33 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 7
Lecture 34 - Spectral Indices
Lecture 35 - Thermal Infrared Remote Sensing - Part 1
Lecture 36 - Thermal Infrared Remote Sensing - Part 2
Lecture 37 - Thermal Infrared Remote Sensing - Part 3
Lecture 38 - Thermal Infrared Remote Sensing - Part 4
Lecture 39 - Thermal Infrared Remote Sensing - Part 5
Lecture 40 - Passive Microwave Remote Sensing - Part 1
Lecture 41 - Passive Microwave Remote Sensing - Part 2
Lecture 42 - Passive Microwave Remote Sensing - Part 3
Lecture 43 - Passive Microwave Remote Sensing - Part 4
Lecture 44 - Active microwave Remote Sensing - Radar - Part 1
Lecture 45 - Active microwave Remote Sensing - Radar - Part 2
Lecture 46 - Active microwave Remote Sensing - Radar - Part 3
Lecture 47 - Active microwave Remote Sensing - Radar - Part 4
Lecture 48 - Active microwave Remote Sensing - Radar - Part 5
Lecture 49 - Active microwave Remote Sensing - Radar - Part 6
Lecture 50 - Platforms for remote sensing observations - Part 1
Lecture 51 - Platforms for remote sensing observations - Part 2
Lecture 52 - Platforms for remote sensing observations - Part 3
Lecture 53 - Platforms for remote sensing observations - Part 4
Lecture 54 - Platforms for remote sensing observations - Part 5
Lecture 55 - Platforms for remote sensing observations - Part 6
Lecture 56 - LIDAR - Part 1
Lecture 57 - LIDAR - Part 2
Lecture 58 - LIDAR - Part 3
Lecture 59 - RS data, data portals and processing tools - Part 1
Lecture 60 - RS data, data portals and processing tools - Part 2
Lecture 61 - RS data, data portals and processing tools - Part 3
Lecture 62 - Land use, land cover monitoring and change detection - Part 1
Lecture 63 - Land use, land cover monitoring and change detection - Part 2
Lecture 64 - Application of RS in water resources management - Part 1
Lecture 65 - Application of RS in water resources management - Part 2
Lecture 66 - Application of RS in water resources management - Part 3
Lecture 67 - Application of RS in water resources management - Part 4

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NPTEL Video Course - Civil Engineering - NOC:Dynamics of Structures

Subject Co-ordinator - Prof. Manish Kumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Structural Dynamics
Lecture 2 - Idealization of Structures
Lecture 3 - Components of Dynamic System
Lecture 4 - Equation of Motion
Lecture 5 - Free Vibration
Lecture 6 - Damped Free Vibration - Part 1
Lecture 7 - Damped Free Vibration - Part 2
Lecture 8 - Undamped Harmonic Excitations
Lecture 9 - Damped Harmonic Excitations
Lecture 10 - Frequency response curves
Lecture 11 - Transmissibility
Lecture 12 - Energy in Forced Vibrations
Lecture 13 - Unit impulse Functions
Lecture 14 - Step and Ramp Forces
Lecture 15 - Pulse Excitations
Lecture 16 - Numerical Response Methods
Lecture 17 - Seismic Response Spectra
Lecture 18 - Continuous systems
Lecture 19 - Lumped mass systems
Lecture 20 - Equation of motion
Lecture 21 - Equation of motion - examples
Lecture 22 - Mode shapes and frequencies
Lecture 23 - Free vibration - Undamped and Damped
Lecture 24 - Damping in MDOF Systems
Lecture 25 - Forced response of MDOF systems
Lecture 26 - Modal superposition Analysis
Lecture 27 - Response Spectrum Analysis
Lecture 28 - Concept of Seismic Isolation
Lecture 29 - Dynamics of Base-isolation Systems

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NPTEL Video Course - Civil Engineering - NOC:Microwave Remote Sensing in Hydrology

Subject Co-ordinator - Prof. J. Indu

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Syllabus
Lecture 2 - History Of Microwave Remote Sensing
Lecture 3 - Overview Of Active and Passive Microwave Remote Sensing
Lecture 4 - Fundamentals Laws Of Remote Sensing
Lecture 5 - Tutorial 1: Python Programming From Beginner Perspective
Lecture 6 - Scattering Of Microwaves
Lecture 7 - Synthetic Aperture Radars - Basics
Lecture 8 - Sar Image Processing - Fundamental Terminologies
Lecture 9 - Working With Sar Imagery
Lecture 10 - Understanding Radar Equation
Lecture 11 - Tutorial 2 : Exploring Alos Palsar Data In Python
Lecture 12 - Understanding Radar Imagery
Lecture 13 - Tutorial 3: Introduction To SNAP
Lecture 14 - Doppler Shift
Lecture 15 - Speckle
Lecture 16 - Speckle - How To Handle
Lecture 17 - Tutorial 4 Part 1: Plotting In 1 D Using Python
Lecture 18 - Tutorial 4 Part 2: Plotting In 2 D Using Python
Lecture 19 - Tutorial 4 Part 3: Statistics Using Python
Lecture 20 - Tutorial 4 Part 4: Hypothesis Tesing Using Python
Lecture 21 - Sar Image Pre Processing
Lecture 22 - Sar Image Texture
Lecture 23 - Texture For Image Classification
Lecture 24 - Polarization
Lecture 25 - Tutorial 5 Part 1: Speckle Filtering Using Python
Lecture 26 - Tutorial 5 Part 2: Speckle Filtering Using Python Using Gaussian Filter
Lecture 27 - Numerical On Radar Remote Sensing
Lecture 28 - Numerical On Radar Remote Sensing
Lecture 29 - Image Classification - Basics

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Lecture 30 - Supervised Classification
Lecture 31 - Maximum Likelihood Classification
Lecture 32 - Tutorial 6 Part 1: Sar Image Pre-processing
Lecture 33 - Tutorial 6 Part 2: Maximum Likelihood Classification In Snap
Lecture 34 - Unsupervised Classification And Accuracy Assessment
Lecture 35 - Fuzzy Classification
Lecture 36 - Tutorial 7 Part 1: Working With Grace Data In Python
Lecture 37 - Tutorial 7 Part 2: Altimetry Data In Python
Lecture 38 - Tutorial 7 Part 3: Swot Mission For Altimetry
Lecture 39 - Radars In Hydrology
Lecture 40 - Applications Of Radar Remote Sensing In Hydrology
Lecture 41 - Doppler Weather Radar
Lecture 42 - Tutorial 8 Part 1: Doppler Weather Radar Data Visualization And Precipitation Estimation
Lecture 43 - Tutorial 8 Part 2: Doppler Weather Radar Data Visualization And Precipitation Estimation
Lecture 44 - Radar Altimetry
Lecture 45 - Measuring Soil Moisture And Terrestrial Water Storage Using Radar Remote Sensing
Lecture 46 - Tutorial 9: Handling Passive Microwave Obsevations
Lecture 47 - Fundamentals Of Passive Microwave Remote Sensing - Part 1
Lecture 48 - Fundamentals Of Passive Microwave Remote Sensing - Part 2
Lecture 49 - Applications Of Passive Microwave Remote Sensing In Hydrology
Lecture 50 - Passive Microwave Radiometers And Their Applications
Lecture 51 - Tutorial 10: Processing Satellite Precipitation Data Using Python
Lecture 52 - Introduction To The Basics Of Sar Intereferometry
Lecture 53 - Sar Interferometry (Insar) And Applications
Lecture 54 - Introduction To Other Modes Of Sar Interferometry And Applications - DInSAR, PSInSAR and DEM's
Lecture 55 - Tutorial 11: Sar Interferometry Processing Using Snaphu
Lecture 56 - Tutorial 12 Part 1: Hydrologic Modelling Using Microwave Remote Sensing
Lecture 57 - Tutorial 12 Part 2: Introduction To Swat+ Hydrological Model
Lecture 58 - Tutorial 12 Part 3: Introductory Tutorial On Vic Hydrological Model

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NPTEL Video Course - Civil Engineering - NOC:Groundwater Hydrology and Management

Subject Co-ordinator - Prof. Pennan Chinnasamy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Groundwater - Part 1
Lecture 2 - Introduction to Groundwater - Part 2
Lecture 3 - Introduction to Groundwater - Part 3
Lecture 4 - Introduction to Groundwater - Part 4
Lecture 5 - Introduction to Groundwater - Part 5
Lecture 6 - International importance of groundwater and India - Part 1
Lecture 7 - International importance of groundwater and India - Part 2
Lecture 8 - International importance of groundwater and India - Part 3
Lecture 9 - International importance of groundwater and India - Part 4
Lecture 10 - International importance of groundwater and India - Part 5
Lecture 11 - Physics and hydrology of Groundwater - Part 1
Lecture 12 - Physics and hydrology of Groundwater - Part 2
Lecture 13 - Physics and hydrology of Groundwater - Part 3
Lecture 14 - Physics and hydrology of Groundwater - Part 4
Lecture 15 - Physics and hydrology of Groundwater - Part 5
Lecture 16 - Groundwater governing equations 1 - Part 1
Lecture 17 - Groundwater governing equations 1 - Part 2
Lecture 18 - Groundwater governing equations 1 - Part 3
Lecture 19 - Groundwater governing equations 1 - Part 4
Lecture 20 - Groundwater governing equations 1 - Part 5
Lecture 21 - Groundwater governing equations 2 - Part 1
Lecture 22 - Groundwater governing equations 2 - Part 2
Lecture 23 - Groundwater governing equations 2 - Part 3
Lecture 24 - Groundwater governing equations 2 - Part 4
Lecture 25 - Groundwater governing equations 2 - Part 5
Lecture 26 - Groundwater recharge and discharge - Part 1
Lecture 27 - Groundwater recharge and discharge - Part 2
Lecture 28 - Groundwater recharge and discharge - Part 3
Lecture 29 - Groundwater recharge and discharge - Part 4

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Lecture 30 - Groundwater recharge and discharge - Part 5
Lecture 31 - Constructing aquifers using groundwater data - Part 1
Lecture 32 - Constructing aquifers using groundwater data - Part 2
Lecture 33 - Constructing aquifers using groundwater data - Part 3
Lecture 34 - Constructing aquifers using groundwater data - Part 4
Lecture 35 - Constructing aquifers using groundwater data - Part 5
Lecture 36 - Conceptual model for groundwater - Part 1
Lecture 37 - Conceptual model for groundwater - Part 2
Lecture 38 - Conceptual model for groundwater - Part 3
Lecture 39 - Conceptual model for groundwater - Part 4
Lecture 40 - Conceptual model for groundwater - Part 5
Lecture 41 - Groundwater data in India - Part 1
Lecture 42 - Groundwater data in India - Part 2
Lecture 43 - Groundwater data in India - Part 3
Lecture 44 - Groundwater data in India - Part 4
Lecture 45 - Groundwater data in India - Part 5
Lecture 46 - Application of Groundwater data in India - Part 1
Lecture 47 - Application of Groundwater data in India - Part 2
Lecture 48 - Application of Groundwater data in India - Part 2
Lecture 49 - Application of Groundwater data in India - Part 3
Lecture 50 - Application of Groundwater data in India - Part 3
Lecture 51 - Introduction to Groundwater modeling - Part 1
Lecture 52 - Introduction to Groundwater modeling - Part 2
Lecture 53 - Introduction to Groundwater modeling - Part 3
Lecture 54 - Introduction to Groundwater modeling - Part 4
Lecture 55 - Introduction to Groundwater modeling - Part 5
Lecture 56 - Case studies of Groundwater in India - Part 1
Lecture 57 - Case studies of Groundwater in India - Part 2
Lecture 58 - Case studies of Groundwater in India - Part 3
Lecture 59 - Case studies of Groundwater in India - Part 4
Lecture 60 - Case studies of Groundwater in India - Part 5

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NPTEL Video Course - Civil Engineering - NOC:Rural Water Resources Management

Subject Co-ordinator - Prof. Pennan Chinnasamy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of water resource management and Hydrological Cycle and representations - Part 1
Lecture 2 - Importance of water resource management and Hydrological Cycle and representations - Part 2
Lecture 3 - Importance of water resource management and Hydrological Cycle and representations - Part 3
Lecture 4 - Importance of water resource management and Hydrological Cycle and representations - Part 4
Lecture 5 - Importance of water resource management and Hydrological Cycle and representations - Part 5
Lecture 6 - Key Hydrological Parameters 1 - Part 1
Lecture 7 - Key Hydrological Parameters 1 - Part 2
Lecture 8 - Key Hydrological Parameters 1 - Part 3
Lecture 9 - Key Hydrological Parameters 1 - Part 4
Lecture 10 - Key Hydrological Parameters 1 - Part 5
Lecture 11 - Key Hydrological Parameters 2 - Part 1
Lecture 12 - Key Hydrological Parameters 2 - Part 2
Lecture 13 - Key Hydrological Parameters 2 - Part 3
Lecture 14 - Key Hydrological Parameters 2 - Part 4
Lecture 15 - Key Hydrological Parameters 2 - Part 5
Lecture 16 - Introduction to Groundwater hydrology - Part 1
Lecture 17 - Introduction to Groundwater hydrology - Part 2
Lecture 18 - Introduction to Groundwater hydrology - Part 3
Lecture 19 - Introduction to Groundwater hydrology - Part 4
Lecture 20 - Introduction to Groundwater hydrology - Part 5
Lecture 21 - Groundwater components - Part 1
Lecture 22 - Groundwater components - Part 2
Lecture 23 - Groundwater components - Part 3
Lecture 24 - Groundwater components - Part 4
Lecture 25 - Groundwater components - Part 5
Lecture 26 - Surface water hydrology - Part 1
Lecture 27 - Surface water hydrology - Part 2
Lecture 28 - Surface water hydrology - Part 3
Lecture 29 - Surface water hydrology - Part 4

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Lecture 30 - Surface water hydrology - Part 5
Lecture 31 - Water Mass Balance Equation - Part 1
Lecture 32 - Water Mass Balance Equation - Part 2
Lecture 33 - Water Mass Balance Equation - Part 3
Lecture 34 - Water Mass Balance Equation - Part 4
Lecture 35 - Water Mass Balance Equation - Part 5
Lecture 36 - Rural water management issues, data challenges and observation records - Part 1
Lecture 37 - Rural water management issues, data challenges and observation records - Part 2
Lecture 38 - Rural water management issues, data challenges and observation records - Part 3
Lecture 39 - Rural water management issues, data challenges and observation records - Part 4
Lecture 40 - Rural water management issues, data challenges and observation records - Part 5
Lecture 41 - Rural water resource management infrastructure (engineered) - Part 1
Lecture 42 - Rural water resource management infrastructure (engineered) - Part 2
Lecture 43 - Rural water resource management infrastructure (engineered) - Part 3
Lecture 44 - Rural water resource management infrastructure (engineered) - Part 4
Lecture 45 - Rural water resource management infrastructure (engineered) - Part 5
Lecture 46 - Rural water resource management infrastructure (nature based) - Part 1
Lecture 47 - Rural water resource management infrastructure (nature based) - Part 2
Lecture 48 - Rural water resource management infrastructure (nature based) - Part 3
Lecture 49 - Rural water resource management infrastructure (nature based) - Part 4
Lecture 50 - Rural water resource management infrastructure (nature based) - Part 5
Lecture 51 - Solving case studies in rural water resource management - Part 1
Lecture 52 - Solving case studies in rural water resource management - Part 2
Lecture 53 - Solving case studies in rural water resource management - Part 3
Lecture 54 - Solving case studies in rural water resource management - Part 4
Lecture 55 - Solving case studies in rural water resource management - Part 5
Lecture 56 - Rural hydrological databases for India - Part 1
Lecture 57 - Rural hydrological databases for India - Part 2
Lecture 58 - Rural hydrological databases for India - Part 3
Lecture 59 - Rural hydrological databases for India - Part 4
Lecture 60 - Rural hydrological databases for India - Part 5

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NPTEL Video Course - Civil Engineering - NOC:Geotechnical Engineering-II

Subject Co-ordinator - Prof. Devendra Narain Singh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Shear Strength of Soils - I
Lecture 3 - Shear Strength of Soils - II
Lecture 4 - Shear Strength of Soils - III
Lecture 5 - Shear Strength of Soils - IV
Lecture 6 - Testing for shear strength parameters: Introduction
Lecture 7 - Direct shear box test
Lecture 8 - Direct Shear Interpretation of Test Results - I
Lecture 9 - Direct Shear Interpretation of Test Results - II
Lecture 10 - Kf line
Lecture 11 - Selection of Parameter (Shear Strength,SS) - I
Lecture 12 - Selection of Parameter (Shear Strength,SS) - II
Lecture 13 - Shear Strength of Cohesive Soils - I
Lecture 14 - Shear Strength of Cohesive Soils - II
Lecture 15 - Triaxial Test - I
Lecture 16 - Triaxial Test - II
Lecture 17 - Triaxial Test - III
Lecture 18 - Interpretation of Triaxial test Results - I
Lecture 19 - Interpretation of Triaxial test Results - II
Lecture 20 - Interpretation of Triaxial test Results - III
Lecture 21 - Pore Pressure Parameters - I
Lecture 22 - Pore Pressure Parameters - II
Lecture 23 - Stress Paths - I
Lecture 24 - Stress Paths - II
Lecture 25 - Plastic Equilibrium in Soils
Lecture 26 - Mechanisms of Development of Plastic Equilibrium in Soils - I
Lecture 27 - Mechanisms of Development of Plastic Equilibrium in Soils - II
Lecture 28 - Earth Pressure Analysis (Trial Wedge) - I
Lecture 29 - Earth Pressure Analysis (Trial Wedge) - II

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Lecture 30 - Earth Pressure Analysis (Trial Wedge) - III
Lecture 31 - Analysis of Completely Submerged Retaining wall
Lecture 32 - Gravity Walls Supporting Cohesive Soil Mass (Backfill)
Lecture 33 - Sloping Backfill
Lecture 34 - Earth Pressure Analysis - I
Lecture 35 - Earth Pressure Analysis - II
Lecture 36 - Sheet Pile Wall Introduction - I
Lecture 37 - Sheet Pile Wall Introduction - II
Lecture 38 - Sheet pile wall Introduction - III
Lecture 39 - Analysis of sheet piles - I
Lecture 40 - Analysis of sheet piles - II
Lecture 41 - Anchored Bulkheads
Lecture 42 - Cantilever Sheet Piles
Lecture 43 - Lateral Earth Pressure Braced Sheet Pile Walls
Lecture 44 - Slope Stability - I
Lecture 45 - Slope Stability - II
Lecture 46 - Slope Instability - I
Lecture 47 - Slope Instability - II
Lecture 48 - Slope Instability - III
Lecture 49 - Analysis of Finite Slopes - I Planar Failure Surface
Lecture 50 - Analysis of Finite Slopes - II Circular Failure Surface
Lecture 51 - Finite Slopes Friction Circle Method
Lecture 52 - Slip Circle Method

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NPTEL Video Course - Civil Engineering - NOC:Remote Sensing and GIS for Rural Development

Subject Co-ordinator - Prof. Pennan Chinnasamy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to course - Rural development (RD)
Lecture 2 - Water security (SF) and Water security (GW) and issues
Lecture 3 - Food security and issues
Lecture 4 - Agriculture and rural infrastructure issues
Lecture 5 - Rural Development
Lecture 6 - Data and mapping issues for Rural regions
Lecture 7 - Introduction to Remote Sensing and need
Lecture 8 - Remote Sensing for Water and Food Security
Lecture 9 - Remote Sensing for Rural infrastructures
Lecture 10 - Remote Sensing for Rural Development
Lecture 11 - Intro to Remote Sensing Data for Rural Development
Lecture 12 - Intro to Remote Sensing Data for Rural Development : Water
Lecture 13 - Intro to Remote Sessing Data for Rural Development : Soil and Climate
Lecture 14 - Intro to Remote Sensing Data for Rural Development : NASA datasets for water
Lecture 15 - Intro to Remote Sensing Data for Rural Development
Lecture 16 - Intro to GIS and QGIS
Lecture 17 - Intro to GIS data types and download
Lecture 18 - Intro to GIS vector data type and QGIS panel
Lecture 19 - Vector Tools in QGIS
Lecture 20 - QGIS tutorials for vector analysis and data searching
Lecture 21 - Intro to Raster Data type in GIS
Lecture 22 - Raster data type formats and uses
Lecture 23 - Raster data and Vector data quality issues
Lecture 24 - Raster data tools: Raster calculator and Raster Align
Lecture 25 - Raster data tools: Clip and Masking tools
Lecture 26 - Intro to GIS Projections and Co-ordinate systems
Lecture 27 - Intro to digitization of images for raster data
Lecture 28 - Digitization of scanned maps into raster data
Lecture 29 - Extracting point and line features from georeferenced data

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Lecture 30 - Extracting polygon features from georeferenced data
Lecture 31 - Creating shapefiles from georefrenced maps
Lecture 32 - Google Earth Pro introduction for extracting data
Lecture 33 - Ground Control points from Google Earth Pro and Basemaps
Lecture 34 - Digital Elevation models and sources
Lecture 35 - Digital Elevation models (hands on example)
Lecture 36 - Introduction to Land Use Land Cover
Lecture 37 - Data for LULC and proxy data
Lecture 38 - Analyzing Bhuvan LULC data - Part 1
Lecture 39 - Analyzing Bhuvan LULC data - Part 2
Lecture 40 - Analyzing USGS LULC data
Lecture 41 - Different types of LULC classifications
Lecture 42 - Different types of LULC classifications
Lecture 43 - Remote Sensing for irrigation assessments
Lecture 44 - Remote Sensing for Groundwater irrigation assessments
Lecture 45 - Methods for Crop Statistics using Remote Sensing data
Lecture 46 - Remote Sensing based indicators for rural development
Lecture 47 - Remote Sensing methods for crop area and health assessments
Lecture 48 - NDVI data access
Lecture 49 - NDVI data from NASA platforms
Lecture 50 - NDVI data from Sentinel and NASA platforms
Lecture 51 - Remote Sensing based indicators database
Lecture 52 - Synergized mapping using Remote Sensing and Crowd Sourced data for rural infrastructures
Lecture 53 - RS and OSM for mapping rural infrastructures: Schools
Lecture 54 - RS and OSM for mapping rural infrastructures: Hospitals
Lecture 55 - RS and OSM for mapping rural infrastructures: Adding data, crops and water bodies
Lecture 56 - RS and GIS application for Rural Development: Moniotring and Evaluation
Lecture 57 - RS and GIS application for Rural Development: Monitoring and Evaluation using NDVI and NDWI
Lecture 58 - RS and GIS application for Rural Development: Water Quality Assessment
Lecture 59 - RS and GIS application for Rural Development: Indicators and Dashboards
Lecture 60 - RS and GIS for Rural Development - Summary, Wrap and Ways Forward

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NPTEL Video Course - Civil Engineering - NOC:Stress and Strain Issues in Structural Geology

Subject Co-ordinator - Prof. Soumyajit Mukherjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Doming and Diapirism
Lecture 2 - Isostasy - I
Lecture 3 - Isostasy - II
Lecture 4 - Ghyben-Herzberg law, Hydrostatic and Deviatoric stresses and strains
Lecture 5 - Resolution of stress as vectors
Lecture 6 - Addition and resolution of Stress (& Force) - I
Lecture 7 - Addition and resolution of Stress (& Force) - II
Lecture 8 - Addition and resolution of Stress (& Force) - III
Lecture 9 - Addition and resolution of Stress (& Force) - IV
Lecture 10 - Principle of centrifuge analogue modeling
Lecture 11 - Stress Issue: Mohr circle - I
Lecture 12 - Stress Issue: Mohr circle - II
Lecture 13 - Stress Issue: Mohr circle - III
Lecture 14 - Stress Issue: Mohr circle - IV
Lecture 15 - Strain parameters: Definitions and Calculations - I
Lecture 16 - Finding out areas of irregular geometries
Lecture 17 - Elementary strain analysis - I
Lecture 18 - Elementary strain analysis - II
Lecture 19 - Stress and strain behaviour of rocks - I
Lecture 20 - Stress and strain behaviour of rocks - II
Lecture 21 - Stress and strain behaviour of rocks - III
Lecture 22 - Ductile simple shear zone kinematics - I
Lecture 23 - Ductile simple shear zone kinematics - II
Lecture 24 - Ductile simple shear zone kinematics - III
Lecture 25 - Ductile simple shear zone kinematics - IV
Lecture 26 - Ductile simple shear zone kinematics - V
Lecture 27 - Ductile simple shear zone kinematics - VI
Lecture 28 - Ductile simple shear zone kinematics - VII
Lecture 29 - Ductile simple shear zone kinematics - VIII

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Lecture 30 - Ductile pure shear zone kinematics
Lecture 31 - Ductile pure shear zone kinematics and Taylor-Couette flow
Lecture 32 - Taylor-Couette flow
Lecture 33 - Introduction to Second-Rank Tensors - I
Lecture 34 - Introduction to Second-Rank Tensors - II
Lecture 35 - Second-Rank Tensors and Stress Issues - I
Lecture 36 - Second-Rank Tensors and Stress Issues - II
Lecture 37 - Second-Rank Tensors and Stress Issues - III
Lecture 38 - Cauchy Stress Tetrahedron
Lecture 39 - Stress Invariants
Lecture 40 - Stress and strain invariants, Hooke law for isotropic materials
Lecture 41 - Hookeâ s law - II
Lecture 42 - Triaxial stress applied on materials with thermal effects
Lecture 43 - How stress can alter permeability, double dot product and applications
Lecture 44 - Deviatoric stress and strain, deformation gradient and Jacobian matrix
Lecture 45 - General definition of 3D strain, application of Jacobian matrix
Lecture 46 - Application of Jacobian matrix, nonhomogeneous deformation
Lecture 47 - Rotation and translation - changes in coordinates
Lecture 48 - Principles of 1g analogue modeling - I
Lecture 49 - Principles of 1g analogue modeling - II
Lecture 50 - Principles of 1g analogue modeling - III
Lecture 51 - Anderson's theory of faulting
Lecture 52 - Stereoplot of principal stress axes - I
Lecture 53 - Stereoplot of principal stress axes - II
Lecture 54 - Stereoplot of principal stress axes - III
Lecture 55 - Deduction of principal stress axes orientation from fault data
Lecture 56 - Elementary stress problems dealing with stereonet - I
Lecture 57 - Elementary stress problems dealing with stereonet - II
Lecture 58 - Poroelasticity - I
Lecture 59 - Poroelasticity - II, stereonet problem
Lecture 60 - Poroelasticity - III

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NPTEL Video Course - Civil Engineering - NOC:Principles of Stratigraphy

Subject Co-ordinator - Prof. Soumyajit Mukherjee

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Principles of Stratigraphy
Lecture 2 - Unconformities - I
Lecture 3 - Unconformities - II
Lecture 4 - Basement-cover relationship
Lecture 5 - Primary Sedimentary Structures
Lecture 6 - Preparation of Lithologs
Lecture 7 - Thickness Issue
Lecture 8 - Drill cores and Wellbores
Lecture 9 - How planes appear in drill cores - II
Lecture 10 - Applications of image logs, Geological Time Scale - I
Lecture 11 - Geological Time Scale - II
Lecture 12 - Geological Time Scale - III
Lecture 13 - Geological Time Scale - IV
Lecture 14 - Geological Time Scale - V
Lecture 15 - Lithostratigraphy - I
Lecture 16 - Lithostratigraphy - II
Lecture 17 - Lithostratigraphy - III
Lecture 18 - Lithostratigraphy - IV
Lecture 19 - Lithostratigraphy - V and different sedimentary environments
Lecture 20 - Stratigraphic Issues
Lecture 21 - Heavy mineral stratigraphy and layered deposits
Lecture 22 - Glacial stratigraphy and Volcanic stratigraphy - I
Lecture 23 - Volcanic stratigraphy - II
Lecture 24 - Rose Diagram
Lecture 25 - Bar diagrams, tadpole plots and polar tangent plots
Lecture 26 - Volcanic stratigraphy - III and Historical development of stratigraphy
Lecture 27 - Sedimentary successions in different environments and Hydrostratigraphy
Lecture 28 - Stratigraphy of rift basins and collisional terrains
Lecture 29 - Biostratigraphy - I

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Lecture 30 - Biostratigraphy - II
Lecture 31 - Biostratigraphy - III (biozones)
Lecture 32 - Biostratigraphy - IV (graphic and statistical correlations)
Lecture 33 - Graph Theory - I
Lecture 34 - Graph Theory - II
Lecture 35 - Graph Theory - III
Lecture 36 - Biostratigraphy - V (Elementary use of graph theory)
Lecture 37 - Biostratigraphy - VI (Use of graph theory)
Lecture 38 - Matching in the context of biostratigraphic correlation
Lecture 39 - Cladistics - I
Lecture 40 - Cladistics - II (How stratigraphy matters)
Lecture 41 - Biostratigraphy - VII
Lecture 42 - Magnetostratigraphy - I
Lecture 43 - Magnetostratigraphy - II
Lecture 44 - Magnetostratigraphy - III
Lecture 45 - Magnetostratigraphy - IV and Chemostratigraphy - I
Lecture 46 - Chemostratigraphy - II
Lecture 47 - Chemostratigraphy - III
Lecture 48 - Chemostratigraphy - IV
Lecture 49 - Chemostratigraphy - V
Lecture 50 - Sequence Stratigraphy - I
Lecture 51 - Sequence Stratigraphy - II
Lecture 52 - Sequence Stratigraphy - III
Lecture 53 - Sequence Stratigraphy - IV
Lecture 54 - Stratigraphy based on seismic images and well logs
Lecture 55 - Sequence Stratigraphy - V
Lecture 56 - Sequence Stratigraphy - VI, coastal and marine deposits
Lecture 57 - Sequence Stratigraphy - VII
Lecture 58 - Sequence Stratigraphy - VIII
Lecture 59 - Chronostratigraphy - I
Lecture 60 - Chronostratigraphy - II

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NPTEL Video Course - Civil Engineering - NOC:Cross-Section Balancing in Structural Geology

Subject Co-ordinator - Prof. Soumyajit Mukherjee

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prerequisites of cross-section balancing â Strain parameters and area calculation - I
Lecture 2 - Prerequisites of cross-section balancing â Strain parameters and area calculation - II
Lecture 3 - Fault Rules - I
Lecture 4 - Fault Rules - II
Lecture 5 - Busk method of fold extrapolation - I
Lecture 6 - Busk method of fold extrapolation - II
Lecture 7 - Kink method of fold extrapolation - I
Lecture 8 - Kink method of fold extrapolation - II
Lecture 9 - Interpretation of folds and Principles of cross section balancing - I
Lecture 10 - Principles of cross section balancing - II
Lecture 11 - Principles of Cross section balancing - III
Lecture 12 - Box folds, lift-off structures and Principles of cross section balancing - IV
Lecture 13 - Principles of cross section balancing - V
Lecture 14 - Principles of cross section balancing - VI and Finding out depth and dip direction of detachment
Lecture 15 - Cross-section balancing practical - I
Lecture 16 - Cross-section balancing practical - II
Lecture 17 - Cross-section balancing practical - III
Lecture 18 - Cross section balancing practical - IV
Lecture 19 - Cross-section balancing practical - V
Lecture 20 - Cross-section balancing practical - VI
Lecture 21 - Tutorial 1 - Use of 'excess area' in cross-section balancing - I
Lecture 22 - Tutorial 2 - Use of 'excess area' in cross-section balancing - II

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NPTEL Video Course - Civil Engineering - Concrete Technology

Subject Co-ordinator - Dr. B. Bhattacharjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Production and Composition
Lecture 2 - Structure and Hydration
Lecture 3 - Structure and Hydration
Lecture 4 - Properties and Tests
Lecture 5 - Types and Use
Lecture 6 - Aggregates (Size, Shape)
Lecture 7 - Packing, FM, SM
Lecture 8 - Properties
Lecture 9 - Chemical Admixtures
Lecture 10 - Chemical Admixtures
Lecture 11 - Mineral Admixtures
Lecture 12 - Mineral Admixtures
Lecture 13 - Mineral Admixtures
Lecture 14 - Mix Proportioning of Concrete
Lecture 15 - Mix design of Concrete
Lecture 16 - Mix Design of Concrete
Lecture 17 - Mix Design of concrete
Lecture 18 - Mix Design of concrete
Lecture 19 - Batching and Mixing of concrete
Lecture 20 - RMC and Transporting Concrete
Lecture 21 - Workability and Pumping of Concrete
Lecture 22 - Compaction and Curing Concrete
Lecture 23 - Strength of Concrete
Lecture 24 - Strength of Concrete
Lecture 25 - Strength of Concrete
Lecture 26 - Mechanical Properties of Concrete
Lecture 27 - Creep of Concrete
Lecture 28 - Creep and Shrinkage of Concrete
Lecture 29 - Shrinkage of Concrete

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Lecture 30 - Shrinkage of Concrete
Lecture 31 - Fundamental Concepts, Degradation Process, Attacks
Lecture 32 - Frost Action and Rebar Corrosion
Lecture 33 - Carbonation and Chloride Affect
Lecture 34 - Rebar Corrosion
Lecture 35 - Rebar Corrosion and General Strateggy
Lecture 36 - High Strength Concrete
Lecture 37 - High Strength Matrics and SCC
Lecture 38 - Self Compacting Concrete
Lecture 39 - Fiber Concrete
Lecture 40 - Fiber and Roller Compacted Concrete
Lecture 41 - Special Concrete and Sustainability

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NPTEL Video Course - Civil Engineering - Seismic Analysis of Structures

Subject Co-ordinator - Dr. T.K. Datta, Dr. Ashok Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Seismology
Lecture 2 - Seismology (Continued...)
Lecture 3 - Seismology (Continued...)
Lecture 4 - Seismology (Continued...)
Lecture 5 - Seismic Inputs
Lecture 6 - Seismic Inputs (Continued...)
Lecture 7 - Seismic Inputs (Continued...)
Lecture 8 - Seismic Inputs (Continued...)
Lecture 9 - Response Analysis for Specified Ground Motion
Lecture 10 - Response Analysis for Specified Ground Motion (Continued...)
Lecture 11 - Response Analysis for Specified Ground Motion (Continued...)
Lecture 12 - Response Analysis for Specified Ground Motion (Continued...)
Lecture 13 - Response Analysis for Specified Ground Motion (Continued...)
Lecture 14 - Response Analysis for Specified Ground Motion (Continued...)
Lecture 15 - Frequency Domain Spectral Analysis
Lecture 16 - Frequency Domain Spectral Analysis.
Lecture 17 - Frequency Domain Spectral Analysis (Continued...)
Lecture 18 - Frequency Domain Spectral Analysis (Continued...)
Lecture 19 - Frequency Domain Spectral Analysis (Continued...)
Lecture 20 - Response Spectrum Method of Analysis
Lecture 21 - Response Spectrum Method of Analysis.
Lecture 22 - Response Spectrum Method of Analysis (Continued...)
Lecture 23 - Response Spectrum Method of Analysis (Continued...)
Lecture 24 - Response Spectrum Method of Analysis (Continued...)
Lecture 25 - Inelastic Seismic Response of Structures
Lecture 26 - Inelastic Seismic Response of Structures (Continued...)
Lecture 27 - Inelastic Seismic Response of Structures (Continued...)
Lecture 28 - Inelastic Seismic Response of Structures (Continued...)
Lecture 29 - Inelastic Seismic Response of Structures (Continued...)

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Lecture 30 - Inelastic Seismic Response of Structures (Continued...)

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NPTEL Video Course - Civil Engineering - Building materials and Construction

Subject Co-ordinator - Dr. B. Bhattacharjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functions Of Buildings
Lecture 2 - Role Of Material In Construction
Lecture 3 - Concrete
Lecture 4 - Concrete Production (Continued...)
Lecture 5 - Concrete Production (Continued...)
Lecture 6 - Concrete
Lecture 7 - Concrete
Lecture 8 - Cement
Lecture 9 - Cement and Cementitious Material
Lecture 10 - Fresh Concrete
Lecture 11 - Fresh Concrete
Lecture 12 - Fresh Concrete
Lecture 13 - Fresh Concrete
Lecture 14 - Strength of Concrete - I
Lecture 15 - Strength of Concrete - II
Lecture 16 - Strength of Concrete - III
Lecture 17 - Mechanical Properties of Concrete - I
Lecture 18 - Mechanical Properties of Concrete - II
Lecture 19 - Strength of Concrete
Lecture 20 - Durability of Concrete - I
Lecture 21 - Durability of Concrete - II
Lecture 22 - Durability of Concrete - III
Lecture 23 - Cement Aggregate and Water Selection
Lecture 24 - Mix Design of Concrete
Lecture 25 - Mix Design Of concrete IS Method
Lecture 26 - Mix Design Of Concrete
Lecture 27 - Masonry
Lecture 28 - Masonry
Lecture 29 - Masonry

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Lecture 30 - Masonry
Lecture 31 - Walls
Lecture 32 - Walls
Lecture 33 - Metals Fundamentals
Lecture 34 - Metals and Iron Systems
Lecture 35 - Steel
Lecture 36 - Steel
Lecture 37 - Polymer in Construction
Lecture 38 - Polymer in Construction
Lecture 39 - Glass and Timber
Lecture 40 - Glass and Timber
Lecture 41 - Roof and Floor Construction

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NPTEL Video Course - Civil Engineering - Water Management

Subject Co-ordinator - Dr. A.K. Gosain

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Irrigation Water Management
Lecture 2 - Soil - Water - Plant Relationships
Lecture 3 - Soil - Water - Plant Relationships (Continued...)
Lecture 4 - Soil - Water - Plant Relationships (Continued...)
Lecture 5 - Soil - Water - Plant Relationships (Continued...)
Lecture 6 - Soil - Water - Plant Relationships (Continued...) and Infiltration
Lecture 7 - Crop Water Requirements
Lecture 8 - Crop Water Requirements (Continued...)
Lecture 9 - Crop Water Requirements (Continued...)
Lecture 10 - Crop Water Requirements (Continued...)
Lecture 11 - Crop Water Requirements (Continued...)
Lecture 12 - Crop Water Requirements (Continued...)
Lecture 13 - Crop Water Requirements (continued...)
Lecture 14 - Irrigation Efficiencies - Part I
Lecture 15 - Irrigation Efficiencies - Part II and Irrigation Methods and their Suitability
Lecture 16 - Irrigation Methods - III
Lecture 17 - Irrigation Methods - IV
Lecture 18 - Irrigation Methods - V
Lecture 19 - Irrigation Methods - VI
Lecture 20 - Irrigation Methods and their Suitability
Lecture 21 - Border Irrigation System - I
Lecture 22 - Border Irrigation System - II
Lecture 23 - Border Irrigation System - III
Lecture 24 - Border Irrigation System - IV
Lecture 25 - Furrow Irrigation System - I
Lecture 26 - Furrow Irrigation System - II
Lecture 27 - Furrow Irrigation System - III
Lecture 28 - Furrow Irrigation System - IV
Lecture 29 - Sprinkler Irrigation System - I

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Lecture 30 - Sprinkler Irrigation System - II
Lecture 31 - Sprinkler Irrigation System - III
Lecture 32 - Sprinkler Irrigation System - IV
Lecture 33 - Sprinkler Irrigation System - V
Lecture 34 - Sprinkler Irrigation System - VI
Lecture 35 - Sprinkler Irrigation System - VII
Lecture 36 - Sprinkler Irrigation System - VIII
Lecture 37 - Drip Irrigation System - I
Lecture 38 - Drip Irrigation System - II
Lecture 39 - Drip Irrigation System - III
Lecture 40 - Drip Irrigation System - IV

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NPTEL Video Course - Civil Engineering - NOC:Geoenvironmental Engineering (Environmental Geotechnology) Landf

Subject Co-ordinator - Prof. Manoj Datta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geoenvironmental Engineering
Lecture 2 - Sources and Impact of Contamination
Lecture 3 - Waste-Soil Interaction
Lecture 4 - Solid Waste Generation and Disposal
Lecture 5 - Waste Minimization by Integrated Solid Waste Management (ISWM)
Lecture 6 - Integrated Solid Waste Management (ISWM) - Case Studies
Lecture 7 - Principles of Landfilling
Lecture 8 - Planning of Landfills - Part 1
Lecture 9 - Planning of Landfills - Part 2
Lecture 10 - Liners for Landfills - Part 1
Lecture 11 - Liners for Landfills - Part 2
Lecture 12 - Liners for Landfills - Part 3
Lecture 13 - Liners for Landfills - Part 4
Lecture 14 - Covers for Landfills - Part 1
Lecture 15 - Covers for Landfills - Part 2
Lecture 16 - Generation and Control of Leachate
Lecture 17 - Generation and Control of Landfill Gas
Lecture 18 - Stability of Slopes - Part 1
Lecture 19 - Stability of Slopes - Part 2
Lecture 20 - Stability of Slopes - Part 3
Lecture 21 - (Missing)
Lecture 22 - Some Solved Examples
Lecture 23 - Subsurface Monitoring Around Landfills - Part 1
Lecture 24 - Subsurface Monitoring Around Landfills - Part 2
Lecture 25 - Cost of Geotechnical Components of Landfills
Lecture 26 - Construction and Operation of Landfills
Lecture 27 - Site Selection for Landfills
Lecture 28 - Closure, Rehabilitation and Expansion of MSW Landfills
Lecture 29 - Control and Remedial Measures at Contaminated Sites - Part 1

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Lecture 30 - Control and Remedial Measures at Contaminated Sites - Part 2
Lecture 31 - Slurry Disposal on Land
Lecture 32 - Disposal of Slurry Waste in Ponds and Impoundments and Dry Waste in Mounds
Lecture 33 - Geotechnical Properties of Coal Ash and Mine Tailings - Part 1
Lecture 34 - Geotechnical Properties of Coal Ash and Mine Tailings - Part 2
Lecture 35 - Planning and Design of Slurry Ponds
Lecture 36 - Stability of Incrementally Raised Embankments - Part 1
Lecture 37 - Stability of Incrementally Raised Embankments - Part 2
Lecture 38 - Remedial Measures for Slope Failures in Embankments / Dykes of Slurry Ponds
Lecture 39 - Environmental Control at Slurry Ponds
Lecture 40 - Geotechnical Reuse of Waste Materials - Part 1
Lecture 41 - Geotechnical Reuse of Waste Materials - Part 2
Lecture 42 - End-of-the-Course Review

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NPTEL Video Course - Civil Engineering - NOC:Energy Efficiency, Acoustics and Daylighting in Building

Subject Co-ordinator - Dr. B. Bhattacharjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Environmental Factors - 1
Lecture 2 - Introduction to Environmental Factors - 2
Lecture 3 - Introduction to Environmental Factors - 3
Lecture 4 - Introduction to Environmental Factors - 4
Lecture 5 - Introduction to Environmental Factors - 5
Lecture 6 - Introduction to Environmental Factors - 6
Lecture 7 - Introduction to Environmental Factors - 7
Lecture 8 - Comfort and Heat Transfer Concepts
Lecture 9 - Heat Flow in Buildings - 1
Lecture 10 - Heat Flow in buildings - 2
Lecture 11 - Heat Flow in buildings - 3
Lecture 12 - Admittance Method - 1
Lecture 13 - Admittance Method - 2
Lecture 14 - Heat Flow in buildings - 1 (Frequency Domain)
Lecture 15 - Heat Flow in buildings - 2 (Frequency Domain)
Lecture 16 - Heat Flow in buildings - 2 (Frequency Domain)
Lecture 17 - Heat flow in buildings
Lecture 18 - Admittance Method
Lecture 19 - Comfort - 1
Lecture 20 - Comfort - 2
Lecture 21 - Comfort and Thermal Design of Buildings - 1
Lecture 22 - Comfort and Thermal Design of Buildings - 2
Lecture 23 - Comfort and Thermal Design of Buildings - 3
Lecture 24 - Thermal Design of Unconditioned Building
Lecture 25 - External Shading Multipliers for external suns shading
Lecture 26 - Passive Concepts
Lecture 27 - Design for Thermal Efficiency
Lecture 28 - Ventilation - 1
Lecture 29 - Ventilation - 2

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Lecture 30 - Natural ventilation design
Lecture 31 - Noise and Acoustic Fundamentals - 1
Lecture 32 - Noise and Acoustic Fundamentals - 2
Lecture 33 - Noise and Acoustic Fundamentals - 3
Lecture 34 - Noise and Acoustic Fundamentals, Noise Outdoors
Lecture 35 - Noise outdoors
Lecture 36 - Sound within enclosure - 1
Lecture 37 - Sound within enclosure - 2
Lecture 38 - Sound within enclosure - 3
Lecture 39 - Sound within enclosure - 4
Lecture 40 - Sound within enclosure - 5
Lecture 41 - Sound within enclosure - 6
Lecture 42 - Sound within enclosure, isolation
Lecture 43 - Isolation - 1
Lecture 44 - Isolation - 2
Lecture 45 - Auditorium - 1
Lecture 46 - Auditorium - 2
Lecture 47 - Daylighting - 1
Lecture 48 - Daylighting - 2
Lecture 49 - Daylighting - 3
Lecture 50 - Daylighting - 4
Lecture 51 - Daylighting - 5
Lecture 52 - Daylighting - 6
Lecture 53 - Artificial Lighting
Lecture 54 - Design Sky models
Lecture 55 - Live Session

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NPTEL Video Course - Civil Engineering - NOC:Fire Protection, Services and Maintenance Management of Building

Subject Co-ordinator - Dr. B. Bhattacharjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts of Fire Protection - I
Lecture 2 - Basic concepts of Fire Protection - II
Lecture 3 - Fire Resistance
Lecture 4 - Introduction Process of Combustion
Lecture 5 - ventilation and fuel Process of Combustion controlled fire
Lecture 6 - Process of Combustion
Lecture 7 - Effect of Fire on Construction Materials
Lecture 8 - Design for Fire Resistance
Lecture 9 - Design for Fire Resistance
Lecture 10 - Design for Fire Resistance
Lecture 11 - Fire Safety
Lecture 12 - Fire Safety
Lecture 13 - Fire safety
Lecture 14 - Fire Safety
Lecture 15 - Introduction to Lift Design
Lecture 16 - Design of Lift systems
Lecture 17 - Design of Lift systems
Lecture 18 - Design of Lift systems
Lecture 19 - Design of Lift systems
Lecture 20 - Introduction to System and Flow Systems
Lecture 21 - Water Supply System
Lecture 22 - Water Supply System
Lecture 23 - Diversity factor (Continued...)
Lecture 24 - Control Systems
Lecture 25 - Introduction to HVAC
Lecture 26 - Governing Equations for HVAC Process
Lecture 27 - Numerical Problem on HVAC System
Lecture 28 - Numerical Problem on HVAC System (Continued...)
Lecture 29 - Psychrometric Chart

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Lecture 30 - Flow in Pipe Networks and Fixture Units
Lecture 31 - Flow in Pipe Networks (Continued...) and Design of Water Supply Distribution System
Lecture 32 - Design of Water Supply Distribution System (Continued...) and Flow in Waste Water pipes
Lecture 33 - Electrical Systems (introduction)
Lecture 34 - Design of Electrical Systems
Lecture 35 - Intelligent Building
Lecture 36 - Life cycle cost and basics of building maintenance
Lecture 37 - Stages of maintenance management
Lecture 38 - Planning for building maintenance
Lecture 39 - Periodicity of maintenance management
Lecture 40 - Estimation of repair cycle
Lecture 41 - Cost profile of maintenance
Lecture 42 - Lamp replacement
Lecture 43 - Building inspection, Planned and Ad-hoc maintenance
Lecture 44 - Condition survey and health evaluation of buildings
Lecture 45 - Diagnosis of building by visual survey
Lecture 46 - Case studies of visual survey
Lecture 47 - Effect of corrosion and Alkali Aggregate Reaction
Lecture 48 - Sampling and choice of test location
Lecture 49 - Non Destructive Testing - 1
Lecture 50 - Non Destructive Testing - 2
Lecture 51 - Core strength test
Lecture 52 - Carbonation and Chloride measurement
Lecture 53 - Electrical methods of progress measurement
Lecture 54 - Repair, Rehabilitation and Retrofit
Lecture 55 - Periodicity and economics of condition survey
Lecture 56 - Interpretation of test results

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NPTEL Video Course - Civil Engineering - NOC:Sustainable Materials and Green Buildings

Subject Co-ordinator - Dr. B. Bhattacharjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Planet Equivalent
Lecture 2 - Basics of Carbon Cycle
Lecture 3 - Factors Affecting carbon Cycle
Lecture 4 - Fundamentals of Sustainability
Lecture 5 - Role of Materials and Embodied Energy
Lecture 6 - Case Study for Energy in Building
Lecture 7 - Calculation of Ecological Footprint
Lecture 8 - Role of Cement in Sustainability and Calculation of Chemical Exergy
Lecture 9 - Fuel for Cement
Lecture 10 - Cemebtitious/Supplementary Cementitious Materials and Their Characterization
Lecture 11 - Strength of Concrete With Supplementary Cementitious Materials and Composite Cements
Lecture 12 - Types of Composite Cements
Lecture 13 - Alternative Fuel for cement and Embodied Energy
Lecture 14 - Life Cycle Embodied Energy and Concrete Sustainability
Lecture 15 - Strength of Concrete and Use of Admixtures
Lecture 16 - Curing Methods and Use of Waste Water for Mixing and Curing
Lecture 17 - Modern Composite Concrete
Lecture 18 - Recycled Aggregate-ITZ and Proessing
Lecture 19 - Classification of Recycled Aggregate
Lecture 20 - Crushing and Grinding
Lecture 21 - Operational Energy
Lecture 22 - Operational Energy
Lecture 23 - Operational Energy
Lecture 24 - Thermal Diffusivity and Clay Bricks
Lecture 25 - Types of Bricks Kilns and Carbon Balance
Lecture 26 - Carbon Balance, Comparison of Various Types of Brick Kilns and Sealants, Paints, Adhesive
Lecture 27 - Sealants, Health Hazards of Building Materials and Emission Models
Lecture 28 - Emission Models and Testing
Lecture 29 - Energy Efficient Design of Buildings

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Lecture 30 - Design Optimization of Buildings
Lecture 31 - Building Design Optimization Using Genetic Algorithm
Lecture 32 - Urban Heat Island
Lecture 33 - Urban Heat Island
Lecture 34 - Evapotranspiration
Lecture 35 - Evapotranspiration
Lecture 36 - Energy Conservation Building Code (ECBC2007)
Lecture 37 - Energy Conservation Building Code (ECBC2007) (Continued...)
Lecture 38 - ECBC Compliant Methodology
Lecture 39 - OTTV Methodology
Lecture 40 - Solar Energy and Solar Cells
Lecture 41 - Solar Photo Volatic Cells
Lecture 42 - Solar Water Heating
Lecture 43 - Design Strategies and the Green Design Process
Lecture 44 - Green Building Rating Systems
Lecture 45 - Autoclaved Aerated Concrete, Insulated Precast System and Insulated Precast Forms
Lecture 46 - Insulated Concrete Form and Tunnel Form
Lecture 47 - Modular Construction

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NPTEL Video Course - Civil Engineering - NOC:Scheduling Techniques in Projects

Subject Co-ordinator - Prof. J. Uma Maheswari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Projects
Lecture 2 - Inputs to Scheduling
Lecture 3 - Critical Path Method
Lecture 4 - Precedence Diagramming Method
Lecture 5 - Line of Balance Method
Lecture 6 - Resource-driven Scheduling
Lecture 7 - Information-driven Scheduling
Lecture 8 - Dependency Structure Matrix - I
Lecture 9 - Dependency Structure Matrix - II
Lecture 10 - Dependency Structure Matrix - III
Lecture 11 - Beeline Diagramming Method
Lecture 12 - Other Scheduling Techniques

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NPTEL Video Course - Civil Engineering - NOC:Safety in Construction

Subject Co-ordinator - Prof. J. Uma Maheswari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Safety in Construction
Lecture 2 - Introduction to Safety Standards; Signs, Signals in Construction
Lecture 3 - Role of Stakeholders in Construction safety
Lecture 4 - Cost of Injury Vs Investment in Safety
Lecture 5 - Safety Program Accident/Incident Investigation
Lecture 6 - PPE in Construction
Lecture 7 - A Case Study on Construction Safety
Lecture 8 - Introduction to Fatal Falls
Lecture 9 - Fall hazard in Concerting
Lecture 10 - Fall hazard in Demolition Works
Lecture 11 - Safety in Demolttion Work Practical Examples
Lecture 12 - Trench Cav-ins
Lecture 13 - Tunneling Safety
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18 - Fire Safety and Steel Construction
Lecture 19 - Electrical Safety
Lecture 20 - A case Study on Construction Safety - Contractual Provision on Construction Zone Safety
Lecture 21 - Health Issues in Construction
Lecture 22 - Ergonomics and Health Issues with Concerting
Lecture 23 - General Safety Precautions
Lecture 24 - Safety in MEP Services
Lecture 25 - Managing Hazards in Construction
Lecture 26 - BIM for Construction
Lecture 27 - BIM for Safety

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NPTEL Video Course - Civil Engineering - NOC:Structural Dynamics: Theory and Computation

Subject Co-ordinator - Prof. Arnab Banerjee

Co-ordinating Institute - IIT Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to SDOF System (MATLAB Example)
Lecture 2 - Free Vibration of SDOF System (MATLAB Example) (Continued...)
Lecture 3 - Forced Vibration of SDOF System (MATLAB Example)
Lecture 4 - Forced Vibration of SDOF System (MATLAB Example) (Continued...)
Lecture 5 - D-operator and Duhamel Integral
Lecture 6 - Duhamel Integral (MATLAB Example) (Continued...)
Lecture 7 - Base Excitation and Numerical Methods
Lecture 8 - Numerical Methods (MATLAB Example) (Continued...)
Lecture 9 - Numerical Methods (MATLAB Example) (Continued...)
Lecture 10 - Fourier Series and Fourier Transformation
Lecture 11 - Fourier Transformation (MATLAB Example) (Continued...)
Lecture 12 - MDOF System
Lecture 13 - MDOF System (MATLAB Example) (Continued...)
Lecture 14 - MDOF System (Continued...)
Lecture 15 - Response Spectrum (MATLAB Example)
Lecture 16 - Base Isolation and Tuned Mass Damper
Lecture 17 - Vibration Control (Hâ) (MATLAB Example)
Lecture 18 - Continuous System (Bar Element)
Lecture 19 - Continuous System (Bar Element) (Continued...)
Lecture 20 - Continuous System (Beam Element)
Lecture 21 - Transfer Matrix and Spectral Element Method
Lecture 22 - Transfer Matrix and Spectral Element Method (Continued...)
Lecture 23 - Weak Form and Weighted Residual Method
Lecture 24 - Dynamic Stiffness Matrix
Lecture 25 - Modelling of Damping
Lecture 26 - Modelling of Damping (Continued...)
Lecture 27 - Laplace Transformation

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NPTEL Video Course - Civil Engineering - Advanced Hydraulics

Subject Co-ordinator - Dr. Suresh A Kartha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - advanced hydraulics & course structure
Lecture 2 - Various classifications of open channel flows
Lecture 3 - Flow classifications & velocity distribution
Lecture 4 - Pressure distribution
Lecture 5 - Equation of continuity & energy
Lecture 6 - Specific energy & critical flow
Lecture 7 - Energy, momentum & specific force
Lecture 8 - Computation of critical flow - Part 1
Lecture 9 - Critical flow computations
Lecture 10 - Introduction to uniform flow
Lecture 11 - Manning's equation and normal depth
Lecture 12 - Uniform Flow Computations - Part 1
Lecture 13 - Uniform flow in compound sections, concept of normal slope
Lecture 14 - Uniform flow approximation for flood discharge
Lecture 15 - Design of channels for uniform flow
Lecture 16 - Design of channels using uniform flow
Lecture 17 - Design of erodible channels
Lecture 18 - Introduction to gradually varied flows
Lecture 19 - Gradually varied flow equations
Lecture 20 - Classification of gradually varied flow - Part 1
Lecture 21 - Classification of gradually varied flow - Part 2
Lecture 22 - Gradually varied flow profiles with change in bed slopes
Lecture 23 - GVF profile properties and transitional depths
Lecture 24 - Gradually varied flow computations - Part 1
Lecture 25 - Gradually varied flow computations RK method - Part 2
Lecture 26 - Standard step method for gradually varied flow computations
Lecture 27 - Spatially varied flow
Lecture 28 - Features on spatially varied flow
Lecture 29 - Rapidly varied flow - introduction

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Lecture 30 - Theoretical aspects of hydraulic jump
Lecture 31 - Characteristics of jumps in rectangular channel
Lecture 32 - Features of hydraulic jumps
Lecture 33 - Jumps as energy dissipators
Lecture 34 - Jump controls
Lecture 35 - Surges - Part 1
Lecture 36 - Surges - Part 2
Lecture 37 - Channel transitions - Part 1
Lecture 38 - Channel transitions - Part 2
Lecture 39 - Channel transitions - Part 3
Lecture 40 - Application of momentum principles
Lecture 41 - Pumps - 1
Lecture 42 - Turbines - Part 3 (pumps, turbines)
Lecture 43 - Turbines, cavitation

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NPTEL Video Course - Civil Engineering - Design of Steel Structures

Subject Co-ordinator - Prof. Damodar Maity

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Design of Steel Structures
Lecture 2 - Connections
Lecture 3 - Riveted Connections
Lecture 4 - Design of Rivet Joint
Lecture 5 - Welding
Lecture 6 - Design of Fillet and Butt Welds
Lecture 7 - Bolted Connection
Lecture 8 - Eccentric Connections
Lecture 9 - Design of Eccentric Connection With Load Lying in Plane of Joint Rivet Bolt
Lecture 10 - Eccentric Connection With Load Perpendicular to Plane of Riveted Joint
Lecture 11 - Analysis and Design of Join with Seat Connection
Lecture 12 - Eccentric Connection
Lecture 13 - Load Lying Perpendicular to the Plane of Weld Joint
Lecture 14 - Tension Member
Lecture 15 - Design of Tension Member
Lecture 16 - Design of Tension Member
Lecture 17 - Design of Tension Member
Lecture 18 - Compression Member
Lecture 19 - Design of Compression Member
Lecture 20 - Design of Eccentrically Loaded tension Member
Lecture 21 - Built up Compression Member
Lecture 22 - Design of Built up Compression Member
Lecture 23 - Lacing for Built Up Compression Member
Lecture 24 - Design of Lacing System
Lecture 25 - Design of Batten Plates
Lecture 26 - Introduction to Flexural Members
Lecture 27 - Design Procedure of Beam Members
Lecture 28 - Design of Laterally Supported Beams
Lecture 29 - Design of Laterally Unsupported Beams

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Lecture 30 - Built-Up Beams
Lecture 31 - Built-Up Beams
Lecture 32 - Design of a Built-Up Beams
Lecture 33 - Design of Shear Connections and Purlins
Lecture 34 - Gantry Girders
Lecture 35 - Design of Gantry Girders
Lecture 36 - Introduction to Plate Girders - Part 1
Lecture 37 - Introduction to Plate Girders - Part 2
Lecture 38 - Design of a Plate Girder
Lecture 39 - Column Base - Part 1
Lecture 40 - Column Base - Part 2

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NPTEL Video Course - Civil Engineering - Hydraulics

Subject Co-ordinator - Prof. Arup Kumar Sharma

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Hydraulics
Lecture 2 - Open Channel Hydraulics - Part 1
Lecture 3 - Open Channel Hydraulics - Part 2
Lecture 4 - Velocity and Pressure Distribution
Lecture 5 - Practical use of velocity co-efficient in channel flow
Lecture 6 - Conservation Principles & ioioGoverning Equations
Lecture 7 - Uniform Flow
Lecture 8 - Uniform Flow Formula
Lecture 9 - Computation of Uniform Flow - Part 1
Lecture 10 - Computation of Uniform Flow - Part 2
Lecture 11 - Uniform Flow in Mobile Boundary Channel
Lecture 12 - Incipient Motion Condition and Regime of Flow
Lecture 13 - Concept of Specific Energy
Lecture 14 - Computation of Critical Depth
Lecture 15 - Specific Force, Critical Depth & Sequent Depth
Lecture 16 - Non-uniform Flow
Lecture 17 - Classification of Gradually Varied Flow
Lecture 18 - Characteristic of Gradually Varied Flow
Lecture 19 - Characteristic of Gradually Varied Flow & its Computation
Lecture 20 - Gradually Varied Flow & its Computation
Lecture 21 - Computation of Gradually Varied Flow
Lecture 22 - Gradually Varied Flow
Lecture 23 - Rapidly Varied Flow
Lecture 24 - Hydraulic Jump
Lecture 25 - Flow Over Hump and Channel Contraction
Lecture 26 - Canal Design - 1
Lecture 27 - Canal Design - 2
Lecture 28 - Design of Alluvial Channel - 1
Lecture 29 - Design of Alluvial Channel - 2

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Lecture 30 - Design of Alluvial Channel - 3
Lecture 31 - Unsteady Flow
Lecture 32 - Unsteady Flow Part - 2
Lecture 33 - Unsteady Flow Part - 3
Lecture 34 - Pipe Flow
Lecture 35 - Pipe Flow
Lecture 36 - Pipe in Series & Parallel
Lecture 37 - Pipe Network Analysis
Lecture 38 - Water Hammer & Surge Tank
Lecture 39 - Pipe Flow Friction Loss
Lecture 40 - Pipe Flow

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NPTEL Video Course - Civil Engineering - NOC:Higher Surveying

Subject Co-ordinator - Prof. Ajay Dashora

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Higher Surveying
Lecture 2 - Understanding reference system, reference frame, and coordinate system for Earth
Lecture 3 - Coordinate and datum transformations
Lecture 4 - Projected coordinate system
Lecture 5 - Fundamentals of astronomy
Lecture 6 - Applications of concepts of astronomy
Lecture 7 - Time
Lecture 8 - Application of concepts of astronomy and time
Lecture 9 - Fundamental concepts of error, accuracy, and error propagation
Lecture 10 - Applications of error propagation
Lecture 11 - Observation Equation Method of adjustments
Lecture 12 - Condition Equation Method and Combined Method of adjustments
Lecture 13 - Analysis of adjustments and reporting of errors
Lecture 14 - Global Positioning System (GPS)
Lecture 15 - Introduction to Photogrammetry
Lecture 16 - Vertical photogrammetry
Lecture 17 - Stereo photogrammetry
Lecture 18 - Analytical photogrammetry - I
Lecture 19 - Analytical photogrammetry - II
Lecture 20 - Photogrammetric products
Lecture 21 - Image matching
Lecture 22 - Close range photogrammetry
Lecture 23 - Fundamentals of LiDAR
Lecture 24 - LiDAR data acquisition
Lecture 25 - Geolocation and errors of LiDAR data
Lecture 26 - Information extraction from LiDAR data
Lecture 27 - RADAR fundamenetals - I
Lecture 28 - RADAR fundamenetals - II
Lecture 29 - RADAR fundamenetals - III

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Lecture 30 - Radargrammetry
Lecture 31 - Geoscience perspective for RADAR applications
Lecture 32 - Fundamental concepts of hydrographic survey
Lecture 33 - Field procedures for hydrographic Surveying
Lecture 34 - Modern techniques for hydrographic Survey
Lecture 35 - Navigation
Lecture 36 - Conclusive lecture

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NPTEL Video Course - Civil Engineering - NOC:Unsaturated Soil Mechanics

Subject Co-ordinator - Dr. Tadikonda Venkata Bharat

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamental Aspects of Unsaturated Soil Mechanics and its Basic Principles
Lecture 2 - Phases of Unsaturated Soils-I
Lecture 3 - Phases of Unsaturated Soils-II
Lecture 4 - Equilibrium between Air and Water Phases
Lecture 5 - Capillary Phenomenon in Unsaturated Soils - I
Lecture 6 - Capillary Phenomenon in Unsaturated Soils - II
Lecture 7 - Summary
Lecture 8 - Concept of Water Retention and Soil Water Characteristics - I
Lecture 9 - Concept of Water Retention and Soil Water Characteristics - II
Lecture 10 - Hydraulic conductivity functions and determination of state variables
Lecture 11 - Suction Measurement/Control Techniques - I
Lecture 12 - Suction Measurement/Control Techniques - II
Lecture 13 - Summary
Lecture 14 - HCF Determination
Lecture 15 - SWCC and HCF Models
Lecture 16 - HCF Modelling
Lecture 17 - Fitting of SWCC and HCF modelling
Lecture 18 - Pedo-transfer Functions (PTF)
Lecture 19 - Steady-State Flow Through Soils
Lecture 20 - Steady-State and Transient Flow
Lecture 21 - Analytical Methods for Transient Flow - I
Lecture 22 - Analytical Methods for Transient Flow - II
Lecture 23 - Shear Strength of Unsaturated Soils
Lecture 24 - Suction-Controlled Direct Shear Test
Lecture 25 - Suction-Controlled Triaxial Test
Lecture 26 - Extended M-C Criterion - I
Lecture 27 - Extended M-C Criterion - II
Lecture 28 - Extended M-C Criterion - III
Lecture 29 - Concept of Suction Stress - I

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Lecture 30 - Concept of Suction Stress - II
Lecture 31 - Concept of Suction Stress - III
Lecture 32 - Summary
Lecture 33 - Swelling Behaviour of Soils
Lecture 34 - Estimation of Swelling Pressure in the Laboratory and Behaviour of Collapsible soil
Lecture 35 - Volume Change Behaviour of Bentonite and Kaolin Clay
Lecture 36 - Demonstration of Various Experiments Related to Unsaturated Soil Mechanics

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NPTEL Video Course - Civil Engineering - NOC:Subsurface Exploration: Importance and Techniques Involved

Subject Co-ordinator - Prof. Abhishek Kumar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Phases and classification of subsurface Investigation
Lecture 3 - Test Pits+ Borings
Lecture 4 - Ground water table and rock drilling
Lecture 5 - Standard Penetration Test
Lecture 6 - Cone Penetration Test
Lecture 7 - Dilatometer Test
Lecture 8 - Pressuremeter Test
Lecture 9 - Seismic reflection method
Lecture 10 - Seismic refraction method
Lecture 11 - Electrical Resistivity Survey
Lecture 12 - Magnetic Survey
Lecture 13 - Surface wave method
Lecture 14 - Gravity Survey
Lecture 15 - Offshore Investigation
Lecture 16 - Geophysical Investigation in Offshore Environment
Lecture 17 - Sampling and Geotechnical Investigations in Offshore Environment
Lecture 18 - Important Terminologies in Offshore Environment
Lecture 19 - Dynamic Testing in Pile Driving
Lecture 20 - Dynamic Testing in Pile (Low Strain)
Lecture 21 - Conclusion

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NPTEL Video Course - Civil Engineering - NOC:Fluid Mechanics

Subject Co-ordinator - Dr. Subhashisa Dutta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts of Fluid
Lecture 2 - Properties of Fluid
Lecture 3 - Properties of Fluid
Lecture 4 - Concepts of Hydrostatic
Lecture 5 - Measurement of Pressure and Hydrostatic forces
Lecture 6 - Buoyancy, Metacentre, Stability and Rigid body motion
Lecture 7 - Reynolds Transport Theorem
Lecture 8 - Conservation of Mass
Lecture 9 - Conservation of Momentum
Lecture 10 - Conservation of Momentum Applications
Lecture 11 - Bernoulliâ s Equation
Lecture 12 - Applications of Bernoulliâ s Equation
Lecture 13 - Fluid Statics Applications: Example Problems
Lecture 14 - Conservation of Momentum: Example problems
Lecture 15 - Bernoulliâ s Equation: Problems Solving on Black Board
Lecture 16 - Lagrangian and Eulerian Descriptions
Lecture 17 - Motion and deformation of fluid elements
Lecture 18 - Problems Solving on Black Board
Lecture 19 - Dimensional Homogeneity
Lecture 20 - Dimensional Analysis and Similarity
Lecture 21 - Laminar and Turbulent Flows
Lecture 22 - Losses in Pipe Fittings
Lecture 23 - Flow in Noncircular Conduits and Multiple Path Pipeflow
Lecture 24 - Mass Conservation Equation - I
Lecture 25 - Mass Conservation Equation - II
Lecture 26 - Stream Function
Lecture 27 - Cauchy's Equation
Lecture 28 - The Navier-Stokes Equation - Part I
Lecture 29 - The Navier-Stokes Equation - Part II

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Lecture 30 - The Navier-Stokes Equation - Part III
Lecture 31 - Approximate solutions of Navier Stokes Equation: Bounary Layer Approximation
Lecture 32 - Boundary Layer Approximation - II
Lecture 33 - Boundary Layer Approximation - III
Lecture 34 - Open Channel Flow - I
Lecture 35 - Open Channel Flow - II
Lecture 36 - Open Channel Flow - III
Lecture 37 - Drag and Lift

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NPTEL Video Course - Civil Engineering - NOC:Remote Sensing and GIS

Subject Co-ordinator - Prof. Rishikesh Bharti

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview and Introduction
Lecture 2 - Basics of Remote Sensing
Lecture 3 - Error corrections in satellite image
Lecture 4 - Error Identification and Correction - I
Lecture 5 - Error Identification and Correction - II
Lecture 6 - Error Identification and Correction - III
Lecture 7 - DIP - I
Lecture 8 - DIP - II
Lecture 9 - DIP - III
Lecture 10 - DIP - IV
Lecture 11 - Image Classification - I
Lecture 12 - Image Classification - II
Lecture 13 - Photogrammetry
Lecture 14 - Thermal Remote Sensing
Lecture 15 - Microwave Remote Sensing
Lecture 16 - HRS - I
Lecture 17 - HRS - II
Lecture 18 - HRS - III
Lecture 19 - HRS - IV
Lecture 20 - HRS - V
Lecture 21 - GIS - I
Lecture 22 - GIS - II
Lecture 23 - Applications of Remote Sensing and GIS - I
Lecture 24 - Applications of Remote Sensing and GIS - II

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NPTEL Video Course - Civil Engineering - NOC:River Engineering

Subject Co-ordinator - Dr. Subhashisa Dutta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to River Engineering
Lecture 2 - Basic properties of sediment - I
Lecture 3 - Basic properties of sediment - II
Lecture 4 - Mass Conservation
Lecture 5 - Linear Momentum Equation
Lecture 6 - Navier-Stokes Equations
Lecture 7 - St. Venant Equation and Solver
Lecture 8 - Specific Energy and Critical Flow
Lecture 9 - Hydraulic Jump and Celerity
Lecture 10 - Floodwave Celerity and Loop Rating Curve
Lecture 11 - Sediment Transport in River - I
Lecture 12 - Sediment Transport in River - II
Lecture 13 - Sediment Transport in River - III
Lecture 14 - Physical River Models
Lecture 15 - Bridge Scour
Lecture 16 - Bridge Scour-II
Lecture 17 - Jet Scour and River Navigation
Lecture 18 - River Training Work
Lecture 19 - Riverbank Stabilization - I
Lecture 20 - Riverbank Stabilization - II
Lecture 21 - Riverbank Protection and Control Structures
Lecture 22 - River Equilibrium - I
Lecture 23 - River Equilibrium - II
Lecture 24 - River Equilibrium - III

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NPTEL Video Course - Civil Engineering - NOC:Municipal Solid Waste Management

Subject Co-ordinator - Prof. Ajay Kalamdhad

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to solid waste
Lecture 2 - Functional elements
Lecture 3 - Types and sources of solid waste
Lecture 4 - Sampling and characteristics
Lecture 5 - Estimation of solid waste quantity
Lecture 6 - Factors affecting solid waste generation rate
Lecture 7 - Handling, separation and storage at source
Lecture 8 - Processing at source
Lecture 9 - Primary collection
Lecture 10 - Types of collection system
Lecture 11 - Analysis of collection system - Part I
Lecture 12 - Analysis of collection system - Part II
Lecture 13 - Analysis of collection system - Part III
Lecture 14 - Need and types of transfer station
Lecture 15 - Transport means and methods
Lecture 16 - Unit operation for component separation
Lecture 17 - Material recovery facilities (MRF)
Lecture 18 - Recycling of dry waste components
Lecture 19 - Waste as a fuel
Lecture 20 - Incineration/Combustion
Lecture 21 - Flue gas characteristics and treatment
Lecture 22 - Solid residue generation, characterization and treatment
Lecture 23 - Waste-to-energy (WtE) plants (case studies) pyrolysis and gasification
Lecture 24 - Definition and phases of composting
Lecture 25 - Factors affecting composting process
Lecture 26 - Types of composting - I
Lecture 27 - Types of composting - II
Lecture 28 - Compost quality
Lecture 29 - Vermicomposting

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Lecture 30 - Definition, stages and factors affecting anaerobic digestion
Lecture 31 - Pretreatment and co-digestion for enhancement of biogas production
Lecture 32 - Types of biogas digesters
Lecture 33 - Site selection and types of landfill
Lecture 34 - Leachate collection and treatment
Lecture 35 - Landfill gas collection and treatment
Lecture 36 - Design of landfill and Bio-minning of old dumpsite
Lecture 37 - Construction and demolition waste
Lecture 38 - Management of bio-mediacal, e-waste and inert waste
Lecture 39 - Integrated solid waste management (ISWM)
Lecture 40 - Municipal solid waste management rules
Lecture 41 - Financing in MSWM projects
Lecture 42 - Public-Private-Partnership (PPP)
Lecture 43 - Public-Private-Partnership (PPP) in MSWM projects

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NPTEL Video Course - Civil Engineering - NOC:Construction Methods and Equipment Management

Subject Co-ordinator - Prof. Indu Siva Ranjani Gandhi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Planning process of equipment
Lecture 2 - Estimation of Ownership cost (Average Annual Investment method)
Lecture 3 - Estimation of Ownership cost (Time value method)
Lecture 4 - Operating cost of Equipment
Lecture 5 - Equipment cost estimation
Lecture 6 - Equipment life and replacement analysis - Part 1
Lecture 7 - Equipment life and replacement analysis - Part 2
Lecture 8 - Equipment life and replacement analysis - Part 3
Lecture 9 - Engineering Fundamentals of Moving Earth
Lecture 10 - Bull Dozers
Lecture 11 - Scrapers - Part 1
Lecture 12 - Scrapers - Part 2
Lecture 13 - Front End loaders
Lecture 14 - Excavators
Lecture 15 - Trucks
Lecture 16 - Piles and Pile driving equipment - Part 1
Lecture 17 - Piles and Pile driving equipment - Part 2
Lecture 18 - Cranes - Part 1
Lecture 19 - Cranes - Part 2
Lecture 20 - Concreting Equipment - Part 1
Lecture 21 - Concreting Equipment - Part 2
Lecture 22 - Summary

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NPTEL Video Course - Civil Engineering - NOC:Advanced Soil Mechanics

Subject Co-ordinator - Prof. Sreedeep S

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to course content
Lecture 2 - Stress acting at a point - Cauchy stress
Lecture 3 - Stress acting at a point - Stress tensor
Lecture 4 - Stress acting on a plane
Lecture 5 - Stress acting on a plane example
Lecture 6 - Transformation of stress tensor
Lecture 7 - Stress invariants
Lecture 8 - Relationship between stress invariants
Lecture 9 - Principle stresses and Eigen vectors
Lecture 10 - Strain in soils
Lecture 11 - Cause effect relationship
Lecture 12 - Important constitutive relationship
Lecture 13 - 3D to 2D idealization
Lecture 14 - Mathematical formulation plane stress plane strain
Lecture 15 - Mathematical formulation axisymmetric
Lecture 16 - Summary of Module 1
Lecture 17 - Basics of shear strength
Lecture 18 - Stress representation
Lecture 19 - Shear strength granular soil - I
Lecture 20 - Shear strength granular soil - II
Lecture 21 - Shear strength cohesive soil
Lecture 22 - Shear strength cohesive soil - Stress strain
Lecture 23 - Pore water pressure and Skemptons equation
Lecture 24 - Overall pore water pressure parameter
Lecture 25 - Pore water pressure - plane strain-effect of sampling
Lecture 26 - Pore water pressure estimation
Lecture 27 - Triaxial test
Lecture 28 - Interpretation triaxial test - UU UCS
Lecture 29 - Interpretation triaxial test - CU

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Lecture 30 - Interpretation triaxial test - CD
Lecture 31 - Some additional aspects of shear strength
Lecture 32 - Summary of Module 2
Lecture 33 - Stress path and representation
Lecture 34 - Failure line in stress path
Lecture 35 - Stress path-some common cases - I
Lecture 36 - Stress path-some common cases - II
Lecture 37 - Stress path-triaxial test-drained
Lecture 38 - Stress path-triaxial test-undrained
Lecture 39 - Stress path-additional undrained case
Lecture 40 - Stress path-field cases - I
Lecture 41 - Stress path-field cases - II
Lecture 42 - Stress path problems
Lecture 43 - Summary of Module 3
Lecture 44 - Introduction-critical state soil mechanics
Lecture 45 - Introduction-critical state soil mechanics
Lecture 46 - CSSM-2 D representation
Lecture 47 - Peak state
Lecture 48 - Soil yielding
Lecture 49 - Cam clay
Lecture 50 - Modified Cam clay
Lecture 51 - Prediction of soil behavior from MCCM
Lecture 52 - Prediction of soil behavior from MCCM
Lecture 53 - Strain from MCCM
Lecture 54 - State boundary surface
Lecture 55 - CSSM problems
Lecture 56 - Summary of Module 4
Lecture 57 - Closure of Advanced Soil Mechanics Course

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NPTEL Video Course - Civil Engineering - NOC:Plates and Shells

Subject Co-ordinator - Prof. Sudip Talukdar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, classification of plates and some useful relations
Lecture 2 - Theory of thin plate bending
Lecture 3 - Plate equations and boundary conditions with examples
Lecture 4 - Exercises on the plate bending theory
Lecture 5 - Simply supported plate subjected to distributed loading
Lecture 6 - Simply supported plate subjected to concentrated load and couple
Lecture 7 - Simply supported plate resting on elastic foundation and other examples
Lecture 8 - General formulation for rectangular plate with two opposite edges simply supported
Lecture 9 - Levy's solution for different loading and boundary conditions
Lecture 10 - Rectangular plate with Levy's boundary condition subjected to edge moment
Lecture 11 - Transformation of plate equation from rectangular co-ordinates to polar co-ordinates
Lecture 12 - Axi-symmetrical bending of circular plate under pure moment and uniformly distributed load
Lecture 13 - Examples in axisymmetrical bending of solid and annular plate
Lecture 14 - Variational principle in plate problem
Lecture 15 - Applications of Rayleigh-Ritz and Gallerkin's method
Lecture 16 - Finite difference method in plate bending
Lecture 17 - Plate subjected to inplane forces and transverse load
Lecture 18 - Buckling load of rectangular plate plate with Navier's boundary condition
Lecture 19 - Buckling load of rectangular with Levy's boundary condition
Lecture 20 - Rayleigh-Ritz and Gallerkin method in buckling of plate
Lecture 21 - Finite difference method in buckling of plate
Lecture 22 - Introduction to shell structure and behavior of stretched membrane
Lecture 23 - Classification of shell structure
Lecture 24 - Stress resultants and couples in shells
Lecture 25 - Membrane analysis of shells of surface of revolution
Lecture 26 - Analysis of Spherical dome
Lecture 27 - Some examples of axi-symmetrical cases in surface of revolution
Lecture 28 - Membrane theory in pressure vessels
Lecture 29 - Membrane theory in pressure vessel in the form a Torus and in a tank of arbitrary meridian

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Lecture 30 - Membrane theory of hyperboloid of revolution: Application to cooling tower
Lecture 31 - Differential Equations of Equilibrium in Cylindrical shell using membrane hypothesis
Lecture 32 - Membrane Analysis of Cylindrical Shell roof subjected to self weight and snow load
Lecture 33 - Circular Cylindrical Shell for Fourier Loading in a membrane state of stress
Lecture 34 - Simplified Bending Theory of Cylindrical Shell-Beam and Arch theories
Lecture 35 - General bending theory of cylindrical shell
Lecture 36 - Some applications of symmetrical bending of circular cylindrical shell

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NPTEL Video Course - Civil Engineering - NOC:Optimization methods for Civil engineering

Subject Co-ordinator - Prof. Rajib Kumar Bhattacharjya

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization
Lecture 2 - Classical Optimization
Lecture 3 - Introduction to Linear Problem
Lecture 4 - General system of equations
Lecture 5 - Simplex Method
Lecture 6 - Solution of Linear Problem using Excel Solver
Lecture 7 - Bracketing Method
Lecture 8 - Region Elimination Methods
Lecture 9 - Gradient Based Method and Examples
Lecture 10 - Convex Function
Lecture 11 - Line Search Methods for Multi-Variable Problems
Lecture 12 - Quadratic Approximation Method
Lecture 13 - Constrained Optimization I: Equality constraints
Lecture 14 - Constrained Optimization II: Inequality constraints
Lecture 15 - Constrained Optimization III: Penalty function methods
Lecture 16 - Introduction to Metaheuristic Optimization
Lecture 17 - Genetic Algorithms - Part I
Lecture 18 - Genetic Algorithms - Part II
Lecture 19 - Genetic Algorithms - Part III
Lecture 20 - Real Coded Genetic Algorithms
Lecture 21 - Multi-modal optimization
Lecture 22 - Introductioin to R
Lecture 23 - GA using R (Unconstrained problem)
Lecture 24 - GA using R (Constrained problem)
Lecture 25 - Constraint Handling in GAs
Lecture 26 - Evolution Strategies (ESs)
Lecture 27 - Particle swarm optimization
Lecture 28 - Introductioin to R - Part II
Lecture 29 - Multi-objective Genetic Algorithms

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Lecture 30 - Introduction to Differential Evolution
Lecture 31 - Introduction to Matlab
Lecture 32 - Optimization using Matlab (Classical methods)
Lecture 33 - A tutorial on Differential Evolution
Lecture 34 - NSGA II Using R
Lecture 35 - Optimization using MATLAB
Lecture 36 - Optimization using Excel Solver
Lecture 37 - Multi-objective Genetic Algorithms using MATLAB
Lecture 38 - Solution of a Design Problem Using MATLAB

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NPTEL Video Course - Civil Engineering - NOC:Engineering Hydrology

Subject Co-ordinator - Prof. Sreeja Pekkat

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Contents
Lecture 2 - Preliminary Concepts
Lecture 3 - Introduction to Reynolds Transport Theorem
Lecture 4 - Derivation of Reynolds Transport Theorem - Part I
Lecture 5 - Derivation of Reynolds Transport Theorem - Part II
Lecture 6 - Conservations Laws
Lecture 7 - Numerical Examples
Lecture 8 - Summary of Module - I
Lecture 9 - Atmospheric Water
Lecture 10 - Water Vapor Dynamics
Lecture 11 - Precipitable Water in the Static Atmospheric Column
Lecture 12 - Numerical Examples on Basic Atmospheric Parameters
Lecture 13 - Precipitation-Types and Formation
Lecture 14 - Terminal Velocity
Lecture 15 - Thunderstorm Cell Model
Lecture 16 - Numerical Examples on Terminal Velocity and Thunderstorm Cell
Lecture 17 - Forms of Precipitation
Lecture 18 - Measurement of rainfall
Lecture 19 - Raingauge Network
Lecture 20 - Presentation of Rainfall Data
Lecture 21 - Analysis of Rainfall Data
Lecture 22 - Average Areal Rainfall
Lecture 23 - Evaporation
Lecture 24 - Evaporation-Energy Balance Method
Lecture 25 - Evaporation-Aerodynamic Method
Lecture 26 - Evaporation-Combined Method
Lecture 27 - Numerical Examples on Evaporation
Lecture 28 - Evaporation-Empirical method
Lecture 29 - Evapotranspiration

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Lecture 30 - Evapotranspiration-Numerical Example
Lecture 31 - Summary of Module - II
Lecture 32 - Subsurface Water
Lecture 33 - 1-D Unsteady Unsaturated Flow Equation
Lecture 34 - Infiltration
Lecture 35 - Measurement of Infiltration
Lecture 36 - Estimation of Infiltration-Empirical Equations
Lecture 37 - Numerical examples - Infiltration estimation using empirical equations
Lecture 38 - Estimation of Infiltration-Theoretical Equation
Lecture 39 - Infiltration-Green Ampt Equation
Lecture 40 - Ponding time
Lecture 41 - Numerical Examples on Green Ampt Infiltration Equation
Lecture 42 - Summary of Module - III
Lecture 43 - Surface Water
Lecture 44 - Excess Rainfall and Direct Runoff
Lecture 45 - Numerical Examples on Direct Runoff
Lecture 46 - Overland flow
Lecture 47 - Streamflow Measurement - I
Lecture 48 - Streamflow Measurement - II
Lecture 49 - Representation of Streamflow
Lecture 50 - Numerical Examples on Streamflow Measurement
Lecture 51 - Summary of Module - IV
Lecture 52 - Hydrologic Analysis - Introduction
Lecture 53 - Linear System Theory
Lecture 54 - Hydrograph Analysis-UH
Lecture 55 - Hydrograph Analysis-DRH
Lecture 56 - Numerical examples on UH and DRH
Lecture 57 - S-Hydrograph
Lecture 58 - Unit Hydrograph of Different Duration
Lecture 59 - Numerical examples UH of Different Duration
Lecture 60 - Instantaneous Unit Hydrograph
Lecture 61 - Instantaneous Unit Hydrograph-Nash's Model
Lecture 62 - Numerical Examples on IUH
Lecture 63 - Synthetic Unit Hydrograph
Lecture 64 - SCS-Synthetic Unit Hydrograph
Lecture 65 - Numerical Examples on SUH
Lecture 66 - Hydrograph Routing
Lecture 67 - Reservoir Routing
Lecture 68 - Numerical Example on Reservoir Routing

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Lecture 69 - Hydrologic Channel Routing
Lecture 70 - Numerical Examples on Channel Routing
Lecture 71 - Summary of Module - V
Lecture 72 - Hydrologic Statistics-Preliminary Concepts
Lecture 73 - Probability Distribution and Basic Descriptive Statistics
Lecture 74 - Probabiity Distributions
Lecture 75 - Frequency Analysis
Lecture 76 - Exreme Value Analysis
Lecture 77 - Summary of Module - VI
Lecture 78 - Hydrologic Design
Lecture 79 - Numerical examples on probability and risk
Lecture 80 - Design Storm
Lecture 81 - Design Flood
Lecture 82 - Summary of Module - VII
Lecture 83 - Closure of Engineering Hydrology

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NPTEL Video Course - Civil Engineering - NOC:Expansive Soil

Subject Co-ordinator - Prof. Anil Kumar Mishra

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Formation of soil
Lecture 2 - Index properties and classification of soil
Lecture 3 - Engineering properties of soil - I
Lecture 4 - Engineering properties of soil - II
Lecture 5 - Clay mineralogy
Lecture 6 - Properties of clay particles
Lecture 7 - Defination, type and behaviour
Lecture 8 - Mechanism of soil-water interaction
Lecture 9 - Swelling of expansive soil
Lecture 10 - Factors controlling DDL thickness
Lecture 11 - Determination of swelling properties
Lecture 12 - Classification and prediction
Lecture 13 - Factors controlling swelling of soil
Lecture 14 - Shrinkage behaviour of soil
Lecture 15 - Factors controlling shrinkage behavior of soils
Lecture 16 - Measurement of various shrinkage characteristics of soil
Lecture 17 - Cyclic Swelling-Shrinkage Behaviour of Soil
Lecture 18 - Thermo-Mechanical-Hydraulic-Chemical Behaviour - I
Lecture 19 - Thermo-Mechanical-Hydraulic-Chemical Behaviour - II
Lecture 20 - Thermo-Mechanical-Hydraulic-Chemical Behaviour - III
Lecture 21 - Mechanical Methods
Lecture 22 - Hydraulic methods
Lecture 23 - Chemical methods - 1
Lecture 24 - Chemical methods - 2
Lecture 25 - By inclusion or confinement
Lecture 26 - Foundation on expansive soil
Lecture 27 - Use of expansive soil for various geotechnical engineering applications
Lecture 28 - Closure lecture

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NPTEL Video Course - Civil Engineering - NOC:Vibration of Continuous Systems

Subject Co-ordinator - Prof. Sudip Talukdar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction and Modelling of Dynamic Systems
Lecture 2 - Time Domain Analysis of Linear System - Harmonic input
Lecture 3 - Time Domain Analysis of Linear System - Arbitrary Input
Lecture 4 - Transformed technique in vibration of linear system
Lecture 5 - Formulation of problem: Equilibrium Approach
Lecture 6 - Formulation of problem by Energy Principle
Lecture 7 - Hamilton's principles for formulating vibration problems
Lecture 8 - Lagrange's equation for formulating vibration problems
Lecture 9 - One Dimensional Wave Equation
Lecture 10 - D-Alembert's Solution of the Wave Equation
Lecture 11 - Transverse Vibration of String
Lecture 12 - Forced Transverse Vibration of String
Lecture 13 - Axial Vibration of Bar
Lecture 14 - Torsional Vibration of Bar
Lecture 15 - Some typical problems in axial and torsional vibrations
Lecture 16 - Transverse vibration of beams
Lecture 17 - Natural frequencies and mode shapes of beams with various end conditions
Lecture 18 - Free damped transverse vibration analysis of beam
Lecture 19 - Forced damped vibration analysis of Euler Bernoulli beam
Lecture 20 - Vibration of beams subjected to moving load
Lecture 21 - Some special topics on the transverse vibration of beam
Lecture 22 - Combination of continuous and lumped parameter system
Lecture 23 - State space solutions in vibration problems
Lecture 24 - Beam with moving oscillator, pulstating force and rolling mass
Lecture 25 - Vibration of membrane
Lecture 26 - Vibration of Circular membrane
Lecture 27 - Vibration of Rectangular plate
Lecture 28 - Free vibration of rectangular plates
Lecture 29 - Forced vibration of rectangular plates

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Lecture 30 - Approximate method for vibration analysis
Lecture 31 - Rayleigh-Ritz method for vibration analysis
Lecture 32 - Gallerkin's method and Finite difference method
Lecture 33 - System subjected to support excitation
Lecture 34 - Response of continuous systems to transient excitations
Lecture 35 - Shock spectrum due to half sine pulse
Lecture 36 - Numerical Evaluation of Duhamel Integral
Lecture 37 - Direct Integration Methods
Lecture 38 - Spectral Analysis of structures for earthquake excitation

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NPTEL Video Course - Civil Engineering - NOC:Reliability-Based Structural Design

Subject Co-ordinator - Dr. Arunasis Chakarborty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Random Variable
Lecture 3 - Functions of Random Variables
Lecture 4 - Joint Distributions
Lecture 5 - Mt. Gen. Func. and CLT
Lecture 6 - Theory of Estimation
Lecture 7 - Goodness of Fit
Lecture 8 - MVFOSM
Lecture 9 - MVFOSM (Continued...)
Lecture 10 - Hasofer-Lind Rel. Index
Lecture 11 - Rackwitz's Algorithm (Continued...)
Lecture 12 - HL-RF for Non-Normal Problems
Lecture 13 - HL-RF for Correlated Problems
Lecture 14 - FORM using MATLAB
Lecture 15 - FORM using MATLAB (Continued...)
Lecture 16 - FORM Using FEM
Lecture 17 - Morgenstern Model
Lecture 18 - Nataf Model
Lecture 19 - Rosenblatt Transformation
Lecture 20 - Brietung's Model
Lecture 21 - Tvedt's Model
Lecture 22 - Monte-Carlo Simulation
Lecture 23 - Importance Sampling
Lecture 24 - Least Square Curve Fitting
Lecture 25 - Orthogonal Polinomials
Lecture 26 - RSM
Lecture 27 - Stochastic Response Surface Method
Lecture 28 - Moving Least Square Method
Lecture 29 - Adaptive-SRSM

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Lecture 30 - Partial Safety Factors
Lecture 31 - Optimal Partial Safety Factors
Lecture 32 - FORM - Revisited
Lecture 33 - Subset Simulation
Lecture 34 - Applications
Lecture 35 - Applications (Continued...)
Lecture 36 - Introduction to Stochastic FEM

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NPTEL Video Course - Civil Engineering - NOC:Applied Seismology for Engineers

Subject Co-ordinator - Prof. Abhishek Kumar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Plate tectonics and continental drift theory
Lecture 2 - Fault Plane Solution - Part 1
Lecture 3 - Fault Plane Solution - Part 2
Lecture 4 - Fault Plane Solution (Stereonets)
Lecture 5 - Seismic gaps
Lecture 6 - Analogy of active and inactive fault
Lecture 7 - Seismic waves and their use in locating EQ epicentre
Lecture 8 - EQ Intensity, magnitude and wave attenuation
Lecture 9 - Seismic source characterization and seismic activity
Lecture 10 - Earthquake catalogue preparation and seismic activity parameters
Lecture 11 - Ground motion simulation models and GMPEs
Lecture 12 - Deterministic seismic hazard analysis (DSHA)
Lecture 13 - Probabilistic seismic hazard analysis (PSHA)
Lecture 14 - One Dimensional equation of motion: P wave
Lecture 15 - One Dimensional equation of motion: S wave
Lecture 16 - Solution to 1D equation of motion: S wave
Lecture 17 - Local Site Effect (LSE) and Ground Response Analysis - Part I
Lecture 18 - Local Site Effect (LSE) and Ground Response Analysis - Part II
Lecture 19 - Ground Response Analysis - Part III
Lecture 20 - Ground Response Analysis - Part IV
Lecture 21 - State Criteria for Liquefaction - Part 1
Lecture 22 - State Criteria for Liquefaction - Part 2
Lecture 23 - Initiation of Liquefaction
Lecture 24 - Assessment of Liquefaction Potential
Lecture 25 - Paleoliquefaction
Lecture 26 - Seismic Microzonation
Lecture 27 - Landslides: Introduction and classification
Lecture 28 - Seismic vulnerability and risk - Part 1
Lecture 29 - Seismic vulnerability and risk - Part 2

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Lecture 30 - Seismic vulnerability and risk - Part 3

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NPTEL Video Course - Civil Engineering - NOC:Structural Vibration

Subject Co-ordinator - Prof. Arunasis Chakarborty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - D'Alembert Principle and Degrees of Freedom
Lecture 2 - Simple Harmonic Motion
Lecture 3 - Examples
Lecture 4 - Undamped Free Vibration
Lecture 5 - Damped free vibration
Lecture 6 - Logarithmic Decrement and Coulomb Damped Free Vibration
Lecture 7 - Structural Damping
Lecture 8 - Damped Forced Vibration
Lecture 9 - Response due to Harmonic Excitation
Lecture 10 - Response due to Harmonic Excitation (Continued...)
Lecture 11 - Examples Set 1
Lecture 12 - Transmissibility and Support Motion Problem
Lecture 13 - Examples Set 2
Lecture 14 - Impulse Response function
Lecture 15 - Duhamel's Integral
Lecture 16 - Response in Frequency Domain
Lecture 17 - Response due to Periodic and Non Periodic Excitations
Lecture 18 - Nigam and Jennings and Central Difference method
Lecture 19 - Wilson Theta and Newmark Method
Lecture 20 - MATLAB Examples
Lecture 21 - Response Spectrum
Lecture 22 - MATLAB Code Generation
Lecture 23 - Generalized SDOF system
Lecture 24 - Rayleigh's Method and Calculus of Variation
Lecture 25 - Hamilton's Principle to Lagrange Equation
Lecture 26 - D'Alembert's Principle to Lagrange Equation
Lecture 27 - Hamilton's Canonical Form
Lecture 28 - Natural Frequencies and Mode shapes of MDOF system
Lecture 29 - Modal Orthogonality and Modal Decomposition

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Lecture 30 - Rayleigh Damping Model and Free Vibration
Lecture 31 - Response Analsysis in Time Domain
Lecture 32 - Response Analysis in Frequency Domain
Lecture 33 - Response History Analysis
Lecture 34 - Response Spectrum Analysis
Lecture 35 - Model Reduction Techniques
Lecture 36 - Free Vibration of Beams
Lecture 37 - Forced Vibration of Beams
Lecture 38 - FE Modelling and Modal Analysis of a Building
Lecture 39 - Modal Superposition Analysis of a Building
Lecture 40 - Response Spectrum Analysis of a Building
Lecture 41 - Modal Analysis of a Steel Bridge

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NPTEL Video Course - Civil Engineering - NOC:Mechanics of Solids (2025)

Subject Co-ordinator - Prof. Arunasis Chakarborty

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Stress and Strain
Lecture 2 - Stress and Strain Behaviour
Lecture 3 - Problems on Stress and Strain
Lecture 4 - Normal and Shear Stress
Lecture 5 - 2D Stress Field
Lecture 6 - Principal Stresses
Lecture 7 - 2D Mohr Circle
Lecture 8 - 3D Stress Analysis
Lecture 9 - 3D Stress Analysis (Continued...)
Lecture 10 - 3D Principal Stresses and Planes
Lecture 11 - 3D Mohr Circle
Lecture 12 - Mohr Circle numerical examples
Lecture 13 - Octahedral Stresses
Lecture 14 - Plane Stress
Lecture 15 - Plane Stress Example
Lecture 16 - 3-D Strain Analysis
Lecture 17 - Principal strains
Lecture 18 - 3-D Strain numerical example
Lecture 19 - Strain Compatibility
Lecture 20 - Strain Compatibility numerical example
Lecture 21 - Stress-Strain relation
Lecture 22 - Stress-Strain relation (Continued...)
Lecture 23 - Failure theories
Lecture 24 - Simple beam bending theory
Lecture 25 - Bending stress in standard sections
Lecture 26 - Bending stress in built-up sections
Lecture 27 - Shear stress distribution
Lecture 28 - Shear stress distribution Example
Lecture 29 - Shear center

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Lecture 30 - Shear center (Continued...)
Lecture 31 - Double integration method
Lecture 32 - Double integration with Macaulay's bracke
Lecture 33 - Beam deflection example
Lecture 34 - Beam deflection example (Continued...)
Lecture 35 - Pure Torsion
Lecture 36 - Shear Stress Distribution
Lecture 37 - Power Transmission and Composite shaft
Lecture 38 - Torsion with Warping
Lecture 39 - Strain Energy
Lecture 40 - Castigliano's theorems
Lecture 41 - Castigliano's theorem example
Lecture 42 - Castigliano's theorem for Indeterminate structure
Lecture 43 - Castigliano's theorem for Indeterminate structure (Continued...)
Lecture 44 - Column Buckling Theory
Lecture 45 - Euler Buckling Load
Lecture 46 - Column Buckling Example
Lecture 47 - Rankine's Theory
Lecture 48 - Column with Eccentric Load
Lecture 49 - Beam-Column Concept

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NPTEL Video Course - Civil Engineering - NOC:Pavement Construction Technology

Subject Co-ordinator - Prof. Rajan Choudhary

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Indian road infrastructure and different categories of roads
Lecture 2 - Pavement types and their cross-sectional elements - Part A
Lecture 3 - Pavement types and their cross-sectional elements - Part B
Lecture 4 - Subgrade course and its function - Part A
Lecture 5 - Subgrade course and its function - Part B
Lecture 6 - Unbound courses and their functions - Part A
Lecture 7 - Unbound courses and their functions - Part B
Lecture 8 - Bituminous bound courses and their function - Part A
Lecture 9 - Bituminous bound courses and their function - Part B
Lecture 10 - Characterization of materials for use in pavement subgrade - Part A
Lecture 11 - Characterization of materials for use in pavement subgrade - Part B
Lecture 12 - Physical and mechanical requirements of materials for granular courses
Lecture 13 - Physical and mechanical characteristics of bituminous-bound materials - Part A
Lecture 14 - Physical and mechanical characteristics of bituminous-bound materials - Part B
Lecture 15 - Mix design of unbound/granular course during construction - Part A
Lecture 16 - Mix design of unbound/granular course during construction - Part B
Lecture 17 - Mix design of bituminous bound courses during construction - Part A
Lecture 18 - Mix design of bituminous bound courses during construction - Part B
Lecture 19 - Mix design of thin bituminous courses for rural roads
Lecture 20 - Equipment and their use in pavement subgrade construction - Part A
Lecture 21 - Equipment and their use in pavement subgrade construction - Part B
Lecture 22 - Field tests to ensure pavement subgrade quality
Lecture 23 - Construction process of granular/unbound courses: Production, laying and compaction - Part A
Lecture 24 - Construction process of granular/unbound courses: Production, laying and compaction - Part B
Lecture 25 - Field tests to ensure the construction quality of granular courses
Lecture 26 - Construction equipment and process for bituminous bound courses - Part A
Lecture 27 - Construction equipment and process for bituminous bound courses - Part B
Lecture 28 - Field tests to ensure construction quality of bituminous bound courses
Lecture 29 - Quality control and quality assurance of pavement subgrade and the pavement granular courses - P

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Lecture 30 - Quality control and quality assurance of pavement subgrade and the pavement granular courses - P
Lecture 31 - Quality control and quality assurance of bituminous bound courses
Lecture 32 - Pavement markings and their construction
Lecture 33 - Roadside safety features and their installation/construction
Lecture 34 - Structural Evaluation Using Benkelman Beam and Falling Weight Deflectometer - Part A
Lecture 35 - Structural Evaluation Using Benkelman Beam and Falling Weight Deflectometer - Part B
Lecture 36 - Pavement roughness and its determination
Lecture 37 - Pavement skid resistance and its measurement
Lecture 38 - Pavement distress types - Part A
Lecture 39 - Pavement distress types - Part B
Lecture 40 - Pavement distress causes and their treatments - Part A
Lecture 41 - Pavement distress causes and their treatments - Part B
Lecture 42 - Treatment for different pavement construction defects
Lecture 43 - Recycling of bituminous pavements: hot mix plant and hot-in-place recycling
Lecture 44 - Design of recycled mixes
Lecture 45 - Recycling equipment and full-depth reclamation - Part A
Lecture 46 - Recycling equipment and full-depth reclamation - Part B

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NPTEL Video Course - Civil Engineering - NOC:Blast and Impact Resistant Structures

Subject Co-ordinator - Prof. Hrishikesh Sharma

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and general considerations of Extreme Events - Part I
Lecture 2 - Introduction and general considerations of Extreme Events - Part II
Lecture 3 - Introduction and general considerations of Extreme Events - Part III
Lecture 4 - Equivalent Static Approximation - Part I
Lecture 5 - Equivalent Static Approximation - Part II
Lecture 6 - Elementary impact and stress wave considerations - Part I
Lecture 7 - Elementary impact and stress wave considerations - Part II
Lecture 8 - Elementary impact and stress wave considerations - Part III
Lecture 9 - Elementary impact and stress wave considerations - Part IV
Lecture 10 - Elementary impact and stress wave considerations - Part V
Lecture 11 - Energy-absorbing systems - Part I
Lecture 12 - Energy-absorbing systems - Part II
Lecture 13 - Energy-absorbing systems - Part III
Lecture 14 - Energy-absorbing systems - Part IV
Lecture 15 - Energy-absorbing systems - Part V
Lecture 16 - Structural elements subjected to impact - Part I
Lecture 17 - Structural elements subjected to impact - Part II
Lecture 18 - Structural elements subjected to impact - Part III
Lecture 19 - Structural elements subjected to impact - Part IV
Lecture 20 - Structural elements subjected to impact - Part V
Lecture 21 - Dynamic properties of ductile materials - Part I
Lecture 22 - Dynamic properties of ductile materials - Part II
Lecture 23 - Dynamic properties of ductile materials - Part III
Lecture 24 - Dynamic properties of ductile materials - Part IV
Lecture 25 - Dynamic properties of ductile materials - Part V
Lecture 26 - Blast Effects and design requirements - Part I
Lecture 27 - Blast Effects and design requirements - Part II
Lecture 28 - Blast Effects and design requirements - Part III
Lecture 29 - Loading on structures caused by external air blasts-A - Part I

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Lecture 30 - Loading on structures caused by external air blasts-A - Part II
Lecture 31 - Loading on structures caused by external air blasts-B - Part I
Lecture 32 - Loading on structures caused by external air blasts-B - Part II
Lecture 33 - Analysis and Design Methods - Part I
Lecture 34 - Analysis and Design Methods - Part II
Lecture 35 - Analysis and Design Methods - Part III
Lecture 36 - Analysis and Design Methods - Part IV
Lecture 37 - Analysis and Design Methods - Part V
Lecture 38 - Analysis and Design Methods - Part VI
Lecture 39 - Analysis and Design Methods - Part VII
Lecture 40 - Failure Mechanism of Structural Elements
Lecture 41 - Dynamic Buckling of Structures - Part I
Lecture 42 - Dynamic Buckling of Structures - Part II
Lecture 43 - Dynamic Buckling of Structures - Part III
Lecture 44 - Dynamic Buckling of Structures - Part IV
Lecture 45 - Dynamic Buckling of Structures - Part V
Lecture 46 - Two-degree-of-freedom (2DOF) analysis methods - Part I
Lecture 47 - Two-degree-of-freedom (2DOF) analysis methods - Part II
Lecture 48 - Two-degree-of-freedom (2DOF) analysis methods - Part III
Lecture 49 - Two-degree-of-freedom (2DOF) analysis methods - Part IV
Lecture 50 - Two-degree-of-freedom (2DOF) analysis methods - Part V
Lecture 51 - Multi-degree-of-freedom (MDOF) methods for analysis of structural elements subject to impact - P
Lecture 52 - Multi-degree-of-freedom (MDOF) methods for analysis of structural elements subject to impact - P
Lecture 53 - Multi-degree-of-freedom (MDOF) methods for analysis of structural elements subject to impact - P
Lecture 54 - Multi-degree-of-freedom (MDOF) methods for analysis of structural elements subject to impact - P
Lecture 55 - Multi-degree-of-freedom (MDOF) methods for analysis of structural elements subject to impact - P
Lecture 56 - MDOF methods for analysis of structural elements subject to blast - Part I
Lecture 57 - MDOF methods for analysis of structural elements subject to blast - Part II
Lecture 58 - MDOF methods for analysis of structural elements subject to blast - Part III
Lecture 59 - MDOF methods for analysis of structural elements subject to blast - Part IV
Lecture 60 - MDOF methods for analysis of structural elements subject to blast - Part V

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NPTEL Video Course - Civil Engineering - NOC:Remote Sensing for Natural Hazard Studies

Subject Co-ordinator - Prof. Rishikesh Bharti

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Remote Sensing
Lecture 2 - Basics of Remote Sensing - I
Lecture 3 - Basics of Remote Sensing - II
Lecture 4 - Errors in Remote Sensing - I
Lecture 5 - Errors in Remote Sensing - II
Lecture 6 - Optical Remote Sensing
Lecture 7 - Microwave Remote Sensing - I : Part A
Lecture 8 - Microwave Remote Sensing - I : Part B
Lecture 9 - Microwave Remote Sensing - II : Part A
Lecture 10 - Microwave Remote Sensing - II : Part B
Lecture 11 - Hyperspectral Data Acquisition and Processing - Part A
Lecture 12 - Hyperspectral Data Acquisition and Processing - Part B
Lecture 13 - Remote Sensing Data Analysis - I : Part A
Lecture 14 - Remote Sensing Data Analysis - I : Part B
Lecture 15 - Remote Sensing Data Analysis - II : Part A
Lecture 16 - Remote Sensing Data Analysis - II : Part B
Lecture 17 - Data Type and Remote Sensing Products - Part A
Lecture 18 - Data Type and Remote Sensing Products - Part B
Lecture 19 - Introduction to Geographical Information System for Data Analysis - Part A
Lecture 20 - Introduction to Geographical Information System for Data Analysis - Part B
Lecture 21 - Potential of Remote Sensing and GIS in Hazard Studies: Overview - Part A
Lecture 22 - Potential of Remote Sensing and GIS in Hazard Studies: Overview - Part B
Lecture 23 - Introduction to Floods - I : Part A
Lecture 24 - Introduction to Floods - I : Part B
Lecture 25 - Introduction to Floods - II : Part A
Lecture 26 - Introduction to Floods - II : Part B
Lecture 27 - Remote Sensing for River Planform Studies - Part A
Lecture 28 - Remote Sensing for River Planform Studies - Part B
Lecture 29 - Remote Sensing for Floods - I : Part A

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Lecture 30 - Remote sensing for Floods - I : Part B
Lecture 31 - Remote Sensing for Floods - II : Part A
Lecture 32 - Remote Sensing for Floods - II : Part B
Lecture 33 - Remote Sensing for River Health - Part A
Lecture 34 - Remote Sensing for River Health - Part B
Lecture 35 - The Cryosphere - Part A
Lecture 36 - The Cryosphere - Part B
Lecture 37 - Introduction to Cryosphere Hazards - Part A
Lecture 38 - Introduction to Cryosphere Hazards - Part B
Lecture 39 - Dynamics of Snow and Glacier - Part A
Lecture 40 - Dynamics of Snow and Glacier - Part B
Lecture 41 - Geophysical Parameters of Snow - 1 : Part A
Lecture 42 - Geophysical Parameters of Snow - 1 : Part B
Lecture 43 - Geophysical Parameters of Snow - 2 : Part A
Lecture 44 - Geophysical Parameters of Snow - 2 : Part B
Lecture 45 - Seismic Impacts on Himalayan Glaciers - Part A
Lecture 46 - Seismic Impacts on Himalayan Glaciers - Part B
Lecture 47 - Introduction to Glacial Lake Outburst Floods - Part A
Lecture 48 - Introduction to Glacial Lake Outburst Floods - Part B
Lecture 49 - Glacial Lake Vulnerability Assessment - Part A
Lecture 50 - Glacial Lake Vulnerability Assessment - Part B
Lecture 51 - Avalanche Studies - Part A
Lecture 52 - Avalanche Studies - Part B
Lecture 53 - Introduction to Landslides - Part A
Lecture 54 - Introduction to Landslides - Part B
Lecture 55 - Remote Sensing for Landslide Studies - 1 : Part A
Lecture 56 - Remote Sensing for Landslide Studies - 1 : Part B
Lecture 57 - Remote Sensing for Landslide Studies - 2 : Part A
Lecture 58 - Remote Sensing for Landslide Studies - 2 : Part B
Lecture 59 - Introduction to Liquefaction - Part A
Lecture 60 - Introduction to Liquefaction - Part B
Lecture 61 - Remote Sensing for Liquefaction Studies - 1 : Part A
Lecture 62 - Remote Sensing for Liquefaction Studies - 1 : Part B
Lecture 63 - Remote Sensing for Liquefaction Studies - 2 : Part A
Lecture 64 - Remote Sensing for Liquefaction Studies - 2 : Part B
Lecture 65 - Introduction to Drought - Part A
Lecture 66 - Introduction to Drought - Part B
Lecture 67 - Remote Sensing for Drought Assessment - Part A
Lecture 68 - Remote Sensing for Drought Assessment - Part B

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Lecture 69 - Present and Future Scopes

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NPTEL Video Course - Civil Engineering - NOC:Reinforced Concrete Design

Subject Co-ordinator - Prof. Arunasis Chakraborty

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Reinforced Cement Concrete
Lecture 2 - Working Stress Method
Lecture 3 - Working Stress Method: Examples
Lecture 4 - Doubly Reinforced Beam (WSM)
Lecture 5 - Material Characteristic Strengths
Lecture 6 - Material Characteristics
Lecture 7 - Limit State of Collapse
Lecture 8 - Singly Reinforced Section Design
Lecture 9 - Doubly Reinforced Section Design
Lecture 10 - Flanged Beam Section Design
Lecture 11 - Shear Design
Lecture 12 - Bond and Detailing
Lecture 13 - One-way Slab Design
Lecture 14 - Two-way Slab Design
Lecture 15 - Axially loaded Column
Lecture 16 - Axially loaded Column: Examples
Lecture 17 - Column Uniaxial Bending (NA Outside)
Lecture 18 - Column Uniaxial Bending (NA Inside)
Lecture 19 - Column Uniaxial Bending Examples
Lecture 20 - Shallow Footing
Lecture 21 - Isolated Footing Design: Example
Lecture 22 - Driven Pile Design
Lecture 23 - Ductile Detailing: IS 13920
Lecture 24 - Deep Beam Design Concept
Lecture 25 - Deep Beam Design: Example
Lecture 26 - Stair Design
Lecture 27 - Stair Design (Continued...)
Lecture 28 - Flat Salb Design
Lecture 29 - Earth Pressure and Wall Behaviour of Underground Water Tank

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Lecture 30 - Underground Water Tank Design Example
Lecture 31 - Circular Tank: Flexible Joint
Lecture 32 - Circular Tank: Rigid Joint
Lecture 33 - Circular Tank Design: Approximate Method
Lecture 34 - Circular Tank Design: IS Code Method
Lecture 35 - Intze Tank: Structural Components
Lecture 36 - Intze Tank Design Example
Lecture 37 - Review: Underground Tank Design Example
Lecture 38 - Biaxial Column Design
Lecture 39 - Building Modeling and Analysis in STAAD Pro
Lecture 40 - Modal Analysis
Lecture 41 - Equivalent Static Seismic Analysis and Structural Design in STADD Pro
Lecture 42 - Response Spectrum Analysis and Design
Lecture 43 - Time History Analysis with Spectrum-Compatible Ground Motion

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NPTEL Video Course - Civil Engineering - Advanced Hydrology

Subject Co-ordinator - Dr. Ashu Jain

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
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Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
Lecture 41
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Lecture 43
Lecture 44

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NPTEL Video Course - Civil Engineering - Concrete Engineering and Technology

Subject Co-ordinator - Dr. Sudhir Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and course overview
Lecture 2 - Constituents of concrete - Part 1 of 2
Lecture 3 - Constituents of concrete - Part 2 of 2
Lecture 4 - Admixtures in concrete â mineral and chemical
Lecture 5 - Hydration of cement
Lecture 6 - Basic properties of concrete
Lecture 7 - Proportioning of concrete mixes - Part 1 of 3
Lecture 8 - Proportioning of concrete mixes - Part 2 of 3
Lecture 9 - Proportioning of concrete mixes - Part 3 of 3
Lecture 10 - Pores and porosity in concrete
Lecture 11 - Porosimetry â measuring pores in concrete
Lecture 12 - Principles of quality control in concrete construction
Lecture 13 - Quality control and acceptance criteria for concrete based on compressive strength
Lecture 14 - Fibre reinforced concrete
Lecture 15 - High strength concrete
Lecture 16 - Mass concrete - Part 1 of 2
Lecture 17 - Mass concrete - Part 2 of 2
Lecture 18 - Concreting in cold weather
Lecture 19 - Concreting in hot weather
Lecture 20 - Roller compacted concrete
Lecture 21 - Self-compacting concrete
Lecture 22 - Testing self-compacting concrete
Lecture 23 - Shotcrete and underwater concrete
Lecture 24 - Alkali â aggregate reaction - Part 1 of 2
Lecture 25 - Alkali â aggregate reaction - Part 2 of 2
Lecture 26 - Reinforcement corrosion in concrete
Lecture 27 - Chloride penetration in concrete
Lecture 28 - Using epoxy-coated bars in concrete structures
Lecture 29 - Using FRP as reinforcement in concrete structures - Part 1 of 2

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Lecture 30 - Using FRP as reinforcement in concrete structures - Part 2 of 2
Lecture 31 - Grouting and importance of formwork in concrete construction
Lecture 32 - Carbonation and freezing & thawing in concrete structures
Lecture 33 - Using recycled aggregates in concrete construction
Lecture 34 - Basic non-destructive testing for concrete structures
Lecture 35 - Measuring permeability in concrete
Lecture 36 - Some additional topics
Lecture 37 - Considerations in repair of concrete structures - Part 1 of 2
Lecture 38 - Considerations in repair of concrete structures - Part 2 of 2
Lecture 39 - Laboratory demonstration
Lecture 40 - Review of the course

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NPTEL Video Course - Civil Engineering - Environmental Air Pollution

Subject Co-ordinator - Prof. Mukesh Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Atmosphere
Lecture 2 - Air Pollution Systems
Lecture 3 - Air Quality Standards
Lecture 4 - Types and Forms of Air Pollutants
Lecture 5 - Measurement Units and Particulate classification
Lecture 6 - Interpretation and Particle size Distribution
Lecture 7 - Atmospheric formation of Air Pollutants - I
Lecture 8 - Atmospheric formation of Air Pollutants - II
Lecture 9 - Atmospheric formation of Air Pollutants - III
Lecture 10 - Kinetics of Air pollution and combustion processes
Lecture 11 - Internal Combustion Engine and Air Pollution - I
Lecture 12 - Internal Combustion Engine and Air Pollution - II
Lecture 13 - Air Pollution and Health - I
Lecture 14 - Air Pollution and Health - II
Lecture 15 - Emission Inventory
Lecture 16 - Sources of Air Pollution
Lecture 17 - Emission from Fugitive Sources and Sulfuric Acid Production
Lecture 18 - Aluminium Production and Air Pollution - I
Lecture 19 - Aluminium Production and Air Pollution - II
Lecture 20 - Coke Production and Air Pollution
Lecture 21 - Examples for Practice
Lecture 22 - Meteorological Measurements and their interpretation
Lecture 23 - Examples for Practice - Dispersion Modeling
Lecture 24 - Vertical Temperature Profile of Atmosphere
Lecture 25 - Stability, Mixing Height and Plume Behavior - I
Lecture 26 - Stability, Mixing Height and Plume Behavior - II
Lecture 27 - Examples - Solar Radiation Based Stability Calculation
Lecture 28 - Air Quality Modeling - I
Lecture 29 - Air Quality Modeling - II

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Lecture 30 - Derivation of Gaussian Model
Lecture 31 - Gaussian Model - Useful Formulation
Lecture 32 - Plume rise, Area and Line Source Model
Lecture 33 - Air Quality Modeling - Maximum Ground Level concentration
Lecture 34 - Examples of Air Quality Modeling
Lecture 35 - Air Pollution Control Devices - I
Lecture 36 - Air Pollution Control Devices - II
Lecture 37 - Source Emission Monitoring
Lecture 38 - Receptor Source Modeling
Lecture 39 - Environmental laws

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NPTEL Video Course - Civil Engineering - Surveying

Subject Co-ordinator - Dr. Bharat Lohani

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module 1 - Lecture 1
Module 2 - Lecture 1
Module 2 - Lecture 2
Module 2 - Lecture 3
Module 2 - Lecture 4
Module 2 - Lecture 5
Module 3 - Lecture 1
Module 3 - Lecture 2
Module 3 - Lecture 3
Module 3 - Lecture 4
Module 4 - Lecture 1
Module 4 - Lecture 2
Module 5 - Lecture 1
Module 5 - Lecture 2
Module 5 - Lecture 3
Module 5 - Lecture 4
Module 5 - Lecture 5
Module 5 - Lecture 6
Module 6 - Lecture 1
Module 6 - Lecture 2
Module 6 - Lecture 3
Module 7 - Lecture 1
Module 7 - Lecture 2
Module 7 - Lecture 3
Module 7 - Lecture 4
Module 7 - Lecture 5
Module 8 - Lecture 1
Module 8 - Lecture 2
Module 9 - Lecture 1

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Module 9 - Lecture 2
Module 9 - Lecture 3
Module 9 - Lecture 4
Module 9 - Lecture 5
Module 10 - Lecture 1
Module 11 - Lecture 1
Module 11 - Lecture 2
Module 11 - Lecture 3
Module 12 - Lecture 1
Module 12 - Lecture 2
Module 12 - Lecture 3

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NPTEL Video Course - Civil Engineering - Water Resources Engineering

Subject Co-ordinator - Dr. Pranab K Mohapatra, Prof. Rajesh Srivastava

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 7
Lecture 8
Lecture 9
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Lecture 15
Lecture 16
Lecture 17
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Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25 (Lecture Missing)
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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NPTEL Video Course - Civil Engineering - Geotechnical Measurements and Explorations

Subject Co-ordinator - Dr. Nihar Ranjan Patra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Geotechnical Measurements & Explorations
Lecture 2 - Geotechnical Measurements & Explorations
Lecture 3 - Geotechnical Measurements & Explorations
Lecture 4 - Geotechnical Measurements & Explorations
Lecture 5 - Geotechnical Measurements & Explorations
Lecture 6 - Geotechnical Measurements & Explorations
Lecture 7 - Geotechnical Measurements & Explorations
Lecture 8 - Geotechnical Measurements & Explorations
Lecture 9 - Geotechnical Measurements & Explorations
Lecture 10 - Geotechnical Measurements & Explorations
Lecture 11 - Geotechnical Measurements & Explorations
Lecture 12 - Geotechnical Measurements & Explorations
Lecture 13 - Geotechnical Measurements & Explorations
Lecture 14 - Geotechnical Measurements & Explorations
Lecture 15 - Geotechnical Measurements & Explorations
Lecture 16 - Geotechnical Measurements & Explorations
Lecture 17 - Geotechnical Measurements & Explorations
Lecture 18 - Geotechnical Measurements & Explorations
Lecture 19 - Geotechnical Measurements & Explorations
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Lecture 24 - Geotechnical Measurements & Explorations
Lecture 25 - Geotechnical Measurements & Explorations
Lecture 26 - Geotechnical Measurements & Explorations
Lecture 27 - Geotechnical Measurements & Explorations
Lecture 28 - Geotechnical Measurements & Explorations
Lecture 29 - Geotechnical Measurements & Explorations

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Lecture 30 - Geotechnical Measurements & Explorations
Lecture 31 - Geotechnical Measurements & Explorations
Lecture 32 - Geotechnical Measurements & Explorations
Lecture 33 - Geotechnical Measurements & Explorations
Lecture 34 - Geotechnical Measurements & Explorations
Lecture 35 - Geotechnical Measurements & Explorations
Lecture 36 - Geotechnical Measurements & Explorations
Lecture 37 - Geotechnical Measurements & Explorations
Lecture 38 - Geotechnical Measurements & Explorations
Lecture 39 - Geotechnical Measurements & Explorations
Lecture 40 - Geotechnical Measurements & Explorations

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NPTEL Video Course - Civil Engineering - Application of Soil Mechanics

Subject Co-ordinator - Dr. Nihar Ranjan Patra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Application of Soil Mechanics
Lecture 2 - Application of Soil Mechanics
Lecture 3 - Application of Soil Mechanics
Lecture 4 - Application of Soil Mechanics
Lecture 5 - Application of Soil Mechanics
Lecture 6 - Application of Soil Mechanics
Lecture 7 - Application of Soil Mechanics
Lecture 8 - Application of Soil Mechanics
Lecture 9 - Application of Soil Mechanics
Lecture 10 - Application of Soil Mechanics
Lecture 11 - Application of Soil Mechanics
Lecture 12 - Application of Soil Mechanics
Lecture 13 - Application of Soil Mechanics
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Lecture 24 - Application of Soil Mechanics
Lecture 25 - Application of Soil Mechanics
Lecture 26 - Application of Soil Mechanics
Lecture 27 - Application of Soil Mechanics
Lecture 28 - Application of Soil Mechanics
Lecture 29 - Application of Soil Mechanics

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Lecture 30 - Application of Soil Mechanics
Lecture 31 - Application of Soil Mechanics
Lecture 32 - Application of Soil Mechanics
Lecture 33 - Application of Soil Mechanics
Lecture 34 - Application of Soil Mechanics
Lecture 35 - Application of Soil Mechanics
Lecture 36 - Application of Soil Mechanics
Lecture 37 - Application of Soil Mechanics
Lecture 38 - Application of Soil Mechanics
Lecture 39 - Application of Soil Mechanics
Lecture 40 - Application of Soil Mechanics

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NPTEL Video Course - Civil Engineering - NOC:Geology and Soil Mechanics

Subject Co-ordinator - Dr. Priyanka Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Description of soil, Engineering Geology Of Soils and Thier Formation
Lecture 2 - Index Properties Of Soil
Lecture 3 - Index Properties Of Soil - A
Lecture 4 - Index Properties Of Soil - B
Lecture 5 - Index Properties Of Soil - C
Lecture 6 - Index Properties Of soil - D
Lecture 7 - Classification Of Soils - A
Lecture 8 - Classification Of Soils - B
Lecture 9 - Classification Of Soils And Clay Mineralogy - A
Lecture 10 - Classification Of Soils And Clay Mineralogy - B
Lecture 11 - Soil compaction - A
Lecture 12 - Soil compaction - B
Lecture 13 - Soil compaction - C
Lecture 14 - Soil compaction - D
Lecture 15 - Soil compaction and Permeability
Lecture 16 - Permeability - A
Lecture 17 - Permeability - B
Lecture 18 - Permeability - C
Lecture 19 - Problems on permeability
Lecture 20 - Seepage
Lecture 21 - Seepage - A
Lecture 22 - Seepage - B
Lecture 23 - Seepage and In situ stress
Lecture 24 - In situ stresses - A
Lecture 25 - In situ stresses - B
Lecture 26 - In situ stresses - A
Lecture 27 - In situ stresses - B
Lecture 28 - In situ stresses - C
Lecture 29 - Consolidation - A

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Lecture 30 - Consolidation - B
Lecture 31 - Consolidation - A
Lecture 32 - Consolidation - B
Lecture 33 - Consolidation - C
Lecture 34 - Consolidation - D
Lecture 35 - Consolidation - E
Lecture 36 - Consolidation - F
Lecture 37 - Shear strength of Soil - A
Lecture 38 - Shear strength of Soil - B
Lecture 39 - Shear strength of Soil - C
Lecture 40 - Shear Strength of Soils
Lecture 41 - Shear Strength of Soils.
Lecture 42 - Shear Strength of Soils..
Lecture 43 - Shear strength of Soil
Lecture 44 - Shear strength of Soil- e
Lecture 45 - Shear strength of Soil_B
Lecture 46 - Problem on shear strength of soil
Lecture 47 - Problem on shear strength of soil -a
Lecture 48 - Problem on shear strength of soil -a
Lecture 49 - Earth Pressure on retaining wall
Lecture 50 - Earth Pressure on retaining wall -A
Lecture 51 - Tutorial on Index properties of soil
Lecture 52 - Tutorial on compaction
Lecture 53 - Tutorial on Permeability - a
Lecture 54 - Tutorial on Permeability - b
Lecture 55 - Tutorial On Consoildation
Lecture 56 - Tutorial on consoildation - a
Lecture 57 - Tutorial on Sheer Strength
Lecture 58 - Tutorial on Sheer Strength - a
Lecture 59 - Earth Pressure on Retaining Wall - a
Lecture 60 - Earth Pressure on Retaining Wall - 1
Lecture 61 - Earth Pressure Theories and Problems on Earth Pressure on Retaining Wall
Lecture 62 - Problems on Earth Pressure on Retaining Wall Edit Lesson
Lecture 63 - Problems on Earth Pressure on Retaining Wall - 2
Lecture 64 - Problems on Earth Pressure Theories - 3
Lecture 65 - Problems on Earth Pressure Theories - 4

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NPTEL Video Course - Civil Engineering - NOC:Engineering Graphics

Subject Co-ordinator - Dr. Nihar Ranjan Patra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Objectives, Lettering and Numbering
Lecture 2 - Geometric Constructions - Part I
Lecture 3 - Geometric Constructions - Part II
Lecture 4 - Orthographic Projections - Part I
Lecture 5 - Orthographic Projections - Part II
Lecture 6 - Orthographic Projections - Part III
Lecture 7 - Orthographic Projections - Part IV
Lecture 8 - Orthographic Projections - Part V
Lecture 9 - Isometric Projections - Part I
Lecture 10 - Isometric Projections - Part II
Lecture 11 - Isometric Projections - Part III
Lecture 12 - Isometric Projections - Part IV
Lecture 13 - Isometric Projections - Part V and Oblique Projections - Part I
Lecture 14 - Oblique Projections - Part II
Lecture 15 - Sectioning
Lecture 16 - Hatching
Lecture 17 - Orthographic Projections - Assemblies
Lecture 18 - Missing Lines and Missing Views
Lecture 19 - Perspective View - Part I
Lecture 20 - Perspective View - Part II
Lecture 21 - Perspective View - Part III
Lecture 22 - Angular Perspective and Circles in perspective
Lecture 23 - Perspective View examples and Space Geometry
Lecture 24 - Space Geometry (Continued...)
Lecture 25 - True Length, Point View and Slope of Oblique lines
Lecture 26 - Space Geometry - Introduction
Lecture 27 - Space Geometry - Part 2
Lecture 28 - Auxiliary View, Lines, Planes
Lecture 29 - Relationship between Lines and Planes, Planes and Planes

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Lecture 30 - Intersection of Solids
Lecture 31 - AUTOCAD
Lecture 32 - Development of Surfaces

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NPTEL Video Course - Civil Engineering - NOC:Earth Sciences for Civil Engineering

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geosciences in Civil Engineering - Part 1
Lecture 2 - Introduction to Geosciences in Civil Engineering - Part 2
Lecture 3 - Plate Tectonics and Continental Drift - Part 2
Lecture 4 - Plate Tectonics and Continental Drift - Part 3
Lecture 5 - Plate Tectonics and Continental Drift - Part 4
Lecture 6 - Rock Forming Minerals and their Properties - Part 1
Lecture 7 - Rock types and their Properties - Part 1
Lecture 8 - Rock types and their Properties - Part 2
Lecture 9 - Rock types and their Properties - Part 3
Lecture 10 - Rock types and their Properties - Part 4
Lecture 11 - Rock types and their properties - Part 5
Lecture 12 - Rock types and their properties - Part 6
Lecture 13 - Rock types and their properties - Part-6 Seismology and the internal structure of the earth - Pa
Lecture 14 - Seismology and the internal structure of the earth - Part 2
Lecture 15 - Seismology and the internal structure of the earth - Part 3 Edit Lesson
Lecture 16 - Seismology and the internal structure of the earth - Part 4
Lecture 17 - Seismology and the internal structure of the earth - Part 5 and Geological Structures - Part 1
Lecture 18 - Geological Structures - Part 2
Lecture 19 - Geological Structures - Part 3
Lecture 20 - Geological Structures - Part 4

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NPTEL Video Course - Civil Engineering - NOC:Earth Sciences for Civil Engineering - Part 2

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geological Hazards and Enviromental Impact - Part 1
Lecture 2 - Introduction to Geological Hazards and Enviromental Impact - Part 2
Lecture 3 - Introduction to Geological Hazards and Enviromental Impact - Part 3
Lecture 4 - Active Faults and its Related Hazards in India - Part 1
Lecture 5 - Active Faults and its Related Hazards in India - Part 2
Lecture 6 - Active faults and its related hazards in India - Part 3
Lecture 7 - Active faults and its related hazards in India - Part 4
Lecture 8 - Active faults its related hazards in India - Part 5
Lecture 9 - Active faults its related hazards in India - Part 6
Lecture 10 - Active faults its related hazards in India - Part 7 and Civil Engineering applications - geologi
Lecture 11 - Civil Engineering applications Â geological considerations in dams, tunnels - Part 2
Lecture 12 - Civil Engineering applications Â geological considerations in dams, tunnels - Part 3 and Tsunam
Lecture 13 - Tsunami and related hazard - Part 2
Lecture 14 - Tsunami and related hazard - Part 3
Lecture 15 - Landslide and subsidence - Part 1
Lecture 16 - Landslide and subsidence - Part 2
Lecture 17 - Landslide and subsidence - Part 3
Lecture 18 - Flood and related hazard - Part 1
Lecture 19 - Flood and related hazard - Part 2
Lecture 20 - Groundwater

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NPTEL Video Course - Civil Engineering - NOC:Hydration, Porosity and Strength of Cementitious Materials

Subject Co-ordinator - Dr. Satyaki Roy, Dr. Sudhir Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1 - Introduction to the course
Lecture 2 - Lecture 2 - Concrete - A Three Phase System
Lecture 3 - Lecture 3 - Basic Properties of Concrete
Lecture 4 - Lecture 4 - Portland Cement
Lecture 5 - Lecture 5 - Portland Cement (Continued...)
Lecture 6 - Lecture 6 - Introduction (Aggregates) - 1
Lecture 7 - Lecture 7 - Introduction (Aggregates) - 2
Lecture 8 - Lecture 8 - Introduction (Aggregates) - 3
Lecture 9 - Lecture 9 - Introduction (Concrete Mixture Proportioning Strategies)
Lecture 10 - Lecture 10 - Introduction (Chemical Admixtures)
Lecture 11 - Lecture-11 - Portland Cement Based Paste Systems - I
Lecture 12 - Lecture 12 - Portland Cement Based Paste Systems - II
Lecture 13 - Lecture 13 - Portland Cement Based Paste Systems - III
Lecture 14 - Lecture 14 - Portland Cement Paste Based Systems - IV
Lecture 15 - Lecture 15 - Portland Cement Based Paste Systems - V
Lecture 16 - Lecture 16 - 18 Part 1 - Portland Cement Based Paste Systems - VI
Lecture 17 - Lecture 16 - 18 Part 2 - Portland Cement Based Paste Systems - VII
Lecture 18 - Lecture 19 - Heat of hydration of Portland Cement
Lecture 19 - Lecture 20 - Mass Concrete
Lecture 20 - Lecture 21-22 - Mineral Admixtures - 1
Lecture 21 - Lecture 23-24 - Mineral Admixtures - 2
Lecture 22 - Lecture 25-27 - Mineral Admixtures - 3
Lecture 23 - Lecture 28-30 - Mineral Admixtures - 4
Lecture 24 - Lecture 31 - From paste to concrete
Lecture 25 - Lecture 32 - Demonstration
Lecture 26 - Lecture 33 - Pores and porosity - A revisit
Lecture 27 - Lecture 34 - Measuring permeability of concrete
Lecture 28 - Lecture 35 - Behavior under load
Lecture 29 - Lecture 36 - Curing of concrete

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Lecture 30 - Lecture 37 - Stress strain behaviour
Lecture 31 - Lecture 38 - Durability of concrete - I
Lecture 32 - Lecture 39 - Durability of concrete - II - Specifications

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NPTEL Video Course - Civil Engineering - NOC:Mechanics of Solids

Subject Co-ordinator - Dr. Priyanka Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Handout
Lecture 2 - Analysis of Mechanical System
Lecture 3 - Conditions of equilibrium in 2D and 3D
Lecture 4 - FBD with examples on modelling of typical supports and joints
Lecture 5 - Support Conditions
Lecture 6 - FBD of Frame Structures
Lecture 7 - Stability of Truss
Lecture 8 - Solutions of Plane Truss
Lecture 9 - Method of Sections
Lecture 10 - Friction 2
Lecture 11 - Tutorial on Truss
Lecture 12 - Tutorial on Friction
Lecture 13 - Force Displacement Relationship
Lecture 14 - Hoop Stresses
Lecture 15 - Mechanism of belt around wheel
Lecture 16 - Tutorial on Force Displacement Relationship and Geometric Compatibility - 1
Lecture 17 - Tutorial on Force Displacement Relationship and Geometric Compatibility - 2
Lecture 18 - Tutorial on Force Displacement Relationship and Geometric Compatibility - 3
Lecture 19 - Concept of Stress
Lecture 20 - Plane Stress
Lecture 21 - State of Stresses
Lecture 22 - Mohrs Circle representation of plane stress
Lecture 23 - Construction of Mohrs Circle
Lecture 24 - Principal Stresses and Introduction to Concept of Strain
Lecture 25 - Normal Strain and Shear Strain
Lecture 26 - Strain Transformation
Lecture 27 - Strain Measurement
Lecture 28 - Tutorial
Lecture 29 - Tutorial on Concept of Strain.

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Lecture 30 - Elastic Stress Strain Relationship
Lecture 31 - Von Mises Yield Criteria
Lecture 32 - Tresca Criteria
Lecture 33 - True Stress Strain
Lecture 34 - Tutorial 2
Lecture 35 - Forces and Moments Transmitted by Slender Members
Lecture 36 - Bending Moment
Lecture 37 - Shear Force and Bending Moment Diagrams
Lecture 38 - Differential Equation Relationship
Lecture 39 - Tutorial 3
Lecture 40 - Tutorial 4
Lecture 41 - Torsion
Lecture 42 - Stress Components
Lecture 43 - Tutorial A
Lecture 44 - Tutorial B
Lecture 45 - Stresses due to Bending
Lecture 46 - Equilibrium Requirements
Lecture 47 - Beam Transmitting both Shear Force and Bending Moment
Lecture 48 - Shear Stress Distribution
Lecture 49 - Distribution of Shear Stress in I Beam
Lecture 50 - Tutorial 1
Lecture 51 - Deflections due to Bending
Lecture 52 - Integration of Moment Curvature Relation
Lecture 53 - Superposition Continued
Lecture 54 - Load Deflection Differential Equation
Lecture 55 - Castiglianoâ s Theorem
Lecture 56 - Strain Energy Methods
Lecture 57 - Introduction to Concept of Elastic Instability
Lecture 58 - Critical Load
Lecture 59 - Critical Load for Flexible Columns
Lecture 60 - Concluding Lecture

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NPTEL Video Course - Civil Engineering - NOC:Principles of Construction Management

Subject Co-ordinator - Dr. Sudhir Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Interdisciplinary nature of modern construction projects
Lecture 3 - Overview of steps in execution of a project
Lecture 4 - Illustrative examples for evaluation of bids based on different schemes
Lecture 5 - Resource management in construction projects
Lecture 6 - Estimating quantities
Lecture 7 - Description of items
Lecture 8 - Estimation of project cost
Lecture 9 - Discussion on the case study of boundary wall
Lecture 10 - Running account bills
Lecture 11 - Economic decision making in construction projects
Lecture 12 - Depreciation of construction equipment
Lecture 13 - Repayment of a loan
Lecture 14 - Introduction to planning and scheduling
Lecture 15 - Introduction to planning and scheduling (Continued...)
Lecture 16 - Project scheduling
Lecture 17 - Uncertainties in duration of activities -Using PERT in scheduling
Lecture 18 - Project monitoring and control systems
Lecture 19 - Resource leveling and allocation
Lecture 20 - Crashing of networks
Lecture 21 - Introduction to construction safety
Lecture 22 - Accidents in construction industry - I
Lecture 23 - Accidents in construction industry - II
Lecture 24 - Personal protective equipment
Lecture 25 - Implications of construction accidents
Lecture 26 - Safety organization and safety officer
Lecture 27 - Quality control in construction
Lecture 28 - Quality in construction - welding
Lecture 29 - Epoxy coated bars

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Lecture 30 - Quality control of grouts in ducts of post-tensioned PC members
Lecture 31 - Quality control (QC) issues in concrete

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NPTEL Video Course - Civil Engineering - NOC:Foundation Design

Subject Co-ordinator - Dr. Nihar Ranjan Patra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - (1A) Subsoil Investigation or Site Investigation - Part 1
Lecture 2 - (1B) Subsoil Investigation or Site Investigation - Part 2
Lecture 3 - (2A) Subsoil Investigation or Site Investigation - Part 3
Lecture 4 - (2B) Subsoil Investigation or Site Investigation - Part 4
Lecture 5 - (3A) Subsoil Investigation or Site Investigation - Part 5
Lecture 6 - (3B) Subsoil Investigation or Site Investigation - Part 6
Lecture 7 - (4A) Subsoil Investigation or Site Investigation - Part 7
Lecture 8 - (4B) Foundations
Lecture 9 - (5A) Bearing Capacity Of Shallow Foundations - Part 1
Lecture 10 - (5B) Bearing Capacity Of Shallow Foundations - Part 2
Lecture 11 - (6A) Bearing Capacity Of Shallow Foundations - Part 3
Lecture 12 - (6B) Bearing Capacity Of Shallow Foundations - Part 4
Lecture 13 - (7A) Bearing Capacity Of Shallow Foundations - Part 5
Lecture 14 - (7B) Bearing Capacity Of Shallow Foundations - Part 6
Lecture 15 - (8A) Settlement Analysis - Part 1
Lecture 16 - (8B) Settlement Analysis - Part 2
Lecture 17 - (9A) Settlement Analysis - Part 3
Lecture 18 - (9B) Stress distribution in soils - Part 1
Lecture 19 - (10A) Stress distribution in soils - Part 2
Lecture 20 - (10B) Stress distribution in soils - Part 3
Lecture 21 - (11A) Stress distribution in soils - Part 4
Lecture 22 - (11B) Stress distribution in soils - Part 5
Lecture 23 - (12A) Examples based on bearing capacity and settlement
Lecture 24 - (12B) Design of foundation - Part 1
Lecture 25 - (13A) Design of Foundation - Part 2
Lecture 26 - (13B) Design of Foundation - Part 3
Lecture 27 - (14A) Design of Foundation - Part 4
Lecture 28 - (14B) Design of Foundation - Part 5
Lecture 29 - (15A) Types of foundations (Combined Footing)

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Lecture 30 - (15B) Design of Raft Foundation
Lecture 31 - (16A) Earth Pressure Theories - Part 1
Lecture 32 - (16B) Earth Pressure Theories - Part 2
Lecture 33 - (17A) Earth Pressure Theories - Part 3
Lecture 34 - (17B) Earth Pressure Theories - Part 4
Lecture 35 - (18A) Earth Pressure Theories - Part 5
Lecture 36 - (18B) Deep Foundation - Part 1
Lecture 37 - (18C) Deep Foundation - Part 2
Lecture 38 - (18D) Deep Foundation - Part 3
Lecture 39 - (20A) Deep Foundation - Part 4
Lecture 40 - (20B) Deep Foundation - Part 5

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NPTEL Video Course - Civil Engineering - NOC:Photogeology In Terrain Evaluation

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Remote Sensing - Photogeology
Lecture 2 - Introduction to Remote Sensing - Photogeology
Lecture 3 - Fundamental Principle in Remote Sensing
Lecture 4 - Aerial Photography
Lecture 5 - Stereo-photos and their Importance
Lecture 6 - Photo-interpretation Techniques
Lecture 7 - Photogrammetry and its Significance
Lecture 8 - Sensors, Cameras and Panchromatic Data
Lecture 9 - Stereoscopy and Methods
Lecture 10 - Relief Displacement on Aerial Photographs
Lecture 11 - Fluvial Processes and Landforms
Lecture 12 - Geomorphology of River Channels
Lecture 13 - Drainage Basins and their Features
Lecture 14 - Morphometric Parameters of Fluvial Channels
Lecture 15 - Drainage Patterns and their Morphology
Lecture 16 - Determination of Flightline (Lab)
Lecture 17 - Determination of Flightline (Lab)
Lecture 18 - Exercise on Relief Displacement
Lecture 19 - Exercise on Stereoscopic Parallax
Lecture 20 - Exercise on Stereoscopic Parallax
Lecture 21 - Generation of Digital Elevation Model and Anaglyph

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NPTEL Video Course - Civil Engineering - NOC:Photogeology In Terrain Evaluation - Part 2

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geological Structures, Photo interpretation and Terrain evaluation
Lecture 2 - Photo interpretation/identification of Landforms associated with Folds - 1
Lecture 3 - Photo interpretation/identification of Landforms associated with Folds - 2
Lecture 4 - Identification of features related to ongoing Crustal Deformation and Mountain Building process
Lecture 5 - Identification of Fault Topography
Lecture 6 - Photogeology
Lecture 7 - Photo Interpretations
Lecture 8 - Photo Interpretations
Lecture 9 - Photo Interpretations
Lecture 10 - Photo-Interpretations
Lecture 11 - Photo Interpretations
Lecture 12 - Photo Interpretations
Lecture 13 - Photo Interpretations
Lecture 14 - Photo Interpretations
Lecture 15 - Photo Interpretations
Lecture 16 - Exercise on Identification of Geological Structures and related Landforms
Lecture 17 - Exercise on Identification of Geomorphic Features related to Various Environments
Lecture 18 - Exercise on Identification of Tectonic Features and Geomorphic Mapping using Satellite Data
Lecture 19 - Exercise on Identification of Geological Structures and Geomorphic Landforms on Aerial/Satellite
Lecture 20 - Exercise on Morphometric Parameters and 3D observation of the Earth Surface Features

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Accounting and Finance for Civil Engineers

Subject Co-ordinator - Dr. Sudhir Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of the Course
Lecture 2 - Introduction
Lecture 3 - General Discussion on Construction Projects
Lecture 4 - Time value of money
Lecture 5 - Economic Decision Making - I
Lecture 6 - Economic decision making - II
Lecture 7 - Incremental Rate of Return (IROR)
Lecture 8 - Benefit cost ratio
Lecture 9 - Sensitivity analysis - Part 1
Lecture 10 - Sensitivity analysis - Part 2
Lecture 11 - Break-even analysis - Part 1
Lecture 12 - Break-even analysis - Part 2
Lecture 13 - Depreciation of construction equipment
Lecture 14 - Effect of depreciation on cash flows
Lecture 15 - Effect of depreciation and inflation on economic decision making
Lecture 16 - Replacement analysis
Lecture 17 - Risk analysis - Part 1
Lecture 18 - Risk analysis - Part 2
Lecture 19 - Risk analysis - Part 3
Lecture 20 - Simulation - Part 1
Lecture 21 - Simulation - Part 2
Lecture 22 - Bidding - Part 1
Lecture 23 - Bidding - Part 2
Lecture 24 - Bidding - Part 3
Lecture 25 - Bidding - Part 4
Lecture 26 - Bidding - Part 5
Lecture 27 - Bidding - Part 6
Lecture 28 - Bidding - Part 7
Lecture 29 - Introduction to accounting - Part 1

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Lecture 30 - Introduction to accounting - Part 2
Lecture 31 - Introduction to accounting - Part 3
Lecture 32 - Revenue recognition
Lecture 33 - Construction Contract Status Reports
Lecture 34 - Assets and Liabilities
Lecture 35 - Accounting statements - case study
Lecture 36 - Working capital
Lecture 37 - Financing resources for working capital
Lecture 38 - Ratio analysis

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NPTEL Video Course - Civil Engineering - NOC:Natural Hazards - Part 1

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Natural Hazards
Lecture 2 - Introduction to Natural Hazards (Types of Hazard)
Lecture 3 - Introduction to Natural Hazards (Earth as a system)
Lecture 4 - Introduction to Natural Hazards (Cyclones and Earthquakes - Part I)
Lecture 5 - Introduction to Natural Hazards (Cyclones and Earthquakes - Part II)
Lecture 6 - Introduction to Natural Hazards (Disaster Management)
Lecture 7 - Introduction to Natural Hazards (Seismic Zonation of India and Landslide)
Lecture 8 - Introduction to Natural Hazards (Flood and Tsunami)
Lecture 9 - Introduction to Natural Hazards (Disaster Prediction and Warning)
Lecture 10 - Introduction to Natural Hazards (Recent Natural Calamities in India and Worldwide)
Lecture 11 - Plate tectonics and related hazards - Part I
Lecture 12 - Plate tectonics and related hazards - Part II
Lecture 13 - Plate tectonics and related hazards - Part III
Lecture 14 - Active fault and Paleoseismology
Lecture 15 - Case study on 2015 Gorkha Earthquake
Lecture 16 - Earthquake and related hazard - Part I
Lecture 17 - Earthquake and related hazard - Part II
Lecture 18 - Earthquake and related hazard - Part III
Lecture 19 - Ground Effects and Evaluation of Earthquake Hazards - Part I
Lecture 20 - Ground Effects and Evaluation of Earthquake Hazards - Part II
Lecture 21 - Ground Effects and Evaluation of Earthquake Hazards - Part III
Lecture 22 - Liquefaction and Related Geological Features
Lecture 23 - Motoring Seismic Activity - Part I
Lecture 24 - Motoring Seismic Activity - Part II
Lecture 25 - Volcano and Related Hazard - Part I
Lecture 26 - Volcano and Related Hazard - Part II
Lecture 27 - Introduction to Landslides
Lecture 28 - Types of Landslide and Related Hazards
Lecture 29 - Civil Engineering applications geological considerations in dams, tunnels - Part 2

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Lecture 30 - Civil Engineering applications geological considerations in dams, tunnels - Part 3 and Tsunami a
Lecture 31 - Tsunami and related hazard - Part 2
Lecture 32 - Tsunami and related hazard - Part 3
Lecture 33 - Landslide and subsidence - Part I
Lecture 34 - Flood and Related Hazards - Part I
Lecture 35 - Flood and Related Hazards - Part II
Lecture 36 - Flood and Related Hazards - Part III
Lecture 37 - Flood and Related Hazards - Part IV
Lecture 38 - Flood and Related Hazards - Part V
Lecture 39 - Introduction to Tsunami
Lecture 40 - Tsunami and Related Hazards - Part I
Lecture 41 - Tsunami and Related Hazards - Part II
Lecture 42 - Tsunami and Related Hazards - Part III
Lecture 43 - Tsunami Modelling

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NPTEL Video Course - Civil Engineering - NOC:Structural Dynamics for Civil Engineers - SDOF Systems

Subject Co-ordinator - Prof. Riya Catherine George

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Structural Dynamics
Lecture 2 - Modelling of Dynamic System
Lecture 3 - Undamped Free vibration
Lecture 4 - Damped Free Vibrations
Lecture 5 - Coulomb Damped Free Vibrations
Lecture 6 - Forced Vibrations - Part 1
Lecture 7 - Forced Vibrations - Part 2
Lecture 8 - Examples
Lecture 9 - Harmonic Vibration Examples
Lecture 10 - Vibrations under Periodic Forces
Lecture 11 - Energy and Damping
Lecture 12 - Response to Arbitrary excitations
Lecture 13 - Response to Pulse Excitations

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NPTEL Video Course - Civil Engineering - NOC:Geomorphic Processes: Landforms and Landscapes

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geomorphic processes- Landforms and Landscapes - Part I
Lecture 2 - Introduction to Geomorphic Processes- Landforms and Landscapes - Part II
Lecture 3 - Introduction to Geomorphic Processes- Landforms and Landscapes - Part III
Lecture 4 - Earth Energy Budget - Part I
Lecture 5 - Earth Energy Budget - Part II
Lecture 6 - Earth and Environment
Lecture 7 - Surface and Ground Water System and Management - Part I
Lecture 8 - Surface and Ground Water System and Management - Part II
Lecture 9 - Surface and Ground Water System and Management - Part III
Lecture 10 - Interior of the Earth and Plate Tectonics - Part I
Lecture 11 - Interior of the Earth and Plate Tectonics - Part II
Lecture 12 - Interior of the Earth and Plate Tectonics - Part III
Lecture 13 - Interior of the Earth and Plate Tectonics - Part IV
Lecture 14 - Interior of the Earth and Plate Tectonics - Part V
Lecture 15 - Fluvial Processes and Related Landforms - Part I
Lecture 16 - Fluvial Processes and Related Landforms - Part II
Lecture 17 - Fluvial Processes and Related Landforms - Part III
Lecture 18 - Fluvial Processes and Related Landforms - Part IV
Lecture 19 - Fluvial Processes and Related Landforms - Part V
Lecture 20 - Fluvial Processes and Related Landforms - Part VI
Lecture 21 - Fluvial Processes and Related Landforms - Part VII
Lecture 22 - Fluvial Processes and Related Landforms - Part VIII
Lecture 23 - Fluvial Processes and Related Landforms - Part IX
Lecture 24 - Tectonic Geomorphology - Part I
Lecture 25 - Tectonic Geomorphology - Part II
Lecture 26 - Tectonic Geomorphology - Part III
Lecture 27 - Tectonic Geomorphology - Part IV
Lecture 28 - Tectonic Geomorphology - Part V
Lecture 29 - Glacial Landforms - Part I

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Lecture 30 - Glacial Landforms - Part II
Lecture 31 - Glacial Landforms - Part III
Lecture 32 - Coastal Processes and Landforms - Part I
Lecture 33 - Coastal Processes and Landforms - Part II
Lecture 34 - Coastal Processes and Landforms - Part III
Lecture 35 - Aeolian Processes and Landforms - Part I
Lecture 36 - Aeolian Processes and Landforms - Part II
Lecture 37 - Tectonic Geomorphology of Kachchh - Part I
Lecture 38 - Tectonic Geomorphology of Kachchh - Part II

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NPTEL Video Course - Civil Engineering - NOC:Structural Geology

Subject Co-ordinator - Prof. Santanu Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Structural Elements and Measurements
Lecture 4 - How to measure strike-dip-pitch/rake-plunge
Lecture 5 - Stereographic Projection in Structural Geology
Lecture 6 - Concept of Strain and Deformation - Part I
Lecture 7 - Concept of Strain and Deformation - Part II
Lecture 8 - Strain Measurement
Lecture 9 - Stress - Part I
Lecture 10 - Stress - Part II
Lecture 11 - Basics of Rheology - Part I
Lecture 12 - Basics of Rheology - Part II
Lecture 13 - Basics of Rheology - Part III
Lecture 14 - Complex Rheology
Lecture 15 - Role of External Parameters
Lecture 16 - Crystal Defects and associated structures
Lecture 17 - Cataclastic Deformation
Lecture 18 - Intracrystalline Deformation
Lecture 19 - Diffusive Mass Transfer
Lecture 20 - Planar Fabrics (Foliation/ Cleavage/ Schistosity) - I
Lecture 21 - Planar Fabrics (Foliation/ Cleavage/ Schistosity) - II
Lecture 22 - Linear Fabrics (Lineation)
Lecture 23 - Folds and Folding
Lecture 24 - Folds and Folding
Lecture 25 - Folds and Folding
Lecture 26 - Folds and Folding
Lecture 27 - Porphyroblasts
Lecture 28 - Boudinage and Pinch-and-Swell Structures - I
Lecture 29 - Boudinage and Pinch-and-Swell Structures - II

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Lecture 30 - Stereonet Problem I
Lecture 31 - Stereonet Problem II
Lecture 32 - Stereonet Problem III
Lecture 33 - Stereonet Problem IV
Lecture 34 - Stereonet Problem V
Lecture 35 - Fractures and Joints - I
Lecture 36 - Fractures and Joints - II
Lecture 37 - Faults and Faulting - I
Lecture 38 - Stereonet Problem VI - Fold geometry from interlimb angle and fold axes
Lecture 39 - Stereonet Problem VII - Fold geometry from pitch of the limbs on another plane
Lecture 40 - Faults and Faulting - II
Lecture 41 - Ductile Shear Zones - I
Lecture 42 - Ductile Shear Zones - II
Lecture 43 - Basic of Litho-Structural Mapping
Lecture 44 - Paleostress analysis
Lecture 45 - Graphical Problem
Lecture 46 - Three point problem
Lecture 47 - Construction of Topographic Profile
Lecture 48 - Construction of Geological Cross-section

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NPTEL Video Course - Civil Engineering - NOC:Earthquake Geology: A tool for Seismic Hazard Assessment

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Earthquake Geology - Part I
Lecture 2 - Introduction to Earthquake Geology - Part II
Lecture 3 - Introduction to Earthquake Geology - Part III
Lecture 4 - Introduction to Earthquake Geology - Part IV
Lecture 5 - Fundamentals Related to Paleoseismology - Part I
Lecture 6 - Fundamentals Related to Paleoseismology - Part II
Lecture 7 - Fundamentals Related to Paleoseismology - Part III
Lecture 8 - Plate Tectonics - Part I
Lecture 9 - Plate Tectonics - Part II
Lecture 10 - Plate Tectonics - Part III
Lecture 11 - Plate tectonics - Part IV
Lecture 12 - Plate Tectonics - Part V
Lecture 13 - Seismic Zonation of India
Lecture 14 - Interior of the Earth - Part I
Lecture 15 - Interior of the Earth - Part II
Lecture 16 - Earthquake Forecasting and Prediction Model - Part I
Lecture 17 - Earthquake Forecasting and Prediction Model - Part II
Lecture 18 - Earthquake Forecasting and Prediction Model - Part III
Lecture 19 - Earthquake in Interplate and Intraplate Region
Lecture 20 - Earthquake Magnitude and Intensity Scale - Part I
Lecture 21 - Earthquake Magnitude and Intensity Scale - Part II
Lecture 22 - Fundamentals Related to Active Faults - Part I
Lecture 23 - Fundamentals Related to Active Faults - Part II
Lecture 24 - Fundamentals Related to Active Faults - Part III
Lecture 25 - Fundamentals Related to Active Faults - Part IV
Lecture 26 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part I
Lecture 27 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part II
Lecture 28 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part III
Lecture 29 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part IV

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Lecture 30 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part V
Lecture 31 - Extensional Tectonic Environments and Related Landforms - Part I
Lecture 32 - Extensional Tectonic Environments and Related Landforms - Part II
Lecture 33 - Extensional Tectonic Environments and Related Landforms - Part III
Lecture 34 - Extensional Tectonic Environments and Related Landforms - Part IV
Lecture 35 - Compressional Tectonic Environments and Related Landforms - Part I
Lecture 36 - Compressional Tectonic Environments and Related Landforms - Part II
Lecture 37 - Compressional Tectonic Environments and Related Landforms - Part III
Lecture 38 - Compressional Tectonic Environments and Related Landforms - Part IV
Lecture 39 - Compressional Tectonic Environments and Related Landforms - Part V
Lecture 40 - Compressional Tectonic Environments and Related Landforms - Part VI
Lecture 41 - Compressional Tectonic Environments and Related Landforms - Part VII
Lecture 42 - Strike-Slip Tectonic Environments and Related Landforms - Part I
Lecture 43 - Strike-Slip Tectonic Environments and Related Landforms - Part II
Lecture 44 - Strike-Slip Tectonic Environments and Related Landforms - Part III
Lecture 45 - Strike-Slip Tectonic Environments and Related Landforms - Part IV
Lecture 46 - Geomoprhic Markers for Fluvial Environment - Part I
Lecture 47 - Geomoprhic Markers for Fluvial Environment - Part II
Lecture 48 - Geomorphic Markers - Part III
Lecture 49 - Tectonic Geomorphology - Part I
Lecture 50 - Tectonic Geomorphology - Part II
Lecture 51 - Coastal Geomorphic Markers - Part I
Lecture 52 - Coastal Geomorphic Markers - Part II
Lecture 53 - Coastal Geomorphic Markers - Part III
Lecture 54 - Tsunami and Paleostsunami signatures Investigation - Part I
Lecture 55 - Tsunami and Paleostsunami signatures Investigation - Part II
Lecture 56 - Tsunami and Paleostsunami signatures Investigation - Part III
Lecture 57 - Field Documentary

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NPTEL Video Course - Civil Engineering - NOC:Development and Applications of Special Concretes

Subject Co-ordinator - Prof. Sudhir Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Some starting points
Lecture 2 - Concrete - A composite material
Lecture 3 - Basic properties (Fresh concrete)
Lecture 4 - Basic properties (Hardened concrete)
Lecture 5 - Fundamentals of proportioning concrete mixes
Lecture 6 - Proportioning of normal concrete mixes
Lecture 7 - Concrete mix proportions: Analysis and adjustments
Lecture 8 - Pores and porosity in concrete
Lecture 9 - Admixtures in concrete
Lecture 10 - Curing of Concrete
Lecture 11 - Cold weather Concreting
Lecture 12 - Hot Weather Concreting
Lecture 13 - Special Topics I - Importance of Right Methods and Specifications
Lecture 14 - Heat of Hydration of Cement and Thermal Stresses
Lecture 15 - Antiwashout Underwater Concrete
Lecture 16 - Concreting Underwater
Lecture 17 - Roller Compacted Concrete
Lecture 18 - Self Compacting Concrete - I
Lecture 19 - Self Compacting Concrete - II
Lecture 20 - Self Compacting Concrete - III
Lecture 21 - Special Topics - Rheology
Lecture 22 - Fibre-Reinforced Concrete - I
Lecture 23 - Fibre-Reinforced Concrete - II
Lecture 24 - Fibre-Reinforced Concrete - III
Lecture 25 - Mixing of Concrete
Lecture 26 - Shotcrete
Lecture 27 - High Strength Concrete
Lecture 28 - Using Polymers in Concrete
Lecture 29 - Improving the Quality of Cover Concrete

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Lecture 30 - Compaction of Concrete
Lecture 31 - Precast Concrete
Lecture 32 - Closing the Course

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NPTEL Video Course - Civil Engineering - NOC:Introductory Field Structural Geology

Subject Co-ordinator - Prof. Santanu Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17

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NPTEL Video Course - Civil Engineering - NOC:Earth Sciences for Civil Engineering (Hindi)

Subject Co-ordinator - Prof. Javed N Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geosciences in Civil Engineering - I
Lecture 2 - Introduction to Geosciences in Civil Engineering - II
Lecture 3 - Introduction to Geosciences in Civil Engineering - III
Lecture 4 - Plate Tectonics and Continental Drift - I
Lecture 5 - Plate Tectonics and Continental Drift - II
Lecture 6 - Plate Tectonics and Continental Drift - III
Lecture 7 - Plate Tectonics and Continental Drift - IV
Lecture 8 - Plate Tectonics and Continental Drift - V
Lecture 9 - Plate Tectonics and Continental Drift - VI
Lecture 10 - Plate Tectonics and Continental Drift - VII
Lecture 11 - Plate Tectonics and Continental Drift - VIII
Lecture 12 - Rock-Forming Minerals and their Properties - I
Lecture 13 - Rock-Forming Minerals and their Properties - II
Lecture 14 - Rock-Forming Minerals and their Properties - III
Lecture 15 - Igneous Rocks and their Properties - I
Lecture 16 - Igneous Rocks and their Properties - II
Lecture 17 - Igneous Rocks and their Properties - III
Lecture 18 - Sedimentary Rocks and their Properties - I
Lecture 19 - Sedimentary Rocks and their Properties - II
Lecture 20 - Sedimentary Rocks and their Properties - III
Lecture 21 - Metamorphic Rocks and their Properties - I
Lecture 22 - Metamorphic Rocks and their Properties - II
Lecture 23 - Seismology and Internal Structure of the earth - Part 1
Lecture 24 - Seismology and Internal Structure of the earth - Part 2
Lecture 25 - Seismology and Internal Structure of the earth - Part 3
Lecture 26 - Seismology and Internal Structure of the earth - Part 4
Lecture 27 - Seismology and Internal Structure of the earth - Part 5
Lecture 28 - Seismic Events and Sediments Amplification - I
Lecture 29 - Seismic Events and Sediments Amplification - II

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Lecture 30 - Geological Structures - I
Lecture 31 - Geological Structures - II
Lecture 32 - Geological Structures - III
Lecture 33 - Geological Structures - IV
Lecture 34 - Sterographic Projection of Geological Strata
Lecture 35 - Faults and its Characteristics
Lecture 36 - Active Faults and Associated Hazard - I
Lecture 37 - Active Faults and Associated Hazard - II
Lecture 38 - Active Faults and Associated Hazard - III
Lecture 39 - Rivers and Associated Landforms - I
Lecture 40 - Rivers and Associated Landforms - II
Lecture 41 - Shear Strength of Soil and its Implications towards Hazard
Lecture 42 - Landslides and Associated Hazard
Lecture 43 - Rock Mass Classification System
Lecture 44 - Dam and Tunnels

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NPTEL Video Course - Civil Engineering - NOC:Construction Management

Subject Co-ordinator - Prof. Sudhir Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 42

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NPTEL Video Course - Civil Engineering - NOC:Laboratory Practices in Earth Sciences: Landscape Mapping

Subject Co-ordinator - Prof. Javed N Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Introduction about the Course
Lecture 2 - Generation Introduction to the Remote Sensing - Part 1
Lecture 3 - Generation Introduction to the Remote Sensing - Part 2
Lecture 4 - Aerial Photogrammetry - Part 1
Lecture 5 - Aerial Photogrammetry - Part 2
Lecture 6 - Stereoscopy
Lecture 7 - Relief Displacement
Lecture 8 - Exploring the Remote Sensing Data and GIS Software - Part 1
Lecture 9 - Exploring the Remote Sensing Data and GIS Software - Part 2
Lecture 10 - Exploring the Remote Sensing Data and GIS Software - Part 3
Lecture 11 - Georeferencing of Toposheets on QGIS
Lecture 12 - Georeferencing of Remote Sensing Data on QGIS
Lecture 13 - Mosaicking, Merging and Generation of Shape Files on QGIS
Lecture 14 - Fluvial Systems and Associated Landforms - Part 1
Lecture 15 - Fluvial Systems and Associated Landforms - Part 2
Lecture 16 - Fluvial Systems and Associated Landforms - Part 3
Lecture 17 - Fluvial Systems and Associated Landforms - Part 4
Lecture 18 - Fluvial Systems and Associated Landforms - Part 5
Lecture 19 - Fluvial Systems and Associated Landforms - Part 6
Lecture 20 - Tectonic Geomorphology - Part 1
Lecture 21 - Tectonic Geomorphology - Part 2
Lecture 22 - Tectonic Geomorphology - Part 3
Lecture 23 - Tectonic Geomorphology - Part 4
Lecture 24 - Anaglyph and DEM Generation of Cartosat-1 data on ENVI
Lecture 25 - Tectono-Geomorphic Mapping on QGIS - Part 1
Lecture 26 - Tectono-Geomorphic Mapping on QGIS - Part 2
Lecture 27 - Tectono-Geomorphic Mapping on QGIS - Part 3
Lecture 28 - Tectono-Geomorphic Mapping on QGIS - Part 4
Lecture 29 - Total Station (TS) and Real Time Kinematics (RTK) and its Applications

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Lecture 30 - Field Demonstration of Real Time Kinematics (RTK) - Part 1
Lecture 31 - Field Demonstration of Real Time Kinematics (RTK) - Part 2
Lecture 32 - Field Demonstration of Total Station (TS) - Part 1
Lecture 33 - Field Demonstration of Total Station (TS) - Part 2
Lecture 34 - Ground Penetrating Radar (GPR) and its Applications - Part 1
Lecture 35 - Ground Penetrating Radar (GPR) and its Applications - Part 2
Lecture 36 - Field Demonstration of GPR - Part 1
Lecture 37 - Field Demonstration of GPR - Part 2
Lecture 38 - Optically Stimulated Luminescence (OSL) Dating technique and its Applications
Lecture 39 - Optically Stimulated Luminescence (OSL) Dating Lab

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NPTEL Video Course - Civil Engineering - NOC:Natural Hazards (Hindi)

Subject Co-ordinator - Prof. Javed N. Malik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Natural Hazards: Understanding the Basics
Lecture 2 - Introduction to Natural Hazards: Processes and Types
Lecture 3 - Human Impacts on Natural Hazards: Vulnerability and Risk
Lecture 4 - Human Impacts on Natural Hazards: Mitigation and Adaptation
Lecture 5 - Introduction to Earthquakes and Landslides: Causes and Impacts
Lecture 6 - Introduction to Cloudbursts and Floods: Mechanisms and Hazards
Lecture 7 - Understanding Tsunamis: Generation and Effects
Lecture 8 - Plate Tectonics: Fundamentals and Historical Development
Lecture 9 - Plate Tectonics: Processes and Features
Lecture 10 - Plate Tectonics: Implications for Natural Hazards
Lecture 11 - Earth as a Dynamo: Understanding Magnetic Polarity Reversals
Lecture 12 - Exploring Earth's Interior: Structure and Dynamics
Lecture 13 - Hot Spot Volcanism
Lecture 14 - Earth's Interior and Seismic Waves
Lecture 15 - Earthquakes: A Hazard
Lecture 16 - Earthquake Forecasting and Predictions
Lecture 17 - Locating Earthquakes Using Seismometers
Lecture 18 - Seismic Amplification Due to Sediment Properties
Lecture 19 - Intraplate Earthquakes
Lecture 20 - Earthquake Intensity and Magnitude Scales
Lecture 21 - Active Faults and Associated Hazards
Lecture 22 - Earthquakes and their Characteristics - Part 1
Lecture 23 - Earthquakes and their Characteristics - Part 2
Lecture 24 - Case Studies of Significant Earthquakes Around the World
Lecture 25 - Active Faults Along the Himalayan Frontal Belt
Lecture 26 - Active Faults of the Kangra Valley and Hajipur in the Himalayas
Lecture 27 - Ground Effects Due to Earthquakes
Lecture 28 - Ground Failure, Liquefaction, and Sand Blows
Lecture 29 - Ground Effefts and Microzonation in India

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Lecture 30 - Volcanic Hazards and Associated Risks
Lecture 31 - Introduction to Floods and Associated Hazards
Lecture 32 - River and Associated Landforms - Part 1
Lecture 33 - River and Associated Landforms - Part 2
Lecture 34 - River and Associated Landforms - Part 3
Lecture 35 - Drainage Basins and Drainage Patterns - Part 1
Lecture 36 - Drainage Basins and Drainage Patterns - Part 2
Lecture 37 - River Monitoring
Lecture 38 - Landslide and Mass Wasting - Part 1
Lecture 39 - Landslide and Mass Wasting - Part 2
Lecture 40 - Type of Landslide - Part 1
Lecture 41 - Type of Landslide - Part 2
Lecture 42 - Landslide Control and Stabilization Techniques
Lecture 43 - Earth's Energy Budget and Climate Impact
Lecture 44 - Greenhouse Gases, Global Warming, and Carbon Footprint
Lecture 45 - Quaternary Climate Change and the Milankovitch Cycles
Lecture 46 - Atmospheric Processes and Hazards - Part 1
Lecture 47 - Atmospheric Processes and Hazards - Part 2
Lecture 48 - Atmospheric Processes and Hazards - Part 3
Lecture 49 - Atmospheric Processes and Hazards - Part 4
Lecture 50 - Introduction to Tsunami - Part 1
Lecture 51 - Introduction to Tsunami - Part 2
Lecture 52 - Case Study of 1960 Chilean Earthquake Tsunami
Lecture 53 - Tsunami Monitoring and Warning System
Lecture 54 - Case Study of 2004 Sumatra-Andaman Earthquake Tsunami - Part 1
Lecture 55 - Case Study of 2004 Sumatra-Andaman Earthquake Tsunami - Part 2
Lecture 56 - Case Study of 2004 Sumatra-Andaman Earthquake Tsunami - Part 3
Lecture 57 - Case Study of 2004 Sumatra-Andaman Earthquake Tsunami - Part 4
Lecture 58 - Case Study of 2004 Sumatra-Andaman Earthquake Tsunami - Part 5
Lecture 59 - Case Study of 2011 Tohoku Earthquake Tsunami - Part 1
Lecture 60 - Palu Tsunami 2018 and Myanmar Earthquake 2025

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NPTEL Video Course - Civil Engineering - NOC:Environmental Fluid Mechanics

Subject Co-ordinator - Prof. Chunendra K Sahu

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Environmental Fluid Mechanics
Lecture 2 - Processes in Environmental Fluid Mechanics - 1
Lecture 3 - Processes in Environmental Fluid Mechanics - 2
Lecture 4 - Conservation Laws and Governing Equations in EFM
Lecture 5 - Hydrostatic and Boussinesq's Approximation
Lecture 6 - Buoyant Plumes
Lecture 7 - Plumes in Unstratified Medium - 1
Lecture 8 - Plumes in Unstratified Medium - 2
Lecture 9 - Plumes in Stratified Medium - 1
Lecture 10 - Plumes in Stratified Medium - 2
Lecture 11 - Plumes in Stratified Medium - 3
Lecture 12 - Plumes in Stratified Medium - 4
Lecture 13 - Numerical Solutions to the Continuous Release Plumes
Lecture 14 - Plumes with fixed buoyancy release (in unstratified medium) - 1
Lecture 15 - Plumes with fixed buoyancy release (in unstratified medium) - 2
Lecture 16 - Gravity Currents
Lecture 17 - Continuous Release Gravity Currents - 1
Lecture 18 - Continuous Release Gravity Currents - 2
Lecture 19 - Continuous Release Gravity Currents - 3
Lecture 20 - Fixed Volume Gravity Currents - 1
Lecture 21 - Fixed Volume Gravity Currents - 2
Lecture 22 - Waves
Lecture 23 - Surface Gravity Waves and Solutions
Lecture 24 - Surface Gravity Waves in Deep and Shallow Waters
Lecture 25 - Kelvin-Helmholtz Instability in Surface Gravity Waves - 1
Lecture 26 - Kelvin-Helmholtz Instability in Surface Gravity Waves - 2
Lecture 27 - Mixing of Fluids due to shear flow
Lecture 28 - Mixing of Fluids due to shear flow and mixing time
Lecture 29 - Rayleigh-Benard Instability (Thermal Instability)

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Lecture 30 - Natural Convection and Formation of Convective Layers
Lecture 31 - Height and Temperature of Convective Layers
Lecture 32 - Introduction to Vortex Flows
Lecture 33 - Forced Vortex Flows
Lecture 34 - Free Vortex Flows
Lecture 35 - Flow through Porous Media
Lecture 36 - Mixing Mechanisms in Porous Media
Lecture 37 - One-Dimensional Diffusion in Porous Media - 1
Lecture 38 - One-Dimensional Diffusion in Porous Media - 2
Lecture 39 - Dispersive Mixing in 1-D and 2-D Flows in Porous Medium
Lecture 40 - Plumes in Porous Media
Lecture 41 - Course Conclusion

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NPTEL Video Course - Civil Engineering - NOC:Transportation Network Analysis

Subject Co-ordinator - Prof. Hemant Gehlot

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course overview, and optimization formulations of fence and shortest path problems
Lecture 2 - Optimization formulations of shortest path and sensor problems and linear programming
Lecture 3 - Optimization formulations of knapsack, maximum coverage and travelling salesman problems
Lecture 4 - Alternative formulation of travelling salesman problem and introduction to complete matching prob
Lecture 5 - Optimization formulations of complete matching and scheduling problems
Lecture 6 - Continuation of scheduling problem; integer programming
Lecture 7 - Branch-and-bound algorithms
Lecture 8 - Analysis of algorithms and order of growth
Lecture 9 - Continuation of order of growth; polynomial-time algorithms
Lecture 10 - Continuation of polynomial-time algorithms; Dijkstra's algorithm
Lecture 11 - Minimum spanning tree, Kruskal's algorithm and Prim's algorithm
Lecture 12 - Approximation algorithm for travelling salesman problem and local search algorithms
Lecture 13 - Continuation of local search algorithms; vehicle routing problem with splitable demand
Lecture 14 - Continuation of vehicle routing problem with splittable demand; vehicle routing problem with uns
Lecture 15 - Continuation of vehicle routing problem with splittable demand; vehicle routing problem with uns
Lecture 16 - Continuation of genetic algorithms
Lecture 17 - Continuation of genetic algorithms
Lecture 18 - Introduction to traffic assignment (user equilibrium)
Lecture 19 - Continuous optimization (unconstrained)
Lecture 20 - Continuation of unconstrained optimization
Lecture 21 - Continuous optimization (constrained); first-order conditions for single variable problems
Lecture 22 - Continuation of first-order conditions for single variable problems; general first-order conditi
Lecture 23 - Continuation of general first-order conditions; case of nonnegativity and linear equality constr
Lecture 24 - Sufficiency conditions and user equilibrium as an optimization problem
Lecture 25 - Equivalency and uniqueness conditions
Lecture 26 - System Optimization
Lecture 27 - Continuation of system optimization; Braess's paradox
Lecture 28 - Price of anarchy and optimization algorithms (golden section method)
Lecture 29 - Bisection method and convex combinations method

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Lecture 30 - Continuation of convex combinations method
Lecture 31 - Solving UE using convex combinations method
Lecture 32 - Theory of discrete choice models; multinomial Logit model
Lecture 33 - Continuation of multinomial Logit model; multinomial Probit model
Lecture 34 - Satisfaction function and route choice
Lecture 35 - Continuation of route choice; Logit based loading
Lecture 36 - Continuation of Logit based loading; Probit based loading
Lecture 37 - Continuation of Probit based loading; stochastic user equilibrium
Lecture 38 - Continuation of stochastic user equilibrium
Lecture 39 - Method of successive averages
Lecture 40 - Continuation of method of successive averages; Two-link interactions in UE
Lecture 41 - Optimization formulation and first-order conditions for two-link interactions
Lecture 42 - Uniqueness and convex combinations method for two-link interactions
Lecture 43 - Generalization to multi-link interactions

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NPTEL Video Course - Civil Engineering - NOC:Stability of Structures

Subject Co-ordinator - Prof. Sudib Kumar Mishra

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Stability of Structures
Lecture 2 - Energy Approach for Structures with Two Degrees of Freedom
Lecture 3 - Stable Symmetric Bifurcation Behavior
Lecture 4 - Bifurcation Stability: Symmetric Unstable and Asymmetric Mixed Paths
Lecture 5 - Stability Behaviour of the von Mises Truss
Lecture 6 - Model Interaction and Bergan's Truss
Lecture 7 - Beam-column System and Response Amplification
Lecture 8 - Effect of Shear Deformation on Beam-Column System and Elastica
Lecture 9 - Torsional-Flexural Buckling Of Columns
Lecture 10 - Lateral Buckling Of Beam
Lecture 11 - Matrix Method For Stability Analysis
Lecture 12 - FEM Solved Example and Review Of Plate Bending
Lecture 13 - Buckling Plate
Lecture 14 - Shear Buckling of Plate
Lecture 15 - Post Critical Analysis of Plate
Lecture 16 - Eigen Buckling Analysis of Frame and Dynamic Stability
Lecture 17 - Column Under Follower Force
Lecture 18 - Column Under Pulsating Load
Lecture 19 - Aerodynamic Instability Analysis of Tacoma Bridge
Lecture 20 - Flutter Instability Analysis and Noise Stabilization of System
Lecture 21 - Lyapunov stability and Chaotic system
Lecture 22 - Stability analysis of shell
Lecture 23 - Donnell Equation for Cylindrical Shell
Lecture 24 - Buckling of Cylindrical Shell Under Various Loading Condition
Lecture 25 - Post Critical Analysis of Cylindrical Shell

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NPTEL Video Course - Civil Engineering - NOC:Earthquake Geology: A Tool for Seismic Hazard Assessment

Subject Co-ordinator - Prof. Javed N Malik

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Active Tectonics and Paleoseismology - Part 1
Lecture 2 - Introduction to Active Tectonics and Paleoseismology - Part 2
Lecture 3 - Introduction to Active Tectonics and Paleoseismology - Part 2
Lecture 4 - Introduction to Active Tectonics and Paleoseismology - Part 4
Lecture 5 - Introduction to Active Tectonics and Paleoseismology - Part 5
Lecture 6 - Significance and Scope of Paleoseismology - Part 1
Lecture 7 - Significance and Scope of Paleoseismology - Part 2
Lecture 8 - Plates Tectonics and Crustal Deformation
Lecture 9 - Continental Drift and Plate Tectonics
Lecture 10 - Volcanoes, Earthquakes and Plate Boundaries
Lecture 11 - Subduction Zones, Fault Systems, and Volcanic Activity
Lecture 12 - Oceanic Hotspots, Subduction, and Himalayan Collision
Lecture 13 - Plate Boundaries and the Himalayan Orogeny
Lecture 14 - Subduction Mechanisms and Earth's Magnetic Field
Lecture 15 - Crustal Deformation and Seismic Hazard in the Himalaya
Lecture 16 - Himalayan Earthquakes and Seismic Potential
Lecture 17 - Archaeoseismology and Ancient Earthquake Evidence
Lecture 18 - Archaeoseismological Classification and Structural Damage Patterns - Part 1
Lecture 19 - Archaeoseismological Classification and Structural Damage Patterns - Part 2
Lecture 20 - The 2001 Bhuj Earthquake and Archaeoseismic Evidence
Lecture 21 - Interior of the Earth and Seismic Waves
Lecture 22 - Seismic Waves and Rock Deformation
Lecture 23 - Earthquake Forecasting and Elastic Rebound Theory
Lecture 24 - Major Earthquakes in India and Earthquake Recurrence
Lecture 25 - Earthquake Classification, Seismic Shaking, and Structural Safety
Lecture 26 - Intraplate Earthquakes and Stable Continental Regions
Lecture 27 - Earthquake Hazards, Intensity, and Magnitude Scales
Lecture 28 - Seismic Energy, Ground Acceleration, and Shaking
Lecture 29 - Paleoseismic Deformation and Structural Features

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Lecture 30 - Field Techniques in Active Fault Mapping and Paleoseismology
Lecture 31 - Paleoseismic Field Evidence in the Himalaya
Lecture 32 - Active Fault Signatures in the Himalayan Foreland
Lecture 33 - Aerial Imaging and Active Fault Features
Lecture 34 - Mapping and Digitization of Active Fault Signatures - Part 1
Lecture 35 - Mapping and Digitization of Active Fault Signatures - Part 2
Lecture 36 - Geophysical Methods and Paleoseismic Investigations - Part 1
Lecture 37 - Geophysical Methods and Paleoseismic Investigations - Part 2
Lecture 38 - Identification of Paleoevents in Trenches
Lecture 39 - Geomorphic Markers of Active Faults in Fluvial Systems
Lecture 40 - River Systems as Geosystems and Delta Formation
Lecture 41 - Fluvial Landforms and their significance
Lecture 42 - River Terraces: Types and their Formation
Lecture 43 - Drainage Basins and Stream Patterns - Part 1
Lecture 44 - Drainage Basins and Stream Patterns - Part 2
Lecture 45 - Tsunami Waves and Coastal Landforms
Lecture 46 - Tectonic Landform Changes from the 2004 Sumatra Earthquake
Lecture 47 - Depositional Coastal Landforms and Coral Reefs
Lecture 48 - Extensional Environments and Associated Landforms - Part 1
Lecture 49 - Extensional Environments and Associated Landforms - Part 2
Lecture 50 - Extensional Environments and Associated Landforms - Part 3
Lecture 51 - Extensional Environments and Associated Landforms - Part 4
Lecture 52 - Stress Conditions in Compressional, Extensional, and Transverse Faults
Lecture 53 - Active, Capable, and Potentially Active Faults
Lecture 54 - Active Fault Topography in Compressional Environments
Lecture 55 - Himalayan Tectonic Framework and Mountain Building Processes
Lecture 56 - Fault Scarp Characteristics in Compressional Environments - Part 1
Lecture 57 - Fault Scarp Characteristics in Compressional Environments - Part 2
Lecture 58 - Colluvial Wedges and Their Characteristics
Lecture 59 - Fault Reactivation and Anticline Growth in the Himalaya
Lecture 60 - Strike-Slip Faults and Associated Landforms
Lecture 61 - Strike-Slip Faulting and Step-Overs
Lecture 62 - Strike-Slip Faulting and Associated Landforms in the Himalaya
Lecture 63 - The Kangra Valley Fault of the Himalaya and the Median Tectonic Line of Japan
Lecture 64 - Paleotsunamis and Landform Changes Associated with Tsunami Events - Part 1
Lecture 65 - Paleotsunamis and Landform Changes Associated with Tsunami Events - Part 2
Lecture 66 - Field Investigations of Past Earthquakes in the Frontal Kumaun Himalaya

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NPTEL Video Course - Civil Engineering - NOC:Nonlinear Structural Analysis: Theory and Applications

Subject Co-ordinator - Prof. Chinmoy Kolay

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Review of Linear Structural Analysis
Lecture 2 - Brief Review of Linear Structural Analysis (Continued...)
Lecture 3 - Stiffness Method of Structural Analysis
Lecture 4 - Beam-Column Element
Lecture 5 - Truss Element, Structural Stiffness Matrix, and Solution Procedure
Lecture 6 - Examples
Lecture 7 - Examples
Lecture 8 - Examples
Lecture 9 - Introduction of Nonlinear Structural Analysis
Lecture 10 - Sources of Nonlinearities and the Levels of Structural Analysis
Lecture 11 - Levels of Structural Analysis (Continued...)
Lecture 12 - Levels of Structural Analysis (Continued...)
Lecture 13 - Overview of Solution Strategies
Lecture 14 - Example
Lecture 15 - Elasto-Plastic Behaviour of Materials
Lecture 16 - Idealisation of Stress-Strain Curves
Lecture 17 - Hardening Rules
Lecture 18 - EPP, BP and Ramberg-Osgood Hysteretic Models
Lecture 19 - GiuffrÃ©-Menegotto-Pinto (GMP) Hysteretic Model
Lecture 20 - Bouc-Wen Hysteretic Model
Lecture 21 - Hysteretic Models for Concrete
Lecture 22 - Flexural Yielding of Structural Steel Sections
Lecture 23 - Flexural Yielding of Structural Steel Sections (Continued...)
Lecture 24 - Moment-Curvature Analysis of Steel Sections
Lecture 25 - P-M Interaction Curves for Steel Sections
Lecture 26 - P-M Interaction Curves for Steel Sections (Continued...)
Lecture 27 - Flexural Behaviour of Reinforced Concrete Sections
Lecture 28 - Moment-Curvature Analysis of RC Sections
Lecture 29 - P-M Interaction and Behaviour of RC Sections Under Cyclic Loading

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Lecture 30 - Brief Review of Continuum Mechanics
Lecture 31 - Brief Review of Continuum Mechanics (Continued...)
Lecture 32 - Brief Review of Continuum Mechanics (Continued...)
Lecture 33 - Yield Criteria
Lecture 34 - Yield Criteria (Continued...)
Lecture 35 - Key Concepts of Plasticity Theory
Lecture 36 - Examples on EPP Material Behaviour
Lecture 37 - Strain Hardening
Lecture 38 - Concept of Stress-Resultant Plasticity
Lecture 39 - Concept of Stress-Resultant Plasticity (Continued...)
Lecture 40 - Concentrated Plasticity Approach for Modelling Lateral Load Resisting Systems (LLRS)
Lecture 41 - Concentrated Plasticity Approach for Modelling Lateral Load Resisting Systems (Continued...)
Lecture 42 - Distributed Plasticity Approach and Stiffness-Based Formulation
Lecture 43 - Flexibility-Based Formulation
Lecture 44 - Numerical Integration
Lecture 45 - Examples
Lecture 46 - Examples
Lecture 47 - Strain Softening Response and Plastic Hinge Integration Methods for FBEs
Lecture 48 - Geometric Nonlinear Analysis
Lecture 49 - Geometric Stiffness Matrices and Second-Order Analysis
Lecture 50 - P-(Big) Î vs P-(Small) Î´ Contributions
Lecture 51 - Lateral Load Behaviour of Frames and Stability
Lecture 52 - Large-Displacement Analysis
Lecture 53 - Nonlinear Static Analysis
Lecture 54 - Displacement-Controlled Analysis
Lecture 55 - Displacement-Controlled Analysis (Continued...)
Lecture 56 - Constant Arc Length Methods
Lecture 57 - Some Fundamentals of Structural Dynamics
Lecture 58 - Some Fundamentals of Structural Dynamics (Continued...)
Lecture 59 - Direct Integration of Equations of Motion
Lecture 60 - Nonlinear Dynamic Analysis
Lecture 61 - Application of Nonlinear Structural Analysis: Evaluating Seismic Resiliency of Buildings with Su
Lecture 62 - Nonlinear Structural Analysis: Multi-Physics - Structural Simulation with Supplemental Damper Sy

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NPTEL Video Course - Civil Engineering - Advanced Foundation Engineering

Subject Co-ordinator - Dr. Kousik Deb

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Soil Exploration
Lecture 3 - Soil Exploration - Penetration Tests
Lecture 4 - Soil Exploration - Geophysical Exploration
Lecture 5 - Shallow Foundation - Introduction
Lecture 6 - Shallow Foundation
Lecture 7 - Shallow Foundation
Lecture 8 - Shallow Foundation
Lecture 9 - Shallow Foundation
Lecture 10 - Shallow Foundation
Lecture 11 - Shallow Foundation - Settlement Calculation - I
Lecture 12 - Shallow Foundation - Settlement Calculation - II
Lecture 13 - Shallow Foundation - Settlement Calculation - III
Lecture 14 - Design of Shallow Foundation
Lecture 15 - Design of Raft Foundation
Lecture 16 - Deep Foundation - Introduction
Lecture 17 - Pile Foundation - Load Carrying Capacity - I
Lecture 18 - Pile Foundation - Load Carrying Capacity - II
Lecture 19 - Pile Foundation - Load Carrying Capacity - III and Settlement Calculation
Lecture 20 - Tension and Lateral Loaded Piles
Lecture 21 - Well Foundation
Lecture 22 - Well Foundation (Continued...)
Lecture 23 - Design of Retaining Wall
Lecture 24 - Design of Retaining Wall (Continued...)
Lecture 25 - Design of Sheet Piles
Lecture 26 - Design of Sheet Piles (Continued...)
Lecture 27 - Design of Sheet Piles (Continued...)
Lecture 28 - Design of Sheet Piles (Continued...)
Lecture 29 - Reinforced Earth

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Lecture 30 - Reinforced Retaining Wall
Lecture 31 - Seismic Design of Retaining Wall
Lecture 32 - Seismic Design of Retaining Walls (Continued...)
Lecture 33 - Soil - Foundation Interaction
Lecture 34 - Soil - Foundation Interaction (Continued...)
Lecture 35 - Soil - Foundation Interaction (Continued...)
Lecture 36 - Soil - Foundation Interaction (Continued...)
Lecture 37 - Soil - Foundation Interaction (Continued...)
Lecture 38 - Soil - Foundation Interaction (Continued...)
Lecture 39 - Soil - Foundation Interaction (Continued...)
Lecture 40 - Soil - Foundation Interaction (Continued...)

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NPTEL Video Course - Civil Engineering - Ground Water Hydrology

Subject Co-ordinator - Dr. Anirban Dhar, Dr. V.R. Desaai

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Ground Water in Hydrologic Cycle (Continued...), Ground Water Budget, Ground Water Level Fluctuat
Lecture 3 - Ground water Level Fluctuations and Environmental Influence (Continued...) Literature/Data/Interr
Lecture 4 - Ground water Level Fluctuations and Environmental Influence (Continued...) Literature/Data/Interr
Lecture 5 - Occurrence and Movement of Ground Water
Lecture 6 - Zones of Aeration and Saturation; Aquifers and their characteristics/classification
Lecture 7 - Aquifer Classification (Continued...), Ground water Basins and Springs; Dorcy's Law; Permeability
Lecture 8 - Determination pf Permeability
Lecture 9 - Ground Water (GW) flowrates and flow directions; general flow equations through porous media
Lecture 10 - General Flow Equations Through Porous Media (Continued...), Dupuit's Assumptions
Lecture 11 - 1-D Unconfined Ground water Flows; Steady Flow into Wells
Lecture 12 - Steady Flow into Wells (Continued...); Unsteady Flow into Wells
Lecture 13 - Unsteady Flow into Wells (Continued...)
Lecture 14 - Unsteady Radial Flow in Confined and Unconfined Aquifers
Lecture 15 - Unsteady Radial Flow in Leaky Aquifers (Continued...); Well Flow Near Aquifer Boundaries
Lecture 16 - Well Flow for Special Conditions; Partially Penetrating Wells; Horizontal Wells and Collector We
Lecture 17 - Well Completion;Well Development; Well Protection; Well Rehabilitation; Well testing for Yields
Lecture 18 - Well Protection/Rehabilitation/Testing for yield (Continued...); Artificial Ground Water Recharg
Lecture 19 - Concept and methods of Artificial Ground Water Recharge (Continued...); Recharge Mounds and Indu
Lecture 20 - Induced Recharge (Continued...); Wastewater recharge for reuse; Water spreading
Lecture 21 - Pollution and Quality Analysis of Ground Water
Lecture 22 - Ground Water Pollution from Industrial, Agricultural and Miscellaneous Sources (Continued...)
Lecture 23 - Ground Water Pollution from Miscellaneous Sources (Continued...), Attenuation and Underground Di
Lecture 24 - Potential Evaluation of Ground water Pollution; Physical/Chemical/Biological analysis of Ground
Lecture 25 - Ground water salinity and samples ;Graphical representations of ground water quality
Lecture 26 - Graphical representations of ground water quality (Continued...), SURFACE/SUB-SURFACE INVESTIGAT
Lecture 27 - Surface Investigation of ground water (Continued...)
Lecture 28 - Seismic refraction/gravity/magnetic methods (Continued...);Sub-surface investigation of ground w
Lecture 29 - Sub-surface investigation of ground water (Continued...)

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Lecture 30 - Radiation method of logging (Continued...); Temperature/caliper/fluid conductivity/fluid velocit
Lecture 31 - Saline Water Intrusion in Aquifers
Lecture 32 - Saline Water Intrusion in Aquifers
Lecture 33 - Saline Water Intrusion in Aquifers
Lecture 34 - Saline Water Intrusion in Aquifers
Lecture 35 - Modeling and Management of Ground Water
Lecture 36 - Modeling and Management of Ground Water
Lecture 37 - Modeling and Management of Ground Water
Lecture 38 - Modeling and Management of Ground Water
Lecture 39 - Modeling and Management of Ground Water
Lecture 40 - Modeling and Management of Ground Water

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NPTEL Video Course - Civil Engineering - Numerical Methods in Civil Engineering

Subject Co-ordinator - Dr. A. Deb

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Numerical Methods
Lecture 2 - Error Analysis
Lecture 3 - Introduction to Linear Systems - I
Lecture 4 - Linear Systems - II
Lecture 5 - Linear Systems - III
Lecture 6 - Linear Systems - Error Bounds
Lecture 7 - Error Bounds and Iterative Methods for Solving Linear Systems
Lecture 8 - Iterative Methods for Solving Linear Systems - I
Lecture 9 - Iterative Methods - II
Lecture 10 - Iterative Methods - III
Lecture 11 - Iterative Methods for Eigen Value Extraction
Lecture 12 - Solving Nonlinear Equations - I
Lecture 13 - Solving Nonlinear Equations - II
Lecture 14 - Solving Multi Dimensional Nonlinear Equations - I
Lecture 15 - Solving Multi Dimensional Nonlinear Equations - II
Lecture 16 - ARC Length and Gradient Based Methods
Lecture 17 - Gradient Based Methods
Lecture 18 - Conjugate Gradient Method - I
Lecture 19 - Conjugate Gradient Method - II
Lecture 20 - Nonlinear Conjugate Gradient and Introduction to PDEs
Lecture 21 - Eigenfunction Solutions for the Wave Equation
Lecture 22 - Analytical Methods for Solving the Wave Equation
Lecture 23 - Analytical Methods for Hyperbolic and Parabolic PDEs
Lecture 24 - Analytical Methods for Parabolic and Elliptic PDEs
Lecture 25 - Analytical Methods for Elliptic PDE\'s
Lecture 26 - Series Solutions for Elliptic PDE\'s and Introduction to Differential Operators
Lecture 27 - Differential Operators - I
Lecture 28 - Differential Operators - II
Lecture 29 - Differential Operators - III

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Lecture 30 - Interpolation
Lecture 31 - Polynomial Fitting
Lecture 32 - Orthogonal Polynomials - I
Lecture 33 - Orthogonal Polynomials - II
Lecture 34 - Orthogonal Polynomials - III
Lecture 35 - Spline Functions
Lecture 36 - Orthogonal Basis Functions for Solving PDE\'s - I
Lecture 37 - Orthogonal Basis Functions for Solving PDE\'s - II
Lecture 38 - Integral Equations - I
Lecture 39 - Integral Equations - II
Lecture 40 - Integral Equations - III

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NPTEL Video Course - Civil Engineering - Probability Methods in Civil Engineering

Subject Co-ordinator - Dr. Rajib Maity

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Role of Probability in Civil Engineering
Lecture 2 - Random Events and Probability Concept
Lecture 3 - Set Theory and Set Operations
Lecture 4 - Axioms of Probability
Lecture 5 - Probability of Events
Lecture 6 - Concept and Defination of Random Variables
Lecture 7 - Probability Distribution of Random Variables
Lecture 8 - CDF and Descriptors of Random Variables
Lecture 9 - Further Descriptors of Random Variables
Lecture 10 - Discrete Probability Distribution
Lecture 11 - Probability Distribution of Continuous RVs
Lecture 12 - Probability Distribution of Continuous RVs (Continued...1)
Lecture 13 - Probability Distribution of Continuous RVs (Continued...2)
Lecture 14 - Functions of Single Random Variables
Lecture 15 - Functions of Random Variables - Different Methods
Lecture 16 - Functions of Random Variables - Different Methods (Continued...)
Lecture 17 - Expectation and Moments of Functions of RV
Lecture 18 - Expectation and Moments of Functions of RV (Continued...)
Lecture 19 - Joint Probability Distribution
Lecture 20 - Marginal Probability Distribution
Lecture 21 - Conditional Probability Distribution
Lecture 22 - Conditional Probability Distribution (Continued...)
Lecture 23 - Properties of Multiple Random Variables
Lecture 24 - Properties of Multiple Random Variables (Continued...)
Lecture 25 - MGF of Multivariate RVs and Multivariate Probability Distributions
Lecture 26 - Multivariate Distribution and Functions of Multiple Random Variables
Lecture 27 - Functions of Multiple Random Variables (Continued...1)
Lecture 28 - Functions of Multiple Random Variables (Continued...2)
Lecture 29 - Introduction to Copulas

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Lecture 30 - Introduction to Copulas (Continued...)
Lecture 31 - Probability Models using Normal Distribution
Lecture 32 - Probability Models using Log Normal and Exponential Distribution
Lecture 33 - Probability Models using Gamma and Extreme Value Distribution
Lecture 34 - Probability Models using Discrete Probability Distributions
Lecture 35 - Sampling Distribution and Parameter Estimation
Lecture 36 - Sampling Distribution and Parameter Estimation (Continued...)
Lecture 37 - Hypothesis Testing
Lecture 38 - Goodness - of - fit tests
Lecture 39 - Regression Analyses and Correlation
Lecture 40 - Regression Analyses and Correlation (Continued...)

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NPTEL Video Course - Civil Engineering - Design of Reinforced Concrete Structures

Subject Co-ordinator - Prof. N. Dhang

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Materials
Lecture 3 - Different Methods of Design of Reinforced Concrete Structures
Lecture 4 - Working Stress Method
Lecture 5 - Working Stress Method (Continued...)
Lecture 6 - Limit State of Collapse Flexure - I
Lecture 7 - Limit State of Collapse Flexure - II
Lecture 8 - Design of Doubly Reinforced Beam Flexure - I
Lecture 9 - Design of Doubly Reinforced Beam Flexure - II
Lecture 10 - Design of Doubly Reinforced Beam Flexure
Lecture 11 - Limit State of Collapse Shear
Lecture 12 - Design for Shear
Lecture 13 - Design for Shear (Continued...)
Lecture 14 - Design of Slabs - Part I
Lecture 15 - Design of Slabs - Part II
Lecture 16 - Design of Slabs - Part III
Lecture 17 - Design of Slabs - Part IV
Lecture 18 - Design of Slabs - Part V
Lecture 19 - Design of Columns - Part I
Lecture 20 - Design of Columns - Part II
Lecture 21 - Design of Columns - Part III
Lecture 22 - Design of Columns - Part IV
Lecture 23 - Design of Columns - Part V
Lecture 24 - Design of Footings - Part I
Lecture 25 - Design of Footings - Part II
Lecture 26 - Design of Staircases
Lecture 27 - Design for Torsion - Part I
Lecture 28 - Design for Torsion - Part II
Lecture 29 - Design of RC Slender Columns

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Lecture 30 - Deflection of RC Beams

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NPTEL Video Course - Civil Engineering - Engineering Geology

Subject Co-ordinator - Dr. Debasis Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Geology
Lecture 2 - Geologic Structures
Lecture 3 - Geologic Maps and Stratigraphic Sections
Lecture 4 - Remote Sensing in Engineering Geology
Lecture 5 - Physical Properties of Minerals
Lecture 6 - Crystallography and Optical Properties
Lecture 7 - Chemical Characteristics of Minerals
Lecture 8 - Origin And Types of Rocks
Lecture 9 - Origin And Types of Soils
Lecture 10 - Igneous Rocks
Lecture 11 - Sedimentary Rocks
Lecture 12 - Metamorphic Rocks
Lecture 13 - Weathering
Lecture 14 - Sediment Transport and Deposition
Lecture 15 - Introduction to Subsurface Exploration
Lecture 16 - Introduction to Subsurface Exploration
Lecture 17 - Sampling and Non - Intrusive Methods
Lecture 18 - Index Properties and Classification of Soils
Lecture 19 - Index Properties of Rock and Rock Mass
Lecture 20 - Stress-Strain Behavior of Soil and Rock - I
Lecture 21 - Stress-Strain Behavior of Soil and Rock - II
Lecture 22 - In-situ State of Stress
Lecture 23 - Geologic Considerations in Tunneling
Lecture 24 - Geologic Considerations in Dam Construction
Lecture 25 - Groundwater - Preliminaries
Lecture 26 - Groundwater Flow - I
Lecture 27 - Groundwater Flow - II
Lecture 28 - Groundwater Related Engineering Issues
Lecture 29 - Groundwater Over Utilization

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Lecture 30 - Plate Tectonics
Lecture 31 - Plate Tectonics - 2 and Earthquake
Lecture 32 - Earthquake Hazard Assessment
Lecture 33 - Geologic Hazards - Seismicity and Volcanism
Lecture 34 - Geologic Hazards - Shoreline Processes
Lecture 35 - Geologic Hazards - Shoreline Processes
Lecture 36 - Geologic Hazards - Landslide Hazards - Zoning
Lecture 37 - Geologic Hazards Subsidence , Collapsible Soils
Lecture 38 - Preparation of Geologic Sections
Lecture 39 - Index testing of soil & rocks
Lecture 40 - Identification of minerals and rock samples

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NPTEL Video Course - Civil Engineering - Introduction to Transportation Engineering

Subject Co-ordinator - Dr. K.S. Reddy, Dr. Bhargab Maitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Transportation Engineering
Lecture 2 - Elements of Concern and Components
Lecture 3 - Traffic Stream Characteristics
Lecture 4 - Traffic Studies
Lecture 5 - Traffic Studies
Lecture 6 - Highway Capacity and Level of Service
Lecture 7 - Intersection Control and Signalization
Lecture 8 - Functional Classification, Design Elements
Lecture 9 - Cross Section Elements
Lecture 10 - Stopping Sight Distance And Decision Sight
Lecture 11 - Overtaking, Intermediate and Headlight Sight
Lecture 12 - Intersection Sight Distance - I
Lecture 13 - Intersection Sight Distance - II
Lecture 14 - Horizontal Alignment - I
Lecture 15 - Horizontal Alignment - II
Lecture 16 - Horizontal Alignment - III
Lecture 17 - Horizontal Alignment - IV
Lecture 18 - Horizontal Alignment - V
Lecture 19 - Horizontal Alignment - VI
Lecture 20 - Vertical Alignment - I
Lecture 21 - Vertical Alignment - II
Lecture 22 - Vertical Alignment - III
Lecture 23 - Highway Alignment
Lecture 24 - Principles of Pavement Design
Lecture 25 - Traffic Loading - I
Lecture 26 - Traffic Loading - II
Lecture 27 - Pavement Materials - I
Lecture 28 - Pavement Materials - II
Lecture 29 - Pavement Materials - III

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Lecture 30 - Pavement Materials - IV
Lecture 31 - Pavement Materials - V
Lecture 32 - Design of Bituminous Mixes - I
Lecture 33 - Design of Bituminous Mixes - II
Lecture 34 - Analysis of Flexible Pavements
Lecture 35 - Analysis of Concrete Pavements
Lecture 36 - Flexible Pavement Design Indian Roads Congress
Lecture 37 - Flexible Pavement Design AASHTO Method - 1993
Lecture 38 - Concrete Pavement Design Indian Congress Method
Lecture 39 - Concrete Pavement Design PCA and AASHTO Methods
Lecture 40 - Pavement Evaluation and Rehabilitation
Lecture 41 - Overlay Design - IRC Method

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NPTEL Video Course - Civil Engineering - Strength of Materials

Subject Co-ordinator - Prof. S.K. Bhattacharyya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Strength of Materials
Lecture 2 - Analysis of Stress - I
Lecture 3 - Analysis of Stress - II
Lecture 4 - Analysis of Stress - III
Lecture 5 - Analysis of Stress - IV
Lecture 6 - Analysis of Stress - V
Lecture 7 - Analysis of Strain - I
Lecture 8 - Analysis of Strain - II
Lecture 9 - Analysis of Strain - III
Lecture 10 - Analysis of Strain - IV
Lecture 11 - Analysis of Strain - V
Lecture 12 - Analysis of Strain - VI
Lecture 13 - Analysis of Strain - VII
Lecture 14 - Analysis of Strain - VIII
Lecture 15 - Application of Stress/Strain
Lecture 16 - Application of Stress / Strain
Lecture 17 - Application of Stress / Strain
Lecture 18 - Torsion - I
Lecture 19 - Torsion - II
Lecture 20 - Torsion - III
Lecture 21 - Torsion - IV
Lecture 22 - Bending of Beams - I
Lecture 23 - Bending of Beams - II
Lecture 24 - Bending of Beams - III
Lecture 25 - Bending of Beams - IV
Lecture 26 - Stresses in Beams - I
Lecture 27 - Stresses in Beams - II
Lecture 28 - Stresses in Beams - III
Lecture 29 - Stresses in Beams - IV

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Lecture 30 - Deflection of Beams - I
Lecture 31 - Deflection of Beams - II
Lecture 32 - Deflection of Beams - III
Lecture 33 - Deflection of Beams - IV
Lecture 34 - Combined Stresses - I
Lecture 35 - Combined Stresses - II
Lecture 36 - Combined Stresses - III
Lecture 37 - Stability of Columns - I
Lecture 38 - Stability of Columns - II
Lecture 39 - Springs - I
Lecture 40 - Springs - II

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NPTEL Video Course - Civil Engineering - NOC:Probability Methods in Civil Engineering

Subject Co-ordinator - Dr. Rajib Maity

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Random Events and Probability Concept
Lecture 2 - Set Theory and Set Operations
Lecture 3 - Axioms of Probability
Lecture 4 - Probability of Events
Lecture 5 - Concept and definition of Random variables
Lecture 6 - Probability distribution of random variables
Lecture 7 - CDF and Descriptors of Random Variables
Lecture 8 - Further Descriptors of Random Variables
Lecture 9 - Discrete Probability Distribution
Lecture 10 - Probability Distribution of Continuous RVs
Lecture 11 - Probability Distribution of Continuous RVs (Continued.....1)
Lecture 12 - Probability Distribution of Continuous RVs (Continued.....2)
Lecture 13 - Functions of Single Random Variables
Lecture 14 - Functions of Different Variables - Different Methods
Lecture 15 - Functions of Random Variables
Lecture 16 - Probability Models using Normal Distribution
Lecture 17 - Probability Models using Log Normal and Exponential Distribution
Lecture 18 - Probability Models using Gamma and Extreme Value Distribution
Lecture 19 - Probability Models using Discrete Probability Distributions
Lecture 20 - Sampling Distribution and Parameter Estimation
Lecture 21 - Sampling Distribution and Parameter Estimation (Continued...)
Lecture 22 - Hypothesis Testing
Lecture 23 - Goodness of Fit-Tests
Lecture 24 - Regression Analyses and Correlation
Lecture 25 - Regression Analyses and Correlation (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Visual Semiotics for Visual Communication

Subject Co-ordinator - Prof. Mainak Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Visual Semantics for Visual Communication
Lecture 2 - Visual Semantics for Visual Communication (Continued...)
Lecture 3 - Visual Semantics for Visual Communication (Continued...)
Lecture 4 - Visual Semantics for Visual Communication (Continued...)
Lecture 5 - Introduction to Millimeter-Wave Technology (Continued...)
Lecture 6 - Visual Semantics for Visual Communication (Continued...)
Lecture 7 - Visual Semantics for Visual Communication (Continued...)
Lecture 8 - Visual Semantics for Visual Communication (Continued...)
Lecture 9 - Introduction to Millimeter-Wave Technology
Lecture 10 - Visual Semantics for Visual Communication (Continued...)
Lecture 11 - Visual Semantics for Visual Communication (Continued...)
Lecture 12 - Visual Semantics for Visual Communication (Continued...)
Lecture 13 - Conceptual Model and Affordances
Lecture 14 - Visual Semantics for Visual Communication (Continued...)
Lecture 15 - Visual Semantics for Visual Communication (Continued...)
Lecture 16 - Visual Semantics for Visual Communication (Continued...)
Lecture 17 - Visual Semantics for Visual Communication (Continued...)
Lecture 18 - Visual Semantics for Visual Communication (Continued...)
Lecture 19 - Visual Semantics for Visual Communication (Continued...)
Lecture 20 - Visual Semantics for Visual Communication (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Life Cycle Assessment

Subject Co-ordinator - Prof. Brajesh Kumar Dubey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Life Cycle Assessment - Introduction
Lecture 2 - Life Cycle Assessment - Introduction
Lecture 3 - LCA and Sustainability
Lecture 4 - LCA and Environmental Systems
Lecture 5 - LCA and Water, Food and Energy
Lecture 6 - RISK Assement and LCA Frameworks
Lecture 7 - RISK Assessment - Toxicology
Lecture 8 - RISK Assessment Methods
Lecture 9 - RISK Assessment Methods (Continued...)
Lecture 10 - Environmental Risk Assessment
Lecture 11 - Environmental Data Collection and LCA Methodology
Lecture 12 - Environmental Data Collection and LCA Methodology (Continued...)
Lecture 13 - Environmental Data Collection and LCA Methodology (Continued...)
Lecture 14 - Environmental Data Collection and LCA Methodology (Continued...)
Lecture 15 - LCA Methodology
Lecture 16 - LCA - A Detailed Methodology
Lecture 17 - LCA - A Detailed Methodology (Continued...)
Lecture 18 - LCA Benefits and Drawbacks
Lecture 19 - History of LCA
Lecture 20 - The ISO Framework
Lecture 21 - Unit Process, Data and LCI Databases
Lecture 22 - Unit Process and System Boundary (Continued...)
Lecture 23 - Inventory Data and LCIA
Lecture 24 - LCIA
Lecture 25 - LCA Interpretation
Lecture 26 - ISO 14040
Lecture 27 - Key Points of a Good LCA and Example LCA
Lecture 28 - Chemical Release in Environment
Lecture 29 - Green Sustainable Materials

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Lecture 30 - Green Sustainable Materials (Continued...)
Lecture 31 - Design for Sustainability
Lecture 32 - Design for Sustainability (Continued...)
Lecture 33 - Design for Sustainability (Continued...)
Lecture 34 - Sustainable Engineering Design Principles
Lecture 35 - Sustainable Engineering Design Principles (Continued...)
Lecture 36 - Summary and Case Studies
Lecture 37 - Summary and Case Studies (Continued...)
Lecture 38 - Summary and Case Studies (Continued...)
Lecture 39 - Tutorial I
Lecture 40 - Tutorial II

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NPTEL Video Course - Civil Engineering - NOC:Integrated Waste Management for a Smart City

Subject Co-ordinator - Prof. Brajesh Kumar Dubey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Introduction (Continued...)
Lecture 7 - Municipal Solid Waste Chracteristics and Quantities
Lecture 8 - Municipal Solid Waste Chracteristics and Quantities (Continued...)
Lecture 9 - Municipal Solid Waste Chracteristics and Quantities (Continued...)
Lecture 10 - Municipal Solid Waste Chracteristics and Quantities (Continued...)
Lecture 11 - MSW Characteristics - Thermal Properties and Chemical Composition
Lecture 12 - Chemical Analysis Procedure
Lecture 13 - Chemical Analysis Procedure (Continued...)
Lecture 14 - Working with Data and Statistical Methods
Lecture 15 - Waste Management Rules 2016
Lecture 16 - Waste Management Rules 2016 (Continued...)
Lecture 17 - Swachh Bharat Mission and Smart Cities Program Overview
Lecture 18 - Storage of Solid Waste
Lecture 19 - MSW Collection System
Lecture 20 - MSW Collection System (Continued...)
Lecture 21 - Waste Collection and Transport
Lecture 22 - Waste Collection and Transport (Continued...)
Lecture 23 - Waste Collection and Transport (Continued...)
Lecture 24 - Waste Collection and Transport (Continued...)
Lecture 25 - Waste Collection and Transport (Continued...)
Lecture 26 - Collection System
Lecture 27 - Collection System (Continued...)
Lecture 28 - Review of MSW Management in Proposed Smart Cities
Lecture 29 - Biological Treatment of Waste

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Lecture 30 - Biological Treatment of Waste (Continued...)
Lecture 31 - Biological Treatment of Waste (Continued...)
Lecture 32 - Biological Treatment of Waste (Continued...)
Lecture 33 - Biological Treatment of Waste (Continued...)
Lecture 34 - Thermal Treatment
Lecture 35 - Thermal Treatment (Continued...)
Lecture 36 - Thermal Treatment (Continued...)
Lecture 37 - Thermal Treatment (Continued...)
Lecture 38 - Thermal Treatment (Continued...)
Lecture 39 - Thermal Treatment (Continued...)
Lecture 40 - Landfill Disposal
Lecture 41 - Landfill Disposal (Continued...)
Lecture 42 - Landfill Disposal (Continued...)
Lecture 43 - Landfill Disposal (Continued...)
Lecture 44 - Landfill Disposal (Continued...)
Lecture 45 - Landfill Disposal (Continued...)
Lecture 46 - Landfill Disposal (Continued...)
Lecture 47 - Landfill Disposal (Continued...)
Lecture 48 - Construction and Demolition Waste Management
Lecture 49 - Construction and Demolition Waste Management (Continued...)
Lecture 50 - Construction and Demolition Waste Management (Continued...)
Lecture 51 - Construction and Demolition Waste Management (Continued...)
Lecture 52 - Construction and Demolition Waste Management (Continued...)
Lecture 53 - E-Waste Management
Lecture 54 - E-Waste Management (Continued...)
Lecture 55 - E-Waste Management (Continued...)
Lecture 56 - E-Waste Management (Continued...)
Lecture 57 - E-Waste Management (Continued...)
Lecture 58 - E-Waste Management (Continued...)
Lecture 59 - E-Waste Management (Continued...)
Lecture 60 - E-Waste Management (Continued...)
Lecture 61 - Tutorial - I
Lecture 62 - Tutorial - II

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NPTEL Video Course - Civil Engineering - NOC:Computational Hydraulics

Subject Co-ordinator - Dr. Anirban Dhar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computational Hydraulics
Lecture 2 - Problem Definition and Governing Equations (GE)
Lecture 3 - Classification of Problems based on Initial Condition (IC) and/or Boundary Conditions (BC)
Lecture 4 - Classification of Differential Equations
Lecture 5 - Numerical Methods
Lecture 6 - Finite Difference Approximation
Lecture 7 - Ordinary Differential Equation
Lecture 8 - Ordinary Differential Equation
Lecture 9 - Partial Differential Equation
Lecture 10 - Partial Differential Equation
Lecture 11 - Partial Differential Equation
Lecture 12 - Partial Differential Equation
Lecture 13 - Finite Volume Method - Overview
Lecture 14 - Finite Volume Method - BVP
Lecture 15 - Finite Volume Method - IBVP
Lecture 16 - Finite Volume Method - Conservation Law
Lecture 17 - Upwind Approach
Lecture 18 - Godunov Approach
Lecture 19
Lecture 20
Lecture 21 - Mesh-Tree Method
Lecture 22 - Mesh-Free Method
Lecture 23 - Mesh-Free Method
Lecture 24 - Numerical Method
Lecture 25 - Algebraic Equation
Lecture 26 - Algebraic Equation
Lecture 27 - Algebraic Equation
Lecture 28 - Algebraic Equation
Lecture 29 - Algebraic Equation

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Lecture 30 - Algebraic Equation
Lecture 31 - One-Dimensional Flow
Lecture 32 - Steady Two-Dimensional Flow
Lecture 33 - Unsteady Two-Dimensional Flow using Finite Difference Method
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40 - Steady Channel Flow
Lecture 41 - Steady Channel Flow
Lecture 42 - Steady Channel Flow
Lecture 43 - Steady Channel Flow
Lecture 44
Lecture 45
Lecture 46
Lecture 47
Lecture 48
Lecture 49 - Unsteady Flow in Pipes
Lecture 50 - Surface Water and Ground Water Interaction
Lecture 51 - Course Summary

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NPTEL Video Course - Civil Engineering - NOC:Design of Steel Structures

Subject Co-ordinator - Prof. Damodar Maity

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Design of Steel Structures (Limit State Method)
Lecture 2 - Steel as a Structural Material
Lecture 3 - Limit State Design
Lecture 4 - Introduction to Connections
Lecture 5 - Introduction to Bolt Connections
Lecture 6 - Design of Ordinary Black Bolts
Lecture 7 - Worked out Examples on Design of Ordinary Black Bolts
Lecture 8 - Design of High Strength Friction Grip Bolts
Lecture 9 - Weld connection
Lecture 10 - Design of Fillet Welds
Lecture 11 - Design of Butt Welds
Lecture 12 - Design of Plug and Slot Weld
Lecture 13 - Eccentric Connection (Load Lying in Plane of Bolted Joint)
Lecture 14 - Design of Eccentric Connection (Load Lying in Plane of Bolted Joint)
Lecture 15 - Eccentric Connection (Load Lying in Plane of Welded Joint)
Lecture 16 - Eccentric Connection (Load Lying Perpendicular to Plane of Bolted Joint)
Lecture 17 - Design of Eccentric Connection (Load Lying Perpendicular to Plane of Bolted Joint)
Lecture 18 - Eccentric Connection (Load Lying Perpendicular to Plane of Welded Joint)
Lecture 19 - Tension Members and Net Area
Lecture 20 - Calculation of Net Area in Tension Members
Lecture 21 - Net area, Staggered bolt, Chain bolt, Staggered pitch, Deduction of area
Lecture 22 - Strength Calculation of Tension Members
Lecture 23 - Strength of Tension Members with Weld Connection
Lecture 24 - Steps for Design of Tension Members
Lecture 25 - Design Calculation for Tension Members
Lecture 26 - Design of Gusset Plate
Lecture 27 - Lug Angles
Lecture 28 - Splices in Tension Members
Lecture 29 - Compression Members

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Lecture 30 - Design Strength of Compression Members
Lecture 31 - Compressive Strength
Lecture 32 - Compressive Strength of Angle Struts
Lecture 33 - Compressive Strength of Double Angles
Lecture 34 - Design of Compression Members
Lecture 35 - Design of Builtup Compression Members
Lecture 36 - Lacing Systems
Lecture 37 - Design of Lacing Systems
Lecture 38 - Connection Design of Lacing Systems
Lecture 39 - Design of Double Lacing System
Lecture 40 - Batten Plates
Lecture 41 - Design of Batten Plates using Bolt Connection
Lecture 42 - Design of Batten Plates using Weld Connection
Lecture 43 - Design of Column Splices
Lecture 44 - Design of Column Splices due to Shear
Lecture 45 - Introduction to Flexural Members
Lecture 46 - Failure Modes of Flexural Members
Lecture 47 - Laterally Supported Beams
Lecture 48 - Design of Laterally Supported Beams
Lecture 49 - Laterally Supported Beams with High Shear
Lecture 50 - Laterally Unsupported Beams
Lecture 51 - Strength Calculation of Laterally Unsupported Beams
Lecture 52
Lecture 53
Lecture 54
Lecture 55
Lecture 56
Lecture 57
Lecture 58 - Worked out Example for Gantry Girder
Lecture 59 - Slab Base
Lecture 60 - Design of Slab Base
Lecture 61 - Eccentrically Loaded Base Plate
Lecture 62 - Gusset Base
Lecture 63 - Design of Gusset Base

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NPTEL Video Course - Civil Engineering - NOC:Reinforced Concrete Road Bridges

Subject Co-ordinator - Prof. Nirjhar Dhang

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introdudction
Lecture 2 - Classification of Bridges
Lecture 3 - General Features of Design
Lecture 4 - IRC Loading
Lecture 5 - Design Codes
Lecture 6 - Working Stress Method
Lecture 7 - Limit State Method of Design as per IS456
Lecture 8 - Limit State Method of Design as per IRC 112
Lecture 9 - Design of Slab Bridges - Part I
Lecture 10 - Design of Slab Bridges - Part II
Lecture 11 - Design of Slab Bridges - Part III
Lecture 12 - Design of Slab Bridges - Part IV
Lecture 13 - Design of Slab Bridges - Part V
Lecture 14 - Design of Slab Bridges - Part VI
Lecture 15 - Abutment
Lecture 16 - Design of RCC T Beam Bridge - Part I
Lecture 17 - Design of RCC T Beam Bridge - Part II
Lecture 18 - Design of RCC T Beam Bridge - Part III
Lecture 19 - Design of RCC T Beam Bridge - Part IV
Lecture 20 - Summary and Closure

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NPTEL Video Course - Civil Engineering - NOC:Structural Analysis - I

Subject Co-ordinator - Prof. Amit Shaw

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Idealization of Structures, Threats and Responses
Lecture 3 - Static Equilibrium
Lecture 4 - Determinate and Indeterminate Structures
Lecture 5 - Review of Bending Moment and Shear Force Diagram of Beam
Lecture 6 - Tutorial - I
Lecture 7 - Analysis of Statically Determinate Structures
Lecture 8 - Analysis of Truss
Lecture 9 - Analysis of Truss
Lecture 10 - Analysis of Truss
Lecture 11 - Analysis of Truss
Lecture 12 - Analysis of Statically Determinate Structures
Lecture 13 - Analysis of Statically Determinate Structures
Lecture 14 - Analysis of Statically Determinate Structures
Lecture 15 - Analysis of Statically Determinate Structures
Lecture 16 - Analysis of Statically Determinate Structures
Lecture 17 - Deflection of Beams and Frames
Lecture 18 - Deflection of Beams and Frames (Continued...)
Lecture 19 - Deflection of Beams and Frames (Continued...)
Lecture 20 - Deflection of Beams and Frames (Continued...)
Lecture 21 - Deflection of Beams and Frames (Continued...)
Lecture 22 - Deflection of Beams and Frames (Continued...)
Lecture 23 - Deflection of Beams and Frames (Continued...)
Lecture 24 - Deflection of Beams and Frames (Continued...)
Lecture 25 - Deflection of Beams and Frames (Continued...)
Lecture 26 - Deflection of Beams and Frames (Continued...)
Lecture 27 - Deflection of Beams and Frames (Continued...)
Lecture 28 - Influence Line Diagram and moving Loads
Lecture 29 - Influence Line Diagram and moving Loads (Continued...)

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Lecture 30 - Influence Line Diagram and moving Loads (Continued...)
Lecture 31 - Influence Line Diagram and moving Loads (Continued...)
Lecture 32 - Influence Line Diagram and moving Loads (Continued...)
Lecture 33 - Analysis of Statically Indeterminate Structures
Lecture 34 - Analysis of Statically Indeterminate Structures (Continued...)
Lecture 35 - Analysis of Statically Indeterminate Structures (Continued...)
Lecture 36 - Analysis of Statically Indeterminate Structures (Continued...)
Lecture 37 - Analysis of Statically Indeterminate Structures (Continued...)
Lecture 38 - Analysis of Statically Indeterminate Structures
Lecture 39 - Analysis of Statically Indeterminate Structures
Lecture 40 - Analysis of Statically Indeterminate Structures
Lecture 41 - Analysis of Statically Indeterminate Structures
Lecture 42 - Analysis of Statically Indeterminate Structures by Force Method
Lecture 43 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)
Lecture 44 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)
Lecture 45 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)
Lecture 46 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)
Lecture 47 - Analysis of Indeterminate Structures by Displacement Methods
Lecture 48 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 49 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 50 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 51 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 52 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 53 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 54 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 55 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)
Lecture 56 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Soil Mechanics, Geotechnical Engineering-I

Subject Co-ordinator - Prof. Dilip Kumar Baidya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rock cycle
Lecture 2 - Soil Formation
Lecture 3 - Soil Classification
Lecture 4 - Soil Classification (Continued...)
Lecture 5 - Soil Classification (Continued...)
Lecture 6 - Three-phase diagram
Lecture 7 - Three-phase diagram (Continued...)
Lecture 8 - Permeability and seepage
Lecture 9 - Permeability and Seepage (Continued...)
Lecture 10 - Permeability and seepage (Continued...)
Lecture 11 - Permeability And Seepage
Lecture 12 - Permeability And Seepage (Continued...)
Lecture 13 - Permeability And Seepage (Continued...)
Lecture 14 - Compaction Of Soils
Lecture 15 - Compaction Of Soils (Continued...)
Lecture 16 - Deep Dynamic Compaction
Lecture 17 - Permeability/Compaction (Continued...)
Lecture 18 - Effective Stress
Lecture 19 - Effective Stress (Continued...)
Lecture 20 - Effective Stress Aplication
Lecture 21 - Vertical Stress Distribution
Lecture 22 - Boussinesq Point Load Formula
Lecture 23 - Vertical Stress For Distributed Load
Lecture 24 - Vertical Stress
Lecture 25 - Vertical Stress (Continued...)
Lecture 26 - Vertical Stress (Continued...)
Lecture 27 - Shear Strength
Lecture 28 - Shear Strength (Continued...)
Lecture 29 - Shear Strength (Continued...)

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Lecture 30 - Shear Strength (Continued...)
Lecture 31 - Shear Strength (Continued...)
Lecture 32 - Shear Strength (Continued...)
Lecture 33 - Shear Strength (Continued...)
Lecture 34 - Shear Strength (Continued...)
Lecture 35 - Shear Strength (Continued...)
Lecture 36 - Shear Strength (Continued...)
Lecture 37 - Compressibility Of Soils
Lecture 38 - Compressibility Of Soils (Continued...)
Lecture 39 - Compressibility Of Soils (Continued...)
Lecture 40 - Compressibility Of Soils (Continued...)
Lecture 41 - Compressibility Of Soils (Continued...)
Lecture 42 - Compressibility Of Soils (Continued...)
Lecture 43 - Compressibility Of Soils (Continued...)
Lecture 44 - Compressibility And Settlement Of Soil
Lecture 45 - Compressibility And Settlement (Continued...)
Lecture 46 - Compressibility And Secondary Compression
Lecture 47 - Earth Pressure
Lecture 48 - Earth Pressure (Continued...)
Lecture 49 - Earth Pressure (Continued...)
Lecture 50 - Earth Pressure (Continued...)
Lecture 51 - Earth Pressure (Continued...)
Lecture 52 - Earth Pressure (Continued...)
Lecture 53 - Earth Pressure (Continued...)
Lecture 54 - Earth Pressure (Continued...)
Lecture 55 - Stability Of Slopes
Lecture 56 - Stability Of Slopes (Continued...)
Lecture 57 - Stability Of Slopes (Continued...)
Lecture 58 - Slope Stability
Lecture 59 - Slope Stabilty
Lecture 60 - Concluding Remarks
Lecture 61 - Live Session

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NPTEL Video Course - Civil Engineering - NOC:Electronic Waste Management - Issues and Challenges

Subject Co-ordinator - Prof. Brajesh Kumar Dubey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - E-Waste Overview
Lecture 2 - E-waste Overview
Lecture 3 - E-waste Overview
Lecture 4 - E-waste Management Overview
Lecture 5 - E-waste Management Overview
Lecture 6 - Environmental and Public Health Issues
Lecture 7 - Environmental and Public Health Issues (Continued...)
Lecture 8 - E-waste Health Risk Assessment
Lecture 9 - Environmental and Public Health Issues (Continued...)
Lecture 10 - Environmental and Public Health Issues (Continued...)
Lecture 11 - Recovery of Materials from E-Waste
Lecture 12 - Metal Recovery Process
Lecture 13 - Recovery of Metals from Electronic Waste
Lecture 14 - Recovery of Metals from Electronic Waste
Lecture 15 - Recovery of Metals from Electronic Waste
Lecture 16 - E-waste Management
Lecture 17 - E-waste Management
Lecture 18 - E-waste Management
Lecture 19 - Electronics and LCA
Lecture 20 - LCA applications for Electronics
Lecture 21 - Tutorial-I
Lecture 22 - Tutorial-II

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NPTEL Video Course - Civil Engineering - NOC:Mineral Resources - Geology, Exploration, Economics and Environm

Subject Co-ordinator - Prof. M.K.Panigrahi

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mineral Deposits in Space and Time
Lecture 3 - Mineral Deposits in Space and Time (Continued...)
Lecture 4 - Mineral Deposits in Time, Attributes of Mineral Deposits and Theories of Mineral Deposits
Lecture 5 - Classification of Mineral Deposits
Lecture 6 - Magmatic Processes
Lecture 7 - Magmatic Processes
Lecture 8 - Magmatic Processes
Lecture 9 - Magmatic Processes
Lecture 10 - Sedimentary Processes and Resultant Mineral Deposits
Lecture 11 - Sedimentary Processes and Resultant Deposits
Lecture 12 - Sedimentary Processes and Resultant Deposits
Lecture 13 - Sedimentary Processes and Resultant Deposits
Lecture 14 - Sedimentary Processes and Resultant Deposits
Lecture 15 - Morphology of Ore Deposits
Lecture 16 - Hydrothermal Processes
Lecture 17 - Hydrothermal Processe (Continued...)
Lecture 18 - Hydrothermal Processes
Lecture 19 - Hydrothermal Processes
Lecture 20 - Hydrothermal Processes
Lecture 21 - Hydrothermal Processes (Continued...)
Lecture 22 - Hydrothermal Processes (Continued...)
Lecture 23 - Hydrothermal Processes (Continued...)
Lecture 24 - Hydrothermal Systems
Lecture 25 - Hydrothermal Systems (Continued...)
Lecture 26 - Hydrothermal Processes and Resultant Deposits
Lecture 27 - Hydrothermal Processes and Resultant Deposits (Continued...)
Lecture 28 - Hydrothermal Processes and Resultant Mineralization
Lecture 29 - Indian Mineral Deposits

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Lecture 30 - Indian Mineral Deposits (Continued...)
Lecture 31 - Indian Mineral Deposits (Continued...)
Lecture 32 - Mineral Exploration
Lecture 33 - Mineral Exploration (Continued...)
Lecture 34 - Mineral Exploration (Continued...)
Lecture 35 - Mineral Exploration (Continued...)
Lecture 36 - Mineral Exploration (Continued...)
Lecture 37 - Mineral Exploration (Continued...)
Lecture 38 - Mineral Exploration (Continued...)
Lecture 39 - Mineral Exploration (Continued...)
Lecture 40 - Mineral Exploration (Continued...)
Lecture 41 - Mineral Exploration (Continued...)
Lecture 42 - Mineral Exploration (Continued...)
Lecture 43 - Mineral Exploration (Continued...)
Lecture 44 - Mineral Exploration (Continued...)
Lecture 45 - Mineral Inventory Estimation
Lecture 46 - Mineral Inventory Estimation (Continued...)
Lecture 47 - Mineral Inventory Estimation (Continued...)
Lecture 48 - Mineral Inventory Estimation (Continued...)
Lecture 49 - Geostatistical Method of Mineral Inventory Estimation
Lecture 50 - Geostatistical Method of Mineral Inventory Estimation (Continued...)
Lecture 51 - Mineral Economics
Lecture 52 - Mineral Economics (Continued...)
Lecture 53 - Mineral Economics (Continued...)
Lecture 54 - Mineral Economics (Continued...)
Lecture 55 - Mineral Economics (Continued...)
Lecture 56 - Environmental Impact of Mineral Resource Exploitation
Lecture 57 - Environmental Impact of Mineral Resource Exploitation (Continued...)
Lecture 58 - Environmental Impact of Mineral Resource Exploitation (Continued...)
Lecture 59 - Environmental Impact of Mineral Resource Exploitation (Continued...)
Lecture 60 - Environmental Impact of Mineral Resource Exploitation (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Mineral Processing

Subject Co-ordinator - Prof. Arun Kumar Majumder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of Mineral Processing
Lecture 2 - Importance to Mineral Processing (Continued...)
Lecture 3 - Importance of Mineral Processing (Continued...)
Lecture 4 - Importance of Mineral Processing (Continued...)
Lecture 5 - Importance of Mineral Processing (Continued...)
Lecture 6 - Particle Characterization
Lecture 7 - Particle Characterization (Continued...)
Lecture 8 - Particle Characterization (Continued...)
Lecture 9 - Particle Characterization (Continued...)
Lecture 10 - Particle Characterization (Continued...)
Lecture 11 - Particle Characterization (Continued...)
Lecture 12 - Sampling
Lecture 13 - Sampling (Continued...)
Lecture 14 - Plant Sampling
Lecture 15 - Plant Sampling (Continued...)
Lecture 16 - Comminution
Lecture 17 - Comminution (Continued...)
Lecture 18 - Comminution Fundamentals
Lecture 19 - Comminution Fundamentals (Continued...)
Lecture 20 - Crushers
Lecture 21 - Crushers (Continued...)
Lecture 22 - Crushers (Continued...)
Lecture 23 - Grinding
Lecture 24 - Grinding (Continued...)
Lecture 25 - Grinding (Continued...)
Lecture 26 - Grinding (Continued...)
Lecture 27 - Grinding (Continued...)
Lecture 28 - Industrial Screening
Lecture 29 - Industrial Screening (Continued...)

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Lecture 30 - Industrial Screening (Continued...)
Lecture 31 - Industrial Screening (Continued...)
Lecture 32 - Industrial Screening (Continued...)
Lecture 33 - Industrial Screening (Continued...)
Lecture 34 - Industrial Screening (Continued...)
Lecture 35 - Movement of Solids in Fluids
Lecture 36 - Movement of Solids in Fluids (Continued...)
Lecture 37 - Movement of Solids in Fluids (Continued...)
Lecture 38 - Classifier
Lecture 39 - Classifier (Continued...)
Lecture 40 - Hydrocyclone
Lecture 41 - Hydrocyclone (Continued...)
Lecture 42 - Hydrocyclone (Continued...)
Lecture 43 - Hydrocyclone (Continued...)
Lecture 44 - Hydrocyclone (Continued...)
Lecture 45 - Mass Balancing
Lecture 46 - Mass Balancing (Continued...)
Lecture 47 - Closed-Circuit Grinding
Lecture 48 - Gravity Concentration
Lecture 49 - Gravity Concentration (Continued...)
Lecture 50 - Gravity Concentration (Continued...)
Lecture 51 - Gravity Concentration (Continued...)
Lecture 52 - Gravity Concentration (Continued...)
Lecture 53 - Flotation
Lecture 54 - Flotation (Continued...)
Lecture 55 - Flotation (Continued...)
Lecture 56 - Flotation Chemicals
Lecture 57 - Flotation Chemicals (Continued...)
Lecture 58 - Flotation Chemicals (Continued...)
Lecture 59 - Flotation Machines
Lecture 60 - Flotation Machines (Continued...)
Lecture 61 - Magnetic Separation
Lecture 62 - Electric Separation
Lecture 63 - Flow Sheets
Lecture 64 - Flow Sheets (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Foundation Engineering

Subject Co-ordinator - Prof. Koushik Deb

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Shear Strength
Lecture 4 - Soil Exploration - Boring
Lecture 5 - Standard Penetration Test
Lecture 6 - Standard Penetration Test and Cone Penetration Test
Lecture 7 - Cone Penetration Test and Other In-Situ Tests
Lecture 8 - Types of Samples
Lecture 9 - Geophysical Exploration - I
Lecture 10 - Geophysical Exploration - II
Lecture 11 - Shallow Foundation - Bearing Capacity I
Lecture 12 - Shallow Foundation - Bearing Capacity II
Lecture 13 - Shallow Foundation - Bearing Capacity III
Lecture 14 - Shallow Foundation - Bearing Capacity IV
Lecture 15 - Shallow Foundation - Bearing Capacity V
Lecture 16 - Shallow Foundation - Settlement I
Lecture 17 - Shallow Foundation - Settlement II
Lecture 18 - Shallow Foundation - Settlement III
Lecture 19 - Shallow Foundation - Settlement IV
Lecture 20 - Shallow Foundation - Settlement V
Lecture 21 - Shallow Foundation - Design I
Lecture 22 - Shallow Foundation - Design II
Lecture 23 - Shallow Foundation - Design III
Lecture 24 - Shallow Foundation - Design IV
Lecture 25 - Shallow Foundation - Design V
Lecture 26 - Shallow Foundation - Design VI
Lecture 27 - Pile Foundation - I
Lecture 28 - Pile Foundation - II
Lecture 29 - Pile Foundation - III

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Lecture 30 - Pile Foundation - IV
Lecture 31 - Pile Foundation - V
Lecture 32 - Pile Foundation - VI
Lecture 33 - Pile Foundation - VII
Lecture 34 - Pile Foundation - VIII
Lecture 35 - Pile Foundation - IX
Lecture 36 - Pile Foundation - X
Lecture 37 - Pile Foundation - XI
Lecture 38 - Pile Foundation - XII
Lecture 39 - Pile Foundation - XIII
Lecture 40 - Pile Foundation - XIV
Lecture 41 - Earth Pressure - I
Lecture 42 - Earth Pressure - II
Lecture 43 - Earth Pressure - III
Lecture 44 - Earth Pressure - IV
Lecture 45 - Earth Pressure - V
Lecture 46 - Earth Pressure - VI
Lecture 47 - Earth Pressure - VII
Lecture 48 - Earth Pressure and Retaining Wall
Lecture 49 - Retaining Wall - II
Lecture 50 - Retaining Wall - III
Lecture 51 - Retaining Wall - IV
Lecture 52 - Retaining Wall - V and Sheet Piles - I
Lecture 53 - Sheet Piles - II
Lecture 54 - Sheet Piles - III
Lecture 55 - Sheet Piles - IV
Lecture 56 - Sheet Piles - V
Lecture 57 - Sheet Piles - VI
Lecture 58 - Sheet Piles and Braced Excavation
Lecture 59 - Braced Excavation and Underground Conduits
Lecture 60 - Underground Conduits - II

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NPTEL Video Course - Civil Engineering - NOC:Theory of Elasticity

Subject Co-ordinator - Prof. Biswanath Banjerjee, Prof. Amit Shaw

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Tensor
Lecture 3 - Introduction to Tensor (Continued...)
Lecture 4 - Introduction to Tensor (Continued...)
Lecture 5 - Introduction to Tensor (Continued...)
Lecture 6 - Introduction to Tensor (Continued...)
Lecture 7 - Concept of Stress and Strain
Lecture 8 - Concept of Stress and Strain (Continued...)
Lecture 9 - Concept of Stress and Strain (Continued...)
Lecture 10 - Concept of Stress and Strain (Continued...)
Lecture 11 - Concept of Stress and Strain (Continued...)
Lecture 12 - Constitutive Relation - I
Lecture 13 - Constitutive Relation - I (Continued...)
Lecture 14 - Constitutive Relation - I (Continued...)
Lecture 15 - Constitutive Relation - I (Continued...)
Lecture 16 - Constitutive Relation - I (Continued...)
Lecture 17 - Constitutive Relation - II
Lecture 18 - Constitutive Relation - II (Continued...)
Lecture 19 - Constitutive Relation - II (Continued...)
Lecture 20 - Constitutive Relation - II (Continued...)
Lecture 21 - Constitutive Relation - II (Continued...)
Lecture 22 - Formulation of Boundary Value Problems
Lecture 23 - Formulation of Boundary Value Problems (Continued...)
Lecture 24 - Formulation of Boundary Value Problems (Continued...)
Lecture 25 - Formulation of Boundary Value Problems (Continued...)
Lecture 26 - Formulation of Boundary Value Problems (Continued...)
Lecture 27 - Solution of Boundary Value Problems
Lecture 28 - Solution of Boundary Value Problems (Continued...)
Lecture 29 - Solution of Boundary Value Problems (Continued...)

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Lecture 30 - Solution of Boundary Value Problems (Continued...)
Lecture 31 - Solution of Boundary Value Problems (Continued...)
Lecture 32 - Solution of Boundary Value Problems (Continued...)
Lecture 33 - Problems in Flexure
Lecture 34 - Problems in Flexure (Continued...)
Lecture 35 - Problems in Flexure (Continued...)
Lecture 36 - Problems in Flexure (Continued...)
Lecture 37 - Problems in Flexure (Continued...)
Lecture 38 - Boundary Value Problems in Elasticity
Lecture 39 - Boundary Value Problems in Elasticity (Continued...)
Lecture 40 - Boundary Value Problems in Elasticity (Continued...)
Lecture 41 - Boundary Value Problems in Elasticity (Continued...)
Lecture 42 - Boundary Value Problems in Elasticity (Continued...)
Lecture 43 - Complex Variable Method
Lecture 44 - Complex Variable Method (Continued...)
Lecture 45 - Complex Variable Method (Continued...)
Lecture 46 - Complex Variable Method (Continued...)
Lecture 47 - Complex Variable Method (Continued...)
Lecture 48 - Complex Variable Method (Continued...)
Lecture 49 - Thermoelasticity
Lecture 50 - Thermoelasticity (Continued...)
Lecture 51 - Thermoelasticity (Continued...)
Lecture 52 - Thermoelasticity (Continued...)
Lecture 53 - Thermoelasticity (Continued...)
Lecture 54 - Photo-Elasticity
Lecture 55 - Photo-Elasticity (Continued...)
Lecture 56 - Photo-Elasticity (Continued...)
Lecture 57 - Photo-Elasticity (Continued...)
Lecture 58 - Photo-Elasticity (Continued...)
Lecture 59 - Introduction to Nonlinear Elasticity
Lecture 60 - Closure

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NPTEL Video Course - Civil Engineering - NOC:Wastewater Treatment and Recycling

Subject Co-ordinator - Prof. Manoj Kumar Tiwari

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Sources and Types of Wastewater
Lecture 3 - Pollutants in Wastewater
Lecture 4 - Wastewater Management
Lecture 5 - Wastewater Management
Lecture 6 - Wastewater Generation and Quantity Estimation
Lecture 7 - Quantity Estimation of Sewage
Lecture 8 - Population Forecasting Methods
Lecture 9 - Quantity Estimation of Sewage Flow
Lecture 10 - Sewage Quantity Estimation
Lecture 11 - Wastewater Characteristics
Lecture 12 - Wastewater Characteristics
Lecture 13 - Wastewater Characteristics
Lecture 14 - Wastewater Characteristics
Lecture 15 - Wastewater Characteristics
Lecture 16 - Terrace - Introduction
Lecture 17 - Bench Terraces
Lecture 18 - Problems on Bench Terraces
Lecture 19 - Broad-base Terraces
Lecture 20 - Problems on Broad-base Terraces
Lecture 21 - Mass Balance
Lecture 22 - Mass Balance in Reactors
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28 - Secondary Treatment Processes
Lecture 29 - Biological Treatment of Wastewater

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Lecture 30 - Biological Treatment of Wastewater
Lecture 31 - Biological Treatment of Wastewater
Lecture 32 - Biological Treatment of Wastewater
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38 - Introduction to Sludge Management
Lecture 39 - Wastewater Sludge
Lecture 40 - Wastewater Sludge Processing and Treatment
Lecture 41 - Wastewater Sludge Processing and Treatment
Lecture 42 - Wastewater Sludge Processing and Treatment
Lecture 43 - Tertiary (Advanced) Treatment of Wastewater
Lecture 44 - Tertiary Treatment
Lecture 45 - Tertiary Treatment
Lecture 46 - Tertiary Treatment
Lecture 47 - Tertiary Treatment
Lecture 48 - Wastewater Treatment Systems
Lecture 49 - Wastewater Treatment Systems
Lecture 50 - Alternate Wastewater Treatment Systems
Lecture 51 - Alternate Wastewater Treatment Systems
Lecture 52
Lecture 53
Lecture 54
Lecture 55
Lecture 56
Lecture 57 - Wastewater Reuse and Recycling
Lecture 58 - Decision Making in Wastewater Reuse and Recycling
Lecture 59 - Public Acceptance for Recycled Water Use
Lecture 60 - Wastewater Reuse and Recycling
Lecture 61 - Course Summary
Lecture 62 - Course Summary (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Fluid Inclusion in Mineral Principles, Methodology, Practice and

Subject Co-ordinator - Prof. M.K.Panigrahi

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Microthermometry
Lecture 7 - Microthermometry
Lecture 8 - Microthermometry
Lecture 9 - Microthermometry
Lecture 10 - Fluid Inclusion Petrography
Lecture 11 - Aqueous Fluid Inclusions
Lecture 12 - Aqueous Fluid Inclusions (Continued...)
Lecture 13 - Response to Heating Experiment
Lecture 14 - Aqueous Fluid Inclusions (Continued...)
Lecture 15 - Aqueous Fluid Inclusions (Continued...)
Lecture 16 - Pure Carbonic Inclusion
Lecture 17 - Pure Carbonic Inclusion (Continued...)
Lecture 18 - Microthermometry of Aqueous-Carbonic Inclusion
Lecture 19 - Microthermometry of Aqueous-Carbonic Inclusion (Continued...)
Lecture 20 - Microthermometry of Aqueous-Carbonic Fluid Inclusion
Lecture 21 - Application of Fluid Inclusion to Ore Environment
Lecture 22 - Application of Fluid Inclusion Studies to Ore Environment
Lecture 23 - Application of fluid Inclusion to Ore Forming Environments
Lecture 24 - Application of fluid Inclusion to Ore Forming Environments (Continued...)
Lecture 25 - Application of fluid Inclusion to Ore Forming Environments (Continued...)
Lecture 26 - Application of fluid Inclusion to Deformation, Metamorphism
Lecture 27 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)
Lecture 28 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)
Lecture 29 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)

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Lecture 30 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)
Lecture 31 - Analysis of Fluid Inclusion
Lecture 32 - Analysis of Fluid Inclusion (Continued...)
Lecture 33 - Analysis of Fluid Inclusion (Continued...)
Lecture 34 - Analysis of Fluid Inclusion (Continued...)
Lecture 35 - Analysis of Fluid Inclusion (Continued...)
Lecture 36 - Computer Software for Fluid Inclusion Data
Lecture 37 - Computer Software for Fluid Inclusion Data (Continued...)
Lecture 38 - Computer Software for Fluid Inclusion Data (Continued...)
Lecture 39 - Review of the Course
Lecture 40 - Review of the Course (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Matrix Method of Structural Analysis

Subject Co-ordinator - Prof. Biswanath Banjerjee, Prof. Amit Shaw

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Review of Structural Analysis - I
Lecture 3 - Review of Structural Analysis - I (Continued...)
Lecture 4 - Review of Structural Analysis - I (Continued...)
Lecture 5 - Review of Structural Analysis - I (Continued...)
Lecture 6 - Review of Structural Analysis - I (Continued...)
Lecture 7 - Review of Structural Analysis - I (Continued...)
Lecture 8 - Review of Structural Analysis - I (Continued...)
Lecture 9 - Review of Structural Analysis - I (Continued...)
Lecture 10 - Review of Structural Analysis - I (Continued...)
Lecture 11 - Matrix Algebra Review
Lecture 12 - Matrix Algebra Review (Continued...)
Lecture 13 - Matrix Algebra Review (Continued...)
Lecture 14 - Matrix Algebra Review (Continued...)
Lecture 15 - Matrix Algebra Review (Continued...)
Lecture 16 - Matrix Method of Analysis of Trusses
Lecture 17 - Matrix Method of Analysis of Trusses (Continued...)
Lecture 18 - Matrix Method of Analysis of Trusses (Continued...)
Lecture 19 - Matrix Method of Analysis of Trusses (Continued...)
Lecture 20 - Matrix Method of Analysis of Trusses (Continued...)
Lecture 21 - Matrix Method of Analysis
Lecture 22 - Matrix Method of Analysis
Lecture 23 - Matrix Method of Analysis
Lecture 24 - Matrix Method of Analysis
Lecture 25 - Matrix Method of Analysis
Lecture 26 - Matrix Method of Analysis
Lecture 27 - Matrix Method of Analysis
Lecture 28 - Matrix Method of Analysis
Lecture 29 - Matrix Method of Analysis

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Lecture 30 - Matrix Method of Analysis
Lecture 31 - Computer Implementation
Lecture 32 - Computer Implementation (Continued...)
Lecture 33 - Analysis of 3D Truss
Lecture 34 - Analysis of 3D Truss (Continued...)
Lecture 35 - Analysis of Beam
Lecture 36 - Introduction to Finite Element Method
Lecture 37 - Introduction to Finite Element Method (Continued...)
Lecture 38 - Introduction to Finite Element Method (Continued...)
Lecture 39 - Introduction to Finite Element Method (Continued...)
Lecture 40 - Introduction to Finite Element Method (Continued...)
Lecture 41 - Introduction to Finite Element Method (Continued...)
Lecture 42 - Introduction to Finite Element Method (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Plastic Waste Management

Subject Co-ordinator - Prof. Brajesh Kumar Dubey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Plastics - What is Plastic
Lecture 2 - Plastics - Types
Lecture 3 - Plastics - Types (Continued...)
Lecture 4 - Plastics - Uses and Global Statistics
Lecture 5 - Plastics - Global Statistics
Lecture 6 - Plastic Waste Sources
Lecture 7 - Plastic Waste Sources (Continued...)
Lecture 8 - Plastic Waste Sources and Production
Lecture 9 - Global Sources
Lecture 10 - Global and Indian data
Lecture 11 - Plastic Waste Management Rules 2016 (India)
Lecture 12 - Plastic Waste Management Rules (Continued...)
Lecture 13 - Plastic Waste Management Rules (Continued...)
Lecture 14 - Plastic Waste Management Rules (Continued...)
Lecture 15 - Global Rules and Regulations
Lecture 16 - Plastic Bans including China Sword Policy Implication on Global Plastic Waste Management
Lecture 17 - Plastic Bans - Global Examples
Lecture 18 - Plastic Bans - China Sword Policy
Lecture 19 - Plastic Bans - China Sword Policy Impacts
Lecture 20 - Plastic Bans - Impact on Global Plastic Waste Management
Lecture 21 - Impact of Plastic Pollution on Marine Life
Lecture 22 - Impact of Plastic Pollution on Marine Life (Continued...)
Lecture 23 - Plastic Pollution Impacts on Marine and Wildlife
Lecture 24 - Plastic Pollution
Lecture 25 - Plastic Pollution
Lecture 26 - Plastic Waste Management Practices
Lecture 27 - Plastic Waste Management
Lecture 28 - Plastic Waste Management
Lecture 29 - Plastic Waste Management

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Lecture 30 - Use of Waste Plastics in Road Construction
Lecture 31 - Possible Alternate Materials to Plastics - Greener Alternatives
Lecture 32 - Biodegradable Plastics
Lecture 33 - Greener Plastic Products
Lecture 34 - Biobased Plastic Products
Lecture 35 - How to Quantify Something is Green
Lecture 36 - Plastics Resource Recovery and Circular Economy
Lecture 37 - Plastics Resource Recovery and Intro to Circular Economy
Lecture 38 - Plastics and Circular Economy
Lecture 39 - Plastics and Circular Economy - Case Studies
Lecture 40 - Plastics and Circular Economy - Case Studies (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Geotechnical Engineering-II Foundation Engineering

Subject Co-ordinator - Prof. Dilip Kumar Baidya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quick Review of Soil Mechanics
Lecture 2 - Quick Review of Soil Mechanics (Continued...)
Lecture 3 - Quick Review of Soil Mechanics (Continued...)
Lecture 4 - Quick Review of Soil Mechanics (Continued...)
Lecture 5 - Quick Review of Soil Mechanics (Continued...)
Lecture 6 - Foundation Engineering Introduction
Lecture 7 - Foundation Engineering Introduction (Continued...)
Lecture 8 - Foundation Engineering Introduction (Continued...)
Lecture 9 - Shallow Foundation and Bearing Capacity
Lecture 10 - Shallow Foundation and Bearing Capacity (Continued...)
Lecture 11 - Shallow Foundation and Bearing Capacity (Continued...)
Lecture 12 - Shallow Foundation
Lecture 13 - Shallow Foundation (Continued...)
Lecture 14 - Shallow Foundation (Continued...)
Lecture 15 - Shallow Foundation (Continued...)
Lecture 16 - Shallow Foundation (Continued...)
Lecture 17 - Settlement of Foundation
Lecture 18 - Settlement of Foundation (Continued...)
Lecture 19 - Settlement of Foundation (Continued...)
Lecture 20 - Settlement of Foundation (Continued...)
Lecture 21 - Settlement of Foundation (Continued...)
Lecture 22 - Settlement of Foundation (Continued...)
Lecture 23 - Geotechnical Investigation
Lecture 24 - Geotechnical Investigation (Continued...)
Lecture 25 - Geotechnical Investigation (Continued...)
Lecture 26 - Geotechnical Investigation (Continued...)
Lecture 27 - Geotechnical Investigation (Continued...)
Lecture 28 - Earth Pressure Theories
Lecture 29 - Earth Pressure Theories (Continued...)

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Lecture 30 - Earth Pressure Theories (Continued...)
Lecture 31 - Earth Pressure Theories (Continued...)
Lecture 32 - Earth Pressure Theories (Continued...)
Lecture 33 - Stability analysis of earth retaining wall
Lecture 34 - Stability analysis of earth retaining wall (Continued...)
Lecture 35 - Stability analysis of earth retaining wall (Continued...)
Lecture 36 - Stability of earth retaining wall
Lecture 37 - Pile foundation
Lecture 38 - Pile foundation (Continued...)
Lecture 39 - Pile foundation (Continued...)
Lecture 40 - Pile foundation (Continued...)
Lecture 41 - Pile foundation (Continued...)
Lecture 42 - Pile foundation (Continued...)
Lecture 43 - Pile foundation (Continued...)
Lecture 44 - Pile foundation (Continued...)
Lecture 45 - Pile foundation (Continued...)
Lecture 46 - Pile foundation (Continued...)
Lecture 47 - Sheet pile wall
Lecture 48 - Sheet pile wall (Continued...)
Lecture 49 - Anchor bulkhead
Lecture 50 - Anchor bulkhead (Continued...)
Lecture 51 - Deep excavation
Lecture 52 - Deep excavation (Continued...)
Lecture 53 - Introduction to machine foundation
Lecture 54 - Introduction to machine foundation (Continued...)
Lecture 55 - Introduction to machine foundation (Continued...)
Lecture 56 - Introduction to machine foundation (Continued...)
Lecture 57 - Introduction to machine foundation (Continued...)
Lecture 58 - Introduction to machine foundation (Continued...)
Lecture 59 - Introduction to machine foundation (Continued...)
Lecture 60 - Summary

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NPTEL Video Course - Civil Engineering - NOC:Mass, Momentum and Energy Balances in Engineering Analysis

Subject Co-ordinator - Prof. Pavitra Sandilya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Preliminaries
Lecture 3 - Balance Equations Preliminaries - I
Lecture 4 - Tutorial 1 - Balance Equations Preliminaries - I
Lecture 5 - Balance Equations Preliminaries - II
Lecture 6 - Tutorial 2 - Balance Equations Preliminaries - II
Lecture 7 - Macroscopic Balances - I
Lecture 8 - Macroscopic Balances - II
Lecture 9 - Macroscopic Balances - III
Lecture 10 - Tutorial 3 - Macroscopic Balances
Lecture 11 - Tutorial 4 - Macroscopic Balances
Lecture 12 - Tutorial 5 - Systems with chemical reactions
Lecture 13 - Tutorial 6 - Material balance involving chemical reactions
Lecture 14 - Tutorial 7 - Energy interactions in reacting systems Energy interactions in reacting systems
Lecture 15 - Tutorial 8 - Energy interactions in reacting systems
Lecture 16 - Solution of Macroscopic Balance Equations - I
Lecture 17 - Solution of Macroscopic Balance Equations - II
Lecture 18 - Tutorial 9 - Solution of Macroscopic Balance Equations - I
Lecture 19 - Tutorial 10 - Solution of Macroscopic Balance Equations - II
Lecture 20 - Mathematical Solution of Macroscopic Balance Equations
Lecture 21 - Mathematical Solution of Macroscopic Balance Equations
Lecture 22 - Numerical Solution of Macroscopic Balance Equations
Lecture 23 - Numerical evaluation of integrations in macroscopic balance equations
Lecture 24 - Microscopic Balances - I
Lecture 25 - Microscopic Balances - II
Lecture 26 - Microscopic Balances - III
Lecture 27 - Microscopic Balances - IV
Lecture 28 - Microscopic Balances - V
Lecture 29 - Microscopic Balances - VI

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Lecture 30 - Microscopic Balances - VII
Lecture 31 - Microscopic Balance Illustrations - I
Lecture 32 - Microscopic Balance Illustrations - II
Lecture 33 - Microscopic Balance Illustrations - III
Lecture 34 - Microscopic Balance Illustrations - IV
Lecture 35 - Microscopic Balance Illustrations - V
Lecture 36 - Matrix Techniques - I
Lecture 37 - Matrix Techniques - II
Lecture 38 - Regression
Lecture 39 - Interpolation
Lecture 40 - Illustration of Interpolation
Lecture 41 - Illustration of Regression
Lecture 42 - Tutorial on macroscopic energy balance
Lecture 43 - Selective Mathematical Concepts in Transport Phenomena

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NPTEL Video Course - Civil Engineering - NOC:Soil Structure Interaction

Subject Co-ordinator - Prof. Koushik Deb

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Bearing Capacity of Soil
Lecture 3 - Bearing Capacity of Soil (Continued...)
Lecture 4 - Bearing Capacity of Soil (Continued...)
Lecture 5 - Settlement of Shallow Foundation
Lecture 6 - Design of Shallow Foundation
Lecture 7 - Design of Shallow Foundation (Continued...)
Lecture 8 - Design of Shallow Foundation (Continued...)
Lecture 9 - Soil-Structure Interaction for Shallow Foundation
Lecture 10 - Soil-Structure Interaction for Shallow Foundation
Lecture 11 - Soil-Structure Interaction for Shallow Foundation
Lecture 12 - Soil-Structure Interaction for Shallow Foundation
Lecture 13 - Different Foundation Models
Lecture 14 - Different Foundation Models (Continued...)
Lecture 15 - Different Foundation Models (Continued...)
Lecture 16 - Different Foundation Models (Continued...)
Lecture 17 - Different Foundation Models (Continued...)
Lecture 18 - Beams on Elastic Foundation
Lecture 19 - Beams on Elastic Foundation (Continued...)
Lecture 20 - Beams on Elastic Foundation (Continued...)
Lecture 21 - Beams on Elastic Foundation (Continued...)
Lecture 22 - Beams on Elastic Foundation (Continued...)
Lecture 23 - Beams on Elastic Foundation (Continued...)
Lecture 24 - Beams on Elastic Foundation (Continued...)
Lecture 25 - Beams on Elastic Foundation (Continued...)
Lecture 26 - Beams on Elastic Foundation (Continued...)
Lecture 27 - Beams on Elastic Foundation (Continued...)
Lecture 28 - Beams on Elastic Foundation (Continued...)
Lecture 29 - Beams on Elastic Foundation (Continued...)

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Lecture 30 - Beams on Elastic Foundation (Continued...)
Lecture 31 - Beams on Elastic Foundation (Continued...)
Lecture 32 - Beams on Elastic Foundation (Continued...)
Lecture 33 - Beams on Elastic Foundation (Continued...)
Lecture 34 - Beams on Elastic Foundation (Continued...)
Lecture 35 - Beams on Elastic Foundation (Continued...)
Lecture 36 - Beams on Elastic Foundation (Continued...)
Lecture 37 - Beams on Elastic Foundation (Continued...)
Lecture 38 - Beams on Elastic Foundation (Continued...)
Lecture 39 - Beams on Elastic Foundation (Continued...)
Lecture 40 - Beams on Elastic Foundation (Continued...)
Lecture 41 - Plates on Elastic Foundation
Lecture 42 - Plates on Elastic Foundation (Continued...)
Lecture 43 - Plates on Elastic Foundation (Continued...)
Lecture 44 - Plates on Elastic Foundation (Continued...)
Lecture 45 - Use of Finite Difference Method for Soil Structure Interaction Problems
Lecture 46 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)
Lecture 47 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)
Lecture 48 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)
Lecture 49 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)
Lecture 50 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)
Lecture 51 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)
Lecture 52 - Soil Structure Interaction for Pile Foundation
Lecture 53 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 54 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 55 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 56 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 57 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 58 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 59 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 60 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 61 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 62 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 63 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 64 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 65 - Soil Structure Interaction for Pile Foundation (Continued...)
Lecture 66 - Soil Structure Interaction for Pile Foundation (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Water Supply Engineering

Subject Co-ordinator - Prof. Manoj Kumar Tiwari

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Backgroung and Course Introduction
Lecture 2 - Water Sources and Availability
Lecture 3 - Water Uses
Lecture 4 - Water Supply Key Issues and Concerns
Lecture 5 - Urban water services and water supply systems
Lecture 6 - Urban water services and water supply systems
Lecture 7 - Components of Water Demand
Lecture 8 - Fluctuations in Water Demand
Lecture 9 - Concept of Design Period and Design Population Need to Forecast Population Population Forecasting
Lecture 10 - Demand Forecasting and Design Capacities
Lecture 11 - Water Sources and Collection of Water
Lecture 12 - Surface Water Intakes
Lecture 13 - Surface Water Intakes Systems
Lecture 14 - Groundwater Intake
Lecture 15 - Well Interferences, Well losses and Efficiency
Lecture 16 - Raw water Conveyance and Pumping
Lecture 17 - Practice Problems
Lecture 18 - Raw Water Storage
Lecture 19 - Treated Water Storage
Lecture 20 - Placement, Design and Construction of Storage Reservoirs
Lecture 21 - Practice Problems on Reservoir Capacity Estimation
Lecture 22 - Water Quality and Water Pollutants
Lecture 23 - Water Quality Parameters
Lecture 24 - Philosophy of Water Treatment
Lecture 25 - Water Treatment Units Screening and Aeration
Lecture 26 - Water Treatment Units Sedimentation
Lecture 27 - Practice Problems On Sedimentation
Lecture 28 - Coagulation and Flocculation
Lecture 29 - Coagulation and Flocculation

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Lecture 30 - Coagulation and Flocculation
Lecture 31 - Filtration Theory and Slow Sand Filters
Lecture 32 - Rapid Sand Filter
Lecture 33 - Rapid Sand Filters and Pressure Filters
Lecture 34 - Practice Problems Coagulation Flocculation and Filtration
Lecture 35 - Disinfection Basic
Lecture 36 - Chlorination
Lecture 37 - Other Disinfection Method
Lecture 38 - Sluge Management
Lecture 39 - Advanced and Alternate Treatment Systems
Lecture 40 - Advanced Oxidation Processes and Membrane Process
Lecture 41 - Practice Problems
Lecture 42 - Basic of Water Distribution System
Lecture 43 - Water Distribution Networks
Lecture 44 - Analysis of Water Distribution Networks
Lecture 45 - Problems onPipe Flow and Water Distribution Network
Lecture 46 - Water Losses in Water Distribution System
Lecture 47 - Water Balance for Water Loss Assessment and Performance Indicators
Lecture 48 - Water Loss Detection and Control
Lecture 49 - Practice Problems on Water Audit and Water Loss Estimation
Lecture 50 - Continuous (24*7) water supply systems
Lecture 51 - District metered area (DMA) for zoning in water distribution networks
Lecture 52 - Software for water distribution networks design and analysis
Lecture 53 - Demonstration on EPANET and GEMS
Lecture 54 - Concept of smart water supply systems
Lecture 55 - Smart Metering and sensing devices
Lecture 56 - IoT and Automation in Water Supply
Lecture 57 - Example of Automation and Smart Water Supply Systems
Lecture 58 - Economics of Water Supply Systems
Lecture 59 - Capital and Operational Cost of Water Supply System
Lecture 60 - Pricing Waters
Lecture 61 - Pricing Waters (Continued...)
Lecture 62 - Case studies and Practice Problem on Water Pricing

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NPTEL Video Course - Civil Engineering - NOC:Geo Spatial Analysis in Urban Planning

Subject Co-ordinator - Prof. Saikat Kumar Paul

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geographic Information System
Lecture 2 - Introduction to Coordinate System and Geographic Projections
Lecture 3 - Geometric Transformation
Lecture 4 - Vector Data Model
Lecture 5 - Raster Data Model
Lecture 6 - Method of Spatial Analysis
Lecture 7 - Vector Data Analysis
Lecture 8 - Vector Data Analysis (Continued...)
Lecture 9 - Raster Data Analysis
Lecture 10 - Raster Operations, Terrain Visualization and Classification
Lecture 11 - Attribute Data Management and Data Exploration
Lecture 12 - Spatial Interpolation
Lecture 13 - Spatial Interpolation
Lecture 14 - Network Analysis
Lecture 15 - Service or Trade Area Analysis in an Urban Area
Lecture 16 - Service or Trade Area Analysis in an Urban Area (Continued...)
Lecture 17 - Landscape metrics and its applications
Lecture 18 - Urban sprawl characterization using Landscape Metrics
Lecture 19 - Multi-Criteria Decision Analysis

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NPTEL Video Course - Civil Engineering - NOC:Hydraulic Engineering

Subject Co-ordinator - Prof. Mohammad Saud Afzal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of fluid mechanics - I
Lecture 2 - Basics of fluid mechanics - I (Continued...)
Lecture 3 - Basics of fluid mechanics - I (Continued...)
Lecture 4 - Basics of fluid mechanics - I (Continued...)
Lecture 5 - Basics of fluid mechanics - I (Continued...)
Lecture 6 - Basics of fluid mechanics - II
Lecture 7 - Basics of fluid mechanics - II (Continued...)
Lecture 8 - Basics of fluid mechanics - II (Continued...)
Lecture 9 - Basics of fluid mechanics - II (Continued...)
Lecture 10 - Basics of fluid mechanics - II (Continued...)
Lecture 11 - Basics of fluid mechanics - II (Continued...)
Lecture 12 - Laminar and turbulent flow
Lecture 13 - Laminar and turbulent flow (Continued...)
Lecture 14 - Laminar and turbulent flow (Continued...)
Lecture 15 - Laminar and turbulent flow (Continued...)
Lecture 16 - Laminar and turbulent flow (Continued...)
Lecture 17 - Boundary Layer Theory
Lecture 18 - Boundary Layer Theory (Continued...)
Lecture 19 - Boundary Layer Theory (Continued...)
Lecture 20 - Boundary Layer Theory (Continued...)
Lecture 21 - Boundary Layer Theory (Continued...)
Lecture 22 - Boundary Layer Theory (Continued...)
Lecture 23 - Dimensional Analysis and Hydraulic Similitude
Lecture 24 - Dimensional Analysis and Hydraulic Similitude (Continued...)
Lecture 25 - Dimensional Analysis and Hydraulic Similitude (Continued...)
Lecture 26 - Dimensional Analysis and Hydraulic Similitude (Continued...)
Lecture 27 - Dimensional Analysis and Hydraulic Similitude (Continued...)
Lecture 28 - Introduction to Open Channel Flow and Uniform Flow
Lecture 29 - Introduction to Open Channel Flow and Uniform Flow (Continued...)

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Lecture 30 - Introduction to Open Channel Flow and Uniform Flow (Continued...)
Lecture 31 - Introduction to Open Channel Flow and Uniform Flow (Continued...)
Lecture 32 - Introduction to Open Channel Flow and Uniform Flow (Continued...)
Lecture 33 - Introduction to Open Channel Flow and Uniform Flow (Continued...)
Lecture 34 - Non-uniform flow and hydraulic jump
Lecture 35 - Non-uniform flow and hydraulic jump (Continued...)
Lecture 36 - Non-uniform flow and hydraulic jump (Continued...)
Lecture 37 - Non-uniform flow and hydraulic jump (Continued...)
Lecture 38 - Pipe flow
Lecture 39 - Pipe flow (Continued...)
Lecture 40 - Pipe flow (Continued...)
Lecture 41 - Pipe flow (Continued...)
Lecture 42 - Pipe flow (Continued...)
Lecture 43 - Pipe networks
Lecture 44 - Pipe networks (Continued...)
Lecture 45 - Pipe networks (Continued...)
Lecture 46 - Pipe networks (Continued...)
Lecture 47 - Pipe networks (Continued...)
Lecture 48 - Viscous fluid flow
Lecture 49 - Viscous fluid flow (Continued...)
Lecture 50 - Viscous fluid flow (Continued...)
Lecture 51 - Viscous fluid flow (Continued...)
Lecture 52 - Viscous fluid flow (Continued...)
Lecture 53 - Viscous fluid flow (Continued...)
Lecture 54 - Computational fluid dynamics
Lecture 55 - Computational fluid dynamics (Continued...)
Lecture 56 - Computational fluid dynamics (Continued...)
Lecture 57 - Computational fluid dynamics (Continued...)
Lecture 58 - Computational fluid dynamics (Continued...)
Lecture 59 - Introduction to wave mechanics
Lecture 60 - Introduction to wave mechanics (Continued...)
Lecture 61 - Introduction to wave mechanics (Continued...)
Lecture 62 - Introduction to wave mechanics (Continued...)
Lecture 63 - Introduction to wave mechanics (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Multimodal Urban Transportation Systems

Subject Co-ordinator - Prof. Arkopal Kishore Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of urban transportation: Urbanization and Transport
Lecture 2 - Overview of urban transportation: Key issues in urban transportation
Lecture 3 - Overview of urban transportation: Challenges in urban transportation
Lecture 4 - Overview of urban transportation: Travel demand modelling overview
Lecture 5 - Overview of urban transportation: Vehicular Level of Service (LOS) overview
Lecture 6 - Public Transportation: Introduction to public transportation
Lecture 7 - Public Transportation: Basic operating elements of public transportation
Lecture 8 - Public Transportation: Basic operating elements of public transportation (Continued...)
Lecture 9 - Public Transportation: Bus Transportation
Lecture 10 - Public Transportation: Bus Transportation (Continued...)
Lecture 11 - Public Transportation: Financing public transportation
Lecture 12 - Public Transportation: Transit marketing
Lecture 13 - Public Transportation: Rail transportation
Lecture 14 - Public Transportation: Intermediate Public Transportation
Lecture 15 - Public Transportation: Measuring performance of transit systems
Lecture 16 - Public Transportation: Advanced operation concepts of public transportation
Lecture 17 - Public Transportation: Bus and Rail Transit Capacity
Lecture 18 - Public Transportation: Bus and Rail Transit Capacity (Continued...)
Lecture 19 - Public Transportation: Station Capacity
Lecture 20 - Public Transportation: Transit Stop Location
Lecture 21 - Non-motorised Transportation (NMT) Planning: Introduction to NMT Systems
Lecture 22 - Non-motorised Transportation (NMT) Planning: Assessing existing NMT scenario
Lecture 23 - Non-motorised Transportation (NMT) Planning: Data collection and analysis in NMT Planning
Lecture 24 - Non-motorised Transportation (NMT) Planning: Complementarity and Selection of Interventions
Lecture 25 - Non-motorised Transportation (NMT) Planning: Alternative Selection through Economic & Financial
Lecture 26 - Non-Motorised Transportation (NMT) Planning: Basic NMT Characteristics
Lecture 27 - Non-Motorised Transportation (NMT) Planning: Pedestrian Data Collection and Flow Characteristics
Lecture 28 - Non-Motorised Transportation (NMT) Planning: Pedestrian Flow models
Lecture 29 - Non-Motorised Transportation (NMT) Planning: Pedestrian flow characteristics on facilities

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Lecture 30 - Non-Motorised Transportation (NMT) Planning: Pedestrian Level of Service (PLOS) based on Flow mo
Lecture 31 - Non-Motorised Transportation (NMT) Planning: Other types of Pedestrian Level of Service (PLOS)
Lecture 32 - Non-Motorised Transportation (NMT) Planning: HCM 2010 Methodology for PLOS
Lecture 33 - Non-Motorised Transportation (NMT) Planning: HCM 2010 Methodology for PLOS (Continued...)
Lecture 34 - Non-Motorised Transportation (NMT) Planning: Bicycle Facilities and Level of Service (BLOS)
Lecture 35 - Non-Motorised Transportation (NMT) Planning: BLOS and Bicycle Compatibility Index (BCI)
Lecture 36 - Non-Motorised Transportation (NMT) Planning: NMT Design Principles
Lecture 37 - Non-Motorised Transportation (NMT) Planning: Design of Pedestrian Infrastructure
Lecture 38 - Non-Motorised Transportation (NMT) Planning: Design of Pedestrian Infrastructure (Continued...)
Lecture 39 - Non-Motorised Transportation (NMT) Planning: Design of Cycling Infrastructure
Lecture 40 - Non-Motorised Transportation (NMT) Planning: Design of Cycling Infrastructure (Continued...)
Lecture 41 - Urban Transport and Sustainability: Travel Demand Management (TDM) overview
Lecture 42 - Urban Transport and Sustainability: Push measures cases
Lecture 43 - Urban Transport and Sustainability: Pull measure cases
Lecture 44 - Urban Transport and Sustainability: Parking Studies
Lecture 45 - Urban Transport and Sustainability: Transit Oriented Development (TOD)
Lecture 46 - Urban Transport and Sustainability: Introduction to Intelligent Transportation Systems (ITS)
Lecture 47 - Urban Transport and Sustainability: ITS components, applications and communication
Lecture 48 - Urban Transport and Sustainability: ITS Architecture
Lecture 49 - Urban Transport and Sustainability: Electronic Toll Collection (ETC)
Lecture 50 - Urban Transport and Sustainability: Public Bicycle Sharing (PBS) System with ITS
Lecture 51 - Urban Transport and Sustainability: Multimodal transportation (MMT) environment
Lecture 52 - Urban Transport and Sustainability: Multimodal Level of Service (MMLOS)
Lecture 53 - Urban Transport and Sustainability: Multimodal Level of Service (MMLOS) (Continued...)
Lecture 54 - Urban Transport and Sustainability: Design of multimodal transfer facilities
Lecture 55 - Urban Transport and Sustainability: Park & Ride (P&R) Facility Planning
Lecture 56 - Urban Transport and Sustainability: An Introduction to Pedestrian Road Safety and associated Ris
Lecture 57 - Urban Transport and Sustainability: Road crash estimation and elements of predictive methods
Lecture 58 - Urban Transport and Sustainability: Predicting Vehicle-Pedestrian and Vehicle-Bicycle conflicts
Lecture 59 - Urban Transport and Sustainability: Environmental Concerns of Urban Transport
Lecture 60 - Urban Transport and Sustainability: Sustainable strategies for Urban Transportation

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NPTEL Video Course - Civil Engineering - NOC:Advanced Foundation Engineering

Subject Co-ordinator - Prof. Kousik Deb

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Soil Exploration - I
Lecture 2 - Soil Exploration - II
Lecture 3 - Soil Exploration - III
Lecture 4 - Soil Exploration - IV
Lecture 5 - Soil Exploration - V
Lecture 6 - Soil Exploration - VI
Lecture 7 - Shallow Foundation : Bearing Capacity - I
Lecture 8 - Shallow Foundation : Bearing Capacity - II
Lecture 9 - Shallow Foundation : Bearing Capacity - III
Lecture 10 - Shallow Foundation : Bearing Capacity - IV
Lecture 11 - Shallow Foundation : Bearing Capacity - V
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Lecture 17 - Shallow Foundation : Bearing Capacity - XI
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Lecture 20 - Shallow Foundation : Bearing Capacity - XIV
Lecture 21 - Shallow Foundation : Bearing Capacity - XV
Lecture 22 - Shallow Foundation : Bearing Capacity - XVI
Lecture 23 - Shallow Foundation : Settlement - I
Lecture 24 - Shallow Foundation : Settlement - II
Lecture 25 - Shallow Foundation : Settlement - III
Lecture 26 - Shallow Foundation : Settlement - IV
Lecture 27 - Beams on Elastic Foundation - I
Lecture 28 - Beams on Elastic Foundation - II
Lecture 29 - Beams on Elastic Foundation - III

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Lecture 30 - Beams on Elastic Foundation - IV
Lecture 31 - Beams on Elastic Foundation - V
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Lecture 34 - Beams on Elastic Foundation - VIII
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Lecture 36 - Design of Shallow Foundation - I
Lecture 37 - Design of Shallow Foundation - II
Lecture 38 - Design of Shallow Foundation - III
Lecture 39 - Design of Shallow Foundation - IV
Lecture 40 - Design of Shallow Foundation - V
Lecture 41 - Pile Foundation : Under Compressive Load - I
Lecture 42 - Pile Foundation : Under Compressive Load - II
Lecture 43 - Pile Foundation : Under Compressive Load - III
Lecture 44 - Pile Foundation : Under Compressive Load - IV
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Lecture 47 - Pile Foundation : Under Compressive Load - VII
Lecture 48 - Pile Foundation : Under Compressive Load - VIII
Lecture 49 - Pile Foundation : Under Compressive Load - IX
Lecture 50 - Pile Foundation : Under Compressive Load - X
Lecture 51 - Pile Foundation : Under Lateral Load and Uplift - I
Lecture 52 - Pile Foundation : Under Lateral Load and Uplift - II
Lecture 53 - Pile Foundation : Under Lateral Load and Uplift - III
Lecture 54 - Pile Foundation : Under Lateral Load and Uplift - IV
Lecture 55 - Pile Foundation : Under Lateral Load and Uplift - V
Lecture 56 - Pile Foundation : Under Lateral Load and Uplift - VI
Lecture 57 - Pile Foundation : Under Lateral Load and Uplift - VII
Lecture 58 - Pile Foundation : Under Lateral Load and Uplift - VIII
Lecture 59 - Pile Foundation : Under Lateral Load and Uplift - IX
Lecture 60 - Well Foundation - I
Lecture 61 - Well Foundation - II
Lecture 62 - Well Foundation - III
Lecture 63 - Well Foundation - IV
Lecture 64 - Well Foundation - V
Lecture 65 - Well Foundation - VI
Lecture 66 - Well Foundation - VII
Lecture 67 - Well Foundation - VIII
Lecture 68 - Well Foundation - IX

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Lecture 69 - Foundations on Difficult Soils - I
Lecture 70 - Foundations on Difficult Soils - II

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NPTEL Video Course - Civil Engineering - NOC:Urban Transport Systems Planning

Subject Co-ordinator - Prof. Bhargab Maitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Urbanization, Urban Transportation and Transportation Demand
Lecture 2 - Travel Behaviour, Transportation Externalities and Present Scenario of Urban Transportation
Lecture 3 - Approaches for Mitigating Externalities, Need for Transportation Planning and Transport Planning
Lecture 4 - Transport Planning Morphology
Lecture 5 - Hierarchical Level of Urban Transport Planning and Interrelationship of Transport Problems and Mo
Lecture 6 - Traditional Travel Demand Forecasting Process
Lecture 7 - Traditional Travel Demand Forecasting Process, Specification, Calibration, Validation and Forecas
Lecture 8 - Information Needs for Travel Demand Forecasting: Study Area, Urban Activities, Transportation Sys
Lecture 9 - Information Needs for Travel Demand Forecasting: Travel Information
Lecture 10 - Data Collection and Techniques
Lecture 11 - Introduction and Basic Considerations of Trip Generation
Lecture 12 - Trip Classifications and Factors Affecting Trip Generation
Lecture 13 - Modelling Approaches and Step-Wise Approach of Multiple Regression Analysis
Lecture 14 - Step-Wise Approach of Multiple Regression Analysis and Examples
Lecture 15 - Examples, Common Mistakes and Zonal Based Models of Multiple Regression Analysis
Lecture 16 - Zonal and Household Based Regression Models
Lecture 17 - Cross Classification Analysis: Model Structure and Calibration
Lecture 18 - Cross Classification Analysis: Model Calibration
Lecture 19 - Cross Classification Analysis: Model Application, Advantages and Dis-Advantages
Lecture 20 - Matching Productions and Attractions; Stability of Trip Generation Models
Lecture 21 - Basic Considerations and Trip Distribution Matrices
Lecture 22 - Methods for Trip Distribution, Uniform Growth Factor Method and Average Growth Factor Method
Lecture 23 - Detroit Method and Fratar Model
Lecture 24 - Furness Method
Lecture 25 - Synthetic Methods, Measures of Travel Resistance and Gravity Model
Lecture 26 - Singly Constrained Gravity Model
Lecture 27 - Bureau of Public Roads Calibration Procedure
Lecture 28 - Doubly Constrained Gravity Model
Lecture 29 - Intervening Opportunities Model

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Lecture 30 - Competing Opportunities Model and Linear Programming Approach
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Lecture 46 - User Equilibrium Assignment and System Optimum Assignment
Lecture 47 - Deterministic Traffic Assignment - I
Lecture 48 - Deterministic Traffic Assignment - II
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Lecture 57 - Urban Goods Movement - III
Lecture 58 - Urban Goods Movement - IV
Lecture 59 - Activity Based Modelling
Lecture 60 - Big Data, GIS and SDI

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NPTEL Video Course - Civil Engineering - NOC:Structural Reliability

Subject Co-ordinator - Prof. Baidurya Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
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NPTEL Video Course - Civil Engineering - NOC:Ground Improvement

Subject Co-ordinator - Prof. Dilip Kumar Baidya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Need for Ground Improvement
Lecture 2 - Ground Improvement Methods
Lecture 3 - Ground Improvement Methods (Continued...)
Lecture 4 - GI Methods and Classification
Lecture 5 - Excavation and Replacement, the simplest GI method
Lecture 6 - Shallow Densification
Lecture 7 - Shallow densification (Continued...)
Lecture 8 - Quality Control and Quality Assurance
Lecture 9 - Application Problem
Lecture 10 - Application Problem on Excavation and Replacement
Lecture 11 - Deep Dynamic Compaction
Lecture 12 - Deep Dynamic Compaction (Continued...)
Lecture 13 - Deep Dynamic Compaction (Continued...)
Lecture 14 - Deep Dynamic Compaction (Continued...)
Lecture 15 - Deep Dynamic Compaction (Continued...)
Lecture 16 - Rapid Impact Compaction
Lecture 17 - Rapid Impact Compaction (Continued...)
Lecture 18 - Rapid Impact Compaction (Continued...)
Lecture 19 - Vibro compaction
Lecture 20 - Vibro compaction (Continued...)
Lecture 21 - Design Steps
Lecture 22 - Design Parameters and Procedure
Lecture 23 - Application Problem and Quality Control
Lecture 24 - Deep Replacement
Lecture 25 - Deep Replacement (Continued...)
Lecture 26 - Drainage
Lecture 27 - Dewatering
Lecture 28 - Dewatering (Continued...)
Lecture 29 - Dewatering Design Principle

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Lecture 30 - Design Example
Lecture 31 - Preconsolidation
Lecture 32 - Preconsolidation (Continued...)
Lecture 33 - Preconsolidation (Continued...)
Lecture 34 - Preconsolidation (Continued...)
Lecture 35 - Preconsolidation (Continued...)
Lecture 36 - Grouting
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Lecture 42 - Chemical Stabilisation
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Lecture 46 - Soil Nailing
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Lecture 57 - Geosynthetics in Ground Improvement (Continued...)
Lecture 58 - Geosynthetics in Ground Improvement (Continued...)
Lecture 59 - Geosynthetics in Ground Improvement (Continued...)
Lecture 60 - Summary and Concluding Remarks

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NPTEL Video Course - Civil Engineering - NOC:Remote Sensing of Leaf Area Index and Primary Productivity

Subject Co-ordinator - Prof. MD Behera

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Leaf Area Index - Definition and Basics
Lecture 3 - Leaf Area Index - Field Measurements
Lecture 4 - Remote Sensing - Story of Matter and Energy Interactions
Lecture 5 - Remote Sensing - Optical Properties of Leaf and Canopy
Lecture 6 - LAI- Optical RS Methods: Empirical Transfer Functions
Lecture 7 - LAI Estimation - RS Methods: Model Inversion
Lecture 8 - LAI Estimation - LiDAR and Micowave RS Methods
Lecture 9 - LAI- Global Data Products
Lecture 10 - LAI Products - Challenges and Future Prospects
Lecture 11 - RS of Primary Productivity - Introduction and Overview
Lecture 12 - RS of Primary Productivity - VIs and LUE
Lecture 13 - RS of Primary Productivity - Process Based Models
Lecture 14 - RS of Primary Productivity Methods - SIF
Lecture 15 - RS of Primary Productivity Methods - LST, ML, Inversion/Passive RS
Lecture 16 - LAI Applications: Phenology, Climate and LSMs
Lecture 17 - RS of Primary Productivity - Uncertainities and Challenges - LUE
Lecture 18 - LAI Applications: Indian Examples
Lecture 19 - Primary Productivity Applications: Indian Examples
Lecture 20 - Primary Productivity Applications: Indian Examples and Way Forward

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NPTEL Video Course - Civil Engineering - NOC:Rock Mechanics and Tunneling

Subject Co-ordinator - Prof. Debarghya Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Objective, scope, and associated problems
Lecture 2 - Rock Engineering Application Areas (Continued...) and Discontinuities in rock
Lecture 3 - Discontinuities in rock (Continued...) and classification of rock
Lecture 4 - Classification of rock based on origin (Continued...)
Lecture 5 - Stereographic projection Stereonet Example
Lecture 6 - Stereographic projection Stereonet Example (Continued...)
Lecture 7 - Rock coring
Lecture 8 - Rock coring (Continued...)
Lecture 9 - Rock coring (Continued...) and Geophysical Methods
Lecture 10 - Geophysical Methods (Continued...)
Lecture 11 - Geophysical Methods (Continued...)
Lecture 12 - Introduction, Physical properties
Lecture 13 - Physical properties (Continued...)
Lecture 14 - Physical properties (Continued...)
Lecture 15 - Mechanical Properties
Lecture 16 - Mechanical Properties (Continued...)
Lecture 17 - Laboratory Testing Methods
Lecture 18 - Laboratory Testing Methods (Continued...)
Lecture 19 - Laboratory Testing Methods (Continued...)
Lecture 20 - Laboratory Testing Methods (Continued...)
Lecture 21 - In-situ Testing Methods
Lecture 22 - Rock mass classification
Lecture 23 - Rock mass classification (Continued...)
Lecture 24 - Rock mass classification (Continued...)
Lecture 25 - Rock mass classification (Continued...)
Lecture 26 - Rock mass classification (Continued...)
Lecture 27 - Analysis of Stresses
Lecture 28 - Analysis of Stresses (Continued...)
Lecture 29 - Analysis of Stresses (Continued...)

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Lecture 30 - Analysis of Stresses (Continued...) and Stress-Strain Relationship
Lecture 31 - Introduction to rock and rock mass failure
Lecture 32 - Mohr-Coulomb (MC) Failure Criterion
Lecture 33 - Griffith Crack Theory and Empirical Failure Criteria for Rock
Lecture 34 - Empirical Failure Criteria for Rock (Continued...)
Lecture 35 - Equivalent Mohr-Coulomb (MC) Parameters
Lecture 36 - Failure Criterion in Deviatoric Plane
Lecture 37 - Slopes
Lecture 38 - Slopes (Continued...)
Lecture 39 - Slopes (Continued...)
Lecture 40 - Slopes (Continued...)
Lecture 41 - Underground excavations
Lecture 42 - Foundations
Lecture 43 - Foundations (Continued...)
Lecture 44 - Foundations (Continued...)
Lecture 45 - Foundations (Continued...)
Lecture 46 - Rock support systems
Lecture 47 - Shapes and usages
Lecture 48 - Methods of construction
Lecture 49 - Methods of construction (Continued...)
Lecture 50 - Methods of construction (Continued...)
Lecture 51 - Problems associated with tunnels and Tunneling in various subsoil conditions and rocks
Lecture 52 - Methods to determine stresses around openings: Kirsch equation
Lecture 53 - Methods to determine stresses around openings: Kirsch equation (Continued...)
Lecture 54 - Methods to determine stresses around openings: Kirsch equation contdand Greenspanâ s method
Lecture 55 - Basic Concepts for Lined, Unlined, and Pressure Tunnels
Lecture 56 - Basic Concepts for Lined, Unlined, and Pressure Tunnels (Continued...)
Lecture 57 - Improvement of rock mass response
Lecture 58 - Improvement of rock mass response (Continued...)
Lecture 59 - Improvement of rock mass response (Continued...)
Lecture 60 - Improvement of rock mass response (Continued...)
Lecture 61 - Improvement of rock mass response (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Retrofitting and Rehabilitation of Civil Infrastructure

Subject Co-ordinator - Prof. Swati Maitra, Prof. Sriman Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Causes of Deterioration
Lecture 3 - Materials Related Distresses
Lecture 4 - Materials Related Distresses (Continued...)
Lecture 5 - Other Distresses in Concrete
Lecture 6 - Load Associated Distresses
Lecture 7 - Identification of Distresses
Lecture 8 - Semi-destructive Testing
Lecture 9 - Non-destructive Tests
Lecture 10 - Non-destructive Tests (Continued...)
Lecture 11 - Other Tests
Lecture 12 - Considerations for Repair and Retrofitting
Lecture 13 - Repair Techniques
Lecture 14 - Repair Techniques (Continued...)
Lecture 15 - Repair Techniques (Continued...)
Lecture 16 - Strengthening of Structural Components
Lecture 17 - Strengthening of Structural Components (Continued...)
Lecture 18 - Introduction to Composites, Types and Characteristics
Lecture 19 - Properties of Fibers, Resins and FRP Composite
Lecture 20 - Micromechanics of Composites
Lecture 21 - Micromechanics of Composites (Continued...)
Lecture 22 - Manufacturing of FRP Composites
Lecture 23 - FRPC in Flexural Strengthening of Structural Members - I
Lecture 24 - FRPC in Flexural Strengthening of Structural Members - II
Lecture 25 - FRPC in Shear Strengthening of Structural Members
Lecture 26 - FRPC in Axial Strengthening of Structural Members - I
Lecture 27 - FRPC in Axial Strengthening of Structural Members - II
Lecture 28 - Near Surface Mounted FRP Reinforcement
Lecture 29 - FRPC in Strengthening of Beam-Column Joints

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Lecture 30 - Anchorage Systems for FRP Strengthening
Lecture 31 - Installation of FRP
Lecture 32 - Design Considerations
Lecture 33 - Design Approach for Flexural Strengthening
Lecture 34 - Design of Flexural Strengthening
Lecture 35 - Design Approach for Shear Strengthening
Lecture 36 - Design of Shear Strengthening
Lecture 37 - Design Approach for Axial Strengthening
Lecture 38 - Design of Axial Strengthening
Lecture 39 - Concepts of Concrete Overlay
Lecture 40 - Distresses in Existing Pavement
Lecture 41 - Evaluation of Pavement
Lecture 42 - Design Considerations for Concrete Overlay
Lecture 43 - Construction of Concrete Overlay
Lecture 44 - Introduction
Lecture 45 - Retrofitting Steps
Lecture 46 - Review of Materials and Test Methods
Lecture 47 - Review of Analysis Method
Lecture 48 - Some aspects of Seismic Retrofitting
Lecture 49 - Introduction
Lecture 50 - A Few Retrofitting Techniques
Lecture 51 - A Few Seismic Retrofitting Techniques
Lecture 52 - Introduction
Lecture 53 - Retrofitting steps and Techniques
Lecture 54 - Retrofitting Techniques for Structural Elements
Lecture 55 - Retrofitting Techniques for structural elements (Continued...)
Lecture 56 - Retrofitting Techniques for structural elements (Continued...)
Lecture 57 - Retrofitting Techniques for structural elements (Continued...)
Lecture 58 - Seismic Strengthening of structural elements
Lecture 59
Lecture 60
Lecture 61
Lecture 62
Lecture 63

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NPTEL Video Course - Civil Engineering - NOC:Surface Water Hydrology

Subject Co-ordinator - Prof. Rajib Maity

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Hydrologic Cycle and its Different Components
Lecture 3 - Hydrological System Concept
Lecture 4 - Surface Water Resources of India
Lecture 5 - Hydrology and Climate Change
Lecture 6 - Different Forms of Precipitation and Indian Monsoon
Lecture 7 - Measurement and Analysis of Precipitation
Lecture 8 - Precipitation Data Quality and Presentation
Lecture 9 - Areal Precipitation and Frequency Analysis
Lecture 10 - Analysis of Precipitation: IDF and PMP
Lecture 11 - Introduction to Evaporation and Evaporimeters
Lecture 12 - Estimation of Evaporation and Control Measures
Lecture 13 - Evapotranspiration
Lecture 14 - Initial Loss and Infiltration Process
Lecture 15 - Modelling of Infiltration Capacity
Lecture 16 - Infiltration Indices
Lecture 17 - Measurement of Flow Velocity
Lecture 18 - Area-Velocity and Moving-Boat Methods
Lecture 19 - Dilution Technique, Electromagnetic and Ultrasonic Methods
Lecture 20 - Indirect Streamflow Measurement
Lecture 21 - Stage-Discharge Relationship and Rating Curve
Lecture 22 - Introduction and Catchment Characteristics
Lecture 23 - Estimation of Runoff Volume: Empirical Models
Lecture 24 - Estimation of Runoff Volume: Conceptual Models
Lecture 25 - Flow Characteristic Curves and Estimation of Reservoir Storage
Lecture 26 - Concept of Droughts and Environmental Flows
Lecture 27 - Basics of Hydrographs
Lecture 28 - Base Flow Separation, DRH and ERH
Lecture 29 - Introduction to Unit Hydrographs

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Lecture 30 - Unit Hydrograph to Direct Runoff Hydrograph
Lecture 31 - Derivation of Unit Hydrograph
Lecture 32 - Unit Hydrograph of Different Durations: Method of Superposition
Lecture 33 - Unit Hydrograph of Different Durations: Method of S-Curve
Lecture 34 - More on Unit Hydrographs
Lecture 35 - Synthetic Unit Hydrograph
Lecture 36 - Instantaneous Unit Hydrograph
Lecture 37 - Introduction to Floods and Rational Method
Lecture 38 - Flood Peak Discharge and Catchment Characteristics
Lecture 39 - Estimation of Peak Flood Flow
Lecture 40 - Flood Control and its Status in India
Lecture 41 - Introduction to Flood Routing
Lecture 42 - Reservoir Routing: Modified Pulâ s Method
Lecture 43 - Reservoir Routing: Goodrich Method and Runge-Kutta Method
Lecture 44 - Channel Routing: Parameters of Muskingum Method
Lecture 45 - Channel Routing: Muskingum Method and Hydraulic Flood Routing
Lecture 46 - Concept of Routing in IUH Development and Clarkâ s Method
Lecture 47 - Nashâ s Conceptual Model
Lecture 48 - Basic Concepts of Probability and Statistics
Lecture 49 - Types of Data Series and Concept of Return Period
Lecture 50 - Introduction to Frequency Analysis
Lecture 51 - Parametric Methods of Frequency Analysis
Lecture 52 - Frequency Analysis with Extreme Value Type-I Distribution
Lecture 53 - Confidence Interval and Standard Error in the Frequency Estimates
Lecture 54 - Various Issues behind Frequency Analysis
Lecture 55 - Basics of Hydrologic Design
Lecture 56 - Risk Analysis to Determine Return Period
Lecture 57 - Hydro-economic Analysis to Determine Return Period
Lecture 58 - Uncertainty in Hydrologic Analysis
Lecture 59 - Estimated Limiting Storm and Design Flood
Lecture 60 - Design Storm
Lecture 61 - Hydrologic Design of Reservoirs: Introduction and Determination of Storage Capacity
Lecture 62 - Determination of Storage Capacity and Models in Reservoir Design

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NPTEL Video Course - Civil Engineering - NOC:Traffic Engineering

Subject Co-ordinator - Prof. Bhargab Maitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Traffic Engineering Objectives and Role of Transportation Demand and Land-Use
Lecture 2 - Mobility and Accessibility, Traffic Engineering Elements and Components of Traffic
Lecture 3 - Road Users
Lecture 4 - Vehicles, Roadways and Traffic Control Devices
Lecture 5 - Traffic Signs, Delineators and Signals
Lecture 6 - Traffic Facilities and Traffic Stream Parameters
Lecture 7 - Traffic Volumes and Time Headways
Lecture 8 - Traffic Density and Relationships among Macroscopic Parameters
Lecture 9 - Single Regime Traffic Stream Models
Lecture 10 - Multi-Regime Models and Characteristics of Interrupted Flow
Lecture 11 - Analysis of Shock Waves - I
Lecture 12 - Analysis of Shock Waves - II
Lecture 13 - Analysis of Shock Waves - III
Lecture 14 - Queueing Analysis - I
Lecture 15 - Queueing Analysis - II
Lecture 16 - Basic Concepts
Lecture 17 - Analysis of Basic Freeway and Multi-Lane Highway Segments (as per HCM, 2016) - I
Lecture 18 - Analysis of Basic Freeway and Multi-Lane Highway Segments (as per HCM, 2016) - II
Lecture 19 - Analysis of Basic Freeway and Multi-Lane Highway Segments (As per HCM, 2016) - III
Lecture 20 - Analysis of Two-Lane Highway Segments (As per HCM, 2016) - I
Lecture 21 - Analysis of Two-Lane Highway Segments (As per HCM, 2016) - II
Lecture 22 - Analysis of Urban street Segments (As per HCM, 2016) - I
Lecture 23 - Analysis of Urban street Segments (As per HCM, 2016) - II
Lecture 24 - Analysis of Urban street Segments (As per HCM, 2016) - III
Lecture 25 - Analysis of Single, Intermediate and Two-Lane Roads (As per Indo HCM, 2017)
Lecture 26 - Analysis of Multi Lane Highways (As per Indo HCM, 2017)
Lecture 27 - Intersection Control and Critical Aspects of Operation - I
Lecture 28 - Intersection Control and Critical Aspects of Operation - II
Lecture 29 - Intersection Control and Critical Aspects of Operation - III

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Lecture 30 - Intersection Control and Critical Aspects of Operation - IV
Lecture 31 - Intersection Control and Critical Aspects of Operation - V
Lecture 32 - Delay as a Performance Measure
Lecture 33 - Pre-Timed Signal Design - I
Lecture 34 - Pre-Timed Signal Design - II
Lecture 35 - Operational Analysis of Signalized Intersection - I
Lecture 36 - Operational Analysis of Signalized Intersection - II
Lecture 37 - Operational Analysis of Signalized Intersection - III
Lecture 38 - Operational Analysis of Signalized Intersection - IV
Lecture 39 - Actuated Signals
Lecture 40 - Signal Coordination - I
Lecture 41 - Signal Coordination - II
Lecture 42 - Signal Coordination - III
Lecture 43 - Oversaturated Signals and Mitigation Strategies
Lecture 44 - Car Following Theory - I
Lecture 45 - Car Following Theory - II
Lecture 46 - Car Following Theory - III
Lecture 47 - Car Following Theory - IV
Lecture 48 - Traffic Simulation - I
Lecture 49 - Traffic Simulation - II
Lecture 50 - Traffic Simulation - III
Lecture 51 - Introduction to Traffic Control and Management
Lecture 52 - Access Management
Lecture 53 - Demand Management
Lecture 54 - Bus Priority Treatments
Lecture 55 - Emerging Traffic Management Measures
Lecture 56 - Parking Management - I
Lecture 57 - Parking Management - II
Lecture 58 - Parking Management - III
Lecture 59 - Introduction to Road Safety
Lecture 60 - Road Safety Engineering and Crash Data
Lecture 61 - Blackspot Analysis
Lecture 62 - Crash Data Analysis
Lecture 63 - Road Safety Audit
Lecture 64 - Safe System Approach
Lecture 65 - Road Safety Countermeasures
Lecture 66 - Speed Management Measures

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NPTEL Video Course - Civil Engineering - NOC:Bridge Engineering

Subject Co-ordinator - Prof. Piyali Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Components, Materials, Forms, Evolutions and Classifications of Bridges
Lecture 2 - Site Selection, Subsoil Exploration and Traffic Projections for Bridges
Lecture 3 - Hydraulic Characteristics, Economical Span and Choice of Bridge Type
Lecture 4 - Standard Specifications for Road Bridges
Lecture 5 - Standard Specifications for Rail Bridges
Lecture 6 - Design of Slab Culverts
Lecture 7 - Design of T-Beam and Slab Bridge
Lecture 8 - Voided Slab Bridges, Skew Slab Culverts and Curved Bridge Decks
Lecture 9 - Design of Box Culverts
Lecture 10 - Design of Pipe Culverts
Lecture 11 - Design of Steel Truss Bridges
Lecture 12 - Design Example of Steel Truss Bridges
Lecture 13 - Design of Plate Girder Bridges
Lecture 14 - Design Example of Plate Girder Bridges
Lecture 15 - Masonry Arch Bridges
Lecture 16 - Concrete Arch Bridges
Lecture 17 - Suspension Bridges
Lecture 18 - Cable-Stayed Bridges
Lecture 19 - Balanced Cantilever Bridges
Lecture 20 - Prestressed Concrete Bridges
Lecture 21 - Composite Bridges
Lecture 22 - Rigid Frame Bridges
Lecture 23 - Continuous Girder Bridges
Lecture 24 - Design Example of Continuous Girder Bridges
Lecture 25 - Bridge Piers
Lecture 26 - Bridge Abutments
Lecture 27 - Pile Foundations for Bridges
Lecture 28 - Well and Pneumatic Caisson Foundations for Bridges
Lecture 29 - Bridge Bearings

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Lecture 30 - Bridge Joints
Lecture 31 - Bridge Appurtenances
Lecture 32 - Bridge Construction
Lecture 33 - Maintenance and Rehabilitation of Bridges
Lecture 34 - Rebuilding of Bridges
Lecture 35 - Dynamic Response of Bridge Decks
Lecture 36 - Seismic Design of Highway Bridges
Lecture 37 - Seismic Design of Railway Bridges
Lecture 38 - Lessons from Bridge Failures
Lecture 39 - Fatigue and Fracture of Bridges
Lecture 40 - Use of Shape memory Alloys in Bridges
Lecture 41 - Use of Engineered Cementitious Composite (ECC) in Bridges
Lecture 42 - 3D Printing of Bridges
Lecture 43 - High Speed Railway Bridges

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NPTEL Video Course - Civil Engineering - NOC:Elastic Stability of Structures

Subject Co-ordinator - Prof. Sarat Kumar Panda

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts of buckling and introduction to equilibrium approach
Lecture 2 - Introduction to energy and imperfection approach
Lecture 3 - Introduction to different types of buckling
Lecture 4 - Weighted residual methods in structual mechanics
Lecture 5 - Weighted residual methods in structual mechanics (Continued...)
Lecture 6 - Introduction to the strong and weak forms of GDE
Lecture 7 - Variational method: Derivation of Euler Lagrange equation
Lecture 8 - Delta opeator in variational method for finding GDE and Boundary conditions
Lecture 9 - Euler lagrange equation for functional having different dependent variables
Lecture 10 - Brachistochrone problem
Lecture 11 - Rayleigh-Ritz method
Lecture 12 - Extension of Rayleigh-Ritz method and Galerkinâ s method
Lecture 13 - Single DOF stability model
Lecture 14 - Single DOF stability model and model having imperfection
Lecture 15 - Large deflection theory for stability analysis of rigid body stability models
Lecture 16 - Two DOF rigid body stability models
Lecture 17 - Snap through stability model and model of imperfect geometry
Lecture 18 - Weak form solution for hinged-hinged and fixed-fixed column
Lecture 19 - Weak form solution for fixed-free and fixed-hinged column
Lecture 20 - Strong form solution for hinged-hinged column
Lecture 21 - Strong form solution for fixed-fixed and fixed-free column
Lecture 22 - Critical load for column with elastic support
Lecture 23 - Boundary conditions for column with general case of elastically supported ends
Lecture 24 - Critical load for portal frame with column hinged at base
Lecture 25 - Critical load for portal frame with column fixed at base
Lecture 26 - Element stiffness matrix for beam-column
Lecture 27 - Stability analysis of frames by matrix stiffness method
Lecture 28 - Critical load of Euler column: Large deflection theory
Lecture 29 - Critical load of Euler column with initial imperfection

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Lecture 30 - Load deflection curve for beam-column: GDE approach
Lecture 31 - Load deflection curve for beam-column: Energy approach
Lecture 32 - General expression of elastic curve for beam-column
Lecture 33 - Beam-column with several lateral and continuous loads
Lecture 34 - Bending of beam-column by end couples
Lecture 35 - Three moment equation for continuous beam-column
Lecture 36 - Moment equation for continuous beam-column with intermediate column
Lecture 37 - Beam-column on Elastic Foundation
Lecture 38 - St Venant Torsion and Non-uniform Torsion
Lecture 39 - Torsional Buckling
Lecture 40 - Torsional Buckling and Torsional Flexural Buckling
Lecture 41 - Torsional Flexural Buckling of Column Having Different Boundary Conditions
Lecture 42 - Rayleigh-Ritz method for Torsional Flexural Buckling of Column
Lecture 43 - Introduction to Plate Buckling and Small Deflection Theory
Lecture 44 - Governing Differential Equation of Plate Buckling Using Small Deflection Theory
Lecture 45 - Governing Differential Equation of Plate Buckling Using Small Deflection Theory (Continued...)
Lecture 46 - Critical Load of Plate Using Equilibrium Approach
Lecture 47 - Critical Load of Plate Using Energy Approach
Lecture 48 - Critical Load of Plates with Different End Conditions: Energy Approach and Galerkin's
Lecture 49 - F-w Formulation For Plate Buckling
Lecture 50 - Critical load and Post Buckling Behaviour of Plate Using F-w Formulation
Lecture 51 - Governing Differential Equation of Shell Buckling by Using Small Deflection Theory
Lecture 52 - Governing Differential Equation of Shell Buckling by Using Small Deflection Theory (Continued...
Lecture 53 - Governing Differential Equation of Shell Buckling: Donnell's Equation
Lecture 54 - Solution of Donnell's Equation for Finding Critical Load
Lecture 55 - Governing Differential Equation of Shell Buckling by Using Finite Deflection Theory
Lecture 56 - Post Buckling Behaviour of an Imperfect Axially Compressed Cylindrical Shell Panel
Lecture 57 - Governing Differential Equation for the deflection curve of a thin bar
Lecture 58 - Critical load of a two-hinged and fixed-fixed circular arch
Lecture 59 - Inelastic Buckling Analysis of Column
Lecture 60 - Inelastic Buckling Analysis of Column (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Radiogenic Isotope Geology

Subject Co-ordinator - Prof. R. Anand

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals
Lecture 2 - Nuclear Stability and Decay
Lecture 3 - Radioactive Decay and Growth
Lecture 4 - Geochronometry: Mass Spectrometry
Lecture 5 - Geochronometry: Mass Spectrometry (Continued...)
Lecture 6 - Geochronometry: Isotope dilution analysis
Lecture 7 - Geochronometry: Sample processing
Lecture 8 - K-Ar Method of Dating
Lecture 9 - K-Ar Method of Dating (Continued...)
Lecture 10 - Ar-Ar Method of Dating
Lecture 11 - Ar-Ar Method of Dating (Continued...)
Lecture 12 - Rb-Sr Method of Dating
Lecture 13 - Rb-Sr Method of Dating (Continued...)
Lecture 14 - Sm-Nd Method of Dating
Lecture 15 - Sm-Nd Method of Dating (Continued...)
Lecture 16 - Re-Os Method of Dating
Lecture 17 - Lu-Hf Method of Dating
Lecture 18 - U-Th-Pb Geochronology
Lecture 19 - U-Th-Pb Geochronology (Continued...)
Lecture 20 - U-Th-Pb Geochronology (Continued...)
Lecture 21 - Isotope Geology of Pb
Lecture 22 - Isotope Geology of Pb (Continued...)
Lecture 23 - Processing and Presentation of Raw Isotope Geochemical Data
Lecture 24 - Processing and Presentation of Raw Isotope Geochemical Data (Continued...)
Lecture 25 - Application of Sr, Nd, Pb and Hf Isotopes in Petrogenetic Studies
Lecture 26 - Application of Sr, Nd, Pb and Hf Isotopes in Petrogenetic Studies (Continued...)
Lecture 27 - U-series disequilibrium method of dating
Lecture 28 - U-series disequilibrium method of dating
Lecture 29 - Fission-Track dating

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Lecture 30 - Cosmogenic radionuclides and their applications
Lecture 31 - Cosmogenic radionuclides and their applications
Lecture 32 - Cosmogenic radionuclides and their applications
Lecture 33 - Extinct radionuclides and cosmochronology
Lecture 34 - Extinct radionuclides and cosmochronology (Continued...)
Lecture 35 - Extinct radionuclides and cosmochronology

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NPTEL Video Course - Civil Engineering - NOC:Availability and Management of Groundwater Resources

Subject Co-ordinator - Prof. Prasoon Kumar Singh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Hydrological cycle, Need for conservation of Groundwater Resources
Lecture 2 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)
Lecture 3 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)
Lecture 4 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)
Lecture 5 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)
Lecture 6 - Geological formation as Aquifer
Lecture 7 - Geological formation as Aquifer (Continued...)
Lecture 8 - Geological formation as Aquifer (Continued...)
Lecture 9 - Geological formation as Aquifer (Continued...)
Lecture 10 - Introduction about Vadose and Saturated Zone
Lecture 11 - Vadose and Saturated Zone (Continued...)
Lecture 12 - Vadose and Saturated Zone (Continued...)
Lecture 13 - Vadose and Saturated Zone (Continued...)
Lecture 14 - Vadose and Saturated Zone (Continued...)
Lecture 15 - Confined and Unconfined Aquifer and their parameters
Lecture 16 - Confined and Unconfined Aquifer and their parameters (Continued...)
Lecture 17 - Confined and Unconfined Aquifer and their Parameters (Continued...)
Lecture 18 - Confined and Unconfined Aquifer and their Parameters (Continued...)
Lecture 19 - Confined and Unconfined Aquifer and their parameters (Continued...)
Lecture 20 - Porosity, Permeability, Transmissivity and Storage Coefficient
Lecture 21 - Porosity, Permeability, Transmissivity and Storage Coefficient (Continued...)
Lecture 22 - Porosity, Permeability, Transmissivity and Storage Coefficient (Continued...)
Lecture 23 - Porosity, permeability, transmissivity and storage coefficient
Lecture 24 - Porosity, permeability, transmissivity and storage coefficient (Continued...)
Lecture 25 - Law of groundwater movement, Darcy's law and application (Continued...)
Lecture 26 - Law of groundwater movement, Darcy's law and application (Continued...)
Lecture 27 - Law of groundwater movement, Darcy's law and application (Continued...)
Lecture 28 - Law of groundwater movement, Darcy's law and application (Continued...)
Lecture 29 - Law of groundwater movement, Darcy's law and application (Continued...)

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Lecture 30 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics
Lecture 31 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)
Lecture 32 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)
Lecture 33 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)
Lecture 34 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)
Lecture 35 - Measurement of rainfall, Index of wetness, Infiltration rate
Lecture 36 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)
Lecture 37 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)
Lecture 38 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)
Lecture 39 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)
Lecture 40 - Estimation of Total Annual Replenishable Natural Groundwater Recharge
Lecture 41 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)
Lecture 42 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)
Lecture 43 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)
Lecture 44 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)
Lecture 45 - Groundwater resources planning and management
Lecture 46 - Groundwater Resources Planning and Management (Continued...)
Lecture 47 - Groundwater Resources Planning and Management (Continued...)
Lecture 48 - Groundwater Resources Planning and Management (Continued...)
Lecture 49 - Groundwater Resources Planning and Management (Continued...)
Lecture 50 - Rainwater Harvesting and Artificial Groundwater Recharge
Lecture 51 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)
Lecture 52 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)
Lecture 53 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)
Lecture 54 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)
Lecture 55 - Impact of climate change on water resources
Lecture 56 - Impact of climate change on water resources (Continued...)
Lecture 57 - Impact of climate change on water resources (Continued...)
Lecture 58 - Impact of climate change on water resources (Continued...)
Lecture 59 - Impact of climate change on water resources (Continued...)
Lecture 60 - Impact of climate change on water resources (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Soil Dynamics

Subject Co-ordinator - Prof. Paramita Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Theory of Vibrations
Lecture 2 - Theory of Vibrations
Lecture 3 - Single Degree of Freedom System (SDOF) - Part 1
Lecture 4 - Single Degree of Freedom System (SDOF) - Part 2
Lecture 5 - Single Degree of Freedom System (SDOF) - Part 3
Lecture 6 - Single Degree of Freedom System (SDOF) - Part 4
Lecture 7 - Single Degree of Freedom System (SDOF) - Part 5
Lecture 8 - Single Degree of Freedom System (SDOF) - Part 6
Lecture 9 - Single Degree of Freedom System (SDOF) - Part 7
Lecture 10 - Single Degree of Freedom System (SDOF) - Part 8
Lecture 11 - Single Degree of Freedom System (SDOF) - Part 9
Lecture 12 - Multiple Degree of Freedom System (MDOF) - Part 1
Lecture 13 - Multiple Degree of Freedom System (MDOF) - Part 2
Lecture 14 - Multiple Degree of Freedom System (MDOF) - Part 2
Lecture 15 - Multiple Degree of Freedom System (MDOF) - Part 3
Lecture 16 - Multiple Degree of Freedom System (MDOF) - Part 5
Lecture 17 - Wave Propagation in An Elastic Rod
Lecture 18 - Wave Propagation in An Elastic Rod of Finite Length
Lecture 19 - Wave Propagation in An Infinite Elastic Medium
Lecture 20 - Wave Propagation in An Infinite and Semi-Infinite Elastic Medium
Lecture 21 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 1
Lecture 22 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 2
Lecture 23 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 3
Lecture 24 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 4
Lecture 25 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 5
Lecture 26 - Determination of Dynamic Properties of Soils (Seismic Reflection Survey)
Lecture 27 - Determination of Dynamic Properties of Soils (Seismic Reflection Survey)
Lecture 28 - Determination of Dynamic Properties of Soils (Seismic Refraction Survey-Inclined Layering)
Lecture 29 - Determination of Dynamic Properties of Soils (Numerical Problems on Seismic Reflection

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Lecture 30 - Determination of Dynamic Properties of Soils (Block Vibration Test)
Lecture 31 - Liquefaction of Soils - Part 1
Lecture 32 - Liquefaction of Soils - Part 2
Lecture 33 - Liquefaction of Soils - Part 3
Lecture 34 - Liquefaction of Soils - Part 4
Lecture 35 - Liquefaction of Soils - Part 5
Lecture 36 - Machine Foundations (Design Criteria)
Lecture 37 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 1
Lecture 38 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 2
Lecture 39 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 3
Lecture 40 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 4
Lecture 41 - Analysis of Machine Foundations (Linear Elastic Weightless Spring Method - Part 1)
Lecture 42 - Analysis of Machine Foundations (For Reciprocating Machines) - Part 2
Lecture 43 - Analysis of Machine Foundations (For Reciprocating Machines) - Part 3
Lecture 44 - Analysis of Machine Foundations (For Reciprocating Machines) - Part 4
Lecture 45 - Analysis of Machine Foundations (For Impact Type Machines) - Part 1
Lecture 46 - Analysis of Machine Foundations (For Impact Type Machines) - Part 2
Lecture 47 - Analysis of Machine Foundations (For Rotary Machines) - Part 1
Lecture 48 - Analysis of Machine Foundations (For Rotary Machines) - Part 2
Lecture 49 - Analysis of Machine Foundations (For Rotary Machines) - Part 3
Lecture 50 - Analysis of Machine Foundations (For Rotary Machines) - Part 3 (Continued...)
Lecture 51 - Analysis of Pile Foundation Under Dynamic Loading - Part I
Lecture 52 - Analysis of Pile Foundation Under Dynamic Loading - Part II
Lecture 53 - Analysis of Pile Foundation Under Dynamic Loading - Part III
Lecture 54 - Analysis of Pile Foundation Under Dynamic Loading - Part IV
Lecture 55 - Analysis of Pile Foundation Under Dynamic Loading - Part V
Lecture 56 - Isolation of Vibration - Part 1
Lecture 57 - Isolation of Vibration - Part 2
Lecture 58 - Isolation of Vibration - Part 3
Lecture 59 - Isolation of Vibration - Part 4
Lecture 60 - Summary

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NPTEL Video Course - Civil Engineering - NOC:Geotechnical Earthquake Engineering

Subject Co-ordinator - Prof. Kousik Deb

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Causes of Earthquake
Lecture 3 - Seismic Waves
Lecture 4 - Seismic Waves (Continued...)
Lecture 5 - Size of Earthquake
Lecture 6 - Size of Earthquake (Continued...)
Lecture 7 - Introduction
Lecture 8 - Measurement of Ground Motion
Lecture 9 - Ground Motion Parameters
Lecture 10 - Ground Motion Parameters (Continued...)
Lecture 11 - Ground Motion Parameters (Continued...)
Lecture 12 - Ground Motion Parameters (Continued...)
Lecture 13 - Ground Motion Parameters (Continued...)
Lecture 14 - Estimation of Ground Motion Parameters
Lecture 15 - Examples
Lecture 16 - Examples (Continued...)
Lecture 17 - Examples (Continued...)
Lecture 18 - Field Tests
Lecture 19 - Field Tests (Continued...)
Lecture 20 - Field Tests (Continued...)
Lecture 21 - Field Tests (Continued...)
Lecture 22 - Field Tests (Continued...)
Lecture 23 - Field Tests (Continued...)
Lecture 24 - Field Tests (Examples)
Lecture 25 - Field Tests (Continued...)
Lecture 26 - Field Tests (Continued...)
Lecture 27 - Laboratory and Model Tests
Lecture 28 - Stress-Strain Behavior of Cyclically Loaded Soils
Lecture 29 - Stress-Strain Behavior of Cyclically Loaded Soils (Continued...)

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Lecture 30 - Stress-Strain Behavior of Cyclically Loaded Soils (Continued...)
Lecture 31 - Linear Approach
Lecture 32 - Linear Approach (Continued...)
Lecture 33 - Equivalent Linear and Non Linear Approach
Lecture 34 - Evaluation of Liquefaction Resistance of Soils
Lecture 35 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 36 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 37 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 38 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 39 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 40 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 41 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 42 - Evaluation of Liquefaction Resistance of Soils (Continued...)
Lecture 43 - Liquefaction Susceptibility Criteria for Silts and Clays
Lecture 44 - Liquefaction Susceptibility Criteria for Silts and Clays (Continued...)
Lecture 45 - Liquefaction Susceptibility Criteria for Silts and Clays (Continued...)
Lecture 46 - Liquefaction Susceptibility Criteria for Silts and Clays (Continued...)
Lecture 47 - Settlement of Sand due to Earthquake Shaking
Lecture 48 - Settlement of Sand due to Earthquake Shaking (Continued...)
Lecture 49 - Seismic or Liquefaction Hazard Mitigation
Lecture 50 - Seismic or Liquefaction Hazard Mitigation (Continued...)
Lecture 51 - Seismic or Liquefaction Hazard Mitigation (Continued...)
Lecture 52 - Seismic or Liquefaction Hazard Mitigation (Continued...)
Lecture 53 - Seismic or Liquefaction Hazard Mitigation (Continued...)
Lecture 54 - Seismic slope stability analysis: Pseudostatic Analysis
Lecture 55 - Seismic slope stability analysis: Pseudostatic Analysis (Continued...)
Lecture 56 - Seismic slope stability analysis: Newmark Sliding Block Analysis
Lecture 57 - Seismic slope stability analysis: Newmark Sliding Block Analysis (Continued...)
Lecture 58 - Seismic design of retaining walls
Lecture 59 - Seismic design of retaining walls (Continued...)
Lecture 60 - Seismic design of retaining walls (Continued...)
Lecture 61 - Seismic design of retaining walls (Continued...)
Lecture 62 - Seismic design of retaining walls (Continued...)
Lecture 63 - Seismic design of retaining walls (Continued...)
Lecture 64 - Seismic design of retaining walls (Continued...)
Lecture 65 - Seismic design of retaining walls (Continued...)
Lecture 66 - Seismic design of retaining walls (Continued...)
Lecture 67 - Seismic design of retaining walls (Continued...)
Lecture 68 - Seismic design of retaining walls (Continued...)

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Lecture 69 - Seismic design of retaining walls (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Earthquake Seismology

Subject Co-ordinator - Dr. Mohit Agrawal

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Waves on a String
Lecture 3 - Stress
Lecture 4 - Strain tensor and Constitutive equations
Lecture 5 - Equations of Motion
Lecture 6 - Wavenumber vector, Slowness, P-and S-wave Polarization
Lecture 7 - Seismic spectrum, Seismogram rotation, Spherical Waves
Lecture 8 - Energy in the Plane Wave, Potentials at an Interface
Lecture 9 - Boundary Conditions, Types Of Interfaces, Ray Theory, Reflection/Transmission
Lecture 10 - Snell's law, Transmission and Reflection Coefficients, Fermat's Principle, Huygen's
Lecture 11 - Precritical, Critical, and Postcritical waves, reflection and transmission coefficients
Lecture 12 - Surface waves
Lecture 13 - Rayleigh Waves
Lecture 14 - Love waves
Lecture 15 - Dispersion
Lecture 16 - Dispersion example in the Earth and Tsunamis
Lecture 17 - Normal modes
Lecture 18 - Torsional and Spheroidal Modes
Lecture 19 - Solving numerical problems
Lecture 20 - Refraction seismology
Lecture 21 - Refraction seismology (Continued...)
Lecture 22 - Reflection seismology (Continued...)
Lecture 23 - Earth as a constant velocity Distribution
Lecture 24 - Multi Channel Data Geometry
Lecture 25 - Seismic waves in spherical earth
Lecture 26 - Velocity distribution
Lecture 27 - Body waves
Lecture 28 - Core Phases
Lecture 29 - Velocity structure of upper mantle and lower mantle

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Lecture 30 - Anisotropic earth structure
Lecture 31 - Anisotropic earth structure (Continued...)
Lecture 32 - Attenuation and Anelasticity
Lecture 33 - Attenuation and Anelasticity (Continued...)
Lecture 34 - Attenuation and Anelasticity (Continued...)
Lecture 35 - Composition of the mantle and core
Lecture 36 - Composition of the mantle and core (Continued...)
Lecture 37 - Composition of the mantle and core (Continued...)
Lecture 38 - Composition of the mantle and core (Continued...)
Lecture 39 - Earthquakes, focal mechanisms, moment tensors
Lecture 40 - Earthquakes, focal mechanisms, moment tensors (Continued...)
Lecture 41 - Earthquakes, focal mechanisms, moment tensors (Continued...)
Lecture 42 - Earthquakes, focal mechanisms, moment tensors (Continued...)
Lecture 43 - Earthquakes, focal mechanisms, moment tensors (Continued...)
Lecture 44 - Brief on Earthquake geodesy
Lecture 45 - Brief on Earthquake geodesy (Continued...)
Lecture 46 - Brief on Earthquake geodesy (Continued...)
Lecture 47 - Brief on Earthquake geodesy (Continued...)
Lecture 48 - Source parameters, Earthquake statistics
Lecture 49 - Source parameters, Earthquake statistics (Continued...)
Lecture 50 - Source parameters, Earthquake statistics (Continued...)
Lecture 51 - Source parameters, Earthquake statistics (Continued...)
Lecture 52 - Source parameters, Earthquake statistics (Continued...)
Lecture 53 - Seismology and Plate tectonics, Spreading centers, Subduction zones
Lecture 54 - Seismology and Plate tectonics, Spreading centers, Subduction zones (Continued...)
Lecture 55 - Seismology and Plate tectonics, Spreading centers, Subduction zones (Continued...)
Lecture 56 - Numerical Problems in Seismology
Lecture 57 - Numerical Problems in Seismology (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Engineering Geology

Subject Co-ordinator - Prof. R. K. Dubey

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and significance
Lecture 2 - Enginnering geological ground, concept and categorization
Lecture 3 - Geomaterial: Rock, rock material and rock strata, concept of stress, deformation ...
Lecture 4 - Stress-strain behaviour and mechanical parameters of rocks
Lecture 5 - Geomorphology of river valley and mountainous regions and landforms
Lecture 6 - Different types of water and distribution of water, different type of rocks and ...
Lecture 7 - Surface and subsurface water and their interaction with geoground
Lecture 8 - Weathering processes and classification
Lecture 9 - Chemical weathering and impact of weathering
Lecture 10 - Weatherability and weathering indices
Lecture 11 - Characteristic of rocks and rock strata and some physical property
Lecture 12 - Common physical attributes of geomaterials
Lecture 13 - Engineering properties of rocks
Lecture 14 - Geotechnical characteristic of joint and approach for rock mass classification
Lecture 15 - Rock mass classification
Lecture 16 - About construction materials and dimensional stone
Lecture 17 - Crushed stone and suitability of rocks as construction materials
Lecture 18 - Aggregate and deleterious materials
Lecture 19 - Pozzolan and soil
Lecture 20 - Cement-aggregate reaction
Lecture 21 - Concept and classification of dams
Lecture 22 - Classification of dams based on materials used
Lecture 23 - Classification of dam based on design and function
Lecture 24 - Arch dams and classification dams based on use and function and technical ...
Lecture 25 - Forces acting on dam and engineering geological characteristics for dam construction
Lecture 26 - About tunnels and classification of tunnels
Lecture 27 - Tunnelling methods
Lecture 28 - Treatments
Lecture 29 - Anchoring of rock strata : grouting

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Lecture 30 - Anchoring of rock strata : rock bolting
Lecture 31 - Categorization of major geological structures affecting stability of engineering ...
Lecture 32 - Major geological structures Fold, Faults, joints
Lecture 33 - Major geological structures: sedimentary structures, unconformity and effect ...
Lecture 34 - Effects of beddings, folds, faults, joints and unconformity on stability of dams
Lecture 35 - Effects of beddings, folds, faults, joints and unconformity on ground control ...
Lecture 36 - Rock-load/ground pressure, factors affecting ground pressure
Lecture 37 - Methods for determination of rock load: empirical approaches
Lecture 38 - Methods for determination of rock load: empirical, semi-empirical approaches
Lecture 39 - Methods for determination of rock load: Structural defect and rock-support ...
Lecture 40 - Unified approach, support system, and mechanics of rock bolt working
Lecture 41 - About road and highway features and pavement
Lecture 42 - Stress distributions and engineering geological facets of new road/highway alignments
Lecture 43 - About bridges, classifications and working mechanism
Lecture 44 - Engineering geological facets of bridges and material quality
Lecture 45 - Building, building foundation and foundation strata
Lecture 46 - Landslide
Lecture 47 - Landslide Hazards Zonation, causes and mitigation
Lecture 48 - Slope stability aspects of landslide
Lecture 49 - Earthquakes
Lecture 50 - Induced seismicity
Lecture 51 - Sea, seacoast, features and agents
Lecture 52 - Wave propagations and concept of surf zones and breaking of waves
Lecture 53 - Waves propagation in different depth and wave mechanics
Lecture 54 - Erosion induced and deposition assisted sea landforms
Lecture 55 - Sea shore hazards, mitigation and protective structures
Lecture 56 - Energy and introductory aspects of geothermal energy
Lecture 57 - Geothermal resources and enhanced geothermal systems
Lecture 58 - Geotechnical facets of gas hydrate
Lecture 59 - Engineering geological facets of CBM and shale gas
Lecture 60 - Engineering geological aspect of carbon capture, usage and storage (CCUS)

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NPTEL Video Course - Civil Engineering - NOC:Industrial Wastewater Treatment

Subject Co-ordinator - Prof Alok Sinha, Prof S K Gupta

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sources and characteristics of industrial wastewater
Lecture 2 - Sources and characteristics of industrial wastewater
Lecture 3 - Wastewater Management
Lecture 4 - Design Aspects of Equalization Tank
Lecture 5 - Neutralization and Proportioning
Lecture 6 - Ion Exchange Process
Lecture 7 - Ion Exchange Process
Lecture 8 - Ion Exchange Process
Lecture 9 - Adsorption Process
Lecture 10 - Adsorption Process
Lecture 11 - Gas Transfer and Air Stripping (Ammonia Removal)
Lecture 12 - Gas Transfer and Air Stripping (Ammonia Removal)
Lecture 13 - Advanced oxidation processes
Lecture 14 - Advanced oxidation processes
Lecture 15 - Advanced oxidation processes
Lecture 16 - Advanced oxidation processes
Lecture 17 - Membrane processes for wastewater treatment
Lecture 18 - Membrane processes for wastewater treatment
Lecture 19 - Membrane processes for wastewater treatment
Lecture 20 - Membrane processes for wastewater treatment
Lecture 21 - Coagulation, Precipitation and Heavy Metal Removal
Lecture 22 - Coagulation, Precipitation and Heavy Metal Removal
Lecture 23 - Coagulation, Precipitation and Heavy Metal Removal
Lecture 24 - Coagulation, Precipitation and Heavy Metal Removal
Lecture 25 - Coagulation, Precipitation and Heavy Metal Removal
Lecture 26 - Treatment and disposal of sludge
Lecture 27 - Treatment and disposal of sludge
Lecture 28 - Treatment and disposal of sludge
Lecture 29 - Treatment and disposal of sludge

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Lecture 30 - Treatment and disposal of sludge
Lecture 31 - Treatment of wastewater produced from Distillery and Dairy Industries
Lecture 32 - Treatment of wastewater produced from Distillery and Dairy Industries
Lecture 33 - Treatment of wastewater produced from Distillery and Dairy Industries
Lecture 34 - Treatment of wastewater produced from Distillery and Dairy Industries
Lecture 35 - Treatment of wastewater produced from Distillery and Dairy Industries
Lecture 36 - Treatment of wastewater produced from Tannery and Pulp and Paper
Lecture 37 - Treatment of wastewater produced from Tannery and Pulp and Paper
Lecture 38 - Treatment of wastewater produced from Tannery and Pulp and Paper
Lecture 39 - Treatment of wastewater produced from Tannery and Pulp and Paper
Lecture 40 - Treatment of wastewater produced from Tannery and Pulp and Paper
Lecture 41 - Treatment of wastewater produced from Textile and Dye and Fertilizers
Lecture 42 - Treatment of wastewater produced from Textile and Dye and Fertilizers
Lecture 43 - Treatment of wastewater produced from Textile and Dye and Fertilizers
Lecture 44 - Treatment of wastewater produced from Textile and Dye and Fertilizers
Lecture 45 - Treatment of wastewater produced from Textile and Dye and Fertilizers
Lecture 46 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)
Lecture 47 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)
Lecture 48 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)
Lecture 49 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)
Lecture 50 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)
Lecture 51 - Treatment of wastewater produced from Pharmaceutical industry
Lecture 52 - Treatment of wastewater produced from Pharmaceutical industry
Lecture 53 - Treatment of wastewater produced from Pharmaceutical industry
Lecture 54 - Treatment of wastewater produced from Pharmaceutical industry
Lecture 55 - Treatment of wastewater produced from Pharmaceutical industry
Lecture 56 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing
Lecture 57 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing
Lecture 58 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing
Lecture 59 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing
Lecture 60 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing

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NPTEL Video Course - Civil Engineering - NOC:Geoengineering

Subject Co-ordinator - Prof. R. K. Dubey

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, definition and phase relations, components, advances, and relevance
Lecture 2 - Concept of force, load and stress
Lecture 3 - Stress-strain behaviour, modulus, and Poissonâ s ratio
Lecture 4 - Engineering properties of geoground/geomaterial
Lecture 5 - Strength failure criteria of geomaterial (rock)
Lecture 6 - Classification of water
Lecture 7 - Geoground, surface and groundwater interaction
Lecture 8 - Impact of water on geoground (rock)
Lecture 9 - Impact of water on geoground (soil)
Lecture 10 - Impact of water on ground, durability of geoground/geomaterial (soil)
Lecture 11 - Types of infrastructures, components and elements of building
Lecture 12 - Forces acting on building foundation strata/layers
Lecture 13 - Types of foundations and footings
Lecture 14 - Ground-foundation interaction, differential settlement, and basic of retaining walls
Lecture 15 - Retaining walls and earth pressures
Lecture 16 - Elements and classification of underground space structures
Lecture 17 - Excavation methods for underground space structures : Basic of drilling and blasting
Lecture 18 - Excavation methods underground space :underground :underground and blasting techniques
Lecture 19 - Excavation methods for underground space structures :tunnel boring machine (TBN)
Lecture 20 - Subsidence and ground control problems in underground spaces
Lecture 21 - In situ stress, damage zone and concept of ground pressure
Lecture 22 - Approaches for estimation of ground pressure : empirical and semi-empirical methods
Lecture 23 - Approaches for estimation of ground pressure : semi-empirical and other methods
Lecture 24 - Grout, Grouting and groutability
Lecture 25 - Anchoring of rock strata and support system and bolting
Lecture 26 - Characteristics of geoground in cold region
Lecture 27 - Behaviour of geoground in cold region (Mechanical attributes of snow)
Lecture 28 - Behaviour of geoground in cold region (Mechanical attributes ice and ice mixed soils)
Lecture 29 - Ground control issues and facets of glaciated slopes

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Lecture 30 - Mitigation engineering structures
Lecture 31 - Geotechnical implication in mineral exploration
Lecture 32 - Geotechnical issues related to extraction of mineral resources
Lecture 33 - Mine fire and related geotechnical issues
Lecture 34 - Groundwater occurrences and exploration
Lecture 35 - 05:Geotechnical facets of groundwater extraction and saltwater intrusion
Lecture 36 - Concept, resources and classification of energy
Lecture 37 - Geoengineering view of geothermal energy
Lecture 38 - Concept and sources of green energy and associated geotechnical challenges
Lecture 39 - Water energy and geoengineering issues
Lecture 40 - Classification energy source reservoirs
Lecture 41 - Radioactive and strategic minerals gas hydrates as energy geotechnical constraints
Lecture 42 - Classification of energy source reservoirs and concept geomechanical characterization
Lecture 43 - Geomechanical characterization of hydrocarbon reservoir
Lecture 44 - Geomechanical characterization of Coal bed methane and shale gas reservoirs
Lecture 45 - Geomechanical characterization of geothermal reservoir
Lecture 46 - Climate change scenario
Lecture 47 - Impact of climate change
Lecture 48 - Nuclear power and generation of waste and related issues
Lecture 49 - Geotechnical facets of carbon dioxide capture and sequestration
Lecture 50 - Geotechnical issues and solutions in nuclear waste disposal
Lecture 51 - Mass wasting and landslide hazards zonation
Lecture 52 - Slope stability analysis of natural and engineered slopes
Lecture 53 - Earthquake hazards analysis and mitigation
Lecture 54 - Induced seismicity
Lecture 55 - Volcanic hazards, assessment and mitigation
Lecture 56 - Quaternary land forms and active neotectonics
Lecture 57 - River hydraulics and associate problems, geotechnical applications
Lecture 58 - Linking of river and expected geotechnical issues and possible measures
Lecture 59 - Seashore and wave dynamics
Lecture 60 - Wave dynamics, hazards, geotechnical issues and mitigation

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NPTEL Video Course - Civil Engineering - NOC:Free Surface Flows

Subject Co-ordinator - Prof. Mohammad Saud Afzal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Problems
Lecture 6 - Problems (Continued...)
Lecture 7 - Specific Energy
Lecture 8 - Specific Force
Lecture 9 - Computation of critical depth and Channel transitions
Lecture 10 - Channel Transitions (Continued...)
Lecture 11 - Problems
Lecture 12 - Problems (Continued...)
Lecture 13 - Problems (Continued...)
Lecture 14 - Problems (Continued...)
Lecture 15 - Problems (Continued...)
Lecture 16 - Introduction
Lecture 17 - Friction Factor
Lecture 18 - Manning's Roughness
Lecture 19 - Most Efficient Cross Section
Lecture 20 - Most Efficient Cross Section (Continued...)
Lecture 21 - Problems
Lecture 22 - Problems (Continued...)
Lecture 23 - Problems (Continued...)
Lecture 24 - Problems (Continued...)
Lecture 25 - Problems (Continued...)
Lecture 26 - Introduction
Lecture 27 - Differential Equation of GVF
Lecture 28 - Flow Profiles
Lecture 29 - Flow Profiles (Continued...)

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Lecture 30 - GVF Profiles
Lecture 31 - Problems
Lecture 32 - Problems (Continued...)
Lecture 33 - Problems (Continued...)
Lecture 34 - Problems (Continued...)
Lecture 35 - Problems (Continued...)
Lecture 36 - Introduction
Lecture 37 - SVF with increasing discharge and Control Points
Lecture 38 - SVF with decreasing discharge
Lecture 39 - De Marchi Equation and problems
Lecture 40 - Problems
Lecture 41 - Introduction
Lecture 42 - Hydraulic Jump
Lecture 43 - Efficiency and Classification of hydraulic jump
Lecture 44 - Sharp Crested Weir
Lecture 45 - Problems on Rapidly Varied Flow
Lecture 46 - Introduction
Lecture 47 - Equation of Motion of GVUF
Lecture 48 - GVUF equation in terms of discharge
Lecture 49 - Uniformly Progressive Wave
Lecture 50 - Preissmann Scheme
Lecture 51 - Introduction
Lecture 52 - Surges (Continued...)
Lecture 53 - Dam Break Problem
Lecture 54 - Problems on RVUF
Lecture 55 - Problems on RVUF (Continued...)
Lecture 56 - Introduction
Lecture 57 - Sheilds Curve Continued
Lecture 58 - Bed Forms and Resistance
Lecture 59 - Bed Load and Suspended Load Transport
Lecture 60 - Problems
Lecture 61 - Problems (Continued...)

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NPTEL Video Course - Civil Engineering - NOC:Reservoir Geophysics for Hydrocarbon Exploration

Subject Co-ordinator - Prof. Saurabh Datta Gupta

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Discussion on the background of Reservoir Geophysics in the Upstream Oil and Gas Sector
Lecture 2 - Lectuer on the requirements of advancement of Seismic Data Interpretation towards Reservoir Geoph
Lecture 3 - Lectuer on the basic understanding of Borehole Geophysics and establishment of the Requirements r
Lecture 4 - Discussion related to the basic understanding of Geocellular Modelling in line with High Resoluti
Lecture 5 - Lectuer on the Integrated workflow for Development of Geocellular Modelling
Lecture 6 - The key components of Integrated Reservoir Engineering for Reservoir Geophysics study
Lecture 7 - Discussion on the fundamental concept and applications of Petrophysical in Reservoir
Lecture 8 - Lectuer on comprehensive analysis of Petrophysical Properties of the various Reservoir
Lecture 9 - Lectuer on the understanding on Geomechanically property of the reservoir and Reservoir
Lecture 10 - Lectuer on Hydrocarbon Phase behavior and Flow Dynamics: Key Principles and Diagrams
Lecture 11 - Discussion on Reservoir Geophysics uses advanced seismic methods to identify reservoirs
Lecture 12 - Lectuer on advancements seismic studies Reservoir Geophysics and quantitative analysis
Lecture 13 - Studies Reservoir Geophysics based on AVO/AVA analysis multicomponent seismic techniques
Lecture 14 - Comparative discussion between conventional and multicomponent seismic on wave properties
Lecture 15 - Lectuer on multicomponent seismic: Processing Challenges, Binning, and Techniques
Lecture 16 - Lectuer on the Advanced Seismic Techniques for Reservoir Characterization
Lecture 17 - Discussion on the Applications of Multicomponent the Purpose of Seismic Attribute Study
Lecture 18 - Lectuer on Seismic Attribute Study: Types, Post-Stack Examples, and Applications
Lecture 19 - Lectuer on Seismic Attribute Applications
Lecture 20 - Lectuer on Inversion: Workflow, QC, Case Studies, Challenges, of P-Elastic Parameters
Lecture 21 - Lectuer on Introduction to Vertical Seismic Profile (VSP): Basics and Beyond
Lecture 22 - Lectuer on Exploring Vertical Seismic Profile (VSP): Methods, Applications, and Equipment
Lecture 23 - Lectuer on Examples and Techniques in Vertical Seismic Profile (VSP) Data Acquisition
Lecture 24 - Lectuer on Vertical Seismic Profile (VSP) Data Processing and Interpretation Techniques
Lecture 25 - Lectuer on Comprehensive Guide to Passive Seismic Imaging: Techniques, Applications
Lecture 26 - Discussion on VSP Techniques towards Reservoir Characterization
Lecture 27 - Lectuer on VSP data acquisition workflow and its interpretation
Lecture 28 - Discussion of Walkaway VSP technique in complex geological structure
Lecture 29 - Lectuer on 3D and Far Offset VSP in connection with Advantages and Disadvantages

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Lecture 30 - Discussion on Passive Seismic Data and its application towards the study of Reservoir
Lecture 31 - Discussion on basic understanding of Crosswell Seismic Tomography
Lecture 32 - Lectuer on Crosswell Seismic Tomography for Reservoir Characterization and Management
Lecture 33 - Discussion AVO Analysis and Tomography for Enhanced Reservoir Characterization (EOR)
Lecture 34 - Implication of Crosswell Seismic Tomography and AVO for Reservoir Imaging
Lecture 35 - Lectuer on AVO Analysis: Seismic Signatures, Techniques, and Case Study
Lecture 36 - Discussion on Approach and Principal Causes of Low-Resistivity and (LRLC) Reservoirs
Lecture 37 - Lectuer on LRLC Reservoirs: Causes, Traits, Challenges, Evaluation and Solutions
Lecture 38 - Discussion on Clay Distribution Modes and Core-Well Log Integration in LRLC Reservoirs
Lecture 39 - Discussion on Wireline Logging and Petrophysical Techniques for LRLC Reservoirs
Lecture 40 - Lectuer on Gas Condensate Reservoirs: Properties, Sampling, Production and Performance
Lecture 41 - Discussion on 4D Seismic: Requirements, Planning, and Reservoir Monitoring
Lecture 42 - Lectuer on 4D Seismic: Acquisition, Processing, Interpretation, and History Matching
Lecture 43 - Discussion on The Marlim field: A case study
Lecture 44 - Discussion on Reservoir Modeling: Importance, Pore-Scale Mechanisms, and Carbonate Rocks
Lecture 45 - Discussion on Pore-Scale Displacement Mechanism in Carbonate Reservoirs: A Case Study
Lecture 46 - Discussion on Comprehensive Overview of Deepwater, and Production Implications
Lecture 47 - Lectuer on Deepwater Depositional Systems: Architecture, and Exploration Challenges
Lecture 48 - Discussion on Deepwater Exploration: Importance, Challenges, Frontiers, Global Impact
Lecture 49 - Discussion on Deepwater Exploration and Sedimentation: Trends, Sustainable Approaches
Lecture 50 - Discussion on Deepwater Exploration: Challenges, Innovations, Strategies for Advancement
Lecture 51 - Discussion on Comprehensive Overview of Seismic Imaging and Data Processing in Deep
Lecture 52 - Lectuer on Challenges in Deep-Water Seismic Imaging: Data Acquisition, Geological
Lecture 53 - Discussion on Sediment Variability, Technological Innovations, Seismic Exploration
Lecture 54 - Discussion on Risk Identification, Assessment, and Management in Deepwater Exploration
Lecture 55 - Discussion on Risk Analysis and Management in Deepwater the Macondo Blowout Case Study
Lecture 56 - Discussion on Clastic Reservoirs: Pore Structure, Challenges, and Depletion Effects
Lecture 57 - Lectuer on Enhanced Recovery and Characterization of Deep Clastic Reservoirs
Lecture 58 - Discussion on a Case Study of Depleted Clastic Reservoirs
Lecture 59 - Discussion on Basalt Formation, Sub-Basalt Exploration, and Seismic Challenges
Lecture 60 - Discussion on Case Study: Use of Converted Waves for Sub-Basalt Imaging

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NPTEL Video Course - Civil Engineering - NOC:Mathematical Geophysics

Subject Co-ordinator - Prof. Swarandeep Sahoo

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Scalar and Vectors
Lecture 2 - Co-ordinate Systems
Lecture 3 - Solid Angle
Lecture 4 - Theory Of Fields
Lecture 5 - Geometric Model of Fields
Lecture 6 - Scalar Field and Gradient
Lecture 7 - Flux of a field
Lecture 8 - Divergence and Gauss Theorem
Lecture 9 - Curl and Stokesâ Theorem
Lecture 10 - Greenâ s Function and Theorem
Lecture 11 - System of Equations
Lecture 12 - Gravitational Field - I
Lecture 13 - Gravitational Field - II
Lecture 14 - Equations of Gravitational Field
Lecture 15 - Upward Continuation
Lecture 16 - System of Linear Differential Equation
Lecture 17 - Time Invariant and Varying Fields
Lecture 18 - Electric Field
Lecture 19 - Electric Potential
Lecture 20 - Electric Current, Conductivity, and Ohmâ s Law
Lecture 21 - Diffusion
Lecture 22 - Geothermal gradient
Lecture 23 - Magnetic Diffusion
Lecture 24 - Solution of Magnetic Diffusion Equation
Lecture 25 - Decay of Magnetic Field
Lecture 26 - Wave Equation
Lecture 27 - Seismic waves
Lecture 28 - Free Oscillation of the Earth
Lecture 29 - Inertial wave

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Lecture 30 - Internal Gravity Wave
Lecture 31 - Laplaceâ s and Poissonâ s equations
Lecture 32 - Heat flows in the Earth
Lecture 33 - Convective Heat Flows in the Mantle
Lecture 34 - Outer Core Thermal Convection
Lecture 35 - Outer Core Double-Diffusive Convection
Lecture 36 - Fourier Analysis and Transform
Lecture 37 - Linear Time-Invariant Systems and Filtering
Lecture 38 - Sampling Theory for Time Series
Lecture 39 - Transforms for Geophysical Analysis
Lecture 40 - Data Driven Methods in Geophysics

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NPTEL Video Course - Civil Engineering - NOC:Tectonics and Geodynamics

Subject Co-ordinator - Prof. Saibal Gupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Beginnings - Continental Drift Theory
Lecture 2 - Demise of the Continental Drift Theory
Lecture 3 - The Sea Floor
Lecture 4 - Sea Floor Spreading
Lecture 5 - Rigid Plates on the Earths Surface
Lecture 6 - How plates would move on a flat Earth
Lecture 7 - Three Plate Motions on a Flat Earth
Lecture 8 - Plate boundary movements on a Flat Earth
Lecture 9 - Triple junctions on a flat Earth â Part I
Lecture 10 - Triple junctions on a flat Earth â Part II
Lecture 11 - Evaluation of selected triple junctions
Lecture 12 - Plate Motions on a Spherical Earth
Lecture 13 - Calculating Relative Motions at Plate Boundaries
Lecture 14 - Combination of Rotation Vectors
Lecture 15 - Finite and Infinitesimal, Rotations, and Absolute Plate Motions
Lecture 16 - The Magnetic Field of the Earth
Lecture 17 - Calculating the Earth's Magnetic Field
Lecture 18 - Calculating the Earth's Magnetic Field (Continued...)
Lecture 19 - Magnetizing rocks and Magnetic Anomalies
Lecture 20 - The Geomagnetic Reversal Time Scale
Lecture 21 - History of the Oceans
Lecture 22 - It's all About Heat!
Lecture 23 - The 1-D Heat Conduction Equation
Lecture 24 - More on the Heat Conduction Equation
Lecture 25 - The Equilibrium Geotherm
Lecture 26 - Conditions affecting the equilibrium geotherm
Lecture 27 - Continental Heat Flow and Heat Flow Provinces
Lecture 28 - Heat Flow Provinces in Crust with active erosion
Lecture 29 - The thermal Gradient in the Earth's Mantle

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Lecture 30 - Thermal Structure of the Earth's Mantle
Lecture 31 - Oceanic Heat Flow
Lecture 32 - Cooling of the Oceanic Lithosphere - I
Lecture 33 - Cooling of the Oceanic Lithosphere - II
Lecture 34 - Cooling of the Oceanic Lithosphere and Bathymetric Depth
Lecture 35 - Forces acting on Plates - Driving and Resistive Forces
Lecture 36 - The breakings of continents - I
Lecture 37 - The breakings of continents - II
Lecture 38 - Formation of passive continental margins
Lecture 39 - Stretching the Lithosphere
Lecture 40 - Consequences of continental Lithospheric stretching
Lecture 41 - Formation of extensional basins and continental margins
Lecture 42 - The Mid-Oceanic Ridge Rift Sysem
Lecture 43 - Structure of the ocean crust and the ophiolite model
Lecture 44 - Mantle Petrology
Lecture 45 - Melting of the mantle at Mid-Oceanic ridges
Lecture 46 - Conservative Plate Boundaries - Transform Faults
Lecture 47 - Oceanic Transform Faults - Morphology and Crustal Structure
Lecture 48 - Explaining the Idiosyncrasies of Oceanic Transforms - I
Lecture 49 - Explaining the Idiosyncrasies of Oceanic Transforms - II
Lecture 50 - Continental Transforms
Lecture 51 - Convergent Margins
Lecture 52 - Geophysical characteristics of subduction zones
Lecture 53 - The arc basement and accretionary prism
Lecture 54 - Mechanics of Thrust sheets and accretionary prism process - I
Lecture 55 - Mechanics of Thrust sheets and accretionary prism process - II
Lecture 56 - Arcuate trenches, outer swells and back-arc basins
Lecture 57 - Magmatism associated with subduction zones
Lecture 58 - Collisions!
Lecture 59 - Continent-Continent collisions and Formation of Suture Zones
Lecture 60 - Did Plate tectonics operate on Early Earth

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NPTEL Video Course - Civil Engineering - NOC:Advanced Structural Analysis

Subject Co-ordinator - Prof. Devesh Punera

Co-ordinating Institute - IIT - Bhubaneshwar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of stress resultant and static equilibrium
Lecture 2 - Displacement and kinematic compatibility
Lecture 3 - Stability,Static and kinematic indeterminacy of structural system
Lecture 4 - Kinematic indeterminacy, Energy approach
Lecture 5 - Energy concept and virtual work principle
Lecture 6 - Energy Concept (Continued...)
Lecture 7 - Examples cases using energy approach
Lecture 8 - Introduction to Force method
Lecture 9 - Simple flexibility approach - examples
Lecture 10 - Temperature loading/member pre-strains and post processing
Lecture 11 - Introduction to displacement approach - simple stiffness method
Lecture 12 - Application to continuous beams
Lecture 13 - Simple stiffness approach for frame structures
Lecture 14 - Equivalent joint load approach
Lecture 15 - Temperature loading/member pre-strains/support displacements
Lecture 16 - Generalized Flexibility Method - Member Flexibility
Lecture 17 - Generalized Flexibility - Structural System
Lecture 18 - Structural Flexibility Matrix from Generalized System
Lecture 19 - Generalized Flexibility Approach - Examples
Lecture 20 - Generalized Flexibility Approach - Examples (Continued...)
Lecture 21 - Generalized Stiffness Approach - Brief
Lecture 22 - Member Stiffness Matrix
Lecture 23 - Example Case - Flexibility and Stiffness Approach
Lecture 24 - Simple Stiffness Approach - Example
Lecture 25 - Generalized Stiffness Approach - Example
Lecture 26 - Computer Implementation of Stiffness Approach
Lecture 27 - Assembly of Global Stiffness Matrix
Lecture 28 - Matrix Rearrangement and Solution Approach
Lecture 29 - Continuous Beam Systems - Computer Based Stiffness Approach

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Lecture 30 - Continuous Beam - Computer Based Stiffness Approach (Continued...)
Lecture 31 - MATLAB implementation of stiffness approach - continuous beam case
Lecture 32 - Computer Based Stiffness Approach in MATLAB - Hands-on Session
Lecture 33 - Stiffness approach for plane truss members - computer implementation
Lecture 34 - 2D truss stiffness approach - computer implementaion
Lecture 35 - Plane truss MATLAB implementation Hands-on session
Lecture 36 - Computer implementation of Stiffness Approach - Plane Frame System
Lecture 37 - Computer implementation of Stiffness Approach - Plane Frame System (Continued...)
Lecture 38 - Computer implementation for plance frame - Example Problem
Lecture 39 - Computer implementation of Stiffness Approach - Grid Structures
Lecture 40 - Transformation in 3D domain - Space Frame and Space Truss
Lecture 41 - Computer based stiffness approach - Space Frame and Space Truss
Lecture 42 - Space truss member - Example and computer implementation
Lecture 43 - Introduction to the geometrical nonlinearities
Lecture 44 - Geometrical nonlinear analysis - Plane Truss Member
Lecture 45 - Geometrical nonlinear analysis - Plane Truss Structure
Lecture 46 - Geometrical nonlinear analysis - Example Problem
Lecture 47 - Geometrical nonlinear analysis - Beam Members
Lecture 48 - Geometrical nonlinear analysis - Beam Members (Continued...)
Lecture 49 - Incremental load analysis - Geometrical nonlinear problem
Lecture 50 - Newton Raphson Procedure for nonlinear analysis
Lecture 51 - Newton Raphson Scheme - Geometrically nonlinear problem
Lecture 52 - P-delta effects in general frame structures
Lecture 53 - P-delta effects using geometric stiffness and solution
Lecture 54 - Linear Buckling Analysis
Lecture 55 - Introduction to Material nonlinearity
Lecture 56 - Incremental Stress-strain Relation - Material Nonlinearity
Lecture 57 - Member stiffness and incremental analysis
Lecture 58 - Iterative solution approach and numerical example
Lecture 59 - Example case
Lecture 60 - Introduction to finite element approach and way forward

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NPTEL Video Course - Civil Engineering - NOC:Computational Geomechanics

Subject Co-ordinator - Prof. Shantanu Patra

Co-ordinating Institute - IIT - Bhubaneshwar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mathematical Modeling and Governing Equation
Lecture 2 - Solution of governing equation and computer implementation
Lecture 3 - Estimation of Numerical Error and error propagation
Lecture 4 - Numerical Stability and round-off errors
Lecture 5 - Number representation and Computational Limits
Lecture 6 - Numerical differentiation
Lecture 7 - Higher order numerical differentiation and Eigen Value problem
Lecture 8 - Buckling of column and Numerical solution
Lecture 9 - Smallest Eigen value and Roots of characteristic equation
Lecture 10 - Higher Order Numerical Differentiation and Elgen Value Problem
Lecture 11 - Buckling of column and Numerical solution
Lecture 12 - Smallest Eigen value and Roots of characteristic equation
Lecture 13 - Roots of characteristic equation - Bracketing method
Lecture 14 - Roots of characteristic equation - Open method
Lecture 15 - Roots of characteristic polynomial
Lecture 16 - Initial value vs Boundary value problem
Lecture 17 - RK Method and Multi-Step Method
Lecture 18 - System of equations, stiffness and multi-Step Method (Continued...)
Lecture 19 - System of equations, stiffness and multi-Step Method (Continued...)
Lecture 20 - System of equations, stiffness and multi-Step Method (Continued...)
Lecture 21 - Solutions of Simultaneous linear algebraic equations (continued...)
Lecture 22 - Application of FDM - Axially loaded pile
Lecture 23 - BEM for laterally loaded semi-infinite pile
Lecture 24 - BEM for laterally loaded pile (Continued...)
Lecture 25 - Buckling of piles
Lecture 26 - FDM Application - Infinite beam subjected to a point load
Lecture 27 - FDM Application - Infinite beam subjected to a concentrated moment
Lecture 28 - FDM for laterally loaded pile
Lecture 29 - FDM for laterally loaded pile and buckling of column

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Lecture 30 - FDM for buckling of column and BEM (Continued...)
Lecture 31 - Finite Difference Method And Laplace Equation
Lecture 32 - Finite Difference Method And Laplace Equation (Continued...)
Lecture 33 - Finite Difference Method And Laplace Equation (Continued...)
Lecture 34 - Finite Difference Method And Parabolic nequation - Explicit Method
Lecture 35 - Parabolic equation - Explicit and Implicit Method
Lecture 36 - Parabolic equation - Explicit and Implicit Method
Lecture 37 - Parabolic equation - 1-D Consolidation problem
Lecture 38 - FDM for 2D seepage problem
Lecture 39 - FDM for Mat Foundation
Lecture 40 - Approximate methods of solution
Lecture 41 - Constitutive Models for geomechanics
Lecture 42 - Approximate methods for Beam on elastic foundation problem
Lecture 43 - Introduction to Finite Element Method
Lecture 44 - Formulation of Stiffness matrix-direct approach
Lecture 45 - Application of Direct stiffness Methods for 1D Spring element
Lecture 46 - Stiffness Matrix Using Shape Functions and Truss Element
Lecture 47 - Truss analysis
Lecture 48 - Flow through porous medium
Lecture 49 - Variational method for flow through porous medium
Lecture 50 - Variational method for 1D consolidation and bar element
Lecture 51 - Strain energy method for bar element (Continued...)
Lecture 52 - Formulation of stiffness matrix for beam element
Lecture 53 - Formulation of stiffness matrix for beam element (Continued....)
Lecture 54 - Analysis of beam
Lecture 55 - Determination of shape function for 2D CST element
Lecture 56 - Determination of Stiffness matrix for CST element (Continued...)
Lecture 57 - Body force and surface force and numerical integration
Lecture 58 - Iso-parameteric element
Lecture 59 - Axisymmetric element

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NPTEL Video Course - Civil Engineering - NOC:Geotechniques of Dams, Tunnels and Underground Spaces

Subject Co-ordinator - Prof. R. K. Dubey

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of dams, significance and impact
Lecture 2 - Significance of geotechniques and different types of dams foundation ground : rock grounds
Lecture 3 - Major soil grounds and glacial deposits in dam construction
Lecture 4 - Introduction of tunnels, parts of tunnel and significance
Lecture 5 - Introduction of underground spaces, needs and significance
Lecture 6 - Structural components and parameters for categorization of dams
Lecture 7 - Categorization of dams based on material used
Lecture 8 - Categorization of dams based on design and functions
Lecture 9 - Arch dams and categorization of based on usage and function
Lecture 10 - Categorization of miscellaneous dams and based on technical specifications and major forces effe
Lecture 11 - Causes and frequency of failure of dams
Lecture 12 - Parameters for evaluation of dam foundation site
Lecture 13 - Methods of site investigation for dam construction (Areal photography and photogrammetry)
Lecture 14 - Geophysical Methods Used in Site Investigation of Dams
Lecture 15 - Geotechnical methods for site investigation of dams
Lecture 16 - Foundation ground
Lecture 17 - Excavation methods
Lecture 18 - Reinforcement of foundations/ground
Lecture 19 - Foundation types, preparation and problems
Lecture 20 - Treatment of dam foundations
Lecture 21 - Component based types of hazards
Lecture 22 - Classification systems of hazards associated with dams
Lecture 23 - Other classification system
Lecture 24 - Dam safety legislations and Dam Safety Program
Lecture 25 - Dam safety legislations and historical failure of dams
Lecture 26 - Concept and estimation of in-situ-stress
Lecture 27 - Methods for determination of in-situ-stress
Lecture 28 - Rock-coring based methods for determination of in-situ-stress
Lecture 29 - Permeability of foundation ground and its estimation

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Lecture 30 - Test method for determination of insitu permeability of foundation ground
Lecture 31 - Introductory aspects of stability analysis
Lecture 32 - Critical issues in the analysis of the stability of dam
Lecture 33 - Condition for slope stability analysis
Lecture 34 - Estimation of pore-pressure and permeability of dam foundation
Lecture 35 - Application of the laboratory test parameters, monitoring and ground improvement
Lecture 36 - Classification of underground spaces
Lecture 37 - Tunnelling philosophy for construction of underground space structures (New Austrian Tunnelling
Lecture 38 - Tunnelling philosophy for construction of underground space structures (Norwegian Method of Tunr
Lecture 39 - Basics of drilling and blasting for creation underground spaces
Lecture 40 - Underground blasting method for development of underground space structures
Lecture 41 - Tunnel support pressure and estimation methods
Lecture 42 - Evaluation of tunnels support pressure : empirical methods
Lecture 43 - Approaches for estimation of ground pressure : semi-empirical and other methods
Lecture 44 - Types of tunnel support system : rock-bolts
Lecture 45 - Recommendation of support system
Lecture 46 - Tunnelling grounds
Lecture 47 - Classification of squeezing ground
Lecture 48 - Geomechanical criterion for squeezing ground condition
Lecture 49 - Tunnel instrumentation and monitoring
Lecture 50 - Instruments monitoring and management
Lecture 51 - Tunnelling hazards, and classification
Lecture 52 - Latent variables in tunnelling hazards analysis
Lecture 53 - Ground related tunnelling hazards and categorization
Lecture 54 - Squeezing hazards and ground conditions
Lecture 55 - Squeezing criteria, predictions and swelling hazards
Lecture 56 - Anchoring of dam foundation ground
Lecture 57 - Types of rock-bolts
Lecture 58 - Rock bolting theory and working mechanism
Lecture 59 - Mechanics of anchoring of ground by rock-bolting
Lecture 60 - Different forces acting on dam and application of anchoring system

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NPTEL Video Course - Civil Engineering - NOC:Environmental Nanotechnology and Applications

Subject Co-ordinator - Prof. Remya Neelancherry

Co-ordinating Institute - IIT - Bhubaneshwar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Nanotechnology
Lecture 2 - Types of nanomaterials/nanocomposites
Lecture 3 - Properties of nanomaterials/nanocomposites
Lecture 4 - Nanomaterial synthesis through different methods: Top-down approach - I
Lecture 5 - Nanomaterial synthesis through different methods: Top-down approach - II
Lecture 6 - Nanomaterial synthesis through different methods: Bottom-up approach - I
Lecture 7 - Nanomaterial synthesis through different methods: Bottom-up approach - II
Lecture 8 - Green synthesis of nanomaterials
Lecture 9 - Morphological Characterization of Nanomaterials (TEM)
Lecture 10 - Morphological Characterization of Nanomaterials (SEM)
Lecture 11 - Specific surface area and Pore size of Nanomaterials (BET)
Lecture 12 - Crystallographic structure of Nanomaterials (XRD)
Lecture 13 - Elemental Composition of Nanomaterials (XPS)
Lecture 14 - Spectroscopic characteristics of Nanomaterials
Lecture 15 - Identification of functional groups of Nanomaterials (FTIR)
Lecture 16 - Conventional water/wastewater treatment
Lecture 17 - Nanotechnology in water/wastewater treatment - I
Lecture 18 - Nanotechnology in water/wastewater treatment - II
Lecture 19 - Basics of Adsorption
Lecture 20 - Synthesis and properties of nano-adsorbent
Lecture 21 - Nano-adsorbent in pollutant removal from wastewater - I
Lecture 22 - Nano-adsorbent in pollutant removal from wastewater - II
Lecture 23 - Basics of Photocatalysis
Lecture 24 - Nano-photocatalyst preparation and modification - I
Lecture 25 - Nano-photocatalyst preparation and modification - II
Lecture 26 - Nano-photocatalyst modification and characterization
Lecture 27 - Photocatalysis for wastewater treatment - I
Lecture 28 - Photocatalysis for wastewater treatment - II
Lecture 29 - Basics of membrane filtration

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Lecture 30 - Nanomembrane synthesis and characterization
Lecture 31 - Nanomembrane in water and wastewater treatment - I
Lecture 32 - Nanomembrane in water and wastewater treatment - II
Lecture 33 - Nano-biochar and biochar composites
Lecture 34 - Basics of disinfection - I
Lecture 35 - Basics of disinfection - II
Lecture 36 - Nano-disinfectants for wastewater treatment
Lecture 37 - Nanomaterial leaching, toxicity and risk assessment - I
Lecture 38 - Nanomaterial leaching, toxicity and risk assessment - II

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NPTEL Video Course - Civil Engineering - NOC:Fundamentals of Ecosystem Health and Assessment

Subject Co-ordinator - Prof. Surjya Kumar Saikia

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is ecosystem ? and Components of Ecosystem
Lecture 2 - Ecosystem or Ecological Balance
Lecture 3 - Energy Transfer and the living world
Lecture 4 - Ecological Footprints and Biocapacity
Lecture 5 - Carrying Capacity of Earth
Lecture 6 - Human Impact on Ecosystem
Lecture 7 - Ecosystem Degradation
Lecture 8 - Ecosystem Health: The Concept
Lecture 9 - Ecosystem Resources
Lecture 10 - Ecosystem Distress Syndrom For Ecosystem Health Assessment
Lecture 11 - Ecosystem Services - Concept
Lecture 12 - Values of Ecosystem Services
Lecture 13 - Ecosystem Services - Indicators
Lecture 14 - Identifying and Valuing Ecosystem Services
Lecture 15 - Biodiversity and Ecosystem Services
Lecture 16 - Global Climate Change and Ecosystem Services
Lecture 17 - Ecosystem Service : Tools
Lecture 18 - Step by Step Ecosystem Services Assessment (Step 1 - Step 2)
Lecture 19 - Step by Step Ecosystem Services Assessment (Step 3 - Step 5)
Lecture 20 - Introduction of Models for Assessment of Ecosystems Services
Lecture 21 - General Outline for Ecosystem Health Assessment : Classification of Indicators
Lecture 22 - Ecosystem Health Assessment Methods - Introduction
Lecture 23 - VORS Method of Ecosystem Assessment - Calculating NDVI
Lecture 24 - VORS Method of Ecosystem Assessment - Ecosystem Organization
Lecture 25 - Introducing Fragstats
Lecture 26 - VORS Method of Ecosystem Assessment - Resilience and other options
Lecture 27 - Pressure-State-Response (PSR) Model of Ecosystem Assessment
Lecture 28 - Ecosystem Health Assessment Tools
Lecture 29 - Ecosystem Health assessment model - kLAB and InVest

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Lecture 30 - Auto-calculated toolkit for Ecosystem Health Assessment
Lecture 31 - Millennium Ecosystem Health Assessment Model
Lecture 32 - Ecosystem Risk and Ecosystem Risk Assessment
Lecture 33 - Ecosystem Risk Assessment: Framework
Lecture 34 - Ecosystem Risk Analysis: Tools
Lecture 35 - Decision Making Process in ERA
Lecture 36 - Decision Making Criteria
Lecture 37 - Marginal Damage Function
Lecture 38 - Drivers of Global Change
Lecture 39 - Risk Assessment Databases
Lecture 40 - Risk Assessment Tools and Models
Lecture 41 - GLOBIO and IPAT
Lecture 42 - Carbon Credit
Lecture 43 - NET ZERO Initiative and approach

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NPTEL Video Course - Civil Engineering - NOC:Design of Structural Systems

Subject Co-ordinator - Prof. T. Jothi Saravanan

Co-ordinating Institute - IIT Bhubaneswar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Design of Concrete Structures
Lecture 2 - Concept of Structural Systems
Lecture 3 - Basic Materials
Lecture 4 - Indian Design Codes and Handbooks
Lecture 5 - Design Philosophy for RC Structures
Lecture 6 - Design of Beams
Lecture 7 - Analysis and design of Singly reinforced RC section
Lecture 8 - Analysis and design of Doubly reinforced RC section
Lecture 9 - Design for Shear
Lecture 10 - Design for Shear (Continued...)
Lecture 11 - Design for Torsion and Bond
Lecture 12 - Design for Torsion and Bond (Continued...)
Lecture 13 - Introduction to Design of slabs
Lecture 14 - Design of One-way Slab
Lecture 15 - Design of Two-way Slab
Lecture 16 - Design of Two-way slab (Continued...)
Lecture 17 - Design of Staircase
Lecture 18 - Design of Flat slabs
Lecture 19 - Introduction to Compression Members
Lecture 20 - Design of Columns
Lecture 21 - Design of Columns (Continued...)
Lecture 22 - Design of Columns (Continued...)
Lecture 23 - Practical Problems on Column Design
Lecture 24 - Effective length of Columns
Lecture 25 - Introduction to Design of Footings
Lecture 26 - Design of Isolated Footings
Lecture 27 - Design of Isolated Footings (Continued...)
Lecture 28 - Design of Combined Footings
Lecture 29 - Practical problem on Combined Footings

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Lecture 30 - Introduction to Detailing of RC elements
Lecture 31 - Detailing of RC Slabs, Beams, Columns and Footings
Lecture 32 - Detailing of RC Slabs, Beams, Columns and Footings (Continued...)
Lecture 33 - Basics of Seismic Design and Ductile Detailing
Lecture 34 - Basics of seismic design and ductile detailing (Continued...)
Lecture 35 - Load Combinations for Limit State Design
Lecture 36 - RC Moment Resisting Frames
Lecture 37 - RC Special Moment Resisting Frames
Lecture 38 - Elastic vs plastic analysis
Lecture 39 - Theory of Plastic Analysis
Lecture 40 - Formation of Plastic Hinge
Lecture 41 - Formation of Plastic Hinge (Continued...)
Lecture 42 - Nonlinear Analysis of RC structures
Lecture 43 - Introduction to Design of Retaining wall
Lecture 44 - Introduction to Design of Retaining wall (Continued...)
Lecture 45 - Design of Cantilever Retaining Wall
Lecture 46 - Design of Counter fort Retaining Wall
Lecture 47 - Design of Counter fort Retaining Wall (Continued...)
Lecture 48 - Introduction to Tall Buildings
Lecture 49 - Loads and Load path of Tall Buildings
Lecture 50 - Structural Integrity of Tall Buildings
Lecture 51 - Design of Multi-story RC Building
Lecture 52 - Design of Multi-story RC Building (Continued...)
Lecture 53 - Introduction to Steel Structures
Lecture 54 - Loading, Design Philosophy and Connections
Lecture 55 - Beam-Column Connections
Lecture 56 - Gusset Joint and Built-up Column
Lecture 57 - Design and Detailing of Steel structures for earthquake loads
Lecture 58 - Introduction to Industrial Steel Building
Lecture 59 - Design of Industrial Steel building
Lecture 60 - Design of Roof Truss with practical examples

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NPTEL Video Course - Civil Engineering - Advanced Structural Analysis

Subject Co-ordinator - Prof. Devdas Menon

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Basic Structural Analysis - I
Lecture 2 - Review of Basic Structural Analysis - I
Lecture 3 - Review of Basic Structural Analysis - I
Lecture 4 - Review of Basic Structural Analysis - I
Lecture 5 - Review of Basic Structural Analysis - I
Lecture 6 - Review of Basic Structural Analysis - I
Lecture 7 - Review of Basic Structural Analysis - II
Lecture 8 - Review of Basic Structural Analysis - II
Lecture 9 - Review of Basic Structural Analysis - II
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Lecture 12 - Review of Basic Structural Analysis - II
Lecture 13 - Review of Basic Structural Analysis - II
Lecture 14 - Review of Basic Structural Analysis - II
Lecture 15 - Review of Basic Structural Analysis - II
Lecture 16 - Review of Basic Structural Analysis - II
Lecture 17 - Basic Matrix Concepts
Lecture 18 - Basic Matrix Concepts
Lecture 19 - Basic Matrix Concepts
Lecture 20 - Basic Matrix Concepts
Lecture 21 - Basic Matrix Concepts
Lecture 22 - Matrix Analysis of Structures with Axial Elements
Lecture 23 - Matrix Analysis of Structures with Axial Elements
Lecture 24 - Matrix Analysis of Structures with Axial Elements
Lecture 25 - Matrix Analysis of Structures with Axial Elements
Lecture 26 - Matrix Analysis of Structures with Axial Elements
Lecture 27 - Matrix Analysis of Beams and Grids
Lecture 28 - Matrix Analysis of Beams and Grids
Lecture 29 - Matrix Analysis of Beams and Grids

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Lecture 30 - Matrix Analysis of Beams and Grids
Lecture 31 - Matrix Analysis of Beams and Grids
Lecture 32 - Matrix Analysis of Beams and Grids
Lecture 33 - Matrix Analysis of Plane and Space Frames
Lecture 34 - Matrix Analysis of Plane and Space Frames
Lecture 35 - Matrix Analysis of Plane and Space Frames
Lecture 36 - Matrix Analysis of Plane and Space Frames
Lecture 37 - Matrix Analysis of Plane and Space Frames
Lecture 38 - Analysis of elastic instability and second-order effects
Lecture 39 - Analysis of elastic instability and second-order effects
Lecture 40 - Analysis of elastic instability and second-order effects
Lecture 41 - Life beyond Structures & Analysis

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NPTEL Video Course - Civil Engineering - Finite Element Analysis

Subject Co-ordinator - Dr. B.N. Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 6
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Lecture 8
Lecture 9
Lecture 10
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Lecture 12
Lecture 13
Lecture 14
Lecture 15
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Lecture 29

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Lecture 30
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Lecture 35
Lecture 36
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Lecture 39
Lecture 40

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NPTEL Video Course - Civil Engineering - Geosynthetics and Reinforced Soil Structures

Subject Co-ordinator - Dr. K. Rajagopal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction & Need for Geosynthetics
Lecture 2 - Types and Functions of Geosynthetics
Lecture 3 - Polymers in Geosynthetics and Manufacturing Techniques
Lecture 4 - Strength Analysis of Reinforced Soils - I
Lecture 5 - Strength Analysis of Reinforced Soils - II
Lecture 6 - Testing of Geosynthetics - I
Lecture 7 - Testing of Geosynthetics - II
Lecture 8 - Testing of Geosynthetics - III
Lecture 9 - Different Types of Soil Retaining Structures
Lecture 10 - Construction Aspects of Geosynthetic Reinforced Soil Retaining Walls
Lecture 11 - Design Codes for Reinforced Soil Retaining Walls
Lecture 12 - External Stability Analysis of Reinforced Soil Retaining Walls
Lecture 13 - Seismic Loads and Internal Stability Analysis of Reinforced Soil Walls
Lecture 14 - Testing Requirements for Reinforced Soil Retaining Walls
Lecture 15 - Design Example of Reinforced Soil Retaining Walls - I
Lecture 16 - Design Example of Reinforced Soil Retaining Walls - II
Lecture 17 - Design Example of Reinforced Soil Retaining Walls - III
Lecture 18 - Design Example of Reinforced Soil Retaining Walls - IV
Lecture 19 - Case Study of Construction of Very High Tiered Reinforced Soil Walls
Lecture 20 - Controlled Yielding to Reduce Lateral Earth Pressures on Rigid Walls
Lecture 21 - Geosynthetic Reinforced Soil Embankments - I
Lecture 22 - Geosynthetic Reinforced Soil Embankments - II
Lecture 23 - Two-Part Wedge Analysis of Reinforced Soil Embankments
Lecture 24 - Soil Embankments Supported on Geocell Mattresses
Lecture 25 - Accelerated Pre-Consolidation of Soft Clay Soils Using Geosynthetics
Lecture 26 - Geosynthetic Reinforced Pile Systems for High Embankments
Lecture 27 - Geosynthetic Encasement for Stronger and Stiffer Stone Columns
Lecture 28 - Response of Footings Resting on Reinforced Foundation Soils
Lecture 29 - Bearing Capacity Analysis of Footings Resting on Reinforced Foundation Soils

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Lecture 30 - Design and Construction of Container Yards Using Geosynthetics
Lecture 31 - Geosynthetics in Flexible Pavements - I
Lecture 32 - Geosynthetics in Flexible Pavements - II
Lecture 33 - Geosynthetics in Flexible Pavements and Carbon Foot Print Analysis
Lecture 34 - Filtration of Soils Using Geosynthetics
Lecture 35 - Drainage Applications of Geosynthetics
Lecture 36 - Erosion Control of Soils Using Geosynthetics
Lecture 37 - Sustainable Infrastructure Development & Natural Geosynthetics
Lecture 38 - Introduction to Geosynthetics in Landfills
Lecture 39 - Case Study of the Construction of Airport Runway at Pakyong, Sikkim Using Geosynthetics (Guest L
Lecture 40 - Landfill Engineering Systems (Guest Lecture)

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NPTEL Video Course - Civil Engineering - Modern Construction Materials

Subject Co-ordinator - Dr. Ravindra Gettu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prologue
Lecture 2 - The Science, Engineering and Technology of Materials An Introduction - I
Lecture 3 - The Science, Engineering and Technology of Materials An Introduction - II
Lecture 4 - Review of Atomic Bonding - I
Lecture 5 - Review of Atomic Bonding - II
Lecture 6 - Structure of Solids - I
Lecture 7 - Structure of Solids - II
Lecture 8 - Structure of Solids - III
Lecture 9 - Movement of Atoms in Solids
Lecture 10 - Development of Microstructure - I
Lecture 11 - Development of Microstructure - II
Lecture 12 - Surface Properties
Lecture 13 - Response to Stress - Part 1
Lecture 14 - Response to Stress - Part 2
Lecture 15 - Response to Stress - Part 3
Lecture 16 - Failure Theories
Lecture 17 - Fracture Mechanics - Part 1
Lecture 18 - Fracture Mechanics - Part 2
Lecture 19 - Rheology of Liquids and Solids
Lecture 20 - Thermal Properties
Lecture 21 - Review of Construction Materials
Lecture 22 - Wood and Wood Products - 1
Lecture 23 - Wood and Wood Products - 2
Lecture 24 - Wood and Wood Products - Guest Lecture
Lecture 25 - Polymers
Lecture 26 - Fibre Reinforced Polymer - 1
Lecture 27 - Fibre Reinforced Polymer - 2
Lecture 28 - Metals - Part 1
Lecture 29 - Metals - Part 2

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Lecture 30 - Metals - Part 3
Lecture 31 - Bituminous Material - Part 1
Lecture 32 - Bituminous Material - Part 2
Lecture 33 - Concrete - Part 1
Lecture 34 - Concrete - Part 2
Lecture 35 - Concrete - Part 3
Lecture 36 - Concrete - Part 4
Lecture 37 - Concrete - Part 5
Lecture 38 - Glass - Guest Lecture
Lecture 39 - Social Perception - Guest Lecture
Lecture 40 - Water Proofing - Guest Lecture
Lecture 41 - Floor Finishes - Guest Lecture
Lecture 42 - Anchors - Guest Lecture

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NPTEL Video Course - Civil Engineering - Urban transportation planning

Subject Co-ordinator - Dr. V. Thamizh Arasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Course Outline
Lecture 5 - Conceptual Aspects
Lecture 6 - Conceptual Aspects (Continued...)
Lecture 7 - Conceptual Aspects (Continued...)
Lecture 8 - Conceptual Aspects (Continued...)
Lecture 9 - Trip Generation Analysis
Lecture 10 - Trip Generation Analysis (Continued...)
Lecture 11 - Trip Generation Analysis (Continued...)
Lecture 12 - Trip Generation Analysis (Continued...)
Lecture 13 - Modal Split Analysis
Lecture 14 - Modal Split Analysis (Continued...)
Lecture 15 - Modal Split Analysis (Continued...)
Lecture 16 - Modal Split Analysis (Continued...)
Lecture 17 - Modal Split Analysis (Continued...)
Lecture 18 - Modal Split Analysis (Continued...)
Lecture 19 - Modal Split Analysis (Continued...)
Lecture 20 - Trip Distribution Analysis
Lecture 21 - Trip Distribution Analysis (Continued...)
Lecture 22 - Trip Distribution Analysis (Continued...)
Lecture 23 - Trip Distribution Analysis (Continued...)
Lecture 24 - Trip Distribution Analysis (Continued...)
Lecture 25 - Trip Distribution Analysis (Continued...)
Lecture 26 - Trip Distribution Analysis (Continued...)
Lecture 27 - Route Assignment
Lecture 28 - Route Assignment (Continued...)
Lecture 29 - Route Assignment (Continued...)

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Lecture 30 - Route Assignment (Continued...)
Lecture 31 - Transportation Surveys
Lecture 32 - Transportation Surveys (Continued...)
Lecture 33 - Transportation Surveys (Continued...)
Lecture 34 - Transport Related Land-Use Models
Lecture 35 - Transport Related Land-Use Models (Continued...)
Lecture 36 - Transport Related Land-Use Models (Continued...)
Lecture 37 - Urban Structure
Lecture 38 - Urban Structure (Continued...)
Lecture 39 - Urban Goods Movement
Lecture 40 - Urban Goods Movement (Continued...)

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NPTEL Video Course - Civil Engineering - Mechanics of Solids

Subject Co-ordinator - Prof. M.S. Sivakumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Planar Rigid Body
Lecture 2 - Degrees of freedom
Lecture 3 - Equations of Equilibrium
Lecture 4 - Planar rigid body Statics - Example 1
Lecture 5 - Rigid Body Statics - Example 2
Lecture 6 - Structural Systems with rigid bodies
Lecture 7 - Types of 1-D Structural Elements
Lecture 8 - Trusses - Axial members
Lecture 9 - Analysis of Truss Systems
Lecture 10 - Stability of Structural systems
Lecture 11 - Trusses - additional discussions
Lecture 12 - Trusses - Method of Sections
Lecture 13 - Beams - Example 1
Lecture 14 - Beams - BMD & SFD
Lecture 15 - Beams - loading, shear and BM relationships
Lecture 16 - Virtual work method
Lecture 17 - Virtual displacements
Lecture 18 - Finding virtual displacements
Lecture 19 - Virtual Work Method - Example 1
Lecture 20 - Virtual Work Method - Example 2
Lecture 21 - Static Friction - an understanding
Lecture 22 - Belt Friction
Lecture 23 - Friction
Lecture 24 - General concepts - rigid bodies
Lecture 25 - Motion of a rigid body = a translation + a rotation
Lecture 26 - Motion of a point of the rigid body
Lecture 27 - Motion of one point on a rigid body relative to another
Lecture 28 - Understanding rotational motion r_dot = w x r
Lecture 29 - Kinematics velocity and acceleration

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Lecture 30 - Understanding Coriolis Acceleration
Lecture 31 - Kinematics - Solving problems
Lecture 32 - Equations of motion of a rigid body
Lecture 33 - Tips and Techniques 1/2
Lecture 34 - Tips and Techniques 2/2
Lecture 35 - Solving Problems 1/4
Lecture 36 - Solving Problems 2/4
Lecture 37 - Solving Problems 3/4
Lecture 38 - Solving Problems 4/4
Lecture 39 - Engineering Statics - Solving problems

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NPTEL Video Course - Civil Engineering - Pre-stressed Concrete Structures

Subject Co-ordinator - Prof. Devdas Menon, Dr. Amlan Kumar Sengupta

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prestressing System
Lecture 2 - Types of Prestressing
Lecture 3 - Prestressing System and Devices (Pre-Tensioning)
Lecture 4 - Prestressing System and Devices (Post-Tensioning)
Lecture 5 - Concrete - Part-1
Lecture 6 - Concrete, Grout - Part-2
Lecture 7 - Prestressing Steel
Lecture 8 - Losses in Prestress
Lecture 9 - Friction & Anchorage Slip
Lecture 10 - Creep,Shrinkage & Relaxation Losses
Lecture 11 - Analysis of Members
Lecture 12 - Analysis of Members Under Flexure
Lecture 13 - Cracking Moment,Kern Point and Pressure Line
Lecture 14 - Analysis of Rectangular sections
Lecture 15 - Analysis of Flanged Sections
Lecture 16 - Analysis of Partially Prestressed Section
Lecture 17 - Design of Members
Lecture 18 - Design of Members for Flexure (Type1 Members)
Lecture 19 - Design of Members for Flexure (Type1 & Type3)
Lecture 20 - Choice of Sections and Determination of Limiting
Lecture 21 - Magnel`s Graphical Method
Lecture 22 - Detailing Requirements
Lecture 23 - Analysis and Design for Shear and Torsion
Lecture 24 - Design for Shear - Part-1
Lecture 25 - Design for Shear - Part-2
Lecture 26 - Analysis of Torsion
Lecture 27 - Analysis of Torsion - Part-1
Lecture 28 - Analysis of Torsion - Part-2
Lecture 29 - Calculations of Deflection and Crack Width

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Lecture 30 - Transmission of Prestress
Lecture 31 - Post-tensioned Members
Lecture 32 - Cantilever Beams
Lecture 33 - Continuous Beams - Part-1
Lecture 34 - Continuous Beams - Part-2
Lecture 35 - Composite Sections
Lecture 36 - One-Way Slabs
Lecture 37 - Two-Way Slabs - Part-1
Lecture 38 - Two-Way Slabs - Part-2
Lecture 39 - compression Members
Lecture 40 - Circular Prestressing,Conclusion

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NPTEL Video Course - Civil Engineering - Water and Waste Water Engineering

Subject Co-ordinator - Prof. B.S. Murty, Prof. C. Venkobachar, Prof. Ligy Philip

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Water & Waste Water Engineering
Lecture 2 - Water & Waste Water Quality Enhancement
Lecture 3 - Water & Waste Water Quantity Estimation
Lecture 4 - Water & Waste Water Quantity Estimation (Continued...)
Lecture 5 - Water & Waste Water Characteristics
Lecture 6 - Water & Waste Water Characteristics (Continued...)
Lecture 7 - Water Treatment System Unit Operations
Lecture 8 - Sedimentation
Lecture 9 - Sedimentation (Continued...)
Lecture 10 - Coagulation & Flocculation
Lecture 11 - Coagulation & Flocculation (Continued...)
Lecture 12 - Softening
Lecture 13 - Filtration
Lecture 14 - Filtration (Continued...)
Lecture 15 - Disinfection
Lecture 16 - Introduction To Domestic Waste Water Treatment
Lecture 17 - Physical Unit Processes For Waste Water Treatment
Lecture 18 - Introduction To Microbiology
Lecture 19 - Microbiology - (Continued...)
Lecture 20 - Waste Water Treatment Reactor Analysis
Lecture 21 - Biological Unit Processes - Activated Sludge Process
Lecture 22 - Activated Sludge Process - Modification
Lecture 23 - Activated Sludge Process (Continued...)
Lecture 24 - Aeration,Nitrification And Denitrification
Lecture 25 - Natural Waste Water Treatment Systems
Lecture 26 - Attached Growth Aerobic Process
Lecture 27 - Anaerobic Treatment
Lecture 28 - Anaerobic Process-UASB Reactor (Continued...)
Lecture 29 - UASB- Continued & Sludge Treatment

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Lecture 30 - Sludge Treatment (Continued...)
Lecture 31 - Sludge Treatment (Continued...) & Waste Water Disposal
Lecture 32 - Waste Water Disposal And Reuse
Lecture 33 - Advanced Waste Water Treatment
Lecture 34 - Adsorption
Lecture 35 - Ion Exchange, Advanced Oxidation Process
Lecture 36 - Industrial Waste Water Treatment
Lecture 37 - Water Distribution Networks
Lecture 38 - Sanitary sewerage systems
Lecture 39 - Storm water sewerage systems
Lecture 40 - Intake Structures And Pumping Installations

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NPTEL Video Course - Civil Engineering - NOC:Sustainable River Basin Management

Subject Co-ordinator - Dr. Franziska Steinbruch

Co-ordinating Institute - IGCS

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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NPTEL Video Course - Civil Engineering - NOC:Project Planning and Control

Subject Co-ordinator - Dr. Koshy Varghese

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Project Management? Is Project Management an Art/Science ?
Lecture 2 - Objectives of a Project, Scientific Way of Managing of Objectives
Lecture 3 - Course Scope and Plan, Questions and Discussions
Lecture 4 - Construction Industry and National Growth
Lecture 5 - Project Stakeholders, Project Phases, Project Organization
Lecture 6 - Project Scheduling Levels (Scheduling Engineer Responsibilities)
Lecture 7 - Time Management - Overview
Lecture 8 - Basics of Work Breakdown Structure (WBS)
Lecture 9 - Tools for Time Management
Lecture 10 - Gantt / Bar Chart - History, Representation, Progress Monitoring, Uses, Steps to draw a Bar Char
Lecture 11 - Develop a Bar Chart (Exercise)
Lecture 12 - Bar Charts for Resource Usage, Pros and Cons
Lecture 13 - Duration Estimation - Types, Inputs, Methods, Parametric Estimation
Lecture 14 - Factors influencing Productivity, Example for Ideal Productivity, Factored Productivity and Work
Lecture 15 - Piling Activity Example, Applicability of different methods to Estimate Activity Duration
Lecture 16 - Summary of Key Topics, Types of Networks
Lecture 17 - Networks - Introduction, Techniques
Lecture 18 - Representing Results in a Bar Chart, AON Example-2
Lecture 19 - Introduction to Floats, Types of Floats and Example-1 Discussion
Lecture 20 - Example 4, Usage of Floats for Project Decisions
Lecture 21 - Two-Span Bridge
Lecture 22 - Two-Span Bridge
Lecture 23 - Two-Span Bridge
Lecture 24 - Review Network Analysis Concepts, Apply Network Analysis to Two-Span Bridge (Continued...)
Lecture 25 - Two-Span Bridge
Lecture 26 - Two-Span Bridge
Lecture 27 - Fast-Tracking vs Crashing, Relationship between Activity Direct Cost and Activity Duration - Ass
Lecture 28 - Time-Cost trade-off
Lecture 29 - Time-Cost trade-off

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Lecture 30 - Time-Cost trade-off
Lecture 31 - Incorporating Factors such as Bonus and Penalty; Problem-4
Lecture 32 - What is Resource?, Influence of Resources on Schedule, Two-Span Bridge Example, Resource Decisio
Lecture 33 - Projects and Resources, Example of Two Resources, Exercise, Two-Span Bridge Example
Lecture 34 - Review Problem-1; Problem-2 (Cash Resource); Resolving Over-Allocation
Lecture 35 - Problem 1 - Two Resources; Resolving Resource Allocation Problems
Lecture 36 - Resource Profile Requirements
Lecture 37 - Resource Leveling - Example Network
Lecture 38 - Minimum Moment Concept
Lecture 39 - Applying Improvement Factor - Illustration
Lecture 40 - Introduction to Precedence Diagramming Method (PDM)
Lecture 41 - PDM network representation and its issues, Network Calculation
Lecture 42 - PDM Â Problem #1
Lecture 43 - Issues in PDM, Negative Lags, Problem #2 Solution
Lecture 44 - PDM Â Analysis with non-continuous duration, Floats
Lecture 45 - Defining Relationship (Based on Construction Method) - Simple Shed
Lecture 46 - Project Monitoring & Control Â Typical Project Time Monitoring Process, Levels and Frequency of
Lecture 47 - Project Control Process, Daily Progress Report, Macro Level Update- Data Need, Standard Progress
Lecture 48 - Application
Lecture 49 - Review of Key Issues in Project Monitoring, Earned Value Concept Through Examples
Lecture 50 - Basic Earned Value Definitions and Terminology, Summary
Lecture 51 - Uncertainty in Project Schedules
Lecture 52 - PERT Background & Assumptions, Stepwise Procedure
Lecture 53 - PERT Example Problem, Summary
Lecture 54 - Course Conclusion
Lecture 55 - Emerging Trends / Tools in Project Planning
Lecture 56 - Industry Perspective Â Prof. N. Raghavan
Lecture 57 - Final Exam Pattern, Acknowledgements

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NPTEL Video Course - Civil Engineering - NOC:Structural Dynamics

Subject Co-ordinator - Prof. Ramancharala Pradeep Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1: Introduction of Structural Dynamics
Lecture 2 - Module 2: Types of Analysis
Lecture 3 - Module 3: Degrees of Freedom
Lecture 4 - Module 4: Vibrations of SDOF Systems
Lecture 5 - Module 5: Methods Solution of Equilibrium Equation
Lecture 6 - Module 6: UnDamped free Vibration
Lecture 7 - What is MATLAB?
Lecture 8 - Getting Started with MATLAB Online
Lecture 9 - MATLAB Variables
Lecture 10 - MATLAB as a Calculator
Lecture 11 - MATLAB Functions
Lecture 12 - Creating Vectors
Lecture 13 - Creating Uniformly Spaced Vectors (Colon Operator)
Lecture 14 - Creating Uniformly Spaced Vectors (LINSPACE)
Lecture 15 - Accessing Elements of a Vector
Lecture 16 - Calculations with Vectors
Lecture 17 - Creating Matrices
Lecture 18 - Matrix Creation Functions
Lecture 19 - Accessing Elements of a Matrix
Lecture 20 - Matrix Multiplication
Lecture 21 - Logical Operators
Lecture 22 - Writing a FOR Loop
Lecture 23 - If - Else Statements
Lecture 24 - While Loop
Lecture 25 - Line Plots
Lecture 26 - Annotating Graphs
Lecture 27 - Exploring Figures in MATLAB Online
Lecture 28 - Damped Free Vibration
Lecture 29 - Types of Damping

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Lecture 30 - Logarithmic Decrement
Lecture 31 - Dynamic Equilibrium Equation Using Energy Method
Lecture 32 - Module 1: UnDamped Forced Vibration
Lecture 33 - Module 2: Damped Forced Vibration
Lecture 34 - Module 3: Relationship between Rd, Rv & Ra
Lecture 35 - Module 4: Resonant Frequency & Half Power Band Width
Lecture 36 - Module 5: Transmissibility
Lecture 37 - Module 1: Response to Arbitrary Force
Lecture 38 - Module 2: Special Cases in Arbitrary Force
Lecture 39 - Module 3: Fourier Transformation
Lecture 40 - Module 1: Numerical Methods
Lecture 41 - Module 2: Methods Based on Interpolation of Excitation
Lecture 42 - Module 3: Central Difference Method
Lecture 43 - Module 4: Numerical Methods based on Variation of Acceleration: Newmark's Method
Lecture 44 - Central Difference Method (Tutorial)
Lecture 45 - Module 1: Response Spectrum
Lecture 46 - Module 2: Special Cases of Response Spectrum
Lecture 47 - Module 3: Development of Tripartite Plot
Lecture 48 - Module 1: Multi-Degree of Freedom System
Lecture 49 - Module 2: Multi-Degree of Freedom System: Solution of Equilibrium Equation
Lecture 50 - Module 3: Multi-Degree of Freedom System: Modal Orthogonality
Lecture 51 - Module 4: Approximate Methods For Finding Natural Frequency
Lecture 52 - Tutorial 01: Generation of Mass Matrix
Lecture 53 - Tutorial 2: Eigen vector and Modal Orthogonality
Lecture 54 - Module 1: Time History Analysis
Lecture 55 - Module 2: Response Spectrum Analysis
Lecture 56 - Module 1: Three Dimensional Dynamic Analysis
Lecture 57 - Module 2: Generation of Elastic Design Response Spectra
Lecture 58 - W09T01: Centre of Mass & Centre of Stiffness
Lecture 59 - Module 1: Vibration of Continuous Systems
Lecture 60 - Module 2: Example Problem on Continuous system
Lecture 61 - Module 3: Theory of Seismometer
Lecture 62 - Module 1: Dynamics of Non Structural Elements
Lecture 63 - Module 2: Non Structural Elements Example
Lecture 64 - W11T: Non Structural Elements
Lecture 65 - Module 1: Classical and Non-classical Damping
Lecture 66 - Module 2: Vibration Control
Lecture 67 - Module 3: Base Isolation
Lecture 68 - Module 4: Tuned Mass Damper

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NPTEL Video Course - Civil Engineering - NOC:Mechanics of Materials

Subject Co-ordinator - Dr. U. Saravanan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why this course?
Lecture 2 - Concepts and equations in this course
Lecture 3 - Objectives and prerequisite
Lecture 4 - Linear Algebra
Lecture 5 - Vector Algebra
Lecture 6 - Representation of Vector
Lecture 7 - Concept of Force
Lecture 8 - Definition of a body
Lecture 9 - Motion and Displacement field
Lecture 10 - Traction
Lecture 11 - Properties of traction
Lecture 12 - Defnition of stress tensor and linear function
Lecture 13 - Tensor Algebra
Lecture 14 - Meaning of components of the stress tensor
Lecture 15 - Transformation of stress components
Lecture 16 - Mohr's Circle derivaion
Lecture 17 - Example 1
Lecture 18 - Example 2
Lecture 19 - Example 3
Lecture 20 - Uniaxial stress
Lecture 21 - Hydrostatic, pure shear and deviatoric stress
Lecture 22 - Biaxial and Plane state of stress
Lecture 23 - Extreme stress for 3D stresses
Lecture 24 - Extremum shear stress
Lecture 25 - Stresses in the Octahedral plane
Lecture 26 - 2D Equilibrium equations
Lecture 27 - 3D Equilibrium equations
Lecture 28 - Stretch ratio and strain
Lecture 29 - Curves and arc Length

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Lecture 30 - Gradient
Lecture 31 - Deformation and displacement Gradient
Lecture 32 - Right Cauchy Green Deformation tensor
Lecture 33 - Homogeneous deformation
Lecture 34 - Engineering strain
Lecture 35 - Change in Angle
Lecture 36 - Transformation of strain components/ Strain Rosette
Lecture 37 - Compatibility condition
Lecture 38 - Constitutive relation
Lecture 39 - Young's Modulus and Poisson's Ratio
Lecture 40 - Shear Modulus
Lecture 41 - Bulk Modulus
Lecture 42 - Restriction on material parameters
Lecture 43 - Thermal strain
Lecture 44 - Strain energy, load potential and total potential
Lecture 45 - Stepped shaft subjected to axial force
Lecture 46 - Inhomogeneous bar subjected to axial force
Lecture 47 - Stepped shaft subjected to raise in temperature
Lecture 48 - Traction in member subjected to bending
Lecture 49 - Governing equilibrium equations
Lecture 50 - Displacement field
Lecture 51 - Bending equation
Lecture 52 - Radius of curvature
Lecture 53 - Shear force and bending moment diagram
Lecture 54 - Variation of axial stress
Lecture 55 - Deflected shape and rotation of cross section
Lecture 56 - Expression to find shear stress
Lecture 57 - Finding centroid of a cross section
Lecture 58 - Parallel axis theorem and its application
Lecture 59 - Vertical shear stress in I section
Lecture 60 - Horizontal shear stress in I section
Lecture 61 - Connection design
Lecture 62 - Definition of shear center
Lecture 63 - Shear center of Channel section
Lecture 64 - Expression to find shear center
Lecture 65 - Shear force and bending moment diagram
Lecture 66 - Deflected shape and rotation of cross section
Lecture 67 - Finding allowable load
Lecture 68 - Modified bending equation

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Lecture 69 - Bending of a composite beam
Lecture 70 - Connection design
Lecture 71 - Moment of Intertia about arbitrarily oriented axis
Lecture 72 - Example
Lecture 73 - Bending equation for bending about principal axis
Lecture 74 - Bending equation about arbitrary axis
Lecture 75 - Neutral axis
Lecture 76 - Load not about principal axis
Lecture 77 - Load about principal axis
Lecture 78 - Displacement field
Lecture 79 - Torsion equation
Lecture 80 - Example problems
Lecture 81 - Expression relating angle of twist with torsion and shear stress
Lecture 82 - Example problems
Lecture 83 - Thin walled closed sections
Lecture 84 - Example problems
Lecture 85 - Cylindrical polar coordinate system
Lecture 86 - Displacement field
Lecture 87 - Governing differential equation and solution
Lecture 88 - Example problems
Lecture 89 - Thin walled pressure vessels
Lecture 90 - General Principals
Lecture 91 - Different failure modes
Lecture 92 - Tresca Condition
Lecture 93 - vonMises condition
Lecture 94 - Maximum normal stress or rankine condition
Lecture 95 - Mohr - Columb condition
Lecture 96 - Drucker-Prager Condition
Lecture 97 - General Concepts
Lecture 98 - Euler critical load for simply supported column
Lecture 99 - Euler critical load for column with any boundary condition
Lecture 100 - Secant formula
Lecture 101 - Pressure vessel and failure theory
Lecture 102 - Determination of maximum load carrying capacity of a simple truss

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NPTEL Video Course - Civil Engineering - NOC:Advanced Concrete Technology

Subject Co-ordinator - Prof. Manu Santhanam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Introduction to course
Lecture 1 - Cement Production - Part 1
Lecture 2 - Cement Production - Part 2
Lecture 3 - Cement Composition - Part 1
Lecture 4 - Cement Composition - Part 2
Lecture 5 - Cement Classification - Part 1
Lecture 6 - Cement Classification - Part 2
Lecture 7 - Cement Chemistry - Part 1
Lecture 8 - Cement Chemistry - Part 2
Lecture 9 - Cement Chemistry - Part 3
Lecture 10 - Cement Chemistry - Part 4
Lecture 11 - Cement Chemistry - Part 5
Lecture 12 - Aggregates for concrete - Part 1
Lecture 13 - Aggregates for concrete - Part 2
Lecture 14 - Chemical admixtures - Part 1
Lecture 15 - Chemical admixtures - Part 2
Lecture 16 - Chemical admixtures - Part 3
Lecture 17 - Chemical admixtures - Part 4
Lecture 18 - Chemical admixtures - Part 5
Lecture 19 - Mineral admixtures - Part 1
Lecture 20 - Mineral admixtures - Part 2
Lecture 21 - Mineral admixtures - Part 3
Lecture 22 - Mineral admixtures - Part 4
Lecture 23 - Mineral admixtures - Part 5
Lecture 24 - Mineral admixtures - Part 6
Lecture 25 - Mineral admixtures - Part 7
Lecture 26 - Mixture proportioning
Lecture 27 - Fresh concrete - Part 1
Lecture 28 - Fresh concrete - Part 2

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Lecture 29 - Fresh properties - Part 3
Lecture 30 - Introduction to Harden concrete properties
Lecture 31 - Post peak response and Fibre reinforced concrete
Lecture 32 - Shrinkage
Lecture 33 - Creep
Lecture 34 - Shrinkage
Lecture 35 - Shrinkage
Lecture 36 - Introduction to Durability
Lecture 37 - Performance based specifications for durable concrete
Lecture 38 - Durability issues in concrete - Part 1
Lecture 39 - Durability issues in concrete - Part 2
Lecture 40 - Durability issues in concrete - Part 3
Lecture 41 - Durability issues in concrete - Part 4
Lecture 42 - Durability issues in concrete - Part 5
Lecture 43 - Durability issues in concrete - Part 6

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NPTEL Video Course - Civil Engineering - NOC:Glass in Buildings: Design and Application

Subject Co-ordinator - Prof. K.N. Satyanarayana

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Float Process for Manufacturing Glass - Part 1
Lecture 3 - Float Process for Manufacturing Glass - Part 2
Lecture 4 - Coatings on Glass - Need and Types - Part 2
Lecture 5 - Coatings on Glass - Need and Types - Part 2
Lecture 6 - Glass Design for Safety, Sustainability and Aesthetic - Part 1
Lecture 7 - Glass Design for Safety, Sustainability and Aesthetic - Part 2
Lecture 8 - Structural Control and Design for Energy Efficiency - Part I
Lecture 9 - Structural Control and Design for Energy Efficiency - Part II
Lecture 10 - Structural Control and Design for Energy Efficiency - Part III
Lecture 11 - Structural Control and Design for Energy Efficiency - Part IV
Lecture 12 - Structural Control and Design for Energy Efficiency - Part V
Lecture 13 - Design Tools for Glass Selection - Part I
Lecture 14 - Design Tools for Glass Selection - Part II
Lecture 15 - Modeling the Building Envelope - Part I
Lecture 16 - Modeling the Building Envelope - Part II
Lecture 17 - Modeling the Building Envelope - Part III
Lecture 18 - Innovations in Glass Future Facades - Part I
Lecture 19 - Innovations in Glass Future Facades - Part II
Lecture 20 - Standards Related to Glass
Lecture 21 - Introduction to Useful Daylighting in Buildings
Lecture 22 - Fundamentals of Daylighting - Part I
Lecture 23 - Fundamentals of Daylighting - Part II
Lecture 24 - Daylighting Strategies - Techniques - Part I - Video 1
Lecture 25 - Daylighting Strategies - Techniques - Part I - Video 2
Lecture 26 - Daylighting Strategies - Techniques - Part II - Video 1
Lecture 27 - Daylighting Strategies - Techniques - Part II - Video 2
Lecture 28 - Daylighting Strategies - Techniques - Part II - Video 3
Lecture 29 - ECBC and Green Building Requirements

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Lecture 30 - Introduction to Daylight Simulation
Lecture 31 - Daylighting Controls - Part I
Lecture 32 - Daylighting Controls - Part II
Lecture 33 - Acheving Acoustics Through Glass
Lecture 34 - Glass Processing Overview - Part I
Lecture 35 - Glass Processing Overview - Part II
Lecture 36 - Interior Glazing Program - Part I
Lecture 37 - Interior Glazing Program - Part II
Lecture 38 - Interior Glazing Applications-Shower Enclosure - Part I
Lecture 39 - Interior Glazing Applications-Shower Enclosure - Part II
Lecture 40 - Interior Glazing Applications-Shower Enclosure - Part III
Lecture 41 - Interior Glazing Applications-Shower Enclosure - Part IV
Lecture 42 - Glass in Passive Fire Protection - Part I
Lecture 43 - Glass in Passive Fire Protection - Part II
Lecture 44 - Glass in Passive Fire Protection - Part III
Lecture 45 - Glazing Choices for Project Segment - Part I
Lecture 46 - Glazing Choices for Project Segment - Part II
Lecture 47 - National Building Code 2016 - Part I
Lecture 48 - National Building Code 2016 - Part II
Lecture 49 - National Building Code 2016 - Part III
Lecture 50 - National Building Code 2016 - Part IV
Lecture 51 - Facade Fundamentals - Part I
Lecture 52 - Facade Fundamentals - Part II
Lecture 53 - Facade Fundamentals - Part III
Lecture 54 - Facade Fundamentals - Part IV
Lecture 55 - Glass Application on Facades - Part I
Lecture 56 - Glass Application on Facades - Part II
Lecture 57 - Glass Application on Facades - Part III
Lecture 58 - Energy Efficiency Facade System
Lecture 59 - Structural Design of Facades - Part I
Lecture 60 - Structural Design of Facades - Part II
Lecture 61 - Silicone for Structural Glazing - Part - I
Lecture 62 - Silicone for Structural Glazing - Part - II
Lecture 63 - Silicone for Structural Glazing - Part - III
Lecture 64 - Facade Factory Operations - Part I
Lecture 65 - Facade Factory Operations - Part II
Lecture 66 - Performance Testing for Facades - Part I
Lecture 67 - Performance Testing for Facades - Part II
Lecture 68 - The Role of Windows in Building Design - Part I

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Lecture 69 - The Role of Windows in Building Design - Part II
Lecture 70 - Standards Related to Glass II
Lecture 71 - FAQs about usage of Glass in Buildings
Lecture 72 - Case Study of a Different Concept of Facade
Lecture 73 - Case Studies-Envelope Design and Its Impact - Part I
Lecture 74 - Case Studies-Envelope Design and Its Impact - Part II
Lecture 75 - A Case Study of Building Envelope in the context of Environmentally Sustainable Design - Part I
Lecture 76 - A Case Study of Building Envelope in the context of Environmentally Sustainable Design - Part II
Lecture 77 - Sustainable Building and Facades - Part I
Lecture 78 - Sustainable Building and Facades - Part II
Lecture 79 - Building Envelope Design for Sustainable Buildings
Lecture 80 - Building Envelope Design
Lecture 81 - Case Study for Building Envelop Design - Part I
Lecture 82 - Case Study for Building Envelop Design - Part II
Lecture 83 - Case study-Commercial Buildings - Part I
Lecture 84 - Case study-Commercial Buildings - Part II
Lecture 85 - Case study-Commercial Buildings - Part III
Lecture 86 - Case Study-The Untold Truth of the Unbuilt - Part I
Lecture 87 - Case Study-The Untold Truth of the Unbuilt - Part II

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NPTEL Video Course - Civil Engineering - NOC:Glass Processing Technology

Subject Co-ordinator - Prof. K.N. Satyanarayana

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Glass as Building Material - Part I
Lecture 3 - Glass as Building Material - Part II
Lecture 4 - Float Glass Manufacturing - Part I
Lecture 5 - Float Glass Manufacturing - Part II
Lecture 6 - Glass Coating Technology - Part I
Lecture 7 - Glass Coating Technology - Part II
Lecture 8 - Safety in Industries - Part I
Lecture 9 - Safety in Industries - Part II
Lecture 10 - Safety in Glass Handling - Part I
Lecture 11 - Safety in Glass Handling - Part II
Lecture 12 - Process Flow- PPE
Lecture 13 - Serviceability-Sales - Production Planning in Solutions Business - Part I
Lecture 14 - Serviceability-Sales - Production Planning in Solutions Business - Part II
Lecture 15 - Serviceability-Sales - Production Planning in Solutions Business - Part III
Lecture 16 - Environment and Eco packaging
Lecture 17 - Glass Warehouse Management - Part I
Lecture 18 - Glass Warehouse Management - Part II
Lecture 19 - Cutting and Snapping
Lecture 20 - Pre-Processing-Drilling - Part I
Lecture 21 - Pre-Processing-Drilling - Part II
Lecture 22 - Grinding and Fabrication
Lecture 23 - Pre-Processing - Washing
Lecture 24 - Tempering - Part I
Lecture 25 - Tempering - Part II
Lecture 26 - Tempering - Part III
Lecture 27 - Tempering - Part IV
Lecture 28 - Tempering - Part V
Lecture 29 - Tempering - Part VI

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Lecture 30 - Tempering - Part VII
Lecture 31 - Lamination - Part I
Lecture 32 - Lamination - Part II
Lecture 33 - Lamination - Part III
Lecture 34 - Insulating Glass Unit - Part I
Lecture 35 - Insulating Glass Unit - Part II
Lecture 36 - Insulating Glass Unit - Part III
Lecture 37 - Insulating Glass Unit - Part IV
Lecture 38 - Insulating Glass Unit - Part V
Lecture 39 - Insulating Glass Unit - Part VI
Lecture 40 - Insulating Glass Unit - Part VII
Lecture 41 - Insulating Glass Unit - Part VIII
Lecture 42 - Insulating Glass Unit - Part IX
Lecture 43 - Silicone Sealant for Insulated Glass - Part I
Lecture 44 - Silicone Sealant for Insulated Glass - Part II
Lecture 45 - Insulating Glass Unit - Part X
Lecture 46 - Insulating Glass Unit - Part XI
Lecture 47 - Insulating Glass Unit - Part XII
Lecture 48 - Processing Standards and Checks
Lecture 49 - Quality Testing - Part I
Lecture 50 - Quality Testing - Part II
Lecture 51 - Quality Testing - Part III
Lecture 52 - Quality Testing - Part IV - Video 1
Lecture 53 - Quality Testing - Part IV - Video 2
Lecture 54 - Quality Testing - Part V
Lecture 55 - Quality Testing - Part VI
Lecture 56 - Quality Testing - Part VII
Lecture 57 - Heat soaking - Part I
Lecture 58 - Heat soaking - Part II
Lecture 59 - Ceramic Printing on Glass - Part I
Lecture 60 - Ceramic Printing on Glass - Part II
Lecture 61 - Ceramic Printing on Glass - Part III
Lecture 62 - Ceramic Printing on Glass - Part IV
Lecture 63 - Glass Breakage Reasons
Lecture 64 - Internal Process Loss - Part I
Lecture 65 - Internal Process Loss - Part II
Lecture 66 - Internal Process Loss - Part III
Lecture 67 - Root Cause Analysis - Part I
Lecture 68 - Root Cause Analysis - Part II

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Lecture 69 - Post Manufacturing Expenses
Lecture 70 - 5S in Glass Processing
Lecture 71 - Introduction to Quality Management System - Part I
Lecture 72 - Introduction to Quality Management System - Part II
Lecture 73 - Glass Processing - Applications, Innovations and Futuristic Trends - Part I
Lecture 74 - Glass Processing - Applications, Innovations and Futuristic Trends - Part II
Lecture 75 - Sustainability on Glass Processing

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NPTEL Video Course - Civil Engineering - NOC:Advanced Topics in the Science and Technology of Concrete

Subject Co-ordinator - Prof. Manu Santhanam, Dr. Ravindra Gettu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Calcium sulfoaluminate cement-based binder
Lecture 2 - Micro-structural characterisation of cementitious materials - Part 1
Lecture 3 - Micro-structural characterisation of cementitious materials - Part 2
Lecture 4 - Micro-structural characterisation of cementitious materials - Part 3
Lecture 5 - Interview with Prof Karen Scrivener
Lecture 6 - Performance of Fiber reinforced materials
Lecture 7 - Ultra-High performance concrete (UHPC)
Lecture 8 - Ultra-High performance concrete (UHPC)
Lecture 9 - Closed-Loop testing - Part 1
Lecture 10 - Closed-Loop testing - Part 2
Lecture 11 - Uni-axial tensile test of textile reinforced concrete (TRC) panel
Lecture 12 - Fiber reinforced concrete
Lecture 13 - Strain softening response of concrete Under uniaxial compression
Lecture 14 - Tension test of 7-wire steel strand
Lecture 15 - Bond Test of Strand-concrete System
Lecture 16 - Interview with Prof. S. P. Shah
Lecture 17 - Introduction to concrete durability
Lecture 18 - Sulphate attack of concrete
Lecture 19 - Development and performance approach for durability and service life production for structures
Lecture 20 - Colorimetric test to assess carbonation resistance in concrete
Lecture 21 - Experiments on durability index
Lecture 22 - Prof. Mark Alexander
Lecture 23 - Chloride induced corrosion and service life of reinforced concrete structures - Part 1
Lecture 24 - Chloride induced corrosion and service life of reinforced concrete structures - Part 2
Lecture 25 - Corrosion control and cathodic protection of steel reinforcement
Lecture 26 - LCA of cement and concrete - Part 1
Lecture 27 - LCA of cement and concrete - Part 2
Lecture 28 - 8. Chloride threshold testing using linear polarization resistance (LPR) and electrochemical imp
Lecture 29 - Interview with Prof George Sergi

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NPTEL Video Course - Civil Engineering - NOC:Infrastructure Planning and Managements

Subject Co-ordinator - Dr. Ashwin Mahalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to infrastructure and the Transportation sector - Part 1A
Lecture 2 - Introduction to infrastructure and the Transportation sector - Part 1B
Lecture 3 - Introduction to infrastructure and the Transportation sector - Part 1C
Lecture 4 - Introduction to infrastructure and the Transportation sector - Part 1D
Lecture 5 - Introduction to Power and Telecom sectors - Part 2A
Lecture 6 - Introduction to Power and Telecom sectors - Part 2B
Lecture 7 - Urban and Rural Infrastructure - Part 1A
Lecture 8 - Urban and Rural Infrastructure - Part 1B
Lecture 9 - Urban and Rural Infrastructure - Part 1C
Lecture 10 - Phases and Players in Infrastructure Planning and Managements - Part 2A
Lecture 11 - Phases and Players in Infrastructure Planning and Managements - Part 2B
Lecture 12 - Infrastructure Economics and Finance
Lecture 13 - Public-Private Partnership for Infrastructure
Lecture 14 - Public-Private Partnership for Infrastructure - Case Studies - Part 1
Lecture 15 - Public-Private Partnership for Infrastructure - Case Studies - Part 2
Lecture 16 - Public-Private Partnership for Infrastructure - Case Studies - Part 3
Lecture 17 - Risks and Challenges in Infrastructure - Part 1
Lecture 18 - Risks and Challenges in Infrastructure - Part 2
Lecture 19 - Risks and Challenges in Infrastructure - Part 3
Lecture 20 - Economic Risk in Infrastructure - Part 1
Lecture 21 - Economic Risk in Infrastructure - Part 2
Lecture 22 - Political Risk in Infrastructure - Part 1
Lecture 23 - Political Risk in Infrastructure - Part 2
Lecture 24 - Social Environmental Risk in Infrastructure - Part 1
Lecture 25 - Social Environmental Risk in Infrastructure - Part 2
Lecture 26 - Actor Mapping and Social Network Analysis - Part 1
Lecture 27 - Actor Mapping and Social Network Analysis - Part 2
Lecture 28 - Fair Process and Negotiations - Part 1
Lecture 29 - Fair Process and Negotiations - Part 2

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Lecture 30 - Design Thinking - Part 1
Lecture 31 - Design Thinking - Part 2
Lecture 32 - Sustainable Development and Socio - Economic Analysis - Part 1
Lecture 33 - Sustainable Development and Socio - Economic Analysis - Part 2
Lecture 34 - Public Sector Governance - Part 1
Lecture 35 - Public Sector Governance - Part 2
Lecture 36 - Flexibilities and Options on Projects - Part 1
Lecture 37 - Flexibilities and Options on Projects - Part 2
Lecture 38 - Module Flexibilities in Projects - Part 1
Lecture 39 - Module Flexibilities in Projects - Part 2
Lecture 40 - Case Study on PPP Project - Delhi Airport
Lecture 41 - Case Study on PPP Project - Tirupur Water Supply
Lecture 42 - Polycentric Governance and Incomplete Design - Part 1
Lecture 43 - Polycentric Governance and Incomplete Design - Part 2
Lecture 44 - Successful Project Delivery Strategies - Part 1
Lecture 45 - Successful Project Delivery Strategies - Part 2
Lecture 46 - Guest Lecture by K Venkatesh
Lecture 47 - Guest Lecture by Kavitha Selvaraj

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NPTEL Video Course - Civil Engineering - NOC:Design of Masonry Structures

Subject Co-ordinator - Prof. Arun Menon

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory - Part I
Lecture 2 - Introductory - Part II
Lecture 3 - Introductory - Part III
Lecture 4 - Introductory - Part IV
Lecture 5 - Masonry Materials and Properties - Part I
Lecture 6 - Masonry Materials and Properties - Part II
Lecture 7 - Masonry Materials and Properties - Part III
Lecture 8 - Masonry Materials and Properties - Part IV
Lecture 9 - Masonry Materials and Properties - Part V
Lecture 10 - Masonry Materials and Properties - Part VI
Lecture 11 - Strength and Behaviour of Masonry - Part I
Lecture 12 - Strength and Behaviour of Masonry - Part II
Lecture 13 - Strength and Behaviour of Masonry - Part III
Lecture 14 - Strength and Behaviour of Masonry - Part IV
Lecture 15 - Strength and Behaviour of Masonry - Part V
Lecture 16 - Strength and Behaviour of Masonry - Part VI
Lecture 17 - Strength and Behaviour of Masonry - Part VII
Lecture 18 - Strength and Behaviour of Masonry - Part VIII
Lecture 19 - Strength and Behaviour of Masonry - Part IX
Lecture 20 - Strength and Behaviour of Masonry - Part X
Lecture 21 - Strength and Behaviour of Masonry - Part XI
Lecture 22 - Design of Masonry Components and Systems - Part I
Lecture 23 - Design of Masonry Components and Systems - Part II
Lecture 24 - Design of Masonry Components and Systems - Part III
Lecture 25 - Design of Masonry Components and Systems - Part IV
Lecture 26 - Design of Masonry Components and Systems - Part V
Lecture 27 - Design of Masonry Components and Systems - Part VI
Lecture 28 - Design of Masonry Components and Systems - Part VII
Lecture 29 - Design of Masonry Components and Systems - Part VIII

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Lecture 30 - Design of Masonry Components and Systems - Part IX
Lecture 31 - Design of Masonry Components and Systems - Part X
Lecture 32 - Design of Masonry Components and Systems - Part XI
Lecture 33 - Design of Masonry Components and Systems - Example I
Lecture 34 - Design of Masonry Components and Systems - Example II
Lecture 35 - Design of Masonry Components and Systems - Example III
Lecture 36 - Special Topics - Confined Masonry
Lecture 37 - Special Topics - Masonry Infill in RC Frames
Lecture 38 - Special Topics - Assessment of Existing Masonry Structures - Part I
Lecture 39 - Special Topics - Assessment of Existing Masonry Structures - Part II
Lecture 40 - Special Topics - Assessment of Existing Masonry Structures - Part III

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NPTEL Video Course - Civil Engineering - NOC:Characterization of Construction Materials

Subject Co-ordinator - Prof. Manu Santhanam, Prof. Piyush Chaunsali

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Characterization of Construction Materials
Lecture 2 - Characterization of Construction Materials
Lecture 3 - Structure of Contruction Materials
Lecture 4 - Structure of Contruction Materials
Lecture 5 - Structure of Contruction Materials
Lecture 6 - Structure of Contruction Materials
Lecture 7 - Calorimetry
Lecture 8 - Calorimetry
Lecture 9 - Calorimetry
Lecture 10 - Calorimetry
Lecture 11 - Calorimetry
Lecture 12 - X Ray diffraction
Lecture 13 - X Ray diffraction
Lecture 14 - X Ray diffraction
Lecture 15 - X Ray diffraction
Lecture 16 - X Ray diffraction
Lecture 17 - X Ray diffraction
Lecture 18 - X Ray diffraction
Lecture 19 - X Ray Diffraction
Lecture 20 - X Ray Diffraction
Lecture 21 - X Ray Diffraction
Lecture 22 - X Ray Diffraction
Lecture 23 - Thermal Analysis - Part 1
Lecture 24 - Thermal Analysis - Part 2
Lecture 25 - Application of thermal analysis to study construction materials - Part 1
Lecture 26 - Application of thermal analysis to study construction materials - Part 2
Lecture 27 - Surface Area Measurement
Lecture 28 - Surface Area Measurement
Lecture 29 - Surface Area Measurement

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Lecture 30 - Surface Area Measurement
Lecture 31 - Surface Area Measurement
Lecture 32 - Optical and Scanning Microscopy- Introduction and specimen preperation - Part 1
Lecture 33 - Optical and Scanning Microscopy- Introduction and specimen preperation - Part 2
Lecture 34 - Optical and Scanning Microscopy- Features and functions - Part 1
Lecture 35 - Optical and Scanning Microscopy- Features and functions - Part 2
Lecture 36 - Types of optical microsopy - Part 1
Lecture 37 - Types of optical microsopy - Part 2
Lecture 38 - Scanning electron microscope Part 1- Parts and Functioning - Part 1
Lecture 39 - Scanning electron microscope Part 1- Parts and Functioning - Part 2
Lecture 40 - Scanning electron microscope Part 2- Working Principles - Part 1
Lecture 41 - Scanning electron microscope Part 2- Working Principles - Part 2
Lecture 42 - Scanning electron microscope Part 3 - Analysis of cementitious systems 1 - Part 1
Lecture 43 - Scanning electron microscope Part 3 - Analysis of cementitious systems 1 - Part 2
Lecture 44 - Scanning electron microscope Part 4 - Analysis of cementitious system 2 - Part 1
Lecture 45 - Scanning electron microscope Part 4 - Analysis of cementitious system 2 - Part 2
Lecture 46 - Application of characterization techniques to assess composite binder with limestone-calcined cl
Lecture 47 - Application of characterization techniques to assess composite binder with limestone-calcined cl
Lecture 48 - Image analysis - Introduction and image mapping - Part 1
Lecture 49 - Image analysis - Introduction and image mapping - Part 2
Lecture 50 - Image analysis - Basic operations - Part 1
Lecture 51 - Image analysis - Basic operations - Part 2
Lecture 52 - Spectroscopy Techniques - Part 1 AAS, AES - Part 1
Lecture 53 - Spectroscopy Techniques - Part 1 AAS, AES - Part 2
Lecture 54 - Spectroscopy Techniques - Part 2 UV and IR spectroscopy - Part 1
Lecture 55 - Spectroscopy Techniques - Part 2 UV and IR spectroscopy - Part 2
Lecture 56 - Spectroscopy Techniques - Part 3 FTIR and NMR spectroscopy - Part 1
Lecture 57 - Spectroscopy Techniques - Part 3 FTIR and NMR spectroscopy - Part 2
Lecture 58 - Spectrocopy techniques - Part 4 Principle of NMR spectroscopy
Lecture 59 - Porosity and pore structure - Intoduction, significance of pore distribution
Lecture 60 - Porosity and pore structure - Woking of mercury intrusion porosimeter - Part 1
Lecture 61 - Porosity and pore structure - Woking of mercury intrusion porosimeter - Part 2
Lecture 62 - Electrical Impedance analysis - Principle and different methods - Part 1
Lecture 63 - Electrical Impedance analysis - Principle and different methods - Part 2
Lecture 64 - Electrical Impedance analysis - Deliverables and Interpretation - Part 1
Lecture 65 - Electrical Impedance analysis - Deliverables and Interpretation - Part 2
Lecture 66 - Electrochemical testing (Corrosion) using Electrochemical Impedance Spectroscopy (EIS) - Part 1
Lecture 67 - Electrochemical testing (Corrosion) using Electrochemical Impedance Spectroscopy (EIS) - Part 2

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Civil Engineering Profession

Subject Co-ordinator - Dr. Ravindra Gettu, Prof. Subhadeep Banerjee

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Civil Engineering - Part 1
Lecture 2 - What is Civil Engineering - Part 2
Lecture 3 - Structural Conservation of Built Heritage
Lecture 4 - Introduction to Environmental Engineering
Lecture 5 - Interesting Environmental Projects
Lecture 6 - Hydraulic and Water Resources Engineering
Lecture 7 - Geotechnical Engineering
Lecture 8 - Construction Materials and Methods
Lecture 9 - Infrastructure Management
Lecture 10 - Structural Engineering - 1
Lecture 11 - Structural Engineering - 2
Lecture 12 - Structural Engineering - Analysis and Design
Lecture 13 - Structural Modeling
Lecture 14 - Scope for Highway Engineers in Civil Engineering Profession - 1
Lecture 15 - Scope for Highway Engineers in Civil Engineering Profession - 2
Lecture 16 - Introduction to Civil Engineering Profession
Lecture 17 - Hydrology and Water Security
Lecture 18 - An Overview of Computational Science and Engineering
Lecture 19 - Sustainability
Lecture 20 - The Big Picture

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NPTEL Video Course - Civil Engineering - NOC:Maintenance and Repair of Concrete Structures

Subject Co-ordinator - Prof. Radhakrishna G. Pillai

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prologue
Lecture 2 - Corrosion of embedded metal; Significance and fundamentals of corrosion
Lecture 3 - Corrosion of embedded metal; Carbonation-induced and chloride-induced corrosion
Lecture 4 - Corrosion of embedded metal; Types of reinforcement - Bare steels
Lecture 5 - TM - Ring Test For Assessing The Quality of TMT/QST Steel Rebars
Lecture 6 - Corrosion of embedded metal; Types of reinforcement - Metallic and non metallic coated rebars
Lecture 7 - Corrosion in prestressed concrete
Lecture 8 - Deterioration of cementitious systems - Introduction, sulphate attack, biofouling and acid attack
Lecture 9 - Deterioration of cementitious systems - frost attack, freeze-thaw and alkali-silica reaction
Lecture 10 - Deterioration of cementitious systems - Shrinkage and Creep
Lecture 11 - Deterioration of cementitious systems - Fire attack, abrasion and erosion
Lecture 12 - Condition assessment of concrete structures
Lecture 13 - Condition assessment of concrete structures
Lecture 14 - Condition assessmennt of concrete structures; mechanical and corrosion testing of rebars
Lecture 15 - Strategies and materials for surface repair
Lecture 16 - Strategies and materials for surface repair
Lecture 17 - Strategies and materials for surface repair
Lecture 18 - Surface preparation and protective treatment
Lecture 19 - Surface preparation and Protective treatments
Lecture 20 - Surface preparation and Protective treatments
Lecture 21 - Surface preparation and Protective treatments
Lecture 22 - Surface preparation and Protective treatments
Lecture 23 - Coatings on concrete infrastructures
Lecture 24 - Waterproofing of concrete structures - 1
Lecture 25 - Waterproofing of concrete structures - 2
Lecture 26 - Structural Strengthening and Stabilization - Load effects and Introduction to S&S
Lecture 27 - Structural Strengthening and Stabilization - Beams and Slabs
Lecture 28 - Structural Strengthening and Stabilization - Columns and Walls
Lecture 29 - Structural strengthening - 4 (Joints and connections)

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Lecture 30 - Injection Grouts for concrete repair
Lecture 31 - Structural repair of prestressed concrete systems
Lecture 32 - Case studies on structural repair (Right methodologies and systematic approach / case studies)
Lecture 33 - Cathodic Protection in Concrete Structures - Laboratory and field studies
Lecture 34 - Service life estimation - 1
Lecture 35 - Service life estimation - 2

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NPTEL Video Course - Civil Engineering - NOC:Mechanical Characterization of Bituminous Materials

Subject Co-ordinator - Dr. J. Murali Krishnan, Prof. M. R. Nivitha, Prof. Neethu Roy, Prof. A. Padmarekha

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mechanical Characterization of Bituminous Materials-Introduction - Part 1
Lecture 2 - Mechanical Characterization of Bituminous Materials-Introduction - Part 2
Lecture 3 - Linear Viscoelastic Response - Part 1
Lecture 4 - Linear Viscoelastic Response - Part 2
Lecture 5 - Linear Viscoelastic Response - Part 3
Lecture 6 - Linear Viscoelastic Response - Part 4
Lecture 7 - Linear Viscoelastic Response - Part 5
Lecture 8 - Small Amplitude Oscillatory Shear - Part 1
Lecture 9 - Small Amplitude Oscillatory Shear - Part 2
Lecture 10 - Small Amplitude Oscillatory Shear - Part 3
Lecture 11 - Small Amplitude Oscillatory Shear - Part 4
Lecture 12 - Time temperature superposition principle - Part 1
Lecture 13 - Time temperature superposition principle - Part 2
Lecture 14 - Master curve models
Lecture 15 - Asphalt Usage and Processing - Part 1
Lecture 16 - Asphalt Usage and Processing - Part 2
Lecture 17 - Chemical composition of bitumen - Part 1
Lecture 18 - Chemical composition of bitumen - Part 2
Lecture 19 - Chemical composition of bitumen - Part 3
Lecture 20 - Chemical composition of bitumen - Part 4
Lecture 21 - Chemical composition of bitumen - Part 5
Lecture 22 - Aging of Bituminous Binders and Mixtures - Part I
Lecture 23 - Aging of Bituminous Binders and Mixtures - Part II
Lecture 24 - Aging of Bituminous Binders and Mixtures - Part III
Lecture 25 - Dynamic Shear Rheometer - Part I
Lecture 26 - Dynamic Shear Rheometer - Part II
Lecture 27 - Viscosity Grading - Part 1
Lecture 28 - Viscosity Grading - Part 2
Lecture 29 - Performance Grading - Part 1

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Lecture 30 - Performance Grading - Part 2
Lecture 31 - PG-Theoretical Basis
Lecture 32 - Low-temperature PG
Lecture 33 - Modifiers for Bitumen - Part 1
Lecture 34 - Modifiers for Bitumen - Part 2
Lecture 35 - Modifiers for Bitumen - Part 3
Lecture 36 - Modifiers for Bitumen - Part 4
Lecture 37 - Mixing and Compaction Temperature - Part 1
Lecture 38 - Mixing and Compaction Temperature - Part 2
Lecture 39 - Mixing and Compaction Temperature - Part 3
Lecture 40 - Dynamic Modulus of Bituminous Mixtures - Part 1
Lecture 41 - Dynamic Modulus of Bituminous Mixtures - Part 2
Lecture 42 - Resilient Modulus of Bituminous Mixtures - Part 1
Lecture 43 - Resilient Modulus of Bituminous Mixtures - Part 2
Lecture 44 - Rutting Characterisation - Different approaches
Lecture 45 - Dry Rut Wheel Testing of Bituminous Mixtures
Lecture 46 - Laboratory investigation for rutting of bituminous mixtures - Part 1
Lecture 47 - Laboratory investigation for rutting of bituminous mixtures - Part 2
Lecture 48 - Fatigue of Bituminous mixtures - Part 1
Lecture 49 - Fatigue of Bituminous mixtures - Part 2
Lecture 50 - Fatigue of Bituminous mixtures - Part 3
Lecture 51 - Fatigue of Bituminous mixtures - Part 4
Lecture 52 - Fatigue of Bituminous mixtures - Part 5
Lecture 53 - Introduction to curve fitting using Matlab - Part 1
Lecture 54 - Introduction to curve fitting using Matlab - Part 2
Lecture 55 - MSCR Analysis using Matlab
Lecture 56 - Summary

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NPTEL Video Course - Chemical Engineering - NOC:Colloids and Surfaces

Subject Co-ordinator - Prof. Basavaraj Madivala Gurappa

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and motivation
Lecture 2 - Colloidal dispersions, terminology and classification
Lecture 3 - Stability in colloids
Lecture 4 - Source, synthesis and characterisation of colloids
Lecture 5 - Characterisation of colloidal particles - I
Lecture 6 - Characterisation of colloidal particles - II
Lecture 7 - Introduction to forces acting on an individual colloidal particle
Lecture 8 - Introduction to interaction between colloidal particles
Lecture 9 - Application of Brownian force
Lecture 10 - Radiation used to study colloidal systems
Lecture 11 - Radiation used to study colloidal systems
Lecture 12 - Molecular origin of Van der waals forces
Lecture 13 - Vanderwaal interactions between particles
Lecture 14 - Problem on scaling of Vanderwaal interactions
Lecture 15 - Calculation of Vanderwaal's forces between semi-infinite blocks and Hamaker constant - I
Lecture 16 - Calculation of Vanderwaal's forces between semi-infinite blocks and Hamaker constant - II
Lecture 17 - Theories of Vanderwaal forces based on bulk properties and calculation of Hamaker constant using
Lecture 18 - Effect of medium on Vanderwaal's interactions - I
Lecture 19 - Effect of medium on Vanderwaal's interactions - II
Lecture 20 - Colloid Polymer mixtures
Lecture 21 - Colloid polymer mixtures
Lecture 22 - Colloid polymer mixtures
Lecture 23 - Colloid polymer mixtures
Lecture 24 - Depletion interactions
Lecture 25 - Steric interactions/osmotic repulsion
Lecture 26 - Tutorial problem on depletion interactions
Lecture 27 - Colloidal Interactions
Lecture 28 - Introduction to models of electrical double layer
Lecture 29 - Review and summary of Helmholtz model (or capacitor model) of electrical double layer

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Lecture 30 - Models of electrical double layer
Lecture 31 - Potential distribution near planar surfaces
Lecture 32 - Potential distribution near planar surfaces
Lecture 33 - Potential distribution near spherical surfaces
Lecture 34 - Comparison of Capacitor model and Diffuse double layer model
Lecture 35 - Models of electrical double layer
Lecture 36 - Models of electrical double layer
Lecture 37 - Structure of Electrical double layer
Lecture 38 - Force of Repulsion between interacting surfaces
Lecture 39 - Potential Energy of repulsion between Planar double layers and DLVO Theory
Lecture 40 - Zeta Potential and Electrophoretic mobility of an ion
Lecture 41 - Electrokinetic Phenomena
Lecture 42 - Relation between Electrophoretic mobility and Zeta potential - I
Lecture 43 - Relation between Electrophoretic mobility and Zeta potential - II
Lecture 44 - Colloidal particles at interfaces
Lecture 45 - Characterization of Particles at interface
Lecture 46 - Experimental Observations -Concept of Electrostatic interactions and Stability at interfaces
Lecture 47 - Implications from Surface energy balances and Estimation of energy required for detachment
Lecture 48 - Colloidal interactions at interface

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NPTEL Video Course - Chemical Engineering - NOC:Polymers: Concepts, Properties, Uses and Sustainability

Subject Co-ordinator - Dr. Abhijit P. Deshpande

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why are polymers so common?
Lecture 2 - Polymers
Lecture 3 - Process, structure, property
Lecture 4 - Biopolymers
Lecture 5 - Molecular weight and distribution
Lecture 6 - Polymerization
Lecture 7 - Macromolecular nature
Lecture 8 - Renewable sources for polymers
Lecture 9 - Polymerization/depolymerization
Lecture 10 - States of interest
Lecture 11 - Application based terms
Lecture 12 - Reuse and repurpose
Lecture 13 - Molecular conformations
Lecture 14 - Size, mobility and flexibility
Lecture 15 - Polyelectrolytes
Lecture 16 - Structures in biopolymers
Lecture 17 - Amorphous/crystalline states - 1
Lecture 18 - Amorphous/crystalline states - 2
Lecture 19 - Orientation
Lecture 20 - Interactions
Lecture 21 - Kinetics of crystallization
Lecture 22 - Glass transition - 1
Lecture 23 - Glass transition - 2
Lecture 24 - States in environment
Lecture 25 - Liquid crystalline polymers
Lecture 26 - Copolymers - 1
Lecture 27 - Copolymers - 2
Lecture 28 - Blends - 1
Lecture 29 - Blends - 2

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Lecture 30 - Microstructure in polymers
Lecture 31 - Composites
Lecture 32 - Stress strain response
Lecture 33 - Additives for polymeric systems
Lecture 34 - Blends/composites in recycling
Lecture 35 - Physical/chemical crosslinking
Lecture 36 - Mechanical properties - I
Lecture 37 - Mechanical properties - II
Lecture 38 - Physical and chemical aging
Lecture 39 - Solutions
Lecture 40 - Conducting polymers
Lecture 41 - Dielectric response - I
Lecture 42 - Dielectric response - II
Lecture 43 - Plasticity
Lecture 44 - Properties of composites
Lecture 45 - Viscoelasticity
Lecture 46 - Thermal response
Lecture 47 - Viscoelasticity
Lecture 48 - Viscoelasticity
Lecture 49 - Dynamic Mechanical analysis
Lecture 50 - Damping Applications
Lecture 51 - Time Temperature superposition
Lecture 52 - Impact and energy absorption
Lecture 53 - Testing for applications
Lecture 54 - Properties of blends
Lecture 55 - Biomimetic polymers
Lecture 56 - Advanced mechanics
Lecture 57 - Viscoelastic response
Lecture 58 - Polymer packaging
Lecture 59 - Porous polymers/membranes
Lecture 60 - Polymer at interfaces
Lecture 61 - Diffusion in polymers
Lecture 62 - Compatibilizers
Lecture 63 - Biopolymer applications
Lecture 64 - Adhesives and Paints
Lecture 65 - Dissolution and recovery
Lecture 66 - Polymerization kinetics
Lecture 67 - Polymerization reactors
Lecture 68 - Polymer processing - I

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Lecture 69 - Polymer processing - II
Lecture 70 - Polymer processing - III
Lecture 71 - Flow simulations
Lecture 72 - Processing for recycling
Lecture 73 - Recycle, up-down cycling - I
Lecture 74 - Recycle, up-down cycling - II
Lecture 75 - Flow behaviour - rheology
Lecture 76 - Crosslinking
Lecture 77 - Conversion of polymers
Lecture 78 - Rheology and entanglement
Lecture 79 - Rheological models
Lecture 80 - Rheology and processing
Lecture 81 - Absorption and leaching
Lecture 82 - Swelling of polymers
Lecture 83 - Viscosity for polymer processing
Lecture 84 - Microplastics, aerosols, sediments
Lecture 85 - Biodegradation of polymers
Lecture 86 - Biodegradable polymers - 1
Lecture 87 - Biodegradable polymers - 2

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NPTEL Video Course - Civil Engineering - NOC:Basic Construction Materials

Subject Co-ordinator - Prof. Radhakrishna G. Pillai, Prof. Manu Santhanam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Construction Materials - Part 1
Lecture 2 - Introduction to Construction Materials - Part 2
Lecture 3 - Introduction to Construction Materials - Part 3
Lecture 4 - Materials Engineering Concepts - Part 1
Lecture 5 - Materials Engineering Concepts - Part 2
Lecture 6 - Materials Engineering Concepts - Part 3
Lecture 7 - Materials Engineering Concepts - Part 4
Lecture 8 - Materials Engineering Concepts - Part 5
Lecture 9 - Materials Engineering Concepts - Part 6
Lecture 10 - Materials Engineering Concepts - Part 7
Lecture 11 - Nature of Materials - Part 1
Lecture 12 - Nature of Materials - Part 2
Lecture 13 - Nature of Materials - Part 3
Lecture 14 - Nature of Materials - Part 5
Lecture 15 - Nature of Materials - Part 6
Lecture 16 - Nature of Materials - Part 6
Lecture 17 - Nature of Materials - Part 7
Lecture 18 - Stone, Brick and Mortar 1 - Part 1
Lecture 19 - Stone, Brick and Mortar 1 - Part 2
Lecture 20 - Stone, Brick and Mortar 1 - Part 3
Lecture 21 - Stone, Brick and Mortar 1 - Part 4
Lecture 22 - Stone, Brick and Mortar 2 - Part 1
Lecture 23 - Stone, Brick and Mortar 2 - Part 2
Lecture 24 - Cement and Concrete 1 - Part 1
Lecture 25 - Cement and Concrete 1 - Part 2
Lecture 26 - Cement and Concrete 1 - Part 3
Lecture 27 - Cement and Concrete 2 - Part 1
Lecture 28 - Cement and Concrete 2 - Part 2
Lecture 29 - Cement and Concrete 3 - Part 1

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Lecture 30 - Cement and Concrete 3 - Part 2
Lecture 31 - Cement and Concrete 4 - Part 1
Lecture 32 - Cement and Concrete 4 - Part 2
Lecture 33 - Metals - 1 - Part 1
Lecture 34 - Metals - 1 - Part 2
Lecture 35 - Metals - 2 - Part 1
Lecture 36 - Metals - 2 - Part 2
Lecture 37 - Metals - 3 - Part 1
Lecture 38 - Metals - 3 - Part 2
Lecture 39 - Metals - 4
Lecture 40 - Metals - 5 - Part 1
Lecture 41 - Metals - 5 - Part 2
Lecture 42 - Polymers and Composites - Part 1
Lecture 43 - Polymers and Composites - Part 2
Lecture 44 - Polymers and Composites - Part 3
Lecture 45 - Pavement Materials 1 - Part 1
Lecture 46 - Pavement Materials 1 - Part 2
Lecture 47 - Pavement Materials 2 - Part 1
Lecture 48 - Pavement Materials 2 - Part 2
Lecture 49 - Wood and wood products - Part 1
Lecture 50 - Wood and wood products - Part 2
Lecture 51 - Glass

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Lean Construction

Subject Co-ordinator - Prof. Koshy Varghese, Prof. N Raghavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Contents, Long-term Goals, Structure and Module 1 Topics
Lecture 2 - Pedagogy, Approach, Institutions, Instructors, Audience and Pre-requisites
Lecture 3 - ILCE, Conferences, Resources, Further Work Possible
Lecture 4 - Lean Implementation in India from ILCE Directors and other Talks/Testimonials
Lecture 5 - Status of Lean Implementation in India through Industry Panel Discussion with ILCE Directors
Lecture 6 - History of Lean and other Management Philosophies; Toyota Production System (TPS); What is Lean?
Lecture 7 - Lean Construction Timeline; Lean Project Delivery vs LC; Project Management vs LC
Lecture 8 - Key Lean Concepts#1 (Wastes)
Lecture 9 - Key Lean Concepts#1 (Value, Value Stream, Flow, Pull, Perfection)
Lecture 10 - Key Lean Concepts#2 (Continuous Improvement, Collaborative working, Production System, Lean Cult
Lecture 11 - Key Lean Tools#1 (Productivity Measurement System, Work Sampling, Value Stream Mapping)
Lecture 12 - Lean Overview - Key Lean Tools#2 (5S, CPS/ LPS, Big Room Approach)
Lecture 13 - Lean Overview - Future module
Lecture 14 - Productivity Measurement and Improvement, Construction Productivtiy, Productivity levels
Lecture 15 - What is Productivity, Production?; Illustration
Lecture 16 - Productivity and Production Impact; Visualizing Activity Productivity and Production Performance
Lecture 17 - Profit, ROCE, Influences on Operational Productivity; Operational view vs. System view, Summary
Lecture 18 - Outline, Planning and monitoring levels; Productivity Measurement System
Lecture 19 - Measuring Output - Level of Effort (LOE)
Lecture 20 - Productivity and Production Calculations: daily, weekly, cumulative
Lecture 21 - Productivity and Production Calculations: Performance Evaluation
Lecture 22 - Productivity and Production Calculations: Workhour Forecast and Analysis of Trends
Lecture 23 - Factors Influencing Productivity, Productivity Improvement Approach, Summary
Lecture 24 - Sampling/ Surveying Techniques - Data Sources in Construction
Lecture 25 - Construction Activity with Workers doing VA/ NVAN/ NVA; WS vs PMS; Work Sampling
Lecture 26 - Sampling basics, Sampling in construction
Lecture 27 - Steps to Conduct a Work Sampling Study; WS Outcomes
Lecture 28 - Illustration of Tour-based Work Sampling Approach
Lecture 29 - Illustration of Crew-based Work Sampling Approach

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Lecture 30 - Explore relationship between WS Categories and Productivity; Summary
Lecture 31 - Sampling/ Surveying Techniques - Foreman delay survey
Lecture 32 - Sampling/ Surveying Techniques - Foreman delay survey - Implementation
Lecture 33 - Foreman delay survey - Illustrations; Comparison - PMS vs WS vs FDS - discussion
Lecture 34 - Value Stream, Value Stream Mapping (VSM), System vs Process, References
Lecture 35 - Illustration: Value and Value Stream in Food Delivery
Lecture 36 - Value, Value Stream, VSM/PM, Language, Basic VSM - current state and future state
Lecture 37 - Key steps for VSM, Work: Degrees of Granularity, Measurement Metrics
Lecture 38 - VSM - Example 1 (Reinforcement)
Lecture 39 - VSM - Example 2 (Blockwork); Summary
Lecture 40 - Flow Process Chart, Symbols, Process mapping - steps and timing, Measurement metrics
Lecture 41 - Process mapping - Illustration: Reinforcement shifting
Lecture 42 - VSM vs PM; Process Flow chart - variations; Swim-lane diagrams; Summary
Lecture 43 - Understand the Basics of 5S, Explanations and 5S Steps
Lecture 44 -
Lecture 45 - Understand Each -S- in Detail - Standardize, Sustain
Lecture 46 - 5S: Key Points, Benefits, Signs of a 5S Site
Lecture 47 - Experiment 5S with Yourself First, Project Implementation, Facilitations, Why 5S May Fail?, Reca
Lecture 48 - Understand the Applications of 5S through Case Studies_2 cases
Lecture 49 - Understand the Applications of 5S through Case Studies_3 cases
Lecture 50 - Understand the Applications of 5S through Case Study - Ms Diamond Barretto (Godrej Construction)
Lecture 51 - Current Project Performance, Workflow Variation, Traditional PM vs Lean Production Management
Lecture 52 - Some Key Lean Concepts, Focusing on frontline Execution, CPS - Collaborative Planning System
Lecture 53 - CPS Process, Overall Schedules (Master Schedule,Phase Schedule,LAP, Weekly Plan),Constraint Anal
Lecture 54 - Collaborative -Pull- Planning, Percentage Plan Completed (PPC), Daily Huddle, Variance Analysis,
Lecture 55 - Lean Work Structuring
Lecture 56 - Impact of PPC on Productivity, Key aspects,Advantages,The Necessary Conditions,Blocks - CPS,Summ
Lecture 57 - COLPLASSE: Look-Ahead Plan, Constraint Analysis, Weekly Plan, Summary
Lecture 58 - Lean Project Delivery System, Conclusion
Lecture 59 - Understand the Applications of CPS/LPS through Case Studies
Lecture 60 - CPS/LPS implementation in Construction Projects through a Panel of Experts - Part 1
Lecture 61 - CPS/LPS implementation in Construction Projects through a Panel of Experts - Part 2
Lecture 62 - CPS/LPS implementation in Construction Projects through a Panel of Experts - Part 3
Lecture 63 - Introduction of Big Room Approach, Some Requirements for Efficient Working, Virtual BR Meetings
Lecture 64 - Big Room Approach through Case Studies
Lecture 65 - Big Room Approach - Implementation case from URC Construction
Lecture 66 - Future Construction Site, Lean Tools and Processes, Automation strategies and impact, Programmir
Lecture 67 - Document Management, Workflow Process, Communication/Collab./Authen., Sensing
Lecture 68 - Mechanisation/ Robots, Visualization, AI/ Analytics, BIM, CPS/ IOT/ Industry 4.0, Digital Twin

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Lecture 69 - Challenges and Causes, Problem?, Lean, BIM?, Traditional vs BIM, Tools/Technology providers
Lecture 70 - BIM uses; Metrics
Lecture 71 - BIM and Lean, Implementation Framework, BIM Execution Plan, Evidence Cases, Key takeaway
Lecture 72 - How to Start Practicing Lean Tools in Project Sites-1: Work Sampling
Lecture 73 - How to Start Practicing Lean Tools in Project Sites-1: VSM
Lecture 74 - How to Start Practicing Lean Tools in Project Sites-1: 5S
Lecture 75 - How to Start Practicing Lean Tools in Project Sites-1: CPS/ LPS
Lecture 76 - How to Start Practicing Lean Tools in Project Sites-1: Big Room Approach
Lecture 77 - Acknowledgement

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NPTEL Video Course - Civil Engineering - NOC:Design of Connections in Steel Structures

Subject Co-ordinator - Prof. Anil Agarwal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Bolts: dimensions and material
Lecture 2 - Bolts: installation techniques and clearances
Lecture 3 - Design of Bearing type bolts in shear: Basic design principle
Lecture 4 - Correction factors for bolts for long joints, long grip lengths, and thick packing plate
Lecture 5 - Design of friction grip bolts in shear and design of bolts in tension
Lecture 6 - Structural Welding Process
Lecture 7 - Groove/Butt Welds
Lecture 8 - Fillet Welds - 1
Lecture 9 - Fillet Welds - 2
Lecture 10 - Weld symbols, defects, and filler material
Lecture 11 - Design of groove welds
Lecture 12 - Design of fillet welds - 1
Lecture 13 - Design of fillet welds - 2
Lecture 14 - Design example of a bolt group
Lecture 15 - Design example of a weld group
Lecture 16 - Simple and rigid frame connections
Lecture 17 - Design of double angle connections
Lecture 18 - Design of seated angle connections
Lecture 19 - End-plate rigid connection: Introduction
Lecture 20 - End-plate connection: Design example
Lecture 21 - Welded-flange rigid connection
Lecture 22 - Ductile detailed beam-column connections - 1
Lecture 23 - Ductile detailed beam-column connections - 2

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NPTEL Video Course - Civil Engineering - NOC:Analysis and Design of Bituminous Pavements

Subject Co-ordinator - A. Padmarekha, J. Murali Krishnan, M. R. Nivitha, Neethu Roy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Pavement Cross-sections and Pavement Design Process
Lecture 2 - Pavement Design Factors - I
Lecture 3 - Pavement Design Factors - II
Lecture 4 - Stresses and Strains in Bituminous Pavements - I
Lecture 5 - Stresses and Strains in Bituminous Pavements - II
Lecture 6 - Numerical Problems in One-layer Theory
Lecture 7 - Numerical Problems in Two-layer Theory
Lecture 8 - Introduction to KENLAYER
Lecture 9 - KENLAYER - 1
Lecture 10 - KENLAYER - 2
Lecture 11 - KENLAYER - 3
Lecture 12 - KENLAYER - 4
Lecture 13 - Traffic Analysis - ESWL - Part 1
Lecture 14 - Traffic Analysis - ESWL - Part 2
Lecture 15 - Traffic Analysis - EALF
Lecture 16 - Traffic Analysis - ESAL using VDF
Lecture 17 - Traffic Analysis - ESAL using TF
Lecture 18 - Traffic Analysis - Examples
Lecture 19 - Traffic Analysis - Load Spectra Factor
Lecture 20 - Modulus for Design - CBR
Lecture 21 - Modulus for Design - Resilient modulus (Granular material)
Lecture 22 - Modulus for Design - Resilient modulus (Bituminous material)
Lecture 23 - Modulus for Design - Dynamic Modulus
Lecture 24 - Environmental Effect - Part 1
Lecture 25 - Environmental Effect - Part 2
Lecture 26 - Environmental Effect - Part 3
Lecture 27 - Environmental Effect - Part 4
Lecture 28 - Enhanced Integrated Climatic Model - Part 1
Lecture 29 - Enhanced Integrated Climatic Model - Part 2

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Lecture 30 - Climate Consideration in Design Procedures
Lecture 31 - Reliability in Pavement Design - Part 1
Lecture 32 - Reliability in Pavement Design - Part 2
Lecture 33 - Reliability in Pavement Design - Part 3
Lecture 34 - Reliability in Pavement Design - Part 4
Lecture 35 - Reliability in Pavement Design - Part 5
Lecture 36 - Reliability in Pavement Design - Part 6
Lecture 37 - Distress Transfer Function - Fatigue Cracking
Lecture 38 - Rutting and Low-Temperature Cracking
Lecture 39 - KENLAYER - Nonlinear Analysis
Lecture 40 - KENLAYER - Damage Analysis
Lecture 41 - IRC design steps
Lecture 42 - Design Input and IITPAVE software
Lecture 43 - Pavement design with granular base
Lecture 44 - Pavement design with CTB
Lecture 45 - Pavement design with RAP Base
Lecture 46 - Overview of Mechanistic-Empirical Pavement Design Methods - IRC
Lecture 47 - Overview of Mechanistic-Empirical Pavement Design Methods - South Africa - Part I
Lecture 48 - Overview of Mechanistic-Empirical Pavement Design Methods - South Africa - Part II
Lecture 49 - Overview of Mechanistic-Empirical Pavement Design Methods - South Africa - Part III
Lecture 50 - Overview of Mechanistic-Empirical Pavement Design Methods - Australia - Part I
Lecture 51 - Overview of Mechanistic-Empirical Pavement Design Methods - Australia - Part II
Lecture 52 - Overview of Mechanistic-Empirical Pavement Design Methods - AASHTO - Part I
Lecture 53 - Overview of Mechanistic-Empirical Pavement Design Methods - AASHTO - Part II
Lecture 54 - Summary of the course and design projects

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NPTEL Video Course - Civil Engineering - NOC:FEM and Constitutive Modelling in Geomechanics

Subject Co-ordinator - Prof. K Rajagopal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory lecture and course outline
Lecture 2 - Matrix algebra and Gauss elimination method
Lecture 3 - Development of equilibrium equations for 1-d systems
Lecture 4 - Development of equilibrium equations for 2-d bar elements and truss structures
Lecture 5 - Development of equilibrium equations for beam elements
Lecture 6 - Virtual work and principle of stationary potential energy
Lecture 7 - Introduction to Rayleigh-Ritz Method
Lecture 8 - Use of GEOFEM finite element program - Part I
Lecture 9 - Use of GEOFEM finite element program - Part II
Lecture 10 - Stresses and strains in continuum
Lecture 11 - 2-dimensional approximations of continuum
Lecture 12 - Analysis of continuum systems
Lecture 13 - 3-node Constant Strain Triangle
Lecture 14 - Classical methods for developing shape functions
Lecture 15 - Numerical integration techniques
Lecture 16 - Isoparametric Elements - Part I
Lecture 17 - Isoparametric Elements - Part II
Lecture 18 - Isoparametric calculations for stiffness and load vectors
Lecture 19 - Force vector due to surface traction
Lecture 20 - Patch test and Finite Element Modelling
Lecture 21 - GEOFEM - Part III
Lecture 22 - In situ earth pressures, construction and excavation sequences
Lecture 23 - Joint and interface element modelling
Lecture 24 - Modelling of interfaces - Joint Elements
Lecture 25 - Mapped infinite elements for semi-infinite soil medium
Lecture 26 - Some observations of soil behaviour and stress invariants
Lecture 27 - Nonlinear analysis technique - 1
Lecture 28 - Nonlinear analysis technique - 2
Lecture 29 - Nonlinear analysis technique - 3

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Lecture 30 - Bilinear elastic models
Lecture 31 - Nonlinear elastic and hyperbolic models
Lecture 32 - Modified hyperbolic model and determination of material parameters
Lecture 33 - Stress correction procedures in finite element analysis
Lecture 34 - Numerical examples on working with modified hyperbolic models
Lecture 35 - Some Limit solutions in geotechnical engineering
Lecture 36 - Elastic - Plastic Constitutive Matrix
Lecture 37 - Nonassociated Elastic - Plastic Joint Element
Lecture 38 - Introduction to consolidation and dynamic analysis
Lecture 39 - Cam Clay models
Lecture 40 - Modified cam clay models
Lecture 41 - FEM in Geotechnical applications
Lecture 42 - Soil behaviour and An Introduction to the Existing Soil Models
Lecture 43 - Simulation of soil liquefaction using FLAC
Lecture 44 - Mitigation of soil liquefaction using granular columns

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NPTEL Video Course - Civil Engineering - NOC:The Evolution of the Earth and life

Subject Co-ordinator - Prof. Devapriya Chattopadhyay

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Structure
Lecture 2 - Introduction to Google Earth
Lecture 3 - How Does Earth Science Work ?
Lecture 4 - What is a Mineral
Lecture 5 - Minerals and Rock Cycle
Lecture 6 - Continental Drift
Lecture 7 - Plate Tectonics
Lecture 8 - What are Igneous Rocks ?
Lecture 9 - Compositional Variation of Igneous Rocks
Lecture 10 - Why Does the Rock Melt ?
Lecture 11 - Igneous Activity and Plate Tectonics
Lecture 12 - Igneous Structures
Lecture 13 - Volcanoes
Lecture 14 - Discussion on Posted Questions
Lecture 15 - What are Metamorphic Rocks
Lecture 16 - Types of Metamorphism
Lecture 17 - Metamorphism and Plate Tectonics
Lecture 18 - Weathering and Erosion
Lecture 19 - Detrital Sedimentary Rocks
Lecture 20 - Chemical and Organic Sedimentary Rocks
Lecture 21 - Sedimentary Environment and Plate Tectonics
Lecture 22 - Discussion on Conceptual Questions
Lecture 23 - Discussion on Posted Questions
Lecture 24 - Diversity of Life
Lecture 25 - Why Do Groups Change ?
Lecture 26 - Nature of Paleontological Data
Lecture 27 - Introduction to PaleoDB
Lecture 28 - Relative Age
Lecture 29 - Correlation

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Lecture 30 - Attempts to Estimate Absolute Age
Lecture 31 - Radiometric Dating
Lecture 32 - Rocks Full of Life
Lecture 33 - Discussion on Posted Questions_3
Lecture 34 - The Beginning
Lecture 35 - The Formation of the Planets and Moon
Lecture 36 - The Formation of the Continents
Lecture 37 - The Formation of the Atmosphere and Ocean
Lecture 38 - Origin of Life: Initial Ideas
Lecture 39 - Origin of Life: Which Biomolecules Came First ?
Lecture 40 - Origin of Life: Where did it all Start ?
Lecture 41 - Evidence of Early Life
Lecture 42 - Proterozoic Events and Life
Lecture 43 - Discussion on Posted Questions_4
Lecture 44 - Cambrian Earth and Life
Lecture 45 - Cambrian Explosion
Lecture 46 - Journey to Land: Fishes and Tetrapods
Lecture 47 - Journey to Land: Transitional Forms
Lecture 48 - Appearance of Amniotes
Lecture 49 - Dinosaurs
Lecture 50 - Dinosaurs Footprints
Lecture 51 - Appearance of Feathers
Lecture 52 - Mass Extinctions and Their Impact
Lecture 53 - K-Pg Extinction: Patterns
Lecture 54 - K-Pg Extinction: Mechanisms
Lecture 55 - Paleoclimatic Reconstruction
Lecture 56 - Cenozoic Climate
Lecture 57 - Recovery from K-Pg: Paleogene Event
Lecture 58 - Who are Whales ?
Lecture 59 - Discussion on Posted Questions_5
Lecture 60 - Development of Bipedality
Lecture 61 - Early Hominids
Lecture 62 - Megafaunal Extinction
Lecture 63 - Recent Extinctions
Lecture 64 - Anthropocene and Future
Lecture 65 - Discussion on Posted Questions_6

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NPTEL Video Course - Civil Engineering - NOC:Advanced Reinforced Concrete Design

Subject Co-ordinator - Prof S. Suriya Prakash

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction-Overview of RCC - Part 1
Lecture 2 - Introduction-Overview of RCC - Part 2
Lecture 3 - Introduction to Design Concepts and Philosophies - Part 1
Lecture 4 - Introduction to Design Concepts and Philosophies - Part 2
Lecture 5 - Materials Short Term Properties - Part 1
Lecture 6 - Materials Short Term Properties - Part 2
Lecture 7 - Materials Short Term Properties - Part 3
Lecture 8 - Materials Short Term Properties - Part 4
Lecture 9 - Materials Long Term Properties - Part 1
Lecture 10 - Materials Long Term Properties - Part 2
Lecture 11 - Materials Rebar Properties
Lecture 12 - Durability - Overview
Lecture 13 - Durability - Effect of Chemical actions
Lecture 14 - Durability - Effect of Physical,mechanical and corrosion
Lecture 15 - Durability - Design approaches and code provisions
Lecture 16 - Axial Behaviour - Introduction
Lecture 17 - Axial Behaviour of Reinforced Concrete
Lecture 18 - Axial Behaviour - Effect of Compressive Strength
Lecture 19 - Flexure Behaviour - Background to flexural theory
Lecture 20 - Flexure Behaviour - Moment curvature analysis-procedure
Lecture 21 - Flexure Behaviour - Example-Moment curvature of singly reinforced section
Lecture 22 - Flexure Behaviour - Effect of increasing reinforcement on Moment curvature behaviour
Lecture 23 - Flexure Behaviour - Effect of compressive strength on Moment curvatureÃ behaviour
Lecture 24 - Flexure Behaviour - Effect of axial Compression on Moment curvature behaviour - Part 1
Lecture 25 - Flexure Behaviour - Effect of axial Compression on Moment curvature behaviour - Part 2
Lecture 26 - Flexure Behaviour - Effect of Compression steel on Moment curvature behaviour - Part 1
Lecture 27 - Flexure Behaviour - Effect of Compression steel on Moment curvature behaviour - Part 2
Lecture 28 - Flexure Behaviour - Analysis and Design of Singly Reinforced Sections using IS Code - Part 1
Lecture 29 - Flexure Behaviour - Analysis and Design of Singly Reinforced Sections using IS Code - Part 2

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Lecture 30 - Flexure Behaviour - Examples in Flexure using IS Code Provisions
Lecture 31 - Flexure Behaviour - Analysis and Design of Doubly Reinforced Sections using IS Code
Lecture 32 - Flexure Behaviour - Analysis and Design of Flanged Sections using ISÃ CodeÃ Provisions
Lecture 33 - Shear Behaviour of RC elements - Part 1
Lecture 34 - Shear Behaviour of RC elements - Part 2
Lecture 35 - Shear Behaviour of RC elements - Part 3
Lecture 36 - Shear Behaviour - Shear Design using IS 456 Provisions
Lecture 37 - Shear Behaviour - Examples for Shear Design using IS 456 Provisions
Lecture 38 - Shear Behaviour - Torsional Behaviour of RC elements - Part 1
Lecture 39 - Shear Behaviour - Torsional Behaviour of RC elements - Part 2
Lecture 40 - Shear Behaviour - Torsional Behaviour of RC elements - Part 3
Lecture 41 - Shear Behaviour - Torsion Design of RC Beams using IS 456 Provisions
Lecture 42 - Compression behaviour of RC Columns - Intro and Types - Part 1
Lecture 43 - Compression behaviour of RC Columns - Short vs Slender and Effective length - Part 2
Lecture 44 - Compression behaviour of RC Columns - Lateral Flexibility and Example - Part 3
Lecture 45 - Compression behaviour of RC Columns IS Code Provisions - Part 1
Lecture 46 - Compression behaviour of RC Columns Confinement and Tied Vs Spiral Confined Columns - Part 2
Lecture 47 - Compression behaviour of RC Columns - P-M Interaction : Theory
Lecture 48 - Compression behaviour of RC Columns - P-M Interaction : Example as per IS 456
Lecture 49 - Compression behaviour of Design of RC Columns for Biaxial Bending - Part 1
Lecture 50 - Compression behaviour of Design of RC Columns for Biaxial Bending - Part 2
Lecture 51 - Compression behaviour of Slender Column Design: Theory - Part 1
Lecture 52 - Compression behaviour of Slender Column Design: Example as per IS 456 - Part 2
Lecture 53 - Serviceability - Introduction to Deflection of RC Beam Part - 1
Lecture 54 - Serviceability - Introduction to Deflection of RC Beam Part - 2
Lecture 55 - Serviceability - Long term deflection and IS code Provisions
Lecture 56 - Serviceability - Numerical Example for the calculation of Deflection of RC beam
Lecture 57 - Crack width calculation - Theory - Part 1
Lecture 58 - Crack width Calculation - Example - Part 2
Lecture 59 - Serviceability - Design for Bond - Theory - Part 1
Lecture 60 - Serviceability - Design for Bond - Theory - Part 2
Lecture 61 - Serviceability - Design example for Bond and Splicing - Part 3
Lecture 62 - Two way slabs - Background
Lecture 63 - Two way slabs - Design Methods
Lecture 64 - Two way slabs - Direct Design Method - Part 1
Lecture 65 - Two way slabs - Direct Design Method - Part 2
Lecture 66 - Two way slabs - Equivalent Frame Method - Part 1
Lecture 67 - Two way slabs - Equivalent Frame Method (Example) - Part 2

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NPTEL Video Course - Civil Engineering - NOC:Admixtures and Special Concretes

Subject Co-ordinator - Prof. Manu Santhanam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Cement Chemistry and concrete performance: Cement history and production
Lecture 2 - Overview of Cement Chemistry and concrete performance: Quality control and composition
Lecture 3 - Overview of Cement Chemistry: Composition of Cement and Classification of Cement
Lecture 4 - Overview of Cement Chemistry: Hydration of Cement
Lecture 5 - Overview of Concrete Performance: Curing and Hardened Concrete
Lecture 6 - Overview of Concrete Performance: Basics of Hardened Concrete
Lecture 7 - Chemical Admixtures: Introduction
Lecture 8 - Chemical Admixtures: Water reducers - Part 1
Lecture 9 - Chemical Admixtures: Water reducers - Part 2
Lecture 10 - Chemical Admixtures: Water reducers - Part 3
Lecture 11 - Chemical Admixtures: Water reducers - Part 4
Lecture 12 - Chemical Admixtures: Water reducers - Part 5
Lecture 13 - Chemical Admixtures: Water reducers - Part 6
Lecture 14 - Chemical Admixtures: Set controllers
Lecture 15 - Chemical Admixtures: Set controllers - Accelerators
Lecture 16 - Chemical Admixtures: Set controllers - Retarders
Lecture 17 - Chemical Admixtures: Standards
Lecture 18 - Chemical Admixtures: Air entrainers - Part 1
Lecture 19 - Chemical Admixtures: Air entrainers - Part 2
Lecture 20 - Chemical Admixtures: Understanding Concrete Rheology - Part 1
Lecture 21 - Chemical Admixtures: Understanding Concrete Rheology - Part 2
Lecture 22 - Chemical Admixtures: Viscosity Modifying Agents (VMA)
Lecture 23 - Chemical Admixtures: Mechanism of corrosion
Lecture 24 - Chemical Admixtures: Corrosion inhibitors, Shrinkage reducing admixtures
Lecture 25 - Chemical Admixtures: Other specialty admixtures
Lecture 26 - Chemical Admixtures: Curing compounds
Lecture 27 - Mineral Admixtures: Introduction
Lecture 28 - Mineral Admixtures: Types, Composition and Particle size distribution
Lecture 29 - Mineral Admixtures: Microstructure of SCMs and Pozzolonic reactions

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Lecture 30 - Mineral Admixtures: Pozzolonic activity
Lecture 31 - Mineral Admixtures: Electrical Conductivity method, Frattini test and Lime saturation method
Lecture 32 - Mineral Admixtures: Strength Activity test, Lime reactivity test, Mixture Proportioning and R3 t
Lecture 33 - Mineral Admixtures: Flyash - Part 1: Introduction
Lecture 34 - Mineral Admixtures: Flyash - Part 2: Classification and structure
Lecture 35 - Mineral Admixtures: Flyash - Part 3: Effects on fresh concrete
Lecture 36 - Mineral Admixtures: Flyash - Part 4: Effects on hardened concrete
Lecture 37 - Mineral Admixtures: Silica fume - Part 1: Introduction
Lecture 38 - Mineral Admixtures: Silica fume - Part 2: Effects on fresh and hardened concrete
Lecture 39 - Mineral Admixtures: Silica fume - Part 3: Effects on Microstructure + GGBS - Part 1 : Introducti
Lecture 40 - Mineral Admixtures: GGBS - Part 2 : Properties
Lecture 41 - Mineral Admixtures: GGBS - Part 3 : Hydration of slag and Durability of slag cements
Lecture 42 - Mineral Admixtures: Metakaolin
Lecture 43 - Mineral Admixtures: LC3 - Part 1 : Introduction
Lecture 44 - Mineral Admixtures: LC3 - Part 2 : Comparision with other SCMs
Lecture 45 - Mineral Admixtures: LC3 - Part 3 : Durability Performance
Lecture 46 - Mineral Admixtures: Agricultural ashes - Part 1 : Sugarcane bagasse ash
Lecture 47 - Mineral Admixtures: Agricultural ashes - Part 2 : Rice husk ash
Lecture 48 - Mineral Admixtures: Calorimeter
Lecture 49 - Mineral Admixtures: Pore solution analysis
Lecture 50 - Mineral Admixtures: CASH analysis in blended system and Life cycle assessment of concrete - Part
Lecture 51 - Life cycle assessment of concrete - Part 2
Lecture 52 - Life cycle assessment of concrete - Part 3
Lecture 53 - Special concretes - High strength concrete - Definition, design and concept of particle packing
Lecture 54 - Special concretes - High strength concrete - Particle packing models
Lecture 55 - Special concretes - High strength concrete - Mix designs, strength and durability
Lecture 56 - Special concretes - High strength concrete - Design attributes, fresh and hardened properties
Lecture 57 - Special concretes - High strength concrete - Stress:strain relationships, applications
Lecture 58 - Special concretes - Ultra high performance concrete - Design principles, strength, durability
Lecture 59 - Special concretes: Self compacting concrete -Introduction, design requirements and plastic shrin
Lecture 60 - Special concretes: Self compacting concrete - Segregation and laboratory tests
Lecture 61 - Special concretes - Self Compacting Concrete - Workability test methods, classifications and iss
Lecture 62 - Special concretes - Self Compacting Concrete - Design principles, mix designs, concrete properti
Lecture 63 - Special concretes - Mass concrete - Introduction, materials, thermal cracking
Lecture 64 - Special concretes - Mass concrete - Design guidelines, temperature differential measurement
Lecture 65 - Special concretes - Mass concrete - Temperature differential measurement, Design
Lecture 66 - Special concretes - Mass concrete - Temperature monitoring, nomogram, minimizing restraints
Lecture 67 - Special concretes - Mass concrete - Heat modelling
Lecture 68 - Special concretes - Lightweight concrete - Introduction, classifications

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Lecture 69 - Special concretes - Lightweight concrete - Foamed concrete, lightweight aggregates
Lecture 70 - Special concretes - Lightweight concrete - Light weigh aggregates, aerated concrete
Lecture 71 - Special concretes - High density concrete - Heavy weight aggregates, design, case stud
Lecture 72 - Special concretes - Concrete for 3D printing - Introduction, classification, printing process
Lecture 73 - Special concretes - Concrete for 3D printing - Developments, advantages, case study
Lecture 74 - Special concretes - Concrete for 3D printing - Critical parameters, yield stress
Lecture 75 - Special concretes - Concrete for 3D printing - Mix design approach, admixtures
Lecture 76 - Special concretes - Concrete for 3D printing - Failure modes, buildability, early-age beahaviour

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NPTEL Video Course - Civil Engineering - NOC:Advanced Topics in Science and Technology of Concrete

Subject Co-ordinator - Prof. Ravindra Gettu, Prof. Manu Santhanam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Aggregates and their effects on concrete properties - Part 1
Lecture 2 - Aggregates and their effects on concrete properties - Part 2
Lecture 3 - An overview of recycled concrete aggregates (RCA): sources and types - Part 1
Lecture 4 - An overview of recycled concrete aggregates (RCA): sources and types - Part 2
Lecture 5 - Recycled Concrete Aggregate (RCA): Availability, Collection, and Processing Methods - Part 1
Lecture 6 - Recycled Concrete Aggregate (RCA): Availability, Collection, and Processing Methods - Part 2
Lecture 7 - Recycled Concrete Aggregates: Properties and Performance - Part 1
Lecture 8 - Recycled Concrete Aggregates: Properties and Performance - Part 2
Lecture 9 - Recycled Concrete Aggregates: Properties and Performance - Part 3
Lecture 10 - Recycled Concrete Aggregates: Properties and Performance - Part 4
Lecture 11 - Recycled Concrete Aggregates: Properties and Performance - Part 5
Lecture 12 - Effect of moisture condition on the microstructure and design of RCA concrete - Part 1
Lecture 13 - Effect of moisture condition on the microstructure and design of RCA concrete - Part 2
Lecture 14 - Overview and generation of recycled concrete fines
Lecture 15 - Utilisation of recycled concrete fines
Lecture 16 - Recycled Concrete Aggregates: Properties, Design, and Standards
Lecture 17 - Environmental impact and life cycle assessment (LCA) - Part 1
Lecture 18 - Environmental impact and life cycle assessment (LCA) - Part 2
Lecture 19 - Construction supply chains - Part 1
Lecture 20 - Construction supply chains - Part 2
Lecture 21 - Recycled concrete aggregates market: problems and prospects - Part 1
Lecture 22 - Recycled concrete aggregates market: problems and prospects - Part 2

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NPTEL Video Course - Civil Engineering - NOC:An Introduction to Climate Dynamics, Variability and Monitoring

Subject Co-ordinator - Prof. Sayak Banerjee

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Climate Dynamics, Variability and Monitoring - Part 1
Lecture 2 - Introduction to Climate Dynamics, Variability and Monitoring - Part 2
Lecture 3 - Climatic Variables of the Atmosphere
Lecture 4 - Atmospheric Layers; Troposphere; Temperature Lapse Rate
Lecture 5 - Atmospheric Structure and Composition
Lecture 6 - Atmospheric Gas Concentration and introduction to Atmospheric Pressure
Lecture 7 - Atmospheric Pressure and Mass
Lecture 8 - How to Measure Vertical Variation of Pressure
Lecture 9 - Fundamentals of Atmospheric Humidity and Weather Variables
Lecture 10 - Advanced Atmospheric Humidity Concepts Contours and Key Relationships
Lecture 11 - Virtual Temperature and Atmospheric Stability Concepts
Lecture 12 - Understanding Atmospheric Stability Adiabatic Relations and Lapse Rate
Lecture 13 - Potential Temperature, Adiabatic Lapse Rate of Moist Air, Three Possible Stability Relationships
Lecture 14 - Derivation of Potential Temperature, Deriving the Expression for Saturated Adiabatic Lapse Rate
Lecture 15 - Temperature Variation With Changes in Vertical Pressure
Lecture 16 - Temperature Gradient of Dry and Saturated Air Parcel, Earth Sun Relationship
Lecture 17 - Fundamentals of Earth'S Climate System Latitude, Longitude, and Temperature Dynamics
Lecture 18 - Understanding Earth'S Seasons Axial Tilt, Solstice, and Equinox Dynamics
Lecture 19 - Mean Emission Temperature of Earth and the Greenhouse Effect - Part 1
Lecture 20 - Mean Emission Temperature of Earth and the Greenhouse Effect - Part 2
Lecture 21 - Mean Emission Temperature of Earth and the Greenhouse Effect - Part 3
Lecture 22 - Net Radiative Flux Imbalance Annual Averaged and Seasonal
Lecture 23 - Derivation of Beam Spreading Effect, Derivation of the Greenhouse Effect
Lecture 24 - Derivation of Analysing the Atmosphere of Venus, Radiation Fluxes
Lecture 25 - Principles of Electromagnetic Radiation Spectral Intensity, Irradiance, and Material Interactior
Lecture 26 - Blackbody Radiation Relations
Lecture 27 - Atmospheric Absorption and Radiative Transfer
Lecture 28 - 28 Radiative Transfer in the Atmosphere Key Concepts
Lecture 29 - Infrared Radiative Transfer in the Earth'S Atmosphere

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Lecture 30 - Radiative Flux and Optical Depth
Lecture 31 - Introduction to Atmospheric Heating and Heat Balance
Lecture 32 - Advanced Atmospheric Heating and Heat Balance
Lecture 33 - Temperature Distribution for a Continuously Stratified Atmosphere in Radiative Equilibrium - Par
Lecture 34 - Temperature Distribution for a Continuously Stratified Atmosphere in Radiative Equilibrium - Par
Lecture 35 - Temperature Distribution and Greenhouse Effect in a Continuously Stratified Atmosphere
Lecture 36 - Atmospheric Circulation Systems - Basic Concepts
Lecture 37 - Atmospheric Circulation Systems - Coriolis Forces
Lecture 38 - Atmospheric Circulation Systems - Pressure Forces
Lecture 39 - Atmospheric Circulation Systems - Frictional Forces and Surface Level Winds
Lecture 40 - Atmospheric Circulation Systems - High Level Winds
Lecture 41 - Seasonal Shifts - Advanced Concepts
Lecture 42 - The Ocean and the Climate
Lecture 43 - Ocean Salinity and Mixing Layer
Lecture 44 - Importance of Mixing Layer and Wind Driven Surface Current
Lecture 45 - Ocean Circulation and Deep Oceanic thermohaline Circulation
Lecture 46 - Coupled Ocean Atmosphere Variability
Lecture 47 - Global Temperature Model, Radiative Forcing and Zero Dimensional Energy Balance Model
Lecture 48 - Zero Dimensional Energy Balance Model (Continued...)
Lecture 49 - Energy Balance Model and Temperature Responce to Radiative Forcing
Lecture 50 - Temperature Responce to Radiative Forcing (Continued...)
Lecture 51 - Planck Feedback or Blackbody Radiative Feedback, Simple Radiative Balance Model
Lecture 52 - Indirect Feedback: Water Vapour Feedback and Spectral Outgoing Longwave Radiation
Lecture 53 - Absorption of Outgoing Longwave Radiation By Atmospheric CO2
Lecture 54 - Introduction to Principles of Measurement and Instrumentation - Part 1
Lecture 55 - Introduction to Principles of Measurement and Instrumentation - Part 2
Lecture 56 - Introduction to Principles of Measurement and Instrumentation - Part 3
Lecture 57 - Automatic Weather Stations, Temperature Measurements and Humidity Measurements
Lecture 58 - Humidity Measurements and Pressure Measurements
Lecture 59 - Wind Measurements Techniques
Lecture 60 - Radiation and Temperature Measurements - Part 1
Lecture 61 - Radiation and Temperature Measurements - Part 2
Lecture 62 - Radiation and Precipitation Measurements
Lecture 63 - Upper Air Measurements
Lecture 64 - Remote Sensing: Climatological Applications
Lecture 65 - Types of Satellite Orbit and its Remote Sensing Applications, VNIR Imaging through Electro Optic
Lecture 66 - Spatial and Spectral Resolution of Satellite Imagery and Application of VNIR Imaging in Climatol
Lecture 67 - Application of VNIR Imaging in Climatology and Thermal Infrared Imaging Systems
Lecture 68 - Cloud Detection, Nadir Viewing, Limb Sounding, Solar Occultation

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Lecture 69 - Ground Based Atmospheric Remote Sounding

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NPTEL Video Course - Civil Engineering - NOC:Indoor Air Pollution: Sources, Effects, Monitoring, Control and

Subject Co-ordinator - Prof. Asif Qureshi

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Common Air Pollutants
Lecture 2 - Sources of indoor air pollutants - 1
Lecture 3 - Sources of indoor air pollutants - 2
Lecture 4 - Sources of indoor air pollutants - 3
Lecture 5 - Methods to estimate emissions
Lecture 6 - Mass balance
Lecture 7 - Mass balance Simple Examples
Lecture 8 - Residence times and Fractional losses
Lecture 9 - Multi-room (multi-box) models
Lecture 10 - Examples
Lecture 11 - Outdoor air as source to indoor air. Introduction
Lecture 12 - Outdoor air as source to indoor air. Infiltration, health
Lecture 13 - Indoor-Outdoor relationship
Lecture 14 - Air exchange and ventilation rates
Lecture 15 - Health-based ventialtion framework
Lecture 16 - Aerosol Basics
Lecture 17 - Aerosol Deposition
Lecture 18 - Coagulation, condensation and evaporation processes
Lecture 19 - Aerosol sources and aerosol properties
Lecture 20 - Indoor air chemistry: basics of chemical kinetics
Lecture 21 - Indoor air chemistry: some key reactions
Lecture 22 - Surface reactions
Lecture 23 - Examples
Lecture 24 - Bioaerosols in the Indoor Atmosphere: Introduction
Lecture 25 - Bioaerosols in the Indoor Atmosphere: Sources
Lecture 26 - Indoor bioaerosols and health impacts
Lecture 27 - Environmental factors and bioaerosols
Lecture 28 - Indoor air exposure risk assessment - principles
Lecture 29 - Calculation of daily dose

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Lecture 30 - TIme-activity and inhalation risk assessment
Lecture 31 - Examples
Lecture 32 - Indoor air pollution monitoring of physico-chemical pollutants: Introduction and sampling method
Lecture 33 - Indoor air pollution sampling and instruments
Lecture 34 - Indoor air pollutants analysis - 1
Lecture 35 - Indoor air pollutants analysis - 2
Lecture 36 - Indoor bioaerosol sampling methods - 1
Lecture 37 - Indoor bioaerosol sampling methods - 2
Lecture 38 - Methods for bioaerosol analysis - 1
Lecture 39 - Methods for bioaerosol analysis - 2
Lecture 40 - Guest lecture: Case study on comparison of two methdos for indoor bioaerosol sampling and analys
Lecture 41 - Indoor Air Pollution/Quality in the Indian Context
Lecture 42 - Indoor Air Quality in India - Case studies 1
Lecture 43 - Indoor Air Quality in India - Case studies 2
Lecture 44 - Guest lecture: Case study on bioaerosols in Indian indoor environment
Lecture 45 - Indoor Air Quality in India - Overview and Gaps
Lecture 46 - Indoor air quality guidelines and control: Introduction
Lecture 47 - IAQ guidelines and control: Ventilation
Lecture 48 - IAQ control methods
Lecture 49 - Introduction to Contam
Lecture 50 - Indoor air pollution effects: sick building syndrome
Lecture 51 - Managing indoor air quality
Lecture 52 - Air pollution control methods
Lecture 53 - Modeling Example

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NPTEL Video Course - Civil Engineering - NOC:Geophysical Exploration Methods

Subject Co-ordinator - Prof. Elango Lakshmanan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Scope of Different Methods - I
Lecture 2 - Introduction and Scope of Different Methods - II
Lecture 3 - Electrical Methods
Lecture 4 - Comparison of Electrical and Hydraulic Properties
Lecture 5 - Array Advantages and Disadvantages - I
Lecture 6 - Electrical Resistivity Methods : Method of Field Operation, Electrical Profiling and Case Studies
Lecture 7 - Electrical Resistivity Methods : Vertical Electrical Sounding Methods
Lecture 8 - Electrical Resistivity Methods : Vertical Electrical Sounding Data interpretation Methods
Lecture 9 - Electrical Resistivity Methods : 3D Resistivity Tomography case study and Applications
Lecture 10 - Field Demonstration of Vertical Electrical Sounding
Lecture 11 - Application of VES and 3D Tomography for Identification of Seawater intrusion
Lecture 12 - Resistivity Methods for Estimation of Aquifer Properties
Lecture 13 - Expert Lectuer - Dr. V.Arulprakasam
Lecture 14 - Electrical Self Potential Method Introduction
Lecture 15 - Electrical Self Potential Method Field Procedure
Lecture 16 - Applications and Case studies - Self Potential method
Lecture 17 - Electrical Induced Polarization Method - 1
Lecture 18 - IP Time and Frequency Domain Methods
Lecture 19 - Electromagnetic Methods
Lecture 20 - Electromagnetic Method Field Demonstration
Lecture 21 - Expert Lectuers
Lecture 22 - Seismic Methods Introdcution
Lecture 23 - Seismic operation on land
Lecture 24 - Explosive Sources
Lecture 25 - Non-explosive Sources and Receiving Seismic Signals
Lecture 26 - Recording of Seismic Signals and Data Reduction
Lecture 27 - Seismic Method-Types : Refraction Method, Two layer case study
Lecture 28 - Refraction Method - Case study on Multi layer and Dipping layer
Lecture 29 - Borehole Seismics

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Lecture 30 - Geophysics for tunneling and Dam Construction - Expert Lectuer by Dr Sanjay Rana - 1
Lecture 31 - Geophysics for tunneling and Dam Construction - Expert Lectuer by Dr Sanjay Rana - 2
Lecture 32 - Seismic Reflection Method
Lecture 33 - Seismic Reflection Applications and Case Studies - 1
Lecture 34 - Seismic Reflection Applications and Case Studies - 2
Lecture 35 - Expert Lectuer (Seismic Exploration) - Dr. N. Satyavani, NGRI
Lecture 36 - Multichannel Analysis of Surface Waves (MASW)
Lecture 37 - MASW - Case Studies
Lecture 38 - Expert Lectuer (MASW) - Dr.K. Satish Kumar, NGRI
Lecture 39 - Gravity Methods Introduction
Lecture 40 - Gravity Method Principle and Types of Gravity Measurements
Lecture 41 - Types of Gravimeters
Lecture 42 - Calibration and Drift Correction
Lecture 43 - Gravity data reduction or Correction - 1
Lecture 44 - Gravity data reduction or Correction - 2
Lecture 45 - Gravity Method (Interpretation) - Quantitative Methods
Lecture 46 - Gravity Method indirect interpretation
Lecture 47 - Gravity Method Application and Case Studies
Lecture 48 - Gravity Recovery and Climate Experiment (GRACE Mission)
Lecture 49 - GRACE - Case Studies
Lecture 50 - Magnetic Methods Introduction
Lecture 51 - Magnetometers
Lecture 52 - Interpretation and Case studies
Lecture 53 - Expert Lectuer - Prof.N. Sundararajan
Lecture 54 - Ground Penetrating Radar
Lecture 55 - GPR - Field Demonstration
Lecture 56 - Synthetic Aperture Radar (SAR)
Lecture 57 - Surface Nuclear Magnetic Resonance - 1
Lecture 58 - Surface Nuclear Magnetic Resonance - 2
Lecture 59 - Expert Lectuer - Dr. Pramod Kumar Sharma
Lecture 60 - Radioactive Methods
Lecture 61 - Geophysical Well Logging methods - I
Lecture 62 - Geophysical Well Logging Methods - II
Lecture 63 - Induction Log
Lecture 64 - Radiometric logging and applications
Lecture 65 - Other logging methods - Sonic, Caliper, Temperature
Lecture 66 - Fluid conductivity and NMR logging
Lecture 67 - Bore Hole Camera and Summary of Logging methods
Lecture 68 - Answers to the Questions

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NPTEL Video Course - Civil Engineering - NOC:Stability Aspects of Structural Steel Design: Concepts and Appli

Subject Co-ordinator - Prof. Mahendrakumar Madhavan

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Stability - 1
Lecture 2 - Introduction to Stability - 2
Lecture 3 - Introduction to Stability - 3
Lecture 4 - Introduction to Stability - 4
Lecture 5 - Classical Column Theory - 1
Lecture 6 - Classical Column Theory (Continued...)
Lecture 7 - Martix Method of Solving stability problems
Lecture 8 - Martix Method of Solving stability problems (Continued...)
Lecture 9 - Inelastic bucking theories of column
Lecture 10 - Shanley's Theory
Lecture 11 - Imperfect Columns
Lecture 12 - Residual Stresses and its effects on column design curves
Lecture 13 - Perry Robertson approach
Lecture 14 - European multiple column curves
Lecture 15 - American column curves
Lecture 16 - Introduction to beams
Lecture 17 - Solution for Uniform torsion or St.Venant's torsion
Lecture 18 - Torsional constant for open sections
Lecture 19 - Torsional constant for closed sections
Lecture 20 - Solution for Non-Uniform torsion or Vlasov's torsionv
Lecture 21 - Elastic critical moment for simply supprted beam subjected to unifrm bending using differential
Lecture 22 - Solution for elastic critical moment of simply supported beam subjected to uniform bending using
Lecture 23 - Solution for elastic critical moment of simply supported beam subjected to non-uniform bending
Lecture 24 - Solution for elastic critical moment of simply supported beam subjected to concentrated load at
Lecture 25 - Elastic critical moment for fixed ended beam subjected to uniform bending
Lecture 26 - Critical loads for a cross-section under axial compression
Lecture 27 - Problem solving on Torsion
Lecture 28 - Problem solving on Beams
Lecture 29 - Deriving Von Karman's partial differential equation for thin plates

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Lecture 30 - Strain energy method for obtaining critical stress for plates
Lecture 31 - Strain energy method for obtaining critical stress for plates under different loading conditions
Lecture 32 - Generic equations for elastic plate buckling coefficient, k
Lecture 33 - Development of width-to-thickness ratio limits
Lecture 34 - Concept of post critical buckling
Lecture 35 - Deriving the effective width of a plate under uniform compression as per AISI S100
Lecture 36 - Problem solving: Effective Width Method (EWM)
Lecture 37 - Tension Field Action in Plate girder - An application of post-critical buckling in thin plates
Lecture 38 - Deriving the design equations in IS 800:2007 for Simple post-critical method and Tension field m
Lecture 39 - Design of a plate girder-A design example - Part 1
Lecture 40 - Design of a plate girder-A design example - Part 2
Lecture 41 - Curved plate girders: An overview of fabrication and construction
Lecture 42 - Importance of steel structures

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NPTEL Video Course - Civil Engineering - Construction Economics and Finance

Subject Co-ordinator - Prof. Nikhil Bugalia

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to course and its objectives
Lecture 2 - Basic concepts of Engineering Economy
Lecture 3 - Economic Equivalence and Engineering Economy Factors - 1
Lecture 4 - Economic Equivalence and Engineering Economy Factors - 2
Lecture 5 - Arithmetic Gradient Factor
Lecture 6 - Interest Rate Transformation : Effective Interest Rates
Lecture 7 - Engineering Economy Factors Adjusted for Effective Interest Rates
Lecture 8 - Basics of Financial Evaluation of Project Alternatives
Lecture 9 - Present Worth Analysis Method
Lecture 10 - Annual Worth Analysis Method and Internal Rate of Return (IRR) Method
Lecture 11 - Incremental Rate of Return (IROR) method
Lecture 12 - Cost-Benefit Analysis Method
Lecture 13 - Sensitivity Analysis for Engineering Economy Analysis
Lecture 14 - Risk-based Assessments in Engineering Economy - 1
Lecture 15 - Risk-based Assessments in Engineering Economy - 2
Lecture 16 - Monte-Carlo Simulation Concept and Example
Lecture 17 - Break-even Analysis
Lecture 18 - Break-even Analysis (Continued...) and Introduction to Depreciation
Lecture 19 - Depreciation Methods and Switching Decisions
Lecture 20 - Income Tax and Cash-flow Adjustment
Lecture 21 - Inflation Adjustment and Introduction to Replacement Study
Lecture 22 - Procedures to Perform Replacement Study
Lecture 23 - Replacement Study Examples and Numericals
Lecture 24 - Cost Estimation
Lecture 25 - Analysis of Rates
Lecture 26 - Working Capital and Revenue Recognition in Construction Projects
Lecture 27 - Status of Multiple Projects and Introduction to Assets and Liabilities
Lecture 28 - Introduction to Financial Statements
Lecture 29 - Introduction to Accounting

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Lecture 30 - Formal and Informal Accounting Procedures
Lecture 31 - Informal Accounting Examples
Lecture 32 - Informal Accounting Examples - Recording Profits and Losses
Lecture 33 - Working Capital Management for Construction Projects
Lecture 34 - Ratio Analysis

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NPTEL Video Course - Civil Engineering - NOC:Advanced Prestressed Concrete Design

Subject Co-ordinator - Prof. S. Suriya Prakash

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction-Overview of PSC - Part 1
Lecture 2 - Introduction-Overview of PSC - Part 2
Lecture 3 - Introduction-Overview of PSC - Part 3
Lecture 4 - Prestressing: Types, Systems and Devices - Part 1
Lecture 5 - Prestressing: Types, Systems and Devices - Part 2
Lecture 6 - Prestressing: Types, Systems and Devices - Part 3
Lecture 7 - Review of short term and long-term behaviour of prestressed concrete - Part 1
Lecture 8 - Review of short term and long-term behaviour of prestressed concrete - Part 2
Lecture 9 - Review of short term and long-term behaviour of prestressed concrete - Part 3
Lecture 10 - Prestressing Strand: Mechanical properties, Types and Production process - Part 1
Lecture 11 - Prestressing Strand: Mechanical properties, Types and Production process - Part 2
Lecture 12 - Introduction to losses in prestress
Lecture 13 - Elastic shortening losses : Post-tensioned members
Lecture 14 - Friction losses : Post-tensioned members
Lecture 15 - Anchorage slip losses : Post-tensioned members
Lecture 16 - Time dependent losses
Lecture 17 - Time dependent losses : Example problem
Lecture 18 - Introduction to response of prestress member in axial load
Lecture 19 - Developing load deformation curve for different prestressing conditions
Lecture 20 - Developing load deformation curve considering long term losses
Lecture 21 - Review of simple bending theory
Lecture 22 - Analysis of flexural members
Lecture 23 - Concept of equivalent load
Lecture 24 - Stress block parameters for moment curvature analysis
Lecture 25 - Obtaining moment curvature for variour reinforcement conditions
Lecture 26 - Comparison of behaviour and layer-by-layer approach
Lecture 27 - Ultimate moment capacity
Lecture 28 - Moment capacity of flanged sections
Lecture 29 - Example for flanged section

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Lecture 30 - Introduction : Kern points and pressure line
Lecture 31 - Cracking moment, Camber and deflection in prestressed beams
Lecture 32 - Stress analysis of flexural members : Example problem
Lecture 33 - Introduction : Flexural design
Lecture 34 - Design Example on type 1 member
Lecture 35 - Type 2 member and design example on type 2 members, Detailing requirements
Lecture 36 - Magnel's Graphical method and design example
Lecture 37 - Basics of shear stress and shear transfer mechanism in PSC beam
Lecture 38 - Effect of prestress on shear behaviour
Lecture 39 - Analysis of PSC beam for shear
Lecture 40 - Design of PSC beam for shear - 1
Lecture 41 - Design of PSC beam for shear - 2
Lecture 42 - Introduction to Torsion
Lecture 43 - Analysis of PSC beam for Torsion prior to cracking
Lecture 44 - Analysis of PSC beam for Torsion after cracking
Lecture 45 - Evaluation of Torsional capacity of PSc beam
Lecture 46 - Design of PSC beam for combined shear, torsion and bending
Lecture 47 - Transfer of Prestress in Pre Tensioned Member - Part 1
Lecture 48 - Transfer of Prestress in Pre Tensioned Member - Part 2
Lecture 49 - Transfer of Prestress in Pre Tensioned Member - Part 3
Lecture 50 - Transfer of Prestress in Pre Tensioned Member - Part 4
Lecture 51 - Continuous beams: Introduction and basic concepts
Lecture 52 - Continuous beams: Pressure line analysis, secondary and tertiary moments
Lecture 53 - Continuous beams: Linear transformation and concordant cable profile
Lecture 54 - Continuous Beams: Design Process
Lecture 55 - Intorduction to composite construction
Lecture 56 - Analysis of stress
Lecture 57 - Deflection of composite beams, Differential shirnkage
Lecture 58 - Analysis of composite section
Lecture 59 - Design of composite section
Lecture 60 - Concepts of Strut-and-tie model for design of disturbed regions
Lecture 61 - Guidelines for the formulations of efficient strut-and-tie model and structural behaviour of dee
Lecture 62 - Design example of post-tensioned deep beam using strut-and-tie model
Lecture 63 - Design example of corbel using strut-and-tie model
Lecture 64 - Basic force transfer mechanism of precast/prestressed connections and type of connections
Lecture 65 - Types of precast/prestressed connections and their seismic aspects
Lecture 66 - Precast concrete frames with unbonded prestressing
Lecture 67 - Introduction to PT slabs
Lecture 68 - PT systems and tendon dsitribution in slabs

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Lecture 69 - PT one-way slabs
Lecture 70 - Two way PT slab
Lecture 71 - Design criteria fot PT slabs
Lecture 72 - Equivalent frame method
Lecture 73 - Capacity of two-way slabs
Lecture 74 - Design example of PT slab - prelimary design
Lecture 75 - Design example of PT slab - equivalent frame analysis
Lecture 76 - Design example of PT slab - design checks
Lecture 77 - Importance of external post-tensioning system for strengthening applications
Lecture 78 - Applications of external post-tensiong system for strengthening
Lecture 79 - Analysis-design considerations and case studies of external post-tensioning strengthening system

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NPTEL Video Course - Civil Engineering - NOC:Sustainable Groundwater Management

Subject Co-ordinator - Prof. Elango Lakshmanan

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sustainable Groundwater Management - Introduction
Lecture 2 - Groundwater Stress and Sustainability Indicators
Lecture 3 - Sustainability Indicators : Groundwater Depletion and Seawater Intrusion
Lecture 4 - Sustainability Indicators : Quality Degradation, Land Subsidence, and GDEs
Lecture 5 - Future Groundwater Use and the Need for Sustainable Management
Lecture 6 - Hydrologic Cycle and Aquifers
Lecture 7 - Groundwater in different geological formations
Lecture 8 - Porosity and factors affecting porosity
Lecture 9 - Aquifer Storage Properties
Lecture 10 - Aquifer Compressibility and Groundwater Flow
Lecture 11 - Hydrulic Conductivity, Transmissivity and Groundwater flow velocity
Lecture 12 - Determination of Hydraulic Conductivity: Empirical, Laboratory, and Field Methods
Lecture 13 - Estimation of Hydraulic Conductivity by Tracer and Pumping Tests
Lecture 14 - Aquifer tests for Sustianable Yield
Lecture 15 - Aquifer Test Methods: Steady and Unsteady Flow Conditions
Lecture 16 - Alternative Methods for Estimating Aquifer Parameters - Part 1 : Slug and Bail Tests
Lecture 17 - Alternative Methods for Estimating Aquifer Parameters - Part 2 : Well Yield and Loss Analysis
Lecture 18 - Well Performance Evaluation - Part 1 : Step-Drawdown and Loss Relationships
Lecture 19 - Well Performance Evaluation - Part 2 : Efficiency, Deterioration, and Maintenance
Lecture 20 - Surface Water - Groundwater Interaction
Lecture 21 - Groundwater Recharge Estimation: Field Methods and Case Studies
Lecture 22 - Groundwater Dependent Ecosystems: Classification and Controlling Factors
Lecture 23 - Identifying and Assessing GDEs: Indicators, Mapping, and Monitoring Tools
Lecture 24 - Major Threats to GDEs: Causes, Consequences, and the Need for Sustainability
Lecture 25 - Groundwater Sustainability by Aquifer Recharge and Rejuvenation
Lecture 26 - Natural Recharge Enhancement for Sustainable Groundwater Management
Lecture 27 - Managed Aquifer Recharge Part I : Definition, Benefits, and Method Overview
Lecture 28 - Managed Aquifer Recharge Part II : Design and Implementation
Lecture 29 - Traditional Water Harvesting in India and Groundwater Rejuvenation Initiatives

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Lecture 30 - Policy and Management Approaches for Sustainable Groundwater Recharge
Lecture 31 - Policy and Management Approaches for Sustainable Groundwater Recharge
Lecture 32 - Hydrochemistry and Groundwater Quality
Lecture 33 - Chemical Parameters and Composition of Groundwater
Lecture 34 - Groundwater Sampling and Chemical Data Representation
Lecture 35 - Geochemical Changes in Groundwater
Lecture 36 - MAR and Geochemical process
Lecture 37 - Groundwater Quality Criteria
Lecture 38 - Application of Isotopes in Groundwater Sustainability
Lecture 39 - Application of Isotopes in Groundwater Sustainability
Lecture 40 - Artificial isotopes as tracers
Lecture 41 - Groundwater Management and Contamination
Lecture 42 - Type of contaminants - 1
Lecture 43 - Type of contaminants - 2
Lecture 44 - Health Risk Assessment
Lecture 45 - Sustainable Mangement for addressing Groundwater Contamination
Lecture 46 - Applications of Isotopic Techniques in Groundwater Hydrology
Lecture 47 - Coastal Aquifers and Seawater Intrusion : Part I
Lecture 48 - Coastal Aquifers and Seawater Intrusion : Part II
Lecture 49 - Different Methods of Identification of Coastal Salinisation
Lecture 50 - Methods of Prevention/Limiting Seawater Intrusion
Lecture 51 - Sustainable management of coastal Aquifers
Lecture 52 - Groundwater Modelling for sustainable management
Lecture 53 - Numerical Approaches in Groundwater Modelling
Lecture 54 - Solute Transport Process and Stages of Modelling
Lecture 55 - Case Studies on Groundwater Modelling - South Chennai - Part I
Lecture 56 - Case Studies on Groundwater Modelling - South Chennai - Part II
Lecture 57 - Urban and Agricultural Management
Lecture 58 - Urban Groundwater Pollution, Governance, and Management
Lecture 59 - Methods of Urban Aquifer Recharge and Water Pricing : Case studies
Lecture 60 - Sustainable Groundwater Use in Agriculture
Lecture 61 - Sustainable Irrigation Practices
Lecture 62 - Water Audit : Concept and Importance
Lecture 63 - Expert Lectuer 1 - Integrated Water Resources Management (IWRM) Concepts, Challenges, and Oppurt
Lecture 64 - Expert Lectuer 2 - Groundwater Sustainability Interaction of Science and Policy
Lecture 65 - Governance, Policy and Institutional Frameworks - Part I
Lecture 66 - Governance, Policy and Institutional Frameworks - Part II
Lecture 67 - Urban Water and Agricultural Water Efficiency
Lecture 68 - Case Studeis : Rural and Urban Solutions

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Lecture 69 - Groundwater Institutions, Laws and Stakeholders
Lecture 70 - Sectorwise Analysis of Groundwater Regulation and Use
Lecture 71 - Sustainable Groundwater Initiatives in India
Lecture 72 - Groundwater Governance : History, Foundations and Constitutional Scheme
Lecture 73 - Future Challenges and Innovations in Sustainable Groundwater Management
Lecture 74 - Impacts of Climate Change on Groundwater: Future Projections and Case Studies
Lecture 75 - Artificial Intelligence and Machine Learning for Groundwater Sustainability
Lecture 76 - Future Challenges in Participatory Approaches to Sustainable Groundwater Management
Lecture 77 - Strategies for Community Participation in Sustainable Groundwater Management
Lecture 78 - Participatory Groundwater Management
Lecture 79 - Policy Interventions fro Sustaible Groundwater Management in India
Lecture 80 - River bank Filtration : A Source for Sustainable Drinking Water

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NPTEL Video Course - Civil Engineering - NOC:Climate Change - Extreme Events

Subject Co-ordinator - Prof. Somil Swarnkar

Co-ordinating Institute - IISER Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Climate Science Basics - Weather vs. Climate
Lecture 2 - Introduction to Climate Change
Lecture 3 - Introduction to Climate Extremes: Definitions, Types, and Global Impact
Lecture 4 - Week 1 Summary and Assignment
Lecture 5 - Week 1 Assignment Solution
Lecture 6 - Heatwaves and Cold Spells: Causes, Impacts, and Trends
Lecture 7 - Extreme Precipitation: Floods, Droughts, and Water Cycle Impacts
Lecture 8 - Tropical Cyclones, Storms, and Associated Weather Events
Lecture 9 - Week 2 Summary and Assignment
Lecture 10 - Week 2 Assignment Solution
Lecture 11 - Climate Data Sources and Observational Tools
Lecture 12 - Data Collection and Preprocessing: Handling Gaps, Errors, and Temporal Biases
Lecture 13 - Introduction to Climate Models: Types, Resolution, and Applications
Lecture 14 - Week 3 Summary and Assignment
Lecture 15 - Week 3 Assignment Solution
Lecture 16 - Probability Distributions and Climate Data Analysis
Lecture 17 - Introduction to Extreme Value Theory (EVT) and its Applications
Lecture 18 - Analyzing Frequency and Intensity of Extreme Events
Lecture 19 - Week 4 Summary and Assignment
Lecture 20 - Week 4 Assignment Solution
Lecture 21 - Time Series Analysis: Trends, Seasonality, Stationarity and Correlations
Lecture 22 - Detection of Changes in Extreme Events: Statistical Techniques
Lecture 23 - Attribution Studies: Linking Extremes to Anthropogenic Climate Change
Lecture 24 - Week 5 Summary and Assignment
Lecture 25 - Week 5 Assignment Solution
Lecture 26 - Risk Assessment Frameworks for Extreme Events
Lecture 27 - Calculating Return Periods for Rare Events
Lecture 28 - Uncertainty Analysis in Climate Projections and Risk Assessments
Lecture 29 - Week 6 Summary and Assignment

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Lecture 30 - Week 6 Assignment Solution
Lecture 31 - The 2013 Uttarakhand and 2015 South India Floods
Lecture 32 - The Millennium Drought of Australia
Lecture 33 - The 2022 Heatwave Across Northern and Central India
Lecture 34 - Week 7 Summary and Assignment
Lecture 35 - Week 7 Assignment Solution
Lecture 36 - Predictive Models for Climate Extremes: Statistical, and Machine Learning
Lecture 37 - Building and Validating Statistical and ML-Based Models for Prediction
Lecture 38 - Scenario Analysis and Projecting Future Extremes
Lecture 39 - Week 8 Summary and Assignment
Lecture 40 - Week 8 Assignment Solution
Lecture 41 - Economic Costs of Extreme Events: Damage and Recovery
Lecture 42 - Health and Social Impacts of Climate Extremes
Lecture 43 - Vulnerability and Adaptation in Developing Regions
Lecture 44 - Week 9 Summary and Assignment
Lecture 45 - Week 9 Assignment Solution
Lecture 46 - International Agreements and National Policies on Climate Change
Lecture 47 - Risk Reduction Strategies and Community Resilience
Lecture 48 - Adaptation Policies for Climate Extreme Events
Lecture 49 - Week 10 Summary and Assignment
Lecture 50 - Week 10 Assignment Solution
Lecture 51 - Advances in Climate Extremes Research and Big Data Applications
Lecture 52 - Remote Sensing and AI in Detections of Climate Extremes
Lecture 53 - Role of Ecosystems in Mitigating Climate Extremes
Lecture 54 - Week 11 Summary and Assignment
Lecture 55 - Week 11 Assignment Solution
Lecture 56 - Review of Statistical and Analytical Methods
Lecture 57 - Integrated Case Study Project: Analyzing a Recent Extreme Event
Lecture 58 - Course Wrap-Up and Discussion on Future Research Directions

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NPTEL Video Course - Civil Engineering - NOC:Theory of Plasticity for Engineers: Concepts and Applications

Subject Co-ordinator - Prof. Amirtham Rajagopal

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Plasticity
Lecture 2 - Stress-Strain Relations
Lecture 3 - Pressure Independent Materials Failure Criteria
Lecture 4 - Pressure Dependent Materials Failure Criteria
Lecture 5 - Components of Plasticity, Kuhn-Tucker conditions
Lecture 6 - Perfectly Plastic Materials and Flow Rule
Lecture 7 - Stress-Strain Relations for Hardening Materials
Lecture 8 - Implementation in Metals
Lecture 9 - Elasto-Plastic Analysis for Composite Materials
Lecture 10 - Linear Elastic Brittle Fracture Models
Lecture 11 - Implementation of Concrete Constitutive Models
Lecture 12 - Elastic Perfectly Plastic Fracture Models for Concrete
Lecture 13 - Plasticity Models: Plain Concrete and FRC
Lecture 14 - Constitutive Models for Confined Concrete
Lecture 15 - Material Damage and Continuum Damage Mechanics
Lecture 16 - Mechanical Representation of Damage and Damage Variables
Lecture 17 - Thermodynamics of damaged material
Lecture 18 - Inelastic Constitutive Equation for Materials with Isotropic Damage
Lecture 19 - Strain Energy Release and Stress Criteria in Damage Development
Lecture 20 - Constitutive and Evolution Equations of Elastic-Plastic Damage
Lecture 21 - Anisotropic Damage Theory and Dissipation Potential Functions
Lecture 22 - Viscoelasticity, Viscoplasticity and Energy-Based Inelastic Damage Theory - Part 1
Lecture 23 - Viscoelasticity, Viscoplasticity and Energy-Based Inelastic Damage Theory - Part 2
Lecture 24 - Strain Gradient Theories
Lecture 25 - Basics of Blast and Impact
Lecture 26 - Overview of Constitutive Material Models for Concrete
Lecture 27 - Concrete Constitutive Models and Their Extension to UHPC
Lecture 28 - Constitutive modeling of concrete under dynamic loading
Lecture 29 - Foundations of One-Dimensional Rate-Independent Plasticity

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Lecture 30 - Incremental Elastoplasticity and Convex Return-Mapping Algorithms
Lecture 31 - Finite Element Formulation of Elastoplasticity

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NPTEL Video Course - Civil Engineering - NOC:Basics of Climate Modeling

Subject Co-ordinator - Prof. Asif Qureshi

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - ClimateTrends
Lecture 2 - Components of the Climate System
Lecture 3 - Vertical Motions in the atmosphere
Lecture 4 - Hydrosphere
Lecture 5 - Cryosphere
Lecture 6 - Basic data analysis
Lecture 7 - Radiative Balance and Effective Temperature
Lecture 8 - Earth's Surface Temperature and Atmospheric Temperature
Lecture 9 - Ratiative forcing
Lecture 10 - Lapse Rate and Atmospheric Stability
Lecture 11 - Concept of Radiative Forcing
Lecture 12 - Feedbacks and Climate Sensitivity
Lecture 13 - Physical Feedbacks
Lecture 14 - Chemical Cycles and Box modeling
Lecture 15 - Geochemical Cycles
Lecture 16 - Types of Climate Models: Focusing on Energy Balance Models
Lecture 17 - Meridional Energy Transport Components in One-Dimensional Energy Balance Models
Lecture 18 - Applicability of Climate Models and the Snowball Earth Hypothesis
Lecture 19 - Atmosphere-Ocean System
Lecture 20 - Harvey and Schneider (1985) J Geophysical Research Vol 90
Lecture 21 - Transient response of climate to external forcing on timescales of 1 to 10,000 years
Lecture 22 - Wigley and Schlesinger 1985
Lecture 23 - Transport of Energy and Matter
Lecture 24 - Small-scale and Large-scale Motions in the Atmosphere and Oceans
Lecture 25 - Earth's energy balance and the mechanisms of meridional heat transport
Lecture 26 - General Circulation Models (GCMs)
Lecture 27 - Earth System Models of Intermediate Complexity (EMICs)
Lecture 28 - Earth System Models of Intermediate Complexity (EMICs)

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NPTEL Video Course - Civil Engineering - NOC:Seismic Design of Building Structures

Subject Co-ordinator - Prof. Vishwajit Anand

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Earthquakes Source and Waves
Lecture 3 - Earthquakes Magnitude and Intensity
Lecture 4 - Lessons Learnt from Past Earthquakes
Lecture 5 - Seismic Damages and Irregularities
Lecture 6 - Aspects of Good Seismic Design
Lecture 7 - Dynamics of SDOF Systems
Lecture 8 - Seismic Response of SDOF Systems
Lecture 9 - Equivalent Static Method
Lecture 10 - Equivalent Static Method Example
Lecture 11 - Response Spectrum Method - 1
Lecture 12 - Pesposne Spectrum Method - 2
Lecture 13 - Response Spectrum Method - Example
Lecture 14 - Response History Method - I
Lecture 15 - Response History Method - II
Lecture 16 - Seismic Analysis Methods
Lecture 17 - Torsionally Irregular Buildings - I
Lecture 18 - Torsionally Irregular Buildings - II
Lecture 19 - Problems with Force Based Design
Lecture 20 - Displacement Based Seismic Design
Lecture 21 - Peformace Based Seismic Design
Lecture 22 - Capacity based Seismic Design
Lecture 23 - Concepts and Meterial Specifications
Lecture 24 - Design Example Problem Statement
Lecture 25 - Ductile Detailing of RC Beams
Lecture 26 - Design Example RC Beams
Lecture 27 - Ductile Detailing of RC Columns
Lecture 28 - Design Example RC Columns
Lecture 29 - Special Confining Reiforcement and Ductile Detailing of Beam Column Joints

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Lecture 30 - Design Example - RC Beam Column Joints
Lecture 31 - Ductile Detailing of RC Shear Walls - Part 1
Lecture 32 - Ductile Detailing of RC Shear Walls - Part 2
Lecture 33 - Design Example RC Shear Walls
Lecture 34 - Concepts and Material Specifications
Lecture 35 - Design Example - Problem Statement
Lecture 36 - Ductile Detailing o Steel Beams
Lecture 37 - Design Example - Steel Beams
Lecture 38 - Ductile Detailing of Steel Columns
Lecture 39 - Design Example - Steel Columns
Lecture 40 - Ductile Detailing of Steel Beam Column Joints
Lecture 41 - Design Example Steel Beam Column Joints
Lecture 42 - Dectile Detailing of Steel Structural Braces and Shear Links
Lecture 43 - Ductile Detailing of Special Eccentrically Braced Frames EBFs
Lecture 44 - Ductile Detailing of Special Comcentrically Braced Frames SCBFs
Lecture 45 - Meterial Specifications
Lecture 46 - Wall Geometry and Lateral Supports
Lecture 47 - Design Loads and Permissible Stresses
Lecture 48 - Ductile detailing of Masonry Walls
Lecture 49 - Design Example - 1
Lecture 50 - Design Example - 2
Lecture 51 - Design Example - 3
Lecture 52 - Confined Masonry Land Transfer
Lecture 53 - Confined Masonry Meterial Specifications
Lecture 54 - Confined Mesonry Building Configuration and Ductile Detailing of Walls
Lecture 55 - Confined Masonry Ductile Detailing of Confining Elements
Lecture 56 - Confined Masonry Structural Design
Lecture 57 - Equivalent Static Method
Lecture 58 - Equivalent Static Method Example
Lecture 59 - Response Spectrum Method
Lecture 60 - Non structural Components Classification
Lecture 61 - Non Structural Components Behaviour
Lecture 62 - Preliminary Seismic Evaluation of RC Buildings
Lecture 63 - Detailed Sesmic Evaluation of RC Buildings
Lecture 64 - Seismic Retrofit of RC Buildings
Lecture 65 - Seismic Evaluation of Maonry Buildings
Lecture 66 - Seismic Retrofit of Masonry Buildings
Lecture 67 - Seismic Protection Measures

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NPTEL Video Course - Civil Engineering - NOC:Climate Hazards and Disaster Mitigation

Subject Co-ordinator - Prof. Priyank J. Sharma

Co-ordinating Institute - IIT Indore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to climate hazards and disasters
Lecture 2 - Climate change and vulnerability of India
Lecture 3 - Hazard versus disaster and Risk versus vulnerability
Lecture 4 - Summary: Climate hazards, disasters and vulnerability
Lecture 5 - Learning Exercise: Mapping climate vulnerability profile
Lecture 6 - Hydroclimatic measurements and data
Lecture 7 - Extreme rainfall and temperature indices
Lecture 8 - Geospatial data analysis for disaster mitigation
Lecture 9 - Summary Hydroclimatic and geospatial data processing
Lecture 10 - Hands on Downloading and processing gridded rainfall and temperature data
Lecture 11 - Floods: Types, characteristics, causes and drivers
Lecture 12 - Deriving flood characteristics and frequency analysis
Lecture 13 - Trend analysis of flood characteristics
Lecture 14 - Summary: Statistical techniques for flood assessment
Lecture 15 - Hands-on: Flood frequency and trend analysis
Lecture 16 - Flood frequency analysis Distribution fitting
Lecture 17 - Compound and concurrent floods
Lecture 18 - Bivariate flood frequency analysis using copula
Lecture 19 - Summary Univariate and bivariate flood frequency analysis
Lecture 20 - Hands on Flood Frequency Analysis - Univariate and Bivariate
Lecture 21 - Urban flood modelling
Lecture 22 - Flood hazard and risk mapping
Lecture 23 - Flood mitigation and nature-based solutions
Lecture 24 - Summary: Flood risk assessment and mitigation
Lecture 25 - Hands-on: Urban flood risk assessment
Lecture 26 - Droughts Types, characteristics, causes and drivers
Lecture 27 - Estimation of drought indices
Lecture 28 - Assessment of drought characteristics
Lecture 29 - Summary Drought estimation and assessment

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Lecture 30 - Hands on Assessment of drought characteristics
Lecture 31 - Drought severity and frequency analysis
Lecture 32 - Drought propagation and transition
Lecture 33 - Drought mitigation and nature-based solutions
Lecture 34 - Summary: Drought severity and mitigation
Lecture 35 - Hands-on: Drought propagation and transition
Lecture 36 - Heat waves Causes and drivers
Lecture 37 - Estimation of heat stress
Lecture 38 - Urban heat island
Lecture 39 - Summary Heat waves and heat stress
Lecture 40 - Hands on Assessment of heat wave and stress
Lecture 41 - Cold waves Causes and drivers
Lecture 42 - Compound climate extremes
Lecture 43 - Heat and cold wave mitigation approaches
Lecture 44 - Summary Compound climate extremes
Lecture 45 - Hands on Assessment of compound climate extremes
Lecture 46 - Science meets policy and disaster mitigation
Lecture 47 - Disaster risk reduction and economics of disasters
Lecture 48 - Emergency and humanitarian response in disasters
Lecture 49 - Summary: Disaster management and risk reduction
Lecture 50 - Learning Exercise: Formulating a heat action plan
Lecture 51 - Study of disaster management frameworks
Lecture 52 - The Disaster Management Act 2005 India Overview
Lecture 53 - The Disaster Management Act 2005 India Key Aspects
Lecture 54 - The Disaster Management Act 2005 India Way forward
Lecture 55 - Learning Exercise: Formulating a flood emergency action plan
Lecture 56 - Role of big data in climate hazards and disaster modelling
Lecture 57 - Role of climate change in modulating future occurrences of climate hazards
Lecture 58 - Accounting non stationarity in modelling climate hazards
Lecture 59 - Course Summary Climate hazards and risk assessment
Lecture 60 - Course Summary Disaster mitigation and management

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NPTEL Video Course - Civil Engineering - NOC:Smart Cities

Subject Co-ordinator - Prof. Neelima Satyam, Prof. Priyansh Singh

Co-ordinating Institute - IIT Indore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Smart Cities
Lecture 2 - What is Smart Cities ?
Lecture 3 - Evolution of urban systems
Lecture 4 - Components of a smart city - Part 1
Lecture 5 - Components of a smart city - Part 2
Lecture 6 - Global smart city frameworks
Lecture 7 - Smart City Mission (India): Vision and Targets - Part 1
Lecture 8 - Smart City Mission (India): Vision and Targets - Part 2
Lecture 9 - E-Governance Systems and Frameworks
Lecture 10 - ICT Architecture and The IoT Stack
Lecture 11 - Integrated Command and Control Centres (ICCC)
Lecture 12 - Citizen Participation and Engagement
Lecture 13 - Data-Driven Governance
Lecture 14 - Basics of Urban Mobility and Traffic Engineering
Lecture 15 - Intelligent Transport Systems
Lecture 16 - Public Transport - From Fundamentals to Smart Systems
Lecture 17 - Electric and Shared Mobility
Lecture 18 - Non-Motorized Transport (NMT)
Lecture 19 - Smart water supply systems - Part 1
Lecture 20 - Smart water supply systems - Part 2
Lecture 21 - Sewage and drainage monitoring - Part 1
Lecture 22 - Sewage and drainage monitoring - Part 2
Lecture 23 - Urban solid waste systems - Part 1
Lecture 24 - Urban solid waste systems - Part 2
Lecture 25 - Smart metering and energy systems
Lecture 26 - Integration of Urban Services in Smart Cities
Lecture 27 - Renewable Energy in Cities
Lecture 28 - Smart grids: concepts and benefits
Lecture 29 - Distributed Generation and Microgrids

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Lecture 30 - Energy Storage
Lecture 31 - Demand-Side Management
Lecture 32 - Air Quality and Pollution Sensors
Lecture 33 - Wastewater Treatment and Reuse
Lecture 34 - Decentralized Solid Waste Models
Lecture 35 - Urban Green Spaces
Lecture 36 - Smart Environmental Monitoring
Lecture 37 - IoT and sensor networks
Lecture 38 - GIS and digital twins
Lecture 39 - Urban Data Analytics
Lecture 40 - Cybersecurity for Cities
Lecture 41 - Cloud and AI Applications in city services
Lecture 42 - Smart urban form and density
Lecture 43 - Zoning and land-use strategies
Lecture 44 - Transit-oriented development (TOD) and Mixed-use development
Lecture 45 - Urban redevelopment and retrofitting
Lecture 46 - Green Building Concepts
Lecture 47 - Energy-Efficient Architecture
Lecture 48 - Green Building Certification
Lecture 49 - Zero-Carbon Cities
Lecture 50 - Sustainable Urban Design
Lecture 51 - What makes a city resilient ? - Part 1
Lecture 52 - What makes a city resilient ? - Part 2
Lecture 53 - What makes a city resilient ? - Part 3
Lecture 54 - Urban flood mitigation - Part 1
Lecture 55 - Urban flood mitigation - Part 2
Lecture 56 - Seismic planning and structural safety
Lecture 57 - Emergency services and early warning
Lecture 58 - Climate adaptation strategies
Lecture 59 - Indiaâ s Smart City Mission (Pune and Surat)
Lecture 60 - Barcelona - Urban Tech Pioneer
Lecture 61 - Singapore - Integrated Mobility Excellence
Lecture 62 - Amsterdam - Circular Economy Leader
Lecture 63 - Synthesis and Key Success Factors
Lecture 64 - Urban AI and Automation
Lecture 65 - Blockchain in City Governance
Lecture 66 - 5G, Drones and Urban Surveillance
Lecture 67 - Course Review and Future Perspectives

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NPTEL Video Course - Civil Engineering - Foundation Engineering

Subject Co-ordinator - Prof. Priti Maheswari, Prof. N.K. Samadhiya, Prof. Mahendra Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Shallow Foundation - 1
Lecture 2 - Shallow Foundation - 2
Lecture 3 - Shallow Foundation - 3
Lecture 4 - Shallow Foundation - 4
Lecture 5 - Shallow Foundation - 5
Lecture 6 - Shallow Foundation - 6
Lecture 7 - Shallow Foundation - 7
Lecture 8 - Lateral Earth pressure Theories Retaining Walls - 1
Lecture 9 - Lateral Earth pressure Theories Retaining Walls - 2
Lecture 10 - Lateral Earth pressure Theories Retaining Walls - 3
Lecture 11 - Lateral Earth Pressure Theories Retaining Walls - 4
Lecture 12 - Lateral Earth Pressure Theories Retaining Walls - 5
Lecture 13 - Pile Foundations - 1
Lecture 14 - Pile Foundations - 2
Lecture 15 - Pile Foundations - 3
Lecture 16 - Pile Foundations - 4
Lecture 17 - Pile Foundations - 5
Lecture 18 - Pile Foundations - 6
Lecture 19 - Pile Foundations - 7
Lecture 20 - Machine Foundations - 1
Lecture 21 - Machine Foundations - 2
Lecture 22 - Machine Foundations - 3
Lecture 23 - Machine Foundations - 4
Lecture 24 - Well Foundations - 1
Lecture 25 - Well Foundations - 2
Lecture 26 - Well Foundations - 3
Lecture 27 - Foundation Engineering - 1
Lecture 28 - Foundation Engineering - 2
Lecture 29 - Foundation Engineering - 3

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Lecture 30 - Foundation Engineering - 4
Lecture 31 - Foundation Engineering - 5
Lecture 32 - Foundation Engineering - 6
Lecture 33 - Foundation Engineering - 7
Lecture 34 - Foundation Engineering - 8
Lecture 35 - Foundation Engineering - 9
Lecture 36 - Foundation Engineering - 10
Lecture 37 - Foundation Engineering - 11
Lecture 38 - Foundation Engineering - 12
Lecture 39 - Foundation Engineering - 13
Lecture 40 - Foundation Engineering - 14

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NPTEL Video Course - Civil Engineering - Modern Surveying Techniques

Subject Co-ordinator - Prof. S.K. Ghosh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Geographic Information System An Introduction
Lecture 2 - Introduction to Global Positioning System
Lecture 3 - GPS Positioning Methods
Lecture 4 - GPS Solutions and Errors
Lecture 5 - GPS Application
Lecture 6 - Remote Sensing Introduction
Lecture 7 - Electromagnetic Spectrum
Lecture 8 - Sensors and Platform
Lecture 9 - Sensors and Platform
Lecture 10 - Image Interpretation
Lecture 11 - Statistical Evaluation of RS Data
Lecture 12 - Rectification and Restoration
Lecture 13 - Image Enhancement
Lecture 14 - Image Transformation
Lecture 15 - Orthogonal Transformation
Lecture 16 - Image Classification (Supervised Classification)
Lecture 17 - Image Classification (Unsupervised Classification)
Lecture 18 - Spatial Filtering-Noise Removal
Lecture 19 - Spatial Filtering-Edge Removal
Lecture 20 - Photogramatic-Basic concepts of a single photography
Lecture 21 - Stereoscopy-Basic concepts
Lecture 22 - Stereoscopy-Geometry of overlaping photograph
Lecture 23 - Terrestrial Photogrammetry
Lecture 24 - Digital Elevation Model-Basic Concepts
Lecture 25 - Digital Elevation Model-Data Input and Stamping
Lecture 26 - Digital Elevation Model-Surface representation and analysis
Lecture 27 - GIS-Introductory Concepts
Lecture 28 - GIS-Data Input
Lecture 29 - Data Verification and Editing

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Lecture 30 - GIS Data Model
Lecture 31 - GIS Data Base
Lecture 32 - Spatial Analysis
Lecture 33 - Map Overlay and Spatial Correlation
Lecture 34 - Application to Drought Management
Lecture 35 - GIS base planning model for educational facilities in rural areas
Lecture 36 - Application extraction of building attributes
Lecture 37 - Zonal based tourism planning
Lecture 38 - Zonal Planning using remote sensing
Lecture 39 - Municipal GIS for assassment of property tax
Lecture 40 - Application of remote sensing

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NPTEL Video Course - Civil Engineering - Transportation Engineering II

Subject Co-ordinator - Prof. Rajat Rastogi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Railway Engineering
Lecture 2 - Gauges and Permanent Way
Lecture 3 - Wheel and Axles, Coning of Wheels
Lecture 4 - Track Resistances, Hauling Capacity
Lecture 5 - Track Modulus, Stresses in Track
Lecture 6 - Stresses in Components of Track
Lecture 7 - Rails
Lecture 8 - Creep in Rails
Lecture 9 - Wears & Failures in Rails
Lecture 10 - Jointed or Welded rails
Lecture 11 - Sleepers
Lecture 12 - Ballast
Lecture 13 - Fastenings
Lecture 14 - Geometric Design - Alignment of Track
Lecture 15 - Horizontal Curve and Super elevation
Lecture 16 - Speeds on Track
Lecture 17 - Transition Curve & Widening of Track
Lecture 18 - Vertical Curve & Gradients
Lecture 19 - Turnouts - Components
Lecture 20 - Crossing and Design of Turnout
Lecture 21 - Track Junctions and Designs
Lecture 22 - Signals - Part 1
Lecture 23 - Signals - Part 2
Lecture 24 - Train Control Systems
Lecture 25 - Interlocking of Track
Lecture 26 - High Speed Tracks
Lecture 27 - Introduction of Air Transport
Lecture 28 - Aircraft Characteristics
Lecture 29 - Aircraft Controls, Airport Site&Size Selection

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Lecture 30 - Airport Obstructions
Lecture 31 - Runway Orientation
Lecture 32 - Runway Length
Lecture 33 - Runway Geometric
Lecture 34 - Taxiway
Lecture 35 - Exit Taxiway
Lecture 36 - Aprons and Aircraft Parking
Lecture 37 - Terminal Area and Building
Lecture 38 - Terminal Planning and Hangers
Lecture 39 - Visual Aids-Markings
Lecture 40 - Visual Aids-Lighting and Signage

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Geographic Information Systems

Subject Co-ordinator - Dr.Arun K.Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Geographic Information Systems ?
Lecture 2 - Different components of GIS
Lecture 3 - Different types of vector data and concept of topology
Lecture 4 - Raster data models and comparisons with vector
Lecture 5 - TIN data model and comparisons with raster
Lecture 6 - Non-spatial data (attributes) and their type
Lecture 7 - Raster data compression techniques
Lecture 8 - Spatial database systems and their types
Lecture 9 - Pre-processing of spatial datasets
Lecture 10 - Geo-referencing
Lecture 11 - Different map projections
Lecture 12 - Spatial interpolation techniques
Lecture 13 - Digital Elevation Models and different types of resolutions
Lecture 14 - Quality assessment of freely available DEMS
Lecture 15 - GIS analysis - Part 1
Lecture 16 - GIS analysis - Part 2 (Overlaying Operations)
Lecture 17 - GIS analysis - Part 3 (Buffer Analysis)
Lecture 18 - Classification Methods
Lecture 19 - Errors in GIS and Key elements of maps
Lecture 20 - Limitations of GIS

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NPTEL Video Course - Civil Engineering - NOC:Principles and Applications of Building Science

Subject Co-ordinator - Dr. E. Rajasekar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solar Geometry
Lecture 2 - Climate Classification
Lecture 3 - Thermal Comfort in Built Environment - 1
Lecture 4 - Thermal Comfort in Built Environment - 2
Lecture 5 - Thermal Adaptation
Lecture 6 - Bioclimatic Assessment
Lecture 7 - Thermal Performance of Building Envelop
Lecture 8 - Thermal Performance of Building Envelop - Indices and Measures (1/2)
Lecture 9 - Thermal Performance of Building Envelop - Indices and Measures (2/2)
Lecture 10 - Glazing and Shading Systems
Lecture 11 - Shading Analysis
Lecture 12 - Energy Efficiency and Simulation
Lecture 13 - Building Acoustics - Basics
Lecture 14 - Sound Propagation
Lecture 15 - Acoustic Quality Indicators (1/2)
Lecture 16 - Acoustic Quality Indicators (2/2)
Lecture 17 - Acoustic Design Considerations
Lecture 18 - Acoustic Materials
Lecture 19 - Lighting - Basics
Lecture 20 - Lighting Â Design Concepts

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NPTEL Video Course - Civil Engineering - NOC:GPS Surveying

Subject Co-ordinator - Dr.Jayanta Kumar Ghosh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction (GPS Surveying and Applications)
Lecture 2 - GPS System
Lecture 3 - GPS Signal (Civilian Perspective)
Lecture 4 - GPS Receiver
Lecture 5 - GPS Software
Lecture 6 - GPS Position
Lecture 7 - GPS Positioning (Principle and Methods)
Lecture 8 - Field demonstration of GPS Positioning Method
Lecture 9 - GPS Observables (Types, Errors and Quality)
Lecture 10 - Errors in GPS Observables (Systematics Errors)
Lecture 11 - GPS Data Pre-Processing - I
Lecture 12 - GPS Data Pre-Processing - II
Lecture 13 - GPS Data Processing - I
Lecture 14 - GPS Data Processing - II
Lecture 15 - Quality Assessment of GPS Surveying
Lecture 16 - Procedure of GPS Surveying - I
Lecture 17 - Procedure of GPS Surveying - II
Lecture 18 - Procedure of GPS Surveying - III
Lecture 19 - GPS Field Surveying
Lecture 20 - GPS Data Processing

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NPTEL Video Course - Civil Engineering - NOC:Digital Land Surveying And Mapping

Subject Co-ordinator - Prof. Jayanta Kumar Ghosh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Applications
Lecture 2 - Fundamentals and Operations
Lecture 3 - Overview of Digital Land Surveying
Lecture 4 - Introduction of GPS
Lecture 5 - GPS Signal (Civilian Perspective)
Lecture 6 - GPS User Segment
Lecture 7 - GPS Positioning of Control Point
Lecture 8 - Demonstration of GPS Receivers, Software and Positioning of Control Point
Lecture 9 - GPS Position
Lecture 10 - Principle of GPS Positioning and GPS Observables
Lecture 11 - Errors in GPS Observables
Lecture 12 - GPS Data Pre-processing
Lecture 13 - GPS Data Pre-processing
Lecture 14 - GPS Data Processing
Lecture 15 - GPS Data Processing
Lecture 16 - Quality Assessment of GPS Surveying
Lecture 17 - Introduction to Total Station
Lecture 18 - Parts of Total Station
Lecture 19 - Accessories of Total Station
Lecture 20 - Handling and Setting of Total Station
Lecture 21 - Measurement of Distance
Lecture 22 - Measurement of Distance Using TS
Lecture 23 - Measurement of Horizontal Angle Using TS
Lecture 24 - Measurement of Vertical Angle and Height Using TS
Lecture 25 - Errors in Total Station
Lecture 26 - Other Errors in Total Station
Lecture 27 - Errors and Quality of Surveying Measurements
Lecture 28 - Error Propagation and Survey Specifications
Lecture 29 - Basics of Vertical Representation

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Lecture 30 - Contouring
Lecture 31 - Mapping Fundamentals
Lecture 32 - Mapping Basics
Lecture 33 - Mapping Software
Lecture 34 - Automated Mapping
Lecture 35 - Working Steps
Lecture 36 - Establishment of Control Point
Lecture 37 - Detailing of Digital Land Surveying
Lecture 38 - Demonstration of Digital Land Survey Detailing
Lecture 39 - Data Preparation and Map Making
Lecture 40 - Overview of the Course

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NPTEL Video Course - Civil Engineering - NOC:Digital Image Processing of Remote Sensing Data

Subject Co-ordinator - Dr.Arun K.Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Remote-sensing Image and How it is represented
Lecture 2 - Different Techniques of Image Acquisition
Lecture 3 - Why is Digital Image processing Important ?
Lecture 4 - Image characteristics and Different Resolutions in Remote Sensing
Lecture 5 - Electromagnetic spectrum, solar reflection, and thermal emission
Lecture 6 - Color Representation and Transformations
Lecture 7 - Image histograms and statistics
Lecture 8 - Geo-referencing Techniques
Lecture 9 - Image Enhancement Techniques part 1
Lecture 10 - Image Enhancement Techniques part 2
Lecture 11 - Multispectral Transform, Scatter Plot, Principal Component Analysis and Decorrelation Stretch
Lecture 12 - Spatial Filtering Techniques
Lecture 13 - Frequency Domain Fourier Transformation
Lecture 14 - Basic Image Compression Techniques and Different Image File Formats
Lecture 15 - Image Classification Techniques
Lecture 16 - Principles of Image Interpretation
Lecture 17 - SAR Interferometry (InSAR) Techniques
Lecture 18 - Image Merging and Image Mosaicing Techniques
Lecture 19 - Application of Image Analysis
Lecture 20 - Limitations and Future of Digital Image Processing

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NPTEL Video Course - Civil Engineering - NOC:Applied Environmental Microbiology

Subject Co-ordinator - Dr. Gargi Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Cell Structure - I
Lecture 4 - Cell Structure - II
Lecture 5 - Central Dogma - I
Lecture 6 - Central Dogma - II
Lecture 7 - Microbial Energetics - I
Lecture 8 - Microbial Energetics - II
Lecture 9 - Microbial Energetics - III
Lecture 10 - Microbial Energetics - IV
Lecture 11 - Microbial Metabolism - I
Lecture 12 - Microbial Metabolism - II
Lecture 13 - Functional Diversity of Bacteria - I
Lecture 14 - Functional Diversity of Bacteria - II
Lecture 15 - Functional Diversity of Bacteria - III
Lecture 16 - Microbial Ecosystem - I
Lecture 17 - Microbial Ecosystem - II
Lecture 18 - Microbial Ecosystem - III
Lecture 19 - Microbial Ecosystem - IV
Lecture 20 - Microbial Ecosystem - V
Lecture 21 - Environmental Genomics - I
Lecture 22 - Environmental Genomics - II
Lecture 23 - Environmental Genomics - III
Lecture 24 - Environmental Genomics - IV
Lecture 25 - Environmental Genomics - V
Lecture 26 - Microbial Symbiosis - I
Lecture 27 - Microbial Symbiosis - II
Lecture 28 - Virus - I
Lecture 29 - Virus - II

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Lecture 30 - Applied Environmental Microbiology
Lecture 31 - Techniques in Environmental Microbiology - I
Lecture 32 - Techniques in Environmental Microbiology - II
Lecture 33 - Bioremediation - I
Lecture 34 - Bioremediation - II
Lecture 35 - Bioremediation - III
Lecture 36 - Wastewater Microbiology - I
Lecture 37 - Wastewater Microbiology - II
Lecture 38 - Built Microbiology
Lecture 39 - Exposomes - I
Lecture 40 - Exposomes - II
Lecture 41 - Drinking Water Microbiology - I
Lecture 42 - Drinking Water Microbiology - II
Lecture 43 - Drinking Water Microbiology - III
Lecture 44 - Drinking Water Microbiology - IV
Lecture 45 - Drinking Water Microbiology - V
Lecture 46 - Solid Waste Microbiology - I
Lecture 47 - Solid Waste Microbiology - II
Lecture 48 - Solid Waste Microbiology - III
Lecture 49 - Antimicrobial Resistance - I
Lecture 50 - Antimicrobial Resistance - II
Lecture 51 - Epidemiology - I
Lecture 52 - Epidemiology - II
Lecture 53 - Biosensors - I
Lecture 54 - Biosensors - II
Lecture 55 - Biosensors - III
Lecture 56 - Bioinformatics - I
Lecture 57 - Bioinformatics - II
Lecture 58 - Bioinformatics - III
Lecture 59 - Bioinformatics - IV
Lecture 60 - Bioinformatics - V

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NPTEL Video Course - Civil Engineering - NOC:Digital Elevation Models and Applications

Subject Co-ordinator - Prof. Arun K. Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Digital Elevation Model and How It Is Represented
Lecture 2 - Various Techniques to Generate Digital Elevation Model - 1
Lecture 3 - Various Techniques to Generate Digital Elevation Model - 2
Lecture 4 - Various Techniques to Generate Digital Elevation Model - 3
Lecture 5 - Importance of Spatial Resolution With DEMs
Lecture 6 - How To Assess Quality of DEM?
Lecture 7 - Integration of DEMs With Satellite Data
Lecture 8 - Common Derivatives of DEMs- Slope and Aspect
Lecture 9 - Triangulated Irregular Network (TIN) and Its Derivatives
Lecture 10 - Shaded Relief Models and Thier Applications
Lecture 11 - DEMs Derivatives - 1
Lecture 12 - DEMs Derivatives - 2
Lecture 13 - DEMs Derivatives - 3
Lecture 14 - DEMs Derivatives - 4
Lecture 15 - DEM Based Surface Hydrologic Modelling - 1
Lecture 16 - DEM Based Surface Hydrologic Modelling - 2
Lecture 17 - DEM and DAM Simulation and Its Application In Ground Water Hydrology
Lecture 18 - Applications of DEMs In Solar and Wind Energy Potential Estimations
Lecture 19 - Applications of DEMs in Viewshed and Flood Hazard Mapping
Lecture 20 - DEMs Sources, Limitations and Future of Digital Elevation Models

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NPTEL Video Course - Civil Engineering - NOC:Environmental Engineering-Chemical Processes

Subject Co-ordinator - Prof. Bhanu Prakash Vellanki

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Fundamentals of Equilibrium and Kinetics
Lecture 2 - Equilibrium-Process Feasibility, Gibbs Energy-Standard Condition
Lecture 3 - Gibbs Free Energy-Non Standard Conditions - I
Lecture 4 - Gibbs Free Energy-Non Standard Conditions - II
Lecture 5 - Phase Equilibrium
Lecture 6 - Component Balance
Lecture 7 - Reaction Kinetics
Lecture 8 - Rate of Reaction - I
Lecture 9 - Rate of Reaction - II, Types of Reactors
Lecture 10 - Mass Balance on different types of Reactors
Lecture 11 - Material Balance for Complex Reactions
Lecture 12 - Material Balance for Reversible Reactions
Lecture 13 - Determination of Kinetic Equations
Lecture 14 - Acid-Base Reactions
Lecture 15 - Acid Dissociation Constant, Strength of Acid
Lecture 16 - Ionization Fractions
Lecture 17 - Introduction to VMINTEQ
Lecture 18 - Estimation of pH using VMINTEQ
Lecture 19 - Mixing Problems
Lecture 20 - Inverse Dose Problems
Lecture 21 - logC-pH Diagram
Lecture 22 - Carbonate System
Lecture 23 - Carbonate System
Lecture 24 - VMINTEQ
Lecture 25 - VMINTEQ
Lecture 26 - VMINTEQ
Lecture 27 - Buffer Intensity
Lecture 28 - Alkalinity
Lecture 29 - Alkalinity

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Lecture 30 - Acidity and its Applications
Lecture 31 - Alkalinity and Acidity
Lecture 32 - Mixing of Two Solutions and Conservative Quantities - I
Lecture 33 - Mixing of Two Solutions and Conservative Quantities - II
Lecture 34 - Carbonate and Non-Carbonate Alkalinity
Lecture 35 - Anaerobic Digester
Lecture 36 - Aqueous Complexes
Lecture 37 - Aqueous Complexes
Lecture 38 - Aqueous Complexes of Aluminium (Al)
Lecture 39 - Aqueous Complexes of Mercury (Hg)
Lecture 40 - Precipitation and Dissolution
Lecture 41 - Applications of Precipitation and Dissolution
Lecture 42 - Different Stages in Precipitation, Equilibrium of Precipitation - I
Lecture 43 - Equilibrium of Precipitation - II
Lecture 44 - Examples Related to Equilibrium of Precipitation
Lecture 45 - Other Examples of Equilibrium of Precipitation
Lecture 46 - Solubility and Competitive Precipitation
Lecture 47 - Predominance Area Diagram and Introduction to Redox Processes
Lecture 48 - Redox Reactions and its Applications
Lecture 49 - Balancing of Redox and Development of Half Reaction
Lecture 50 - Kinetics of Redox Processes
Lecture 51 - Equilibrium of Redox - I
Lecture 52 - Equilibrium of Redox - II and Reaction Feasibility
Lecture 53 - Reaction Feasibility Based on Pe - I
Lecture 54 - Reaction Feasibility Based on Pe - II
Lecture 55 - Effect of Complexation on Redox
Lecture 56 - Effect of Complexation and Solid Phase on Redox
Lecture 57 - Reaction Feasibility based on Eh
Lecture 58 - Introduction to Electrochemical cell (Ecell)
Lecture 59 - Applications of Ecell
Lecture 60 - logC-Pe and pH-Pe Diagram

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NPTEL Video Course - Civil Engineering - NOC:Environmental Remediation of Contaminated Sites

Subject Co-ordinator - Prof. Bhanu Prakash Vellanki, Prof. Thomas Boving

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Course Outline
Lecture 4 - Introduction to hazardous waste laws and risk assessment
Lecture 5 - The major aspects of Risk Assessment
Lecture 6 - Risk Characterization
Lecture 7 - Risk Assessment - Deterministic approach
Lecture 8 - Risk Assessment - Stochastic Approach
Lecture 9 - Hazardous Waste laws - The TCLP Test
Lecture 10 - Hazardous rules and regulations
Lecture 11 - Remediation of contaminated GW-Plume Containment
Lecture 12 - Remediation of contaminated GW-Javendel et alÃ¢â ¬â ¢s approach
Lecture 13 - Remediation of contaminated GW by Pump and Treat - I
Lecture 14 - Remediation of contaminated GW by Pump and Treat - II
Lecture 15 - Remediation of contaminated GW- Calculation of remediation time and introduction to source contr
Lecture 16 - Permeable Reactive Barriers - I
Lecture 17 - Permeable Reactive Barriers - II
Lecture 18 - Permeable Reactive Barriers - III
Lecture 19 - Design of Permeable Reactive Barriers
Lecture 20 - Case Study on Permeable Reactive Barriers - I
Lecture 21 - Case Study on Permeable Reactive Barriers - II
Lecture 22 - Case Study- PRB (Utah)
Lecture 23 - Case Study (Utah) (Continued...)
Lecture 24 - Mechanism of natural attenuation and the affecting factors
Lecture 25 - Introduction to natural attenuation and its types
Lecture 26 - Pathways of Contaminant Transport and Rate of Degradation of Contaminant
Lecture 27 - Rate of Degradation of Contaminant when advection is considered
Lecture 28 - Rate of Degradation of Contaminant when both diffusion and advection are considered
Lecture 29 - Example of Rate of Degradation in natural attenuation

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Lecture 30 - Case study: Natural Attenuation
Lecture 31 - Results of Case Study: Natural Attenuation
Lecture 32 - Introduction of Soil/Sediments contamination with some examples
Lecture 33 - Case Study: Soil/Sediments Contamination and remediation by Excavation and Disposal
Lecture 34 - Hazardous waste disposal site/TSDF
Lecture 35 - Different type of fluxes through containment barrier
Lecture 36 - Introduction to Solidification and Stabilisation and Case Study
Lecture 37 - Different contaminant reactions during solidification and stabilisation
Lecture 38 - Diffusion of contaminant through solidified form
Lecture 39 - Calculations for fractions of binders, admixtures, waste and water used in solidification
Lecture 40 - Discussion of TCLP approach in solidification and its examples
Lecture 41 - Discussion of TCLP approach (contd.) and Cost estimation of Solidification
Lecture 42 - Case Study: Solidification and Stabilization
Lecture 43 - Chemical Treatment
Lecture 44 - Case Study: In-Situ Chemical Oxidation - Part I
Lecture 45 - Case Study: In-Situ Chemical Oxidation - Part II
Lecture 46 - Case Study: In-Situ Chemical Oxidation - Part III
Lecture 47 - Surfactant Extraction - Part I
Lecture 48 - Surfactant Extraction - Part II
Lecture 49 - Case Study: Surfactant Extraction - Part I
Lecture 50 - Case Study: Surfactant Extraction - Part II
Lecture 51 - Soil Vapor Extraction - Part I
Lecture 52 - Soil Vapor Extraction - Part II
Lecture 53 - Bioremediation - Part I
Lecture 54 - Bioremediation - Part II
Lecture 55 - Case Study: Bioremediation
Lecture 56 - Case Study: Soil Vapor Extraction - Part I
Lecture 57 - Case Study: Soil Vapor Extraction - Part II
Lecture 58 - Phyto-remediation
Lecture 59 - Conceptual Site Model
Lecture 60 - Adaptive Design in Remediation Engineering
Lecture 61 - Solubilization Theory - Part I
Lecture 62 - Solubilization Theory - Part II
Lecture 63 - Enhanced Aquifer Flushing Technologies

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NPTEL Video Course - Civil Engineering - NOC:Global Navigation Satellite Systems and Applications

Subject Co-ordinator - Prof. Arun K. Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Global Navigation Satellite System (GNSS)
Lecture 2 - How position is determined by the GNSS? - Part I
Lecture 3 - How position is determined by the GNSS? - Part II
Lecture 4 - How position is determined by the GNSS? - Part III
Lecture 5 - NAVSTAR - Global Positioning System
Lecture 6 - Global Navigation Satellite System (GLONASS)
Lecture 7 - BeiDou Navigation Satellite System (BDS)
Lecture 8 - Indian Regional Navigation Satellite System (IRNSS)
Lecture 9 - GALILEO
Lecture 10 - Quasi-Zenith Satellite System (QZSS)
Lecture 11 - Differential Global Navigation Satellite System (DGNSS)
Lecture 12 - Real-Time Kinematic (RTK)
Lecture 13 - Satellite Based Augmentation System (SBAS)
Lecture 14 - GNSS Errors
Lecture 15 - GNSS Correction Methods
Lecture 16 - Why altitude estimated by GNSS receivers is not very accurate
Lecture 17 - Global Navigation Satellite Systems (GNSS) Applications - I
Lecture 18 - Global Navigation Satellite Systems (GNSS) Applications - II
Lecture 19 - GNSS
Lecture 20 - GNSS

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NPTEL Video Course - Civil Engineering - NOC:Geomorphology

Subject Co-ordinator - Prof. Pitambar Pati

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geomorphology and Concept of Time Scale in a Geomorphic System
Lecture 2 - Process of Landform Development
Lecture 3 - Energy Flow in Geomorphic System and Role of Uniformitarianism Vs Catastrophism
Lecture 4 - Landform Development - Equilibrium and Evolution
Lecture 5 - Process Geomorphology - I
Lecture 6 - Process Geomorphology - II
Lecture 7 - Weathering and soil Formation Introduction - I
Lecture 8 - Weathering and soil Formation Introduction - II
Lecture 9 - Weathering and Soil Formation (Types of Weathering)
Lecture 10 - Weathering and Soil Formation (Mechanical Weathering)
Lecture 11 - Weathering and Soil Formation (Mechanical and Chemical Weathering)
Lecture 12 - Weathering and Soil Formation (Chemical and Biological Weathering)
Lecture 13 - Weathering of Silicate rocks and Weathering Products
Lecture 14 - Factors of Weathering
Lecture 15 - Soil Formation
Lecture 16 - Soil Formation Processes
Lecture 17 - Soil Classification
Lecture 18 - Mass Wasting
Lecture 19 - Classification of Mass Wasting - I
Lecture 20 - Classification of Mass Wasting - II
Lecture 21 - Hill Slope Evolution - I
Lecture 22 - Hill Slope Evolution - II
Lecture 23 - Arid Zone Geomorphology
Lecture 24 - Landforms in Dry Region
Lecture 25 - Pediment Evolution
Lecture 26 - Aeolian Processes and Landforms - I
Lecture 27 - Aeolian Processes and Landforms - II
Lecture 28 - Wind Erosional Landforms - I
Lecture 29 - Wind Erosional Landforms - II

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Lecture 30 - Dune Classification - I
Lecture 31 - Dune Classification - II
Lecture 32 - Coastal Geomorphology - I
Lecture 33 - Coastal Geomorphology and Landforms
Lecture 34 - Coastal Geomorphology - II
Lecture 35 - Coastal Geomorphology - III
Lecture 36 - Shoreline Platform
Lecture 37 - Coastal Geomorphology - IV
Lecture 38 - Coastal Geomorphology - V
Lecture 39 - Coastal Geomorphology - VI
Lecture 40 - Coastal Geomorphology - VII
Lecture 41 - Coastal Geomorphology - VIII
Lecture 42 - Coastal Geomorphology - IX
Lecture 43 - Tectonic Geomorphology
Lecture 44 - Fluvial Process
Lecture 45 - Fluvial Process - I
Lecture 46 - Fluvial Process - II
Lecture 47 - Fluvial Process - III
Lecture 48 - Fluvial Process - IV
Lecture 49 - Fluvial Process - V and Drainage Analysis
Lecture 50 - Fluvial Process - VI and Drainage Analysis
Lecture 51 - Fluvial Geomorphology River System - I
Lecture 52 - Fluvial Geomorphology River System - II
Lecture 53 - Glacial Geomorphology - I
Lecture 54 - Glacial Geomorphology - II (Valley Glacier)
Lecture 55 - Glacial Geomorphology - III
Lecture 56 - Glacial Geomorphology - IV (Geomorphic Changes by Glacier)
Lecture 57 - Exploration Geomorphology in Oil field Sandbody Geometry - I
Lecture 58 - Exploration Geomorphology in Oil Field Sandbody Geometry - II
Lecture 59 - Seismic Geomorphology - I
Lecture 60 - Seismic Geomorphology - II

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NPTEL Video Course - Civil Engineering - NOC:Remote Sensing Essentials

Subject Co-ordinator - Dr.Arun K.Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rudiments of Remote Sensing and Advantages
Lecture 2 - Historical Perspective of development of remote sensing technology
Lecture 3 - EM spectrum, solar reflection and thermal emission
Lecture 4 - Interaction of EM radiation with atmosphere including atmospheric scattering, absorption and emis
Lecture 5 - Interaction mechanisms of EM radiation with ground, spectral response curves
Lecture 6 - Laws of Radiation and their relevance in Remote Sensing
Lecture 7 - Basis of remote sensing image representation
Lecture 8 - Various Remote Sensing Platforms
Lecture 9 - Multi-spectral scanners and imaging devices
Lecture 10 - Significant characteristics of LANDSAT, SPOT, Sentinel sensors
Lecture 11 - Prominent characteristics of IRS, Cartosat, ResourceSat sensors
Lecture 12 - Unmanned Aerial Vehicle/Drone
Lecture 13 - Passive Microwave Remote Sensing
Lecture 14 - Image characteristics and different resolutions in Remote Sensing
Lecture 15 - Different techniques of Image acquisition
Lecture 16 - Importance of digital image processing
Lecture 17 - Digital Image Processing Software
Lecture 18 - Basic image enhancement techniques
Lecture 19 - Colour representations and transformtions
Lecture 20 - Image Histograms and statistics
Lecture 21 - Atmospheric errors and corrections
Lecture 22 - Geometric transformations/Geo-referencing Technique
Lecture 23 - Digital Image Processing Software Demonstration - 1
Lecture 24 - Image enhancement techniques - 1
Lecture 25 - Image enhancement techniques - 2
Lecture 26 - Digital Image Processing Software Demonstration - 2
Lecture 27 - Spatial Filtering Techniques, Band rationing and PCA
Lecture 28 - Frequency Doman Fourier Transformation
Lecture 29 - Digital Image Processing Software Demonstration - 3

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Lecture 30 - Unsupervised image classification and density slicing techniques
Lecture 31 - Supervised image classification techniques and limitations
Lecture 32 - Digital Image Processing Software Demonstration - 4
Lecture 33 - LiDAR Technique and applications
Lecture 34 - Mosaicking, subsets, sub-sampling techniques and applications
Lecture 35 - False Topographic Phenomena and correction techniques - 1
Lecture 36 - False Topographic Phenomena and correction techniques - 2
Lecture 37 - High Spatial Resolution Satellite Images and limitations
Lecture 38 - Basic Image Compression techniques and different image file formats
Lecture 39 - Hyperspectral Remote Sensing
Lecture 40 - Digital Image vs Digital Photograph
Lecture 41 - NDVI and other indices
Lecture 42 - Active Microwave Remote Sensing - 1
Lecture 43 - Active Microwave Remote Sensing - 2
Lecture 44 - Radar Images interpretation and applications
Lecture 45 - SAR Interferometry (InSAR) Technique - 1
Lecture 46 - SAR Interferometry (InSAR) Technique - 2
Lecture 47 - Principles of image interpretation
Lecture 48 - Image interpretation of different geological landforms, rock types and structures
Lecture 49 - Remote Sensing of Moon and Mars
Lecture 50 - Google Earth and its Applications
Lecture 51 - Integrated applications of RS and GIS in groundwater studies - 1
Lecture 52 - Integrated applications of RS and GIS in groundwater studies - 2
Lecture 53 - Applications of Remote Sensing in Earthquake Studies - 1
Lecture 54 - Applications of Remote Sensing in Earthquake Studies - 2
Lecture 55 - Different sources of free satellite images
Lecture 56 - Limitations of Remote Sensing Techniques

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NPTEL Video Course - Civil Engineering - NOC:Earthquake Resistant Design of Foundations

Subject Co-ordinator - Prof. B. K. Maheshwari

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Shallow Foundations
Lecture 3 - Shallow Foundations
Lecture 4 - Shallow Foundations
Lecture 5 - Shallow Foundations
Lecture 6 - Combined Footings
Lecture 7 - Raft Foundations
Lecture 8 - Raft Foundations
Lecture 9 - Footings under Dynamic Loads
Lecture 10 - Footings under Dynamic Loads
Lecture 11 - Footings under Dynamic Loads
Lecture 12 - Footings under Dynamic Loads
Lecture 13 - Pile Foundations subjected to Static Vertical Load
Lecture 14 - Pile Foundations
Lecture 15 - Pile Foundations under Lateral Loads
Lecture 16 - Pile Foundations under Lateral Loads
Lecture 17 - Pile Foundations under Lateral Loads
Lecture 18 - Pile Foundations under Lateral Loads
Lecture 19 - Dynamic Analysis of Piles under Vertical and Horizontal Vibrations
Lecture 20 - Dynamic Analysis of Piles under Horizontal Vibration
Lecture 21 - Seismic Response of Pile Foundations - 1
Lecture 22 - Seismic Response of Pile Foundations - 2
Lecture 23 - Combined Pile-Raft Foundations (CPRF) - General
Lecture 24 - Geotechnical and Seismic Analyses of CPRF
Lecture 25 - Design of Piles in Liquefiable Soils - 1
Lecture 26 - Design of Piles in Liquefiable Soils - 2
Lecture 27 - Introduction to Well Foundations
Lecture 28 - Lateral Stability of Well Foundations
Lecture 29 - Lateral Stability, Construction and Sinking of Well Foundation

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Lecture 30 - Titling and Shifting of Wells, Numerical Problems
Lecture 31 - Introduction to Soil-Structure Interaction
Lecture 32 - Effects of Soil-Structure Interaction
Lecture 33 - SGM and Wave Propagation
Lecture 34 - Dispersion, Attenuation of Waves and Damping
Lecture 35 - Ground Response Analysis (GRA)
Lecture 36 - Soil-Pile Interaction (SPI)
Lecture 37 - Raft Foundations â Numerical Examples
Lecture 38 - Foundations on Slopes - 1
Lecture 39 - Foundations on Slopes - 2
Lecture 40 - Codal Provisions

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NPTEL Video Course - Civil Engineering - NOC:Geographic Information Systems

Subject Co-ordinator - Prof. Arun K. Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Geographic Information Systems ?
Lecture 2 - Essential Components of GIS
Lecture 3 - Different types of vector data
Lecture 4 - Concept of topology
Lecture 5 - Demonstration through GIS software
Lecture 6 - Raster data model and comparisons with vector
Lecture 7 - TIN data model and comparisons with raster
Lecture 8 - Non-spatial data (attributes) and their types
Lecture 9 - Vector data compression techniques
Lecture 10 - Demonstration through GIS software
Lecture 11 - Raster data compression techniques - 1
Lecture 12 - Raster data compression techniques - 2
Lecture 13 - Georeferencing
Lecture 14 - Pre-processing of spatial datasets - 1
Lecture 15 - Demonstration through GIS software
Lecture 16 - Pre-processing of spatial datasets - 2
Lecture 17 - Pre-processing of spatial datasets - 3
Lecture 18 - Spatial Interpolation Techniques - 1
Lecture 19 - Spatial Interpolation Techniques - 2
Lecture 20 - GIS ANALYSIS - 1
Lecture 21 - GIS Analysis - 2
Lecture 22 - GIS Analysis - 3
Lecture 23 - GIS Analysis - 4
Lecture 24 - GIS Analysis - 5
Lecture 25 - Demonstration through GIS software
Lecture 26 - GIS Analysis - 6
Lecture 27 - GIS Analysis - 7
Lecture 28 - Attributes Classification Methods
Lecture 29 - Special database systems and their types - 1

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Lecture 30 - Demonstration through GIS software
Lecture 31 - Spatial database systems and their types - 2
Lecture 32 - Concept of NoData in Raster
Lecture 33 - Different map projections
Lecture 34 - Concept of digital elevation model (DEM) and how it is represented
Lecture 35 - Demonstration through GIS software
Lecture 36 - Various techniques to generate digital elevation model - 1
Lecture 37 - Various techniques to generate digital elevation model - 2
Lecture 38 - Various techniques to generate digital elevation model - 3
Lecture 39 - Digital Elevation Models and different types of resolutions
Lecture 40 - Demonstration through GIS software
Lecture 41 - How to assess quality of a DEM?
Lecture 42 - Integration of DEMs with satellite data
Lecture 43 - Demonstration through GIS software...
Lecture 44 - Common derivatives of DEMs - Slope and aspect - 1
Lecture 45 - Common derivatives of DEMs - Slope and aspect - 2
Lecture 46 - Common derivatives of DEMs - Slope and aspect - 3
Lecture 47 - Demonstration through GIS software
Lecture 48 - DEMs derivatives - 1
Lecture 49 - DEMs derivatives - 2
Lecture 50 - DEMs derivatives - 3
Lecture 51 - DEMs derivatives - 4
Lecture 52 - Shaded relief models and their applications
Lecture 53 - DEM based Surface Hydrologic Modelling - 1
Lecture 54 - DEM based Surface Hydrologic Modelling - 2
Lecture 55 - DEMs and Dam Simulation and its application in groundwater hydrology
Lecture 56 - Applications of DEMs in Viewshed and Flood Hazard Mapping
Lecture 57 - Applications of DEMs in solar and wind energy potential estimations
Lecture 58 - DEMs Sources, limitations and future of Digital Elevation Models
Lecture 59 - Errors in GIS and key elements of maps
Lecture 60 - Limitations of GIS

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NPTEL Video Course - Civil Engineering - NOC:Water and Waste Water Treatment

Subject Co-ordinator - Prof. Bhanu Prakash Vellanki

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of water and wastewater treatment
Lecture 2 - Life expectancy and real-world scenario
Lecture 3 - Course outline
Lecture 4 - Review of fundamentals
Lecture 5 - Mass balance
Lecture 6 - Mass Balance: Batch reactor, CSTR, and Plug flow reactors
Lecture 7 - Mass balance: Comparison of CSTR and Plug flow reactor
Lecture 8 - Mass Balance: Non ideal system and Water quality parameters
Lecture 9 - Water quality: DO and ways to measure it
Lecture 10 - Water quality: Nutrients in water
Lecture 11 - Water quality: Total suspended solids and Pathogens
Lecture 12 - Wastewater treatment plant: basic principals
Lecture 13 - Wastewater treatment plant: Preliminary treatment
Lecture 14 - Wastewater treatment plant: Sedimentation and basics
Lecture 15 - Sedimentation: Discrete and Flocculant settling
Lecture 16 - Design of primary settling tank
Lecture 17 - Biological treatment: BOD and Nutrient removal
Lecture 18 - Analysis of biological removal process(ASP)
Lecture 19 - Activated sludge process: Material balance for aeration basin
Lecture 20 - Oxygen transfer: types and basic principals
Lecture 21 - Relevance of F/M ratio and Design Parameters of Activated Sludge Process
Lecture 22 - Sludge Bulking and Activated Sludge Variations
Lecture 23 - Sequencing Batch Reactor
Lecture 24 - Nitrogen Removal - I
Lecture 25 - Nitrogen Removal - II and Phosphorus Removal - I
Lecture 26 - Phosphorus Removal - II
Lecture 27 - Secondary Clarifiers and Attached Growth System
Lecture 28 - Disinfection
Lecture 29 - Chlorination Disinfection

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Lecture 30 - Disinfection By-products (DBPs) and Disinfectant Removal
Lecture 31 - Water demand
Lecture 32 - Water Quality Parameters
Lecture 33 - Overview of Water Treatment
Lecture 34 - Physico-Chemical treatment
Lecture 35 - Coagulation - I
Lecture 36 - Coagulation - II
Lecture 37 - Rapid Mixing
Lecture 38 - Flocculation - I
Lecture 39 - Flocculation - II
Lecture 40 - Flocculent settling
Lecture 41 - Filtration
Lecture 42 - Depth filtration
Lecture 43 - Design of Sand filter and Surface filtration
Lecture 44 - Disinfection
Lecture 45 - Hardness - I
Lecture 46 - Hardness - II
Lecture 47 - Lime-Soda softening - I
Lecture 48 - Lime-Soda softening - II
Lecture 49 - Recarbonation
Lecture 50 - Types of Softening Basin and Adsorption
Lecture 51 - Adsorption
Lecture 52 - Adsorption Isotherms
Lecture 53 - Ion Exchange
Lecture 54 - Nanofiltration and RO
Lecture 55 - Aeration: Removal of Fe and Mn
Lecture 56 - Residual Management
Lecture 57 - Sludge Thickening
Lecture 58 - Stabilization of Sludge
Lecture 59 - Anaerobic and Aerobic digestion of sludge
Lecture 60 - Conditioning, Dewatering and Disposal of Sludge

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NPTEL Video Course - Civil Engineering - NOC:Rock Engineering

Subject Co-ordinator - Prof. Priti Maheshwari

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Minerals and Rock Classes
Lecture 3 - Mineral Identification Procedure
Lecture 4 - Rock Identification Procedure
Lecture 5 - Geological Structures and Discontinuities
Lecture 6 - Spherical Representation of Geological Data - 1
Lecture 7 - Spherical Representation of Geological Data - 2
Lecture 8 - Spherical Representation of Geological Data - 3
Lecture 9 - Application of Graphical Representation of Geological Data
Lecture 10 - Laboratory Testing of Rocks - Sampling
Lecture 11 - Laboratory testing of Rocks - Preperations and UCS
Lecture 12 - Factors Influencing UCS and Modes of Failure in Compression
Lecture 13 - Failure Mechanism and Post-Failure Behaviour in Compression, Indirect Method for UCS
Lecture 14 - Indirect Method for UCS, Brazilian Test, Schnidt Rebound Hardness Test
Lecture 15 - Sound Velocity Test, Slake Durability Test, Swelling Pressure and Free Swell Test and Void Index
Lecture 16 - Shear Tests - 1
Lecture 17 - Shear Tests - 2
Lecture 18 - Engineering Classification of Intact Rocks, Concept of Rock Mass, RQD
Lecture 19 - Concept of Rock Mass, Factors Affecting Discontinuities
Lecture 20 - Factors Affecting Discontinuities
Lecture 21 - Classification of Rock Mass: Rock Mass Rating (RMR) - 1
Lecture 22 - Classification of Rock Mass: Rock Mass Rating (RMR) - 2
Lecture 23 - Classification of Rock Mass: Rock Mass Quality (Q-system) - 1
Lecture 24 - Classification of Rock Mass: Rock Mass Quality (Q-system) - 2
Lecture 25 - Classification of Rock Mass: Geological Strength Index (GSI)
Lecture 26 - Strength Criteria for Isotropic and Anisotropic Rock - 1
Lecture 27 - Strength Criteria for Isotropic and Anisotropic Rocks -2, Mohrâ s Failure Theory
Lecture 28 - Mohr-Coulomb Failure Criterion
Lecture 29 - Mohr-Coulomb Failure Criterion, Coulomb Navier Failure Criterion

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Lecture 30 - Concept of Instantaneous c and Ï : Balmer Approach
Lecture 31 - Empirical Failure Criteria: Basics of Regression Analysis
Lecture 32 - Hoek and Brown Criterion (1980)
Lecture 33 - Parameters of Failure Criteria
Lecture 34 - Failure Criteria for Rock Mass
Lecture 35 - Tunneling: Underground Excavations
Lecture 36 - Tunneling: Ground Conditions
Lecture 37 - Elastic Stress Distribution Around Circular Tunnels - 1
Lecture 38 - Elastic Stress Distribution Around Circular Tunnels - 2
Lecture 39 - Elastic Analysis of Circular Tunnels - Displacements
Lecture 40 - Thick Wall Cylinder in Biaxial Stress Field
Lecture 41 - Elasto-Plastic Stress Distribution Around Circular Tunnel
Lecture 42 - Underground Excavation Failure Mechanisms
Lecture 43 - Structurally Controlled Failure: Roof Failure
Lecture 44 - Structurally Controlled Failure: Sidewall Failures - 1
Lecture 45 - Structurally Controlled Failure: Sidewall Failures - 2
Lecture 46 - Rock Mass Support Interaction Analysis - 1
Lecture 47 - Rock Mass Support Interaction Analysis - 2
Lecture 48 - Rock Slope Stability
Lecture 49 - Rock Slope Stability - Plane Failure
Lecture 50 - Rock Slope Stability - Wedge Failure
Lecture 51 - Rock Slope Stability - Circular Failure
Lecture 52 - Rock Slope Stability - Toppling Failure - 1
Lecture 53 - Rock Slope Stability - Toppling Failure - 2
Lecture 54 - Rock Slope Stability - Toppling Failure - 3
Lecture 55 - Rock Slope Stabilization
Lecture 56 - Foundations on Weak Rocks
Lecture 57 - Ultimate Bearing Capacity Using Bellâ s Approach
Lecture 58 - Bearing Capacity from Classification Approaches and Based on UCS
Lecture 59 - Bearing Capacity Based on Plate Load test; Treatment of Foundations
Lecture 60 - Dam Foundation Problems

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NPTEL Video Course - Civil Engineering - NOC:Finite Element Method and Computational Structural Dynamics

Subject Co-ordinator - Prof. Manish Shrikhande

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Scientific Computations - I
Lecture 2 - Introduction to Scientific Computations - II
Lecture 3 - Basic Concepts of Linear Algebra
Lecture 4 - Polynomial Interpolation and Numerical Quadrature - I
Lecture 5 - Polynomial Interpolation and Numerical Quadrature - II
Lecture 6 - Polynomial Interpolation and Numerical Quadrature - III
Lecture 7 - Polynomial Interpolation and Numerical Quadrature - IV
Lecture 8 - Mathematical Modelling and Approximate Solutions - I
Lecture 9 - Mathematical Modelling and Approximate Solutions - II
Lecture 10 - Mathematical Modelling and Approximate Solutions - III
Lecture 11 - Approximation via Variational Principles
Lecture 12 - Introduction to the Finite Element Concept
Lecture 13 - Finite Elements of C^0 Continuity in 1-D - I
Lecture 14 - Finite Elements of C^0 Continuity in 1-D - II
Lecture 15 - Finite Elements of C^0 Continuity in 1-D - III
Lecture 16 - Finite Elements of C^0 Continuity in 1-D - IV
Lecture 17 - Finite Elements of C^1 Continuity in 1-D - I
Lecture 18 - Finite Elements of C^1 Continuity in 1-D - II
Lecture 19 - Finite Elements of C^0 Continuity in 2-D and 3-D - I
Lecture 20 - Finite Elements of C^0 Continuity in 2-D and 3-D - II
Lecture 21 - Finite Elements of C^0 Continuity in 2-D and 3-D - III
Lecture 22 - Finite Elements of C^0 Continuity in 2-D and 3-D - IV
Lecture 23 - Finite Elements of C^0 Continuity in 2-D and 3-D - V
Lecture 24 - Finite Elements of C^0 Continuity in 2-D and 3-D - VI
Lecture 25 - Finite Elements of C^0 Continuity in 2-D and 3-D - VII
Lecture 26 - Finite Elements of C^0 Continuity in 2-D and 3-D - VIII
Lecture 27 - Finite Elements of C^0 Continuity in 2-D and 3-D - IX
Lecture 28 - Finite Elements of C^0 Continuity in 2-D and 3-D - X
Lecture 29 - Finite Elements of C^0 Continuity in 2-D and 3-D - XI

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Lecture 30 - Finite Elements of C^0 Continuity in 2-D and 3-D - XII
Lecture 31 - Mapped Elements - I
Lecture 32 - Mapped Elements - II
Lecture 33 - Mapped Elements - III
Lecture 34 - Mapped Elements - IV
Lecture 35 - Mapped Elements - V
Lecture 36 - Variational Crimes
Lecture 37 - The Patch Test
Lecture 38 - Finite Elements for Plates and Shells - I
Lecture 39 - Finite Elements for Plates and Shells - II
Lecture 40 - Finite Elements for Plates and Shells - III
Lecture 41 - The Time Dimension and Dynamic Effects - I
Lecture 42 - The Time Dimension and Dynamic Effects - II
Lecture 43 - Solution of Linear Simultaneous Equations - I
Lecture 44 - Solution of Linear Simultaneous Equations - II
Lecture 45 - Solution of Linear Simultaneous Equations - III
Lecture 46 - Solution of Linear Simultaneous Equations - IV
Lecture 47 - The Algebraic Eigenvalue Problem - I
Lecture 48 - The Algebraic Eigenvalue Problem - II
Lecture 49 - The Algebraic Eigenvalue Problem - III
Lecture 50 - The Algebraic Eigenvalue Problem - IV
Lecture 51 - Time Marching - I
Lecture 52 - Time Marching - II
Lecture 53 - Time Marching - III
Lecture 54 - Discrete Fourier Transform - I
Lecture 55 - Discrete Fourier Transform - II
Lecture 56 - Discrete Fourier Transform - III
Lecture 57 - Discrete Fourier Transform - IV
Lecture 58 - Discrete Fourier Transform - V
Lecture 59 - Discrete Fourier Transform - VI
Lecture 60 - Discrete Fourier Transform - VII

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NPTEL Video Course - Civil Engineering - NOC:Sustainable Transportation systems

Subject Co-ordinator - Prof. Bhola Ram Gurjar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Transportation Systems - I
Lecture 2 - Introduction to Transportation Systems - II
Lecture 3 - Concept of Sustainability
Lecture 4 - Current Scenario of Transportation in India
Lecture 5 - Climate Change: Indicators and Impacts
Lecture 6 - Impacts of Transportation Systems - I
Lecture 7 - Impacts of Transportation Systems - II
Lecture 8 - Impacts of Transportation Systems - III
Lecture 9 - Impacts of Transportation Systems - IV
Lecture 10 - Impacts of Transportation Systems - V
Lecture 11 - Introduction to Environment Impact Assessment (EIA)
Lecture 12 - EIA Processes - I
Lecture 13 - EIA Processes - II
Lecture 14 - Methodologies of EIA
Lecture 15 - EIA Process in India
Lecture 16 - Global practices in EIA process
Lecture 17 - EIA Case Study - I
Lecture 18 - EIA Case Study - II
Lecture 19 - EIA Case Study - III
Lecture 20 - EIA Case Study - IV
Lecture 21 - EIA Case Study - V
Lecture 22 - Introduction of Land use
Lecture 23 - Land use Planning and Zoning
Lecture 24 - Transit Oriented Development (TOD)
Lecture 25 - TOD Implementation
Lecture 26 - TOD Case study-I: Section of Delhi Metro
Lecture 27 - TOD Case study-II: TOD planning for Belgrade, Serbia
Lecture 28 - TOD Case study-III: Naya Raipur
Lecture 29 - Introduction to Sustainable Transport Planning

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Lecture 30 - Sustainable Transport Planning and Approaches-I: The Traditional Transport Planning Process
Lecture 31 - Sustainable Transport Planning and Approaches-II: The Contemporary Planning Process
Lecture 32 - Sustainable Transport Planning and Approaches-III: Management Strategies
Lecture 33 - Life Cycle Assessment (LCA): An Introduction
Lecture 34 - Life Cycle Assessment: Theory and Practice
Lecture 35 - LCA Case Study
Lecture 36 - Material Flow Analysis (MFA)
Lecture 37 - Material Flow Analysis: Case Study
Lecture 38 - Concept of Circular Economy
Lecture 39 - Circular Economy in Transport Sector
Lecture 40 - Modelling of Transport Emissions - I
Lecture 41 - Modelling of Transport Emissions - II
Lecture 42 - Dispersion Models for Transport Emissions
Lecture 43 - Traffic Noise Emission Models
Lecture 44 - Initiatives and Policies for Environmental Sustainability
Lecture 45 - National Clean Air Programme and Transport Sector
Lecture 46 - Decarbonizing the Transport Sector
Lecture 47 - Alternate Fuels and Sustainable Transportation
Lecture 48 - Electric Vehicles and Sustainability
Lecture 49 - Emerging Transport Technology - Hyperloop
Lecture 50 - Case Study-I: Bus Rapid Transit System (BRTS)
Lecture 51 - Case Study-II: Mass Rapid Transit (MRT) Systems
Lecture 52 - Case Study-III: Sustainability in Airports
Lecture 53 - Case Study-IV: Sustainable Water Transport
Lecture 54 - Case Study-V: Non-Motorized Transport (NMT)
Lecture 55 - openLCA - An LCA Tool
Lecture 56 - openLCA Application - Case Study
Lecture 57 - Material Flow Analysis Tool - STAN
Lecture 58 - Sustainability Indicators
Lecture 59 - Sustainable Transport Appraisal Rating (STAR)
Lecture 60 - Measuring Sustainability

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NPTEL Video Course - Civil Engineering - NOC:Air Pollution and Control

Subject Co-ordinator - Prof. Bhola Ram Gurjar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Air Pollution - I
Lecture 2 - Introduction to Air Pollution - II
Lecture 3 - Impact of Air Pollution on Human Health
Lecture 4 - Impact of Air Pollution on Vegetation and Animals
Lecture 5 - Impact of Air Pollution on Building Materials and Structures
Lecture 6 - Impact of Air Pollution on Atmosphere, Soil and Water Bodies
Lecture 7 - Sources and Classification of Air Pollutants
Lecture 8 - Atmospheric Formation and Fate of Air Pollutants
Lecture 9 - Meteorological Parameters and Air Pollution
Lecture 10 - Atmospheric Stability and Lapse Rates
Lecture 11 - Atmospheric Stability and Plume Behaviour
Lecture 12 - Boundary Layer, Mixing Height, Stack Height and Plume Rise
Lecture 13 - Status of Air Quality Monitoring in India
Lecture 14 - Air Quality Index (AQI)
Lecture 15 - Introduction to Air Quality Modelling
Lecture 16 - Gaussian Dispersion Model for Point Source
Lecture 17 - Gaussian Dispersion Model for Line Source and Area Source
Lecture 18 - Determination of Concentration of Pollutants using Gaussian Dispersion Model
Lecture 19 - Assimilative Capacity of an Airshed
Lecture 20 - Emission Inventory
Lecture 21 - Transport Emission Inventory
Lecture 22 - Emission Inventory for Industrial Sector
Lecture 23 - Emission Inventory for Agriculture Sector
Lecture 24 - Emission Inventory for Residential and Commercial Sectors
Lecture 25 - Application of Remote Sensing/Satellite-Based Data in Air Quality Management
Lecture 26 - Emission Inventory: Case Study
Lecture 27 - Methods of Source Apportionment
Lecture 28 - Source apportionment using Receptor Modeling
Lecture 29 - Indoor Air Quality: An Introduction

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Lecture 30 - Specific Sources and Types of Indoor Air Pollutants
Lecture 31 - Health Impacts Due to Indoor Air Pollution
Lecture 32 - Assessment of Exposure to Indoor Air Pollution
Lecture 33 - Indoor Air Quality Modelling
Lecture 34 - Technologies to Mitigate Indoor Air Pollution
Lecture 35 - Personal Exposure to Fine Particles: A Case Study
Lecture 36 - Indoor Air Quality in Nursery Buildings, UAE â Case Study
Lecture 37 - Global and Regional Environmental Issues - Ozone Depletion
Lecture 38 - Global and Regional Environmental Issues - Global Warming
Lecture 39 - Global and Regional Environmental Issues - Climate Change
Lecture 40 - Global and Regional Environmental Issues - Acid Rain
Lecture 41 - Introduction to Air Pollution Control
Lecture 42 - Air Pollution Control Devices - Part 1
Lecture 43 - Air Pollution Control Devices - Part 2
Lecture 44 - Air Pollution Control Devices - Part 3
Lecture 45 - Air Pollution Control Devices - Part 4
Lecture 46 - Tutorial-II - Practice Examples on Particulate Emission Control Devices
Lecture 47 - Tutorial-III - Practice Examples on Gaseous Emission Control Devices
Lecture 48 - Air Quality Standards
Lecture 49 - Air Pollution Legislations and Regulations
Lecture 50 - National Policies for Managing the Ambient Air Quality (AAQ)
Lecture 51 - International Environmental Treaties to Reduce Air Pollution and GHG Emissions
Lecture 52 - Impact of Lockdown on Air Quality
Lecture 53 - Sector Wise Mitigation Measures to Control Air Pollution
Lecture 54 - Challenges and the Way Forward
Lecture 55 - Sampling and Analysis of PM10 in Ambient Air
Lecture 56 - Sampling and Analysis of PM2.5 in Ambient Air
Lecture 57 - Sampling and Analysis of SO2 and NO2 in Ambient Air
Lecture 58 - Stack Emission Monitoring using Isokinetic Sampling
Lecture 59 - Indoor Air Quality Assessment using Multi Gas Monitor
Lecture 60 - Sampling and Analysis of PM10 and PM2.5 using Spectrometer

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NPTEL Video Course - Civil Engineering - NOC:Underground Space Technology

Subject Co-ordinator - Prof. Priti Maheshwari

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Rock Engineering: Introduction
Lecture 2 - Basics of Rock Engineering: coring, sampling, UCS of intact rock
Lecture 3 - Basics of Rock Engineering: Tensile strength and shear strength of intact rock
Lecture 4 - Basics of Rock Engineering: Classification of intact rocks, concept of rock mass, RQD
Lecture 5 - Basics of Rock Engineering: Classification of rock mass - 1
Lecture 6 - Basics of Rock Engineering: Classification of rock mass: Q-system and GSI
Lecture 7 - Basics of Rock Engineering: Failure criteria for rocks - 1
Lecture 8 - Basics of Rock Engineering: Empirical failure criteria
Lecture 9 - Tunneling: Underground excavations
Lecture 10 - Tunneling: Ground conditions
Lecture 11 - Planning of and exploration for underground construction projects
Lecture 12 - Underground excavation failure mechanisms
Lecture 13 - Application of stereographic projection method: roof failure
Lecture 14 - Application of stereographic projection method: sidewall failures - 1
Lecture 15 - Application of stereographic projection method: sidewall failures - 2
Lecture 16 - Elastic stress distribution around circular tunnels - 1
Lecture 17 - Elastic stress distribution around circular tunnels - 2
Lecture 18 - Elastic analysis of circular tunnels-displacements
Lecture 19 - Thick wall cylinder in biaxial stress field
Lecture 20 - Stress distribution around non-circular openings in elastic ground conditions - 1
Lecture 21 - Stress distribution around non-circular openings in elastic ground conditions - 2
Lecture 22 - Stress distribution under different in-situ stress conditions: design principles
Lecture 23 - Stress distribution for multiple openings
Lecture 24 - Openings in laminated rocks - 1
Lecture 25 - Openings in laminated rocks - 2
Lecture 26 - Openings in laminated rocks - 3
Lecture 27 - Openings in laminated rocks - 4
Lecture 28 - Elasto-plastic analysis of tunnels: Tresca yield criterion - 1
Lecture 29 - Elasto-plastic analysis of tunnels: Tresca yield criterion - 2

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Lecture 30 - Elasto-plastic analysis of tunnels: Mohr-Coulomb criterion
Lecture 31 - Application of rock mass classification system: TerzaghiÃ¢s rock load theory - 1
Lecture 32 - Application of rock mass classification system: TerzaghiÃ¢s rock load theory - 2
Lecture 33 - Application of rock mass classification system: rock mass rating (RMR)
Lecture 34 - Tunnel hazards
Lecture 35 - Tunnel hazards: squeezing ground conditions
Lecture 36 - Application of rock mass classification system: rock mass quality system - 1
Lecture 37 - Application of rock mass classification system: rock mass quality system - 2, NATM, NMT
Lecture 38 - Modulus of deformation of rock mass using Q-system, rock mass number, plate loading test
Lecture 39 - Modulus of deformation of rock mass: uni-axial jacking/plate jacking test
Lecture 40 - Modulus of deformation of rock mass: radial jacking test and Goodman jack test
Lecture 41 - Rock mass support interaction analysis: ground response and support reaction curves - 1
Lecture 42 - Rock mass support interaction analysis: ground response and support reaction curves - 2
Lecture 43 - Rock mass support interaction analysis: influencing factors, LadanyiÃ¢s E-P analysis
Lecture 44 - LadanyiÃ¢s elasto-plastic analysis of tunnels: analysis of stresses and deformations
Lecture 45 - Rock-support interaction analysis: required support line, analysis of available support
Lecture 46 - Rock-support interaction analysis: for shotcrete/concrete lining and blocked steel sets
Lecture 47 - Rock-support interaction analysis: for ungrouted rock bolts, grouted rock bolts/cables
Lecture 48 - Calculation sequence for rock-support interaction analysis - 1
Lecture 49 - Calculation sequence for rock-support interaction analysis - 2
Lecture 50 - Calculation sequence for rock-support interaction analysis - example
Lecture 51 - Methods of tunnel excavation, various support systems: shotcrete
Lecture 52 - Shotcrete
Lecture 53 - Various support systems: rock bolts
Lecture 54 - Permeability and groutability - 1
Lecture 55 - Permeability and groutability - 2
Lecture 56 - Rock stress determination: flat jack test
Lecture 57 - Rock stress determination: hydraulic fracturing technique
Lecture 58 - Instrumentation and monitoring of tunnels - 1
Lecture 59 - Instrumentation and monitoring of tunnels - 2
Lecture 60 - Few case studies

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NPTEL Video Course - Civil Engineering - NOC:Environmental Modeling and Simulation

Subject Co-ordinator - Prof. Gargi Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part I
Lecture 2 - Introduction - Part II
Lecture 3 - 1D Models - Part I
Lecture 4 - 1D Models - Part II
Lecture 5 - Logistic Growth Models - Part I
Lecture 6 - Logistic Growth Models - Part II
Lecture 7 - 1D Models: Auto Catalysis
Lecture 8 - Semi Quantitative Approach to Solve 1D Models
Lecture 9 - Using MATLAB for 1D systems
Lecture 10 - Using R for 1D Systems
Lecture 11 - Bifurcations - I
Lecture 12 - Bifurcations - II
Lecture 13 - Bifurcations - III
Lecture 14 - Bifurcations - IV
Lecture 15 - Bifurcations - V
Lecture 16 - Insect Outbreak Model
Lecture 17 - 2D Systems - I
Lecture 18 - 2D Systems - II
Lecture 19 - 2D Systems - III
Lecture 20 - 2D Systems - IV
Lecture 21 - 2D Systems - V
Lecture 22 - 2D Systems - VI
Lecture 23 - 2D Systems - VII
Lecture 24 - 2D Systems - VIII
Lecture 25 - 2D Systems - IX
Lecture 26 - 2D Systems - X
Lecture 27 - 2D Systems - XI
Lecture 28 - 2D Systems - XII
Lecture 29 - Limit Cycles - I

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Lecture 30 - Limit cycles - II and Bifurcations
Lecture 31 - Bifurcations
Lecture 32 - Bifurcations - I
Lecture 33 - Bifurcations - II
Lecture 34 - Bifurcations - III
Lecture 35 - Application of Empirical Approach - I
Lecture 36 - Application of Empirical Approach - II
Lecture 37 - Application of Empirical Approach - III
Lecture 38 - Gaussian Plumes - Air - I
Lecture 39 - Gaussian Plumes - Air - II
Lecture 40 - Gaussian Plumes - Air - III
Lecture 41 - Gaussian Plumes - Air - IV
Lecture 42 - Gaussian Plumes - Air - V
Lecture 43 - Gaussian Plumes - Air - VI
Lecture 44 - Ground Water - I
Lecture 45 - Ground Water - II
Lecture 46 - Environmental Transport Processes
Lecture 47 - Environmental Non-reactive and Reactive Processes - I
Lecture 48 - Environmental Non-reactive and Reactive Processes - II
Lecture 49 - Environmental Non-reactive and Reactive Processes - III
Lecture 50 - Homogeneous reactors
Lecture 51 - Heterogeneous Reactors - I
Lecture 52 - Heterogeneous Reactors - II
Lecture 53 - Ground Water Extraction
Lecture 54 - 2D Model Using MATLAB
Lecture 55 - Phase Portrait of 1D Models Using R
Lecture 56 - Phase Portrait of 2D Models Using R
Lecture 57 - Simulations - I
Lecture 58 - Simulations - II
Lecture 59 - Application: Climate change and GDP - I
Lecture 60 - Application: Climate change and GDP - II

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NPTEL Video Course - Civil Engineering - NOC:Advanced Geomatics Engineering

Subject Co-ordinator - Prof. Pradeep Kumar Garg

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Geomatics Engineering
Lecture 2 - Various Applications of Geomatics Engineering
Lecture 3 - Photogrammetry - An Introduction
Lecture 4 - Photogrammetry - Geometry of Aerial Photographs
Lecture 5 - Photogrammetry - Scale of Aerial Photographs
Lecture 6 - Photogrammetry - Relief Displacment
Lecture 7 - Photogrammetry - Stereo Pairs and Stereovision
Lecture 8 - Photogrammetry - Stereovision with Stereoscopes
Lecture 9 - Photogrammetry - Parallax in Photographs
Lecture 10 - Height Determination from Stereo-Pairs
Lecture 11 - Photogrammetry - 3D Mapping, DEM, DTM and DSM
Lecture 12 - Digital Photogrammetry
Lecture 13 - Remote Sensing - An Introduction
Lecture 14 - Remote Sensing - Electromagnetic Spectrum
Lecture 15 - Remote Sensing - Energy Interaction with Atmosphere / Earth Surface
Lecture 16 - Remote Sensing - Blackbody and Atmospheric Window
Lecture 17 - Spectral Signature in Remote Sensing
Lecture 18 - Remote Sensing - Types of Resolutions
Lecture 19 - Multi-concepts in Remote Sensing
Lecture 20 - Remote Sensing - Satellite Orbits
Lecture 21 - Remote Sensing - Various Sensors
Lecture 22 - Remote Sensing Sensors and Platforms - I
Lecture 23 - Remote Sensing Sensors and Platforms - II
Lecture 24 - Very High Resolution Remote Sensing Data
Lecture 25 - Remote Sensing - Thermal, Microwave, and Hyperspectral Images
Lecture 26 - Remote Sensing - Visual Interpretation Method
Lecture 27 - GPS Surveying - Introduction and Components
Lecture 28 - GPS Surveying - Working Principle
Lecture 29 - GPS Surveying - Various Methods

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Lecture 30 - GPS Surveying - Sources of Errors
Lecture 31 - GPS - Applications
Lecture 32 - LiDAR - An Introduction
Lecture 33 - Data Collection with Mobile Laser Scanners
Lecture 34 - Data Collection with Airborne LiDAR Systems
Lecture 35 - Unmanned Aerial Vehicles - An Introduction
Lecture 36 - Classifications of UAVs/Drones
Lecture 37 - Various Components of Drone and Their Functions
Lecture 38 - Flying Drones for Data Collection
Lecture 39 - Unmanned Aerial Vehicles - Various Applications
Lecture 40 - Digital Image Processing - An Introduction
Lecture 41 - Pre-processing - Atmospheric Corrections
Lecture 42 - Pre-processing - Geometric Corrections
Lecture 43 - Pre-processing - Resampling Methods
Lecture 44 - Digital Image Enhancement Methods
Lecture 45 - Spatial Filtering in Digital Remote Sensing
Lecture 46 - Digital Image Transformation Methods
Lecture 47 - Supervised Classification Methods
Lecture 48 - Unsupervised Classification Methods
Lecture 49 - Accuracy Assessment of Classification
Lecture 50 - Geographic Information System - An Introduction
Lecture 51 - Various Components of a GIS
Lecture 52 - GIS - Various Data Types and Their Characteristics
Lecture 53 - Geographic Information System - Data Input
Lecture 54 - GIS Databases and Their Uses
Lecture 55 - GIS - Based Extraction of Parameters from DEM
Lecture 56 - Buffering and Overlay Analysis in GIS
Lecture 57 - Spatial and Network Analysis in GIS
Lecture 58 - Geomatics Applications - Site Suitability Analysis
Lecture 59 - Geomatics Applications - Transportation Route Planning
Lecture 60 - Geomatics Applications - Smart City Planning

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NPTEL Video Course - Civil Engineering - NOC:Pavement Materials (Under Pavement Engineering)

Subject Co-ordinator - Prof. Nikhil Saboo

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Soil as a Highway Material
Lecture 2 - Particle Size Distribution - Part 1
Lecture 3 - Particle Size Distribution - Part 2
Lecture 4 - Consistency Limits and Classification of Soils - Part 1
Lecture 5 - Consistency Limits and Classification of Soils - Part 2
Lecture 6 - Strength Properties of Soil - Part 1
Lecture 7 - Strength Properties of Soil - Part 2
Lecture 8 - Strength Properties of Soil - Part 3
Lecture 9 - Strength Properties of Soil - Part 4
Lecture 10 - Expansive Soils and Stabilization Techniques
Lecture 11 - Introduction to Mineral Aggregates: Origin and Types
Lecture 12 - Production and Storage of Aggregates
Lecture 13 - Classification and Gradation of Aggregates - Part 1
Lecture 14 - Classification and Gradation of Aggregates - Part 2
Lecture 15 - Mineralogy of Aggregates and its Importance
Lecture 16 - Aggregates Shape and Surface Texture
Lecture 17 - Aggregate Properties - Part 1
Lecture 18 - Aggregate Properties - Part 2
Lecture 19 - Aggregate Properties - Part 3
Lecture 20 - Aggregate Properties - Part 4
Lecture 21 - Bitumen Basics
Lecture 22 - Chemistry of Bitumen
Lecture 23 - Physical Properties of Bitumen - Part 1
Lecture 24 - Physical Properties of Bitumen - Part 2
Lecture 25 - Physical Properties of Bitumen - Part 3
Lecture 26 - Introduction to Viscoelasticity
Lecture 27 - Rheological Properties of Bitumen - Part 1
Lecture 28 - Rheological Properties of Bitumen - Part 2
Lecture 29 - Grading of Bitumen - Part 1

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Lecture 30 - Grading of Bitumen - Part 2
Lecture 31 - Modified Bitumen
Lecture 32 - Bitumen Emulsion
Lecture 33 - Production of Bituminous Mixtures
Lecture 34 - Role and Desirable Properties: Mix Design
Lecture 35 - Volumetrics in Mix Design - Part 1
Lecture 36 - Volumetrics in Mix Design - Part 2
Lecture 37 - Volumetrics in Mix Design - Part 3
Lecture 38 - Volumetrics in Mix Design - Part 4
Lecture 39 - Volumetrics in Mix Design - Part 5
Lecture 40 - Marshall and Superpave Mix Design - Part 1
Lecture 41 - Marshall and Superpave Mix Design - Part 2
Lecture 42 - Hot Recycled Mixtures - Part 1
Lecture 43 - Hot Recycled Mixtures - Part 2
Lecture 44 - Hot Recycled Mixtures - Part 3
Lecture 45 - Cold Bituminous Mixtures
Lecture 46 - Performance Based Mix Design Concepts
Lecture 47 - Characterization of Bituminous Mixtures - Part 1
Lecture 48 - Characterization of Bituminous Mixtures - Part 2
Lecture 49 - Cementitious Materials - Part 1
Lecture 50 - Cementitious Materials - Part 2
Lecture 51 - Types of Cement, Admixtures, Geopolymers - Part 1
Lecture 52 - Types of Cement, Admixtures, Geopolymers - Part 2
Lecture 53 - Mix Design of PQC - IRC 44
Lecture 54 - Mix Design of PQC - Examples - Part 1
Lecture 55 - Mix Design of PQC - Examples - Part 2
Lecture 56 - Mix Design of DLC - IRC SP 49
Lecture 57 - Mix Design of Pervious Concrete - Part 1
Lecture 58 - Mix Design of Pervious Concrete - Part 2
Lecture 59 - Overview of Alternate Pavement Materials - Part 1
Lecture 60 - Overview of Alternate Pavement Materials - Part 2

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NPTEL Video Course - Civil Engineering - NOC:Geometric Design of Highways

Subject Co-ordinator - Prof. Rajat Rastogi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Design Controls - 1
Lecture 2 - Design Controls - 2
Lecture 3 - Design Controls - 3
Lecture 4 - Design Controls - 4
Lecture 5 - Design Controls and Space Requirements
Lecture 6 - Space and Sight Distance Requirements - 1
Lecture 7 - Sight Distance Requirements - 2
Lecture 8 - Sight Distance Requirements - 3
Lecture 9 - Sight Distance Requirements - 4
Lecture 10 - Sight Distance Requirements - 5
Lecture 11 - Cross-Section Elements - 1
Lecture 12 - Cross-Section Elements - 2
Lecture 13 - Cross-Section Elements - 3
Lecture 14 - Cross-Section Elements - 4
Lecture 15 - Cross-Section Elements - 5
Lecture 16 - Cross-Section Elements - 6
Lecture 17 - Cross-Section Elements - 7
Lecture 18 - Cross-Section Elements - 8
Lecture 19 - Cross-Section Elements - 9
Lecture 20 - Crossing Facility and Road Furniture - 1
Lecture 21 - Road Furniture - 2
Lecture 22 - Road Furniture - 3
Lecture 23 - Road Furniture - 4
Lecture 24 - Road Furniture - 5
Lecture 25 - Road Furniture - 6
Lecture 26 - Road Furniture - 7
Lecture 27 - Alignment Design - 1
Lecture 28 - Alignment Design - 2
Lecture 29 - Alignment Design - 3

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Lecture 30 - Alignment Design - 4
Lecture 31 - Alignment Design - 5
Lecture 32 - Alignment Design - 6
Lecture 33 - Alignment Design - 7
Lecture 34 - Alignment Design - 8
Lecture 35 - Alignment Design - 9
Lecture 36 - Alignment Design - 10
Lecture 37 - Alignment Design - 11
Lecture 38 - Alignment Design - 12
Lecture 39 - Alignment Design - 13
Lecture 40 - Alignment Design - 14
Lecture 41 - Alignment Design - 15
Lecture 42 - Alignment Design - 16
Lecture 43 - Intersection Layouts - 1
Lecture 44 - Intersection Layouts - 2
Lecture 45 - Intersection Layouts - 3
Lecture 46 - Intersection Layouts - 4
Lecture 47 - Intersection Layouts - 5
Lecture 48 - Intersection Layouts - 6
Lecture 49 - Intersection Layouts - 7
Lecture 50 - Intersection Layouts - 8
Lecture 51 - Intersection Layouts - 9
Lecture 52 - Intersection Layouts - 10
Lecture 53 - Design of Facilities - 1
Lecture 54 - Design of Facilities - 2
Lecture 55 - Design of Facilities - 3
Lecture 56 - Design of Facilities - 4
Lecture 57 - Design of Facilities - 5
Lecture 58 - Design of Facilities - 6
Lecture 59 - Design of Facilities - 7
Lecture 60 - Design of Facilities - 8
Lecture 61 - Design of Facilities - 9
Lecture 62 - Design of Facilities - 10

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NPTEL Video Course - Civil Engineering - NOC:Plate Tectonics

Subject Co-ordinator - Prof. Pitambar Pati

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Interior of Earth - I
Lecture 2 - Interior of Earth - II
Lecture 3 - Interior of Earth - III
Lecture 4 - Interior of Earth - IV
Lecture 5 - Interior of Earth - V
Lecture 6 - Interior of Earth - VI
Lecture 7 - Oceanic Crust - I
Lecture 8 - Oceanic Crust - II
Lecture 9 - Continental Crust - I
Lecture 10 - Continental Crust - II
Lecture 11 - Types of Plates and Plate Margins
Lecture 12 - Basic Assumption of Plate Tectonics
Lecture 13 - Relative Motion of Lithospheric Plates
Lecture 14 - Euler's Theory on Lithospheric Plate Motion
Lecture 15 - Constructive/Creative Plate Margin
Lecture 16 - Slow and Fast Spreading Ridges
Lecture 17 - Magma Chamber Properties at Mid-Oceanic Ridge
Lecture 18 - Age-Depth Relationship Around the Mid-Oceanic Ridge
Lecture 19 - Along Axis Segmentation of the Mid Oceanic Ridge
Lecture 20 - Propagating Rifts and Microplate Development
Lecture 21 - Conservative Plate Margin - I
Lecture 22 - Conservative Plate Margin - II, Continental Transform Faults
Lecture 23 - Conservative Plate Margin - III, Transform Continental Margins
Lecture 24 - Conservative Plate Margin - IV, Continental Transform Faults
Lecture 25 - Destructive Plate Margins - I
Lecture 26 - Destructive Plate Margins - II, The Oceanic Trench
Lecture 27 - Destructive Plate Margins - III, The Island Arc System
Lecture 28 - Destructive Plate Margins - IV, The Back Arc Basin and Accretionary Prism
Lecture 29 - Destructive Plate Margins - V, Seismicity in the Subduction Zone

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Lecture 30 - Destructive Plate Margins - VI, Gravity Anomaly and Thermal Structure at Subduction Zone
Lecture 31 - Magmatism and Metamorphism at Different Plate Settings - I, Magmatism at Subduction Zone
Lecture 32 - Magmatism and Metamorphism at Different Plate Settings - II, Metamorphic at Subduction Zone
Lecture 33 - Orogeny and Epiorogeny - I, Ocean-Continent Collision
Lecture 34 - Orogeny and Epiorogeny - II, Continent-Continent Collision
Lecture 35 - Orogeny and Epiorogeny - III, Arc-Continent Collision
Lecture 36 - Fault Plane Solution
Lecture 37 - Plate Tectonics and Mineralisation - I
Lecture 38 - Plate Tectonics and Mineralisation - II
Lecture 39 - Plate Tectonics and Mineralisation at Divergent Margins - III
Lecture 40 - Plate Tectonics and Mineralisation at Divergent Margins - IV
Lecture 41 - Plate Tectonics and Mineralisation at Convergent Margins - V
Lecture 42 - Plate Tectonics and Mineralisation at Convergent Margins - VI
Lecture 43 - Plate Tectonics and Mineralisation at Convergent Margins - VII
Lecture 44 - Plate Tectonics and Mineralisation at Intraplate Tectono-Metallogenic System - VIII
Lecture 45 - Plate Tectonics and Hydrocarbon Exploration - I
Lecture 46 - Plate Tectonics and Hydrocarbon Exploration - II
Lecture 47 - Plate Tectonics and Climate Change
Lecture 48 - Stability of Triple Junction
Lecture 49 - Volcano
Lecture 50 - Volcano and its Products - I
Lecture 51 - Volcano and its Products - II
Lecture 52 - Himalayan Tectonics - I
Lecture 53 - Himalayan Tectonics - II
Lecture 54 - Indian Seismicity
Lecture 55 - Neotectonics - I
Lecture 56 - Neotectonics - II
Lecture 57 - Continental Drift - I
Lecture 58 - Continental Drift - II
Lecture 59 - Seafloor Spreading
Lecture 60 - Global Positioning System (GPS) and Plate

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NPTEL Video Course - Civil Engineering - NOC:Earthquake Geotechnical Engineering

Subject Co-ordinator - Prof. B.K. Maheshwari

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Engineering Seismology
Lecture 4 - Engineering Seismology (Continued...)
Lecture 5 - Strong Ground Motion
Lecture 6 - Strong Ground Motion (Continued...)
Lecture 7 - Seismic Hazard Analysis
Lecture 8 - Seismic Hazard Analysis (Continued...)
Lecture 9 - Wave Propagation
Lecture 10 - Wave Propagation (Continued...)
Lecture 11 - Stress Conditions
Lecture 12 - Field Tests
Lecture 13 - Field Tests (Continued...)
Lecture 14 - Field Tests (Continued...)
Lecture 15 - Laboratory Tests
Lecture 16 - Laboratory Tests (Continued...)
Lecture 17 - Laboratory Tests (Continued...)
Lecture 18 - Constitutive Relationships of Soils
Lecture 19 - Constitutive Relationships of Soils (Continued...)
Lecture 20 - Constitutive Relationships of Soils (Continued...)
Lecture 21 - One-Dimensional
Lecture 22 - One-Dimensional (Continued...)
Lecture 23 - One-Dimensional (Continued...)
Lecture 24 - Two Dimensional
Lecture 25 - Soil-Structure Interaction
Lecture 26 - Soil-Structure Interaction (Continued...)
Lecture 27 - Local Site Effects
Lecture 28 - Local Site Effects (Continued...)
Lecture 29 - Local Site Effects (Continued...)

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Lecture 30 - Local Site Effects (Continued...)
Lecture 31 - Introduction
Lecture 32 - Liquefaction Susceptibility
Lecture 33 - Liquefaction Susceptibility (Continued...)
Lecture 34 - Initiation of Liquefaction
Lecture 35 - Initiation of Liquefaction (Continued...)
Lecture 36 - Initiation of Liquefaction (Continued...)
Lecture 37 - Initiation of Liquefaction (Continued...)
Lecture 38 - Initiation of Liquefaction (Continued...)
Lecture 39 - Initiation of Liquefaction (Continued...)
Lecture 40 - Effects of Liquefaction
Lecture 41 - Slope Stability Analysis
Lecture 42 - Slope Stability Analysis (Continued...)
Lecture 43 - Slope Stability Analysis (Continued...)
Lecture 44 - Slope Stability Analysis (Continued...)
Lecture 45 - Slope Stability Analysis (Continued...)
Lecture 46 - Introduction to Retaining Walls
Lecture 47 - Static Pressure on Retaining Walls
Lecture 48 - Static Pressure on Retaining Walls (Continued...)
Lecture 49 - Design of Retaining Walls
Lecture 50 - Design of Retaining Walls (Continued...)
Lecture 51 - Slope Stability and Retaining Walls: Design of Retaining Walls
Lecture 52 - Ground Improvement Techniques: Types of GIT
Lecture 53 - Ground Improvement Techniques: Types of GIT
Lecture 54 - Ground Improvement Techniques: Types of GIT
Lecture 55 - Ground Improvement Techniques: Geosynthetics
Lecture 56 - Ground Improvement Techniques: Geosynthetics
Lecture 57 - Ground Improvement Techniques: Vertical Drains
Lecture 58 - Ground Improvement Techniques: Vertical Drains
Lecture 59 - Ground Improvement Techniques: Reinforced Fibers
Lecture 60 - Ground Improvement Techniques: Verification and IS Code

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NPTEL Video Course - Civil Engineering - NOC:Railway Engineering

Subject Co-ordinator - Prof. Rajat Rastogi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Permanent Way
Lecture 3 - Gauges
Lecture 4 - Wheels and Axles, Locomotives, Wagons
Lecture 5 - Wagons, Coning of Wheels
Lecture 6 - Rail Sections
Lecture 7 - Rail Length, Tests and Failures
Lecture 8 - Sleepers - Density and Spacing
Lecture 9 - Sleepers - Types and Uses
Lecture 10 - Ballast Cushion
Lecture 11 - Traction and Resistances
Lecture 12 - Resistances
Lecture 13 - Hauling Capacity and Tractive Effort
Lecture 14 - Hauling Capacity Numerical
Lecture 15 - Track Modulus and Relief of Stresses
Lecture 16 - Track Stresses - Vertical Lateral Longitudinal
Lecture 17 - Track Stresses - Rails
Lecture 18 - Track Stresses - Rails and Sleepers
Lecture 19 - Track Stresses - Ballast Formation
Lecture 20 - Joints in Rails - Types and Requirements
Lecture 21 - Joints in Rails - Insulated and Welded
Lecture 22 - Joints in Rails - Flash Butt Weld
Lecture 23 - SWR Rails
Lecture 24 - Creep in Rails
Lecture 25 - Buckling, Hogging, Battering, Corrosion and Corrugation
Lecture 26 - Corrosion, Corrugation and Rail Failures - I
Lecture 27 - Rail Failures - II
Lecture 28 - Rail Failures and Wears
Lecture 29 - Rail Wears

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Lecture 30 - Permissible Wear, LWR and CWR
Lecture 31 - LWR and CWR
Lecture 32 - Fastenings - Rail to Rail
Lecture 33 - Fastenings - Rail to Sleeper (Elastic)
Lecture 34 - Fastenings - Rail to Sleeper (Others)
Lecture 35 - Track Alignment
Lecture 36 - Speed on Track
Lecture 37 - Circular Curve on Track
Lecture 38 - Superelevation on Track - I
Lecture 39 - Superelevation on Track - II and Transition Curves - I
Lecture 40 - Transition Curves - II, Extra Clearances
Lecture 41 - Widening of Gauge and Vertical Curves
Lecture 42 - Realignment of Curves
Lecture 43 - Turnouts, Points and Crossings - I
Lecture 44 - Turnouts, Points and Crossings - II
Lecture 45 - Crossings and Turnout Design
Lecture 46 - Turnout Design and Maintenance
Lecture 47 - Track Junctions and Design - I
Lecture 48 - Track Junctions and Design - II
Lecture 49 - Signaling - I
Lecture 50 - Signaling - II
Lecture 51 - Signaling - III
Lecture 52 - Interlocking Systems - I
Lecture 53 - Interlocking Systems - II
Lecture 54 - Interlocking Systems - III
Lecture 55 - Interlocking Systems - IV
Lecture 56 - Train Control Systems - I
Lecture 57 - Train Control Systems - II
Lecture 58 - Stations, Yards, Level Crossings
Lecture 59 - Track Maintenance - I
Lecture 60 - Track Maintenance - II
Lecture 61 - Track Maintenance - III
Lecture 62 - Track Maintenance - IV
Lecture 63 - Track Renewals and Drainage
Lecture 64 - High Speed Tracks

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NPTEL Video Course - Civil Engineering - NOC:Groundwater Engineering

Subject Co-ordinator - Prof. Arun K. Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Groundwater Hydrology - 1
Lecture 2 - Introduction to Groundwater Hydrology - 2
Lecture 3 - Why to study groundwater
Lecture 4 - Hydrological Cycle - 1
Lecture 5 - Hydrological Cycle - 2
Lecture 6 - Surface water vs groundwater
Lecture 7 - Water Balance and its Components
Lecture 8 - Types of aquifers - 1
Lecture 9 - Types of aquifers - 2
Lecture 10 - Infiltration and Percolation
Lecture 11 - Porosity
Lecture 12 - Permeability
Lecture 13 - Surface Runoff
Lecture 14 - Darcy's Law - 1
Lecture 15 - Darcy's Law - 2
Lecture 16 - Darcy's Law - 3
Lecture 17 - Reynolds Number
Lecture 18 - Groundwater Flow and Flow Nets
Lecture 19 - Darcy's law applied to aquifers
Lecture 20 - Flow to a well
Lecture 21 - Transmissibility
Lecture 22 - Speed of Groundwater Movement
Lecture 23 - Drawdowns in the vicinity of discharging wells
Lecture 24 - Aquifer Boundaries
Lecture 25 - Flow nets near aquifer boundaries
Lecture 26 - Nonsteady state steady shape and steady shape conditions
Lecture 27 - Jacob Method
Lecture 28 - Field determination of transmissibility and storage coefficient - 1
Lecture 29 - Field determination of transmissibility and storage coefficient - 2

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Lecture 30 - Theis Equation and example of superposition for solution
Lecture 31 - Theis Equation Theis Equation Assumptions and Applications - 1
Lecture 32 - Theis Equation Theis Equation Assumptions and Applications - 2
Lecture 33 - Geologic Formations as Aquifers - 1
Lecture 34 - Geologic Formations as Aquifers - 2
Lecture 35 - Geologic Formations as Aquifers - 3
Lecture 36 - Springs
Lecture 37 - Springs in India - 1
Lecture 38 - Springs in India - 2
Lecture 39 - Groundwater Exploration - 1
Lecture 40 - Groundwater Exploration - 2
Lecture 41 - Groundwater Exploration - 3
Lecture 42 - Groundwater Exploration - 4
Lecture 43 - Groundwater Exploration - 5
Lecture 44 - Groundwater Exploration - 6
Lecture 45 - Groundwater Exploration - 7
Lecture 46 - Groundwater Exploration - 8
Lecture 47 - Groundwater Exploration - 9
Lecture 48 - Groundwater Exploration - 10
Lecture 49 - Groundwater Exploration - 11
Lecture 50 - Groundwater Exploration - 12
Lecture 51 - Groundwater Exploration - 13 : Sampling
Lecture 52 - Groundwater Exploration - 14 : Hydrogeological Well Logging
Lecture 53 - Groundwater Exploration - 15 : Spontaneous potential logging
Lecture 54 - Groundwater Exploration - 16 : Selection of types of wells and Exploration for Art-Rec sites
Lecture 55 - Groundwater Exploration - 17 : Exploration for hot springs
Lecture 56 - Groundwater Exploration - 18 : Pollution related exploration
Lecture 57 - Groundwater Quality
Lecture 58 - Conjunctive use of ground and surface water
Lecture 59 - Groundwater Modelling - 1
Lecture 60 - Groundwater Modelling - 2
Lecture 61 - Groundwater Recharge Methods in India
Lecture 62 - Artificial Recharge Techniques and Designs

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Sequence Stratigraphy

Subject Co-ordinator - Prof. Biplab Bhattacharya

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Terminology
Lecture 3 - Different Types of Stratigraphy
Lecture 4 - Lithostratigraphy vs. Sequence Stratigraphy
Lecture 5 - Concept of Scale in Sequence Stratigraphy
Lecture 6 - Correlations of Stratigraphic Successions
Lecture 7 - Cyclicity in Sedimentary Successions - I
Lecture 8 - Cyclicity in Sedimentary Successions - II
Lecture 9 - Relative vs. Absolute Ages - I
Lecture 10 - Relative vs. Absolute Ages - II
Lecture 11 - Concept of Facies - I
Lecture 12 - Concept of Facies - II
Lecture 13 - Facies Models and Depositional Environment - I
Lecture 14 - Facies Models and Depositional Environment - II
Lecture 15 - Facies Models and Depositional Environment - III
Lecture 16 - Ichnology, Ichnofabric and Ichnofacies - I
Lecture 17 - Ichnology, Ichnofabric and Ichnofacies - II
Lecture 18 - Sea Level Changes
Lecture 19 - Relative Sea Level Changes
Lecture 20 - Shoreline Trajectories
Lecture 21 - Base level and Accommodation - I
Lecture 22 - Base level and Accommodation - II
Lecture 23 - Base Level vs. Shoreline Trajectory - I
Lecture 24 - Base Level vs. Shoreline Trajectory - II
Lecture 25 - Accommodation vs. Stratal Terminations
Lecture 26 - Data Input and Workflow in Sequence Stratigraphy
Lecture 27 - Basic Concepts of Sequence Stratigraphic Elements - I
Lecture 28 - Basic Concepts of Sequence Stratigraphic Elements - II
Lecture 29 - Basic Concepts of Sequence Stratigraphic Elements - III

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Lecture 30 - Basic Concepts of Sequence Stratigraphic Elements - IV
Lecture 31 - Surfaces in Sequence Stratigraphy - I: Introduction
Lecture 32 - Surfaces in Sequence Stratigraphy - II: Unconformity
Lecture 33 - Surfaces in Sequence Stratigraphy - III: Correlative Conformity
Lecture 34 - Surfaces in Sequence Stratigraphy - IV: BSFR
Lecture 35 - Surfaces in Sequence Stratigraphy - V: RSME
Lecture 36 - Surfaces in Sequence Stratigraphy - VI: MRS
Lecture 37 - Surfaces in Sequence Stratigraphy - VII: MFS
Lecture 38 - Surfaces in Sequence Stratigraphy - VIII: TRS - Part 1
Lecture 39 - Surfaces in Sequence Stratigraphy - IX: TRS - Part 2
Lecture 40 - Surfaces in Sequence Stratigraphy - X: Within Trend Facies Contacts
Lecture 41 - The Systems Tracts - I: Introduction
Lecture 42 - The Systems Tracts - II: Highstand Systems Tract - Part 1
Lecture 43 - The Systems Tracts - III: Highstand Systems Tract - Part 2
Lecture 44 - The Systems Tracts - IV: Falling-stage Systems Tract - Part 1
Lecture 45 - The Systems Tracts - V: Falling-stage Systems Tract - Part 2
Lecture 46 - The Systems Tracts - VI: Falling-stage Systems Tract - Part 3
Lecture 47 - The Systems Tracts - VII: Falling-stage Systems Tract - Part 4
Lecture 48 - The Systems Tracts - VIII: Lowstand Systems Tract - Part 1
Lecture 49 - The Systems Tracts - IX: Lowstand Systems Tract - Part 2
Lecture 50 - The Systems Tracts - X: Lowstand Systems Tract - Part 3
Lecture 51 - The Systems Tracts - XI: Transgressive Systems Tract - Part 1
Lecture 52 - The Systems Tracts - XII: Transgressive Systems Tract - Part 2
Lecture 53 - The Systems Tracts - XIII: Transgressive Systems Tract - Part 3
Lecture 54 - The Systems Tracts - XIV: Transgressive Systems Tract - Part 4
Lecture 55 - The Systems Tracts - XV: Regressive Systems Tract
Lecture 56 - Sequence Stratigraphy of Fluvial Environment
Lecture 57 - Sequence Stratigraphy of Carbonate Depositional Environments - I
Lecture 58 - Sequence Stratigraphy of Carbonate Depositional Environments - II
Lecture 59 - Sequence Stratigraphy of Carbonate Depositional Environments - III
Lecture 60 - Sequence Stratigraphy of Carbonate Depositional Environments - IV

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NPTEL Video Course - Civil Engineering - NOC:Drone Surveying

Subject Co-ordinator - Prof. Pradeep Kumar Garg, Prof. Prakhar Misra

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Land Surveying
Lecture 2 - Developments in surveying equipment
Lecture 3 - Types of Drones and their classifications
Lecture 4 - Technical Terms used in Drone Surveying
Lecture 5 - Components of a Drone System and Their Functions
Lecture 6 - Various Payloads and Sensors used in Drone Surveying
Lecture 7 - Photographic Sensors in Drones
Lecture 8 - LiDAR Sensor in Drone
Lecture 9 - Role of GNSS and IMU Sensors in Drone Survey
Lecture 10 - Accuracy Controls using GNSS and GCPs
Lecture 11 - Flight planning of drones and their limitations
Lecture 12 - Creation of DEM and Orthophoto from Drone Imagery
Lecture 13 - Creation of DTM from Drone's LiDAR Data and its applications
Lecture 14 - Various software to process drone data
Lecture 15 - Sensors Data Integration in GIS
Lecture 16 - Applications of Drone in urban planning
Lecture 17 - Applications of Drone in disaster management
Lecture 18 - Cost economics of Drone surveying
Lecture 19 - Regulations to fly drones
Lecture 20 - Doâ s and Donâ t while flying drones for data collection

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NPTEL Video Course - Civil Engineering - Ground Improvement Techniques

Subject Co-ordinator - Dr. G.L. Sivakumar Babu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Need for Ground Improvement
Lecture 2 - Classification of ground modification techniques
Lecture 3 - Emerging trends in ground improvement
Lecture 4 - Mechanical modification
Lecture 5 - Compaction Control
Lecture 6 - Deep compaction
Lecture 7 - Dynamic compaction
Lecture 8 - Vibro-compaction methods
Lecture 9 - Case studies in stone columns
Lecture 10 - Prefabricated Vertical Drains (PVDS) - I
Lecture 11 - Prefabricated drains (PVDS) - II
Lecture 12 - Dewatering - I
Lecture 13 - Dewatering - II
Lecture 14 - Electro-kinetic stabilization
Lecture 15 - Heating and freezing methods, Blasting methods - I
Lecture 16 - Heating and freezing methods, Blasting methods - II
Lecture 17 - Ground Treatment with lime - I
Lecture 18 - Ground Treatment with lime - II
Lecture 19 - Ground treatment with cement
Lecture 20 - Grouting procedures
Lecture 21 - Grouting
Lecture 22 - Micropiles
Lecture 23 - Introduction to Geosynthetics - I
Lecture 24 - Introduction to Geosynthetics - II
Lecture 25 - Reinforced soil principles and mechanisms
Lecture 26 - Material properties
Lecture 27 - Factors affecting reinforced soil
Lecture 28 - Bearing capacity improvement - I
Lecture 29 - Bearing capacity improvement - II

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Lecture 30 - Reinforced soil slopes
Lecture 31 - Reinforced Soil Walls
Lecture 32 - Reinforced Soil Walls - I
Lecture 33 - Soil Nailing
Lecture 34 - Design of embankments on soft soil using geosynthetics
Lecture 35 - Design of embankments on soft soil using geocells, Use of geosyntheticsfor filtration and draina
Lecture 36 - Applications in filtration and drainage & erosion control
Lecture 37 - Geosynthetics in pavements
Lecture 38 - Sustainable development and energy geotechnology
Lecture 39 - Microbial geotechnology and Ground Improvement
Lecture 40 - Nano-technologies in ground improvement and site remediation

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NPTEL Video Course - Civil Engineering - Stochastic Hydrology

Subject Co-ordinator - Prof. P.P. Mujumdar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Bivariate Distributions
Lecture 3 - Independence ; Functions of Random Variables
Lecture 4 - Moments of a Distribution
Lecture 5 - Normal Distribution
Lecture 6 - Other Continuous Distributions
Lecture 7 - Parameter Estimation
Lecture 8 - Covariance and Correlation
Lecture 9 - Data Generation
Lecture 10 - Time Series Analysis (1)
Lecture 11 - Time Series Analysis (2)
Lecture 12 - Time Series Analysis (3)
Lecture 13 - Frequency Domain Analysis (1)
Lecture 14 - Frequency Domain Analysis (2) and ARIMA Models (1)
Lecture 15 - ARIMA Models (2)
Lecture 16 - ARIMA Models (3)
Lecture 17 - ARIMA Models (4)
Lecture 18 - Case Studies (1)
Lecture 19 - Case Studies (2)
Lecture 20 - Case Studies (3)
Lecture 21 - Case Studies (4)
Lecture 22 - Markov Chains (1)
Lecture 23 - Markov Chains (2)
Lecture 24 - Frequency Analysis (1)
Lecture 25 - Frequency Analysis (2)
Lecture 26 - Frequency Analysis (3) and Probability Plotting (1)
Lecture 27 - Probability Plotting (2)
Lecture 28 - Goodness of Fit
Lecture 29 - IDF Relationships

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Lecture 30 - Multiple Linear Regression
Lecture 31 - Principal Component Analysis
Lecture 32 - Regression on Principal Components
Lecture 33 - Multivariate Stochastic Models (1)
Lecture 34 - Multivariate Stochastic Models (2)
Lecture 35 - Multivariate Stochastic Models (3)
Lecture 36 - Data Consistency Checks (1)
Lecture 37 - Data Consistency Checks (2)
Lecture 38 - Data Consistency Checks (3)
Lecture 39 - Recent Applications
Lecture 40 - Summary of the Course

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NPTEL Video Course - Civil Engineering - Stochastic Structural Dynamics

Subject Co-ordinator - Prof. C.S. Manohar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition of probability measure and conditional probability
Lecture 2 - Scalar random variables - 1
Lecture 3 - Scalar random variables - 2
Lecture 4 - Multi-dimensional random variables - 1
Lecture 5 - Multi-dimensional random variables - 2
Lecture 6 - Random processes - 1
Lecture 7 - Random processes - 2
Lecture 8 - Random processes - 3
Lecture 9 - Random processes - 4, Random vibrations of sdof systems - 1
Lecture 10 - Random processes - 4, Random vibrations of sdof systems - 1
Lecture 11 - Random vibrations of sdof systems - 2
Lecture 12 - Random vibrations of sdof systems - 3
Lecture 13 - Random vibrations of sdof systems - 4
Lecture 14 - Random vibrations of mdof systems - 1
Lecture 15 - Random vibrations of mdof systems - 2
Lecture 16 - Random vibrations of mdof systems - 3
Lecture 17 - Random vibrations of mdof systems - 4
Lecture 18 - Failure of randomly vibrating systems - 1
Lecture 19 - Failure of randomly vibrating systems - 2
Lecture 20 - Failure of randomly vibrating systems - 3
Lecture 21 - Failure of randomly vibrating systems - 4
Lecture 22 - Markov vector approach - 1
Lecture 23 - Markov vector approach - 2
Lecture 24 - Markov vector approach - 3
Lecture 25 - Markov vector approach - 4
Lecture 26 - Markov vector approach - 5, Monte Carlo simulation approach - 1
Lecture 27 - Markov vector approach - 5 & Monte Carlo simulation approach - 1
Lecture 28 - Monte Carlo simulation approach - 2
Lecture 29 - Monte Carlo simulation approach - 3

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Lecture 30 - Monte Carlo simulation approach - 4
Lecture 31 - Monte Carlo simulation approach - 5
Lecture 32 - Monte Carlo simulation approach - 6
Lecture 33 - Monte Carlo simulation approach - 7
Lecture 34 - Probabilistic methods in earthquake engineering - 1
Lecture 35 - Probabilistic methods in earthquake engineering - 2
Lecture 36 - Probabilistic methods in earthquake engineering - 3
Lecture 37 - Probabilistic methods in earthquake engineering - 4
Lecture 38 - Fatigue failure & Vibration energy flow models
Lecture 39 - Problem solving session - 1
Lecture 40 - Problem solving session - 2
Lecture 41 - Problem solving session - 3
Lecture 42 - Problem solving session - 4

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NPTEL Video Course - Civil Engineering - Water Resources Systems : Modeling Techniques and Analysis

Subject Co-ordinator - Prof. P.P. Mujumdar

Co-ordinating Institute - IISc - Bangalore

Lecture 1 - Introduction
Lecture 2 - Definitions and types of systems
Lecture 3 - Optimization
Lecture 4 - Optimization
Lecture 5 - Constrained optimization (1)
Lecture 6 - Constrained optimization (2)
Lecture 7 - Kuhn-Tucker conditions and Introduction to Linear Programming
Lecture 8 - Linear Programming
Lecture 9 - Linear Programming
Lecture 10 - Linear Programming
Lecture 11 - Linear Programming
Lecture 12 - Linear Programming
Lecture 13 - Linear Programming
Lecture 14 - Introduction to Dynamic Programming
Lecture 15 - Dynamic Programming
Lecture 16 - Dynamic Programming
Lecture 17 - Dynamic Programming
Lecture 18 - Simulation
Lecture 19 - Multi-objective planning
Lecture 20 - Reservoir sizing
Lecture 21 - Reservoir capacity using Linear Programming (1)
Lecture 22 - Reservoir capacity using Linear Programming (2)
Lecture 23 - Reservoir operation
Lecture 24 - Multi-reservoir systems
Lecture 25 - Stationary policy using Dynamic Programming
Lecture 26 - Hydropower generation
Lecture 27 - Basic probability theory (1)
Lecture 28 - Basic probability theory (2)
Lecture 29 - Chance constrained Linear Programming for reservoir operation and design (1)
Lecture 30 - Chance constrained Linear Programming for reservoir operation and design (2)
Lecture 31 - Stochastic Dynamic Programming for reservoir operation (1)
Lecture 32 - Stochastic Dynamic Programming for reservoir operation (2)
Lecture 33 - Stochastic Dynamic Programming for reservoir operation (3)

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Lecture 34 - Fuzzy optimization (1)
Lecture 35 - Fuzzy optimization (2)
Lecture 36 - Fuzzy optimization for water quality control and reservoir operation
Lecture 37 - Conjunctive use of ground and surface water
Lecture 38 - Hydropower optimization
Lecture 39 - Crop yield optimization
Lecture 40 - Multi-basin and multi-reservoir systems

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NPTEL Video Course - Civil Engineering - Finite Element method for vibration and Stability analyses

Subject Co-ordinator - Prof. C.S. Manohar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Equations of motion using HamiltonÂ s principle
Lecture 2 - Equations of motion for continuous systems and RayleighÂ s quotient
Lecture 3 - Rayleigh Ritz method and method of weighted residuals
Lecture 4 - FEM
Lecture 5 - Beam elements. Reference systm. Assembly of matrices. Imposition of BCS. Final equation of motior
Lecture 6 - FE modelling of planar structures
Lecture 7 - FE modelling of planar structures (Continued...)
Lecture 8 - FRF-s and damping models-1
Lecture 9 - FRF-s and damping models-2
Lecture 10 - Material damping models. Dynamic stiffness and transfer matrices
Lecture 11 - Twisting of circular bars and rectangular bars. Analysis of grids
Lecture 12 - 3D frames
Lecture 13 - Mathematical preliminaries and terminologies; EulerÂ s forward and backward difference methods
Lecture 14 - Forward and backward Euler method. Central difference method
Lecture 15 - Second order implicit methods
Lecture 16 - Energy conservation. Nonlinear systems
Lecture 17 - Model reduction schemes
Lecture 18 - Substructuring schemes
Lecture 19 - Plane stress models
Lecture 20 - Plane stress models (Continued...)
Lecture 21 - 3d Solid element
Lecture 22 - Axisymmetric models. Plate bending elements.
Lecture 23 - Plate bending elements (Continued...)
Lecture 24 - Plate bending elements (Continued...)
Lecture 25 - Plate bending elements (Continued...)
Lecture 26 - Introduction
Lecture 27 - Introduction (Continued...)
Lecture 28 - Nonlinear dynamical systems, fixed points and bifurcations
Lecture 29 - Energy methods in stability analysis

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Lecture 30 - FEM for stability analysis. Euler-Bernoulli beam and general formulations
Lecture 31 - 3D beam element; plate element; imperfection sensitive structures; beams on elastic foundations;
Lecture 32 - Dynamic analysis of stability and analysis of time varying systems
Lecture 33 - Dynamic analysis of stability and analysis of time varying systems
Lecture 34 - FE modelling of vehicle structure interactions
Lecture 35 - Inverse response sensitivity analysis
Lecture 36 - Inverse response sensitivity analysis (Continued...)
Lecture 37 - Introduction and review of continuum mechanics
Lecture 38 - Review of measures of strain and stress; balance laws
Lecture 39 - Total and updated Lagrangian formulations
Lecture 40 - Closure

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NPTEL Video Course - Civil Engineering - NOC:Introduction to Engineering Seismology

Subject Co-ordinator - Dr. P. Anbazhagan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Earthquake hazard
Lecture 3 - Different Earthquake Hazards
Lecture 4 - Different Earthquake Hazards (Continued...)
Lecture 5 - Earthquake Terminologies
Lecture 6 - Plate Tectonics
Lecture 7 - Faults; Seismic Sources
Lecture 8 - Types of Earthquakes; Causes of Earthquakes
Lecture 9 - Introduction to Wave Propagation
Lecture 10 - Seismic Wave propagation;
Lecture 11 - Instrumentation to record Earthquake
Lecture 12 - Seismic Sensors
Lecture 13 - Seismic Instrumentation in India
Lecture 14 - Seismic Instrumentation in India (Continued...)
Lecture 15 - Intensity scales of Earthquake
Lecture 16 - Road Damage Intensity Scale; and Seismic Vulnerability assessment
Lecture 17 - Quantification of Earthquake (magnitude)
Lecture 18 - Energy released due to earthquakes
Lecture 19 - Interpretation of Earthquake records; Baseline correction
Lecture 20 - Interpretation of Earthquake records (Continued...); Time Domain Parameters
Lecture 21 - Time Domain Parameters (Continued...)
Lecture 22 - Duration parameters; Duration Prediction Equations
Lecture 23 - Frequency Domain Characteristics; Response Spectrum
Lecture 24 - Fourier Spectrum
Lecture 25 - Seismic Source Parameters;
Lecture 26 - Time history; response Spectra (design); Stochastic models
Lecture 27 - Ground Motion Simulation models
Lecture 28 - Prediction Relationships
Lecture 29 - Recapitulation - 1

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Lecture 30 - Recapitulation - 2
Lecture 31 - Recapitulation - 3
Lecture 32 - Recapitulation - 4
Lecture 33 - Recapitulation - 5
Lecture 34 - Recapitulation - 6
Lecture 35 - Recapitulation - 7
Lecture 36 - Recapitulation - 8
Lecture 37 - Earthquake Prediction
Lecture 38 - Earthquake prediction (Continued...)
Lecture 39 - Seismic Gap
Lecture 40 - Earthquake Prediction (some Precautions)
Lecture 41 - Seismic zonation and microzonation
Lecture 42 - Seismic zonation and microzonation (Continued...)
Lecture 43 - Seismic microzonation of various Indian cities
Lecture 44 - Seismic microzonation of various Indian cities (Continued...)
Lecture 45 - Global Equation model
Lecture 46 - Global Earthquake risk map
Lecture 47 - Seismic Microzonation of Bangalore
Lecture 48 - Seismic Microzonation of Bangalore
Lecture 49 - Seismic zonation of India
Lecture 50 - IS 1893 version 2002 and 2016 explained
Lecture 51 - Zonation Map of India
Lecture 52 - Seismicity of India
Lecture 53 - Seismicity of India
Lecture 54 - SeismoTectonics of India - 1
Lecture 55 - SeismoTectonics of India - 2
Lecture 56 - SeismoTectonics of India - 3
Lecture 57 - Seismic Hazard Analysis - Introduction
Lecture 58 - SHA (Continued...) - Seismic Study area and Seismotectonic Map
Lecture 59 - SHA (Continued...) - Seismic Data Collection
Lecture 60 - SHA (Continued...) - Maximum Magnitude Estimation
Lecture 61 - SHA - Source and Source-Site Distance
Lecture 62 - SHA - Prediction Equation for India
Lecture 63 - SHA - Selection of GMPE
Lecture 64 - SHA - Estimation of Hazard

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NPTEL Video Course - Civil Engineering - NOC:Aquatic Geochemistry

Subject Co-ordinator - Prof. Soumita Boral

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Global Water Challenges - I
Lecture 3 - Global Water Challenges - II
Lecture 4 - Hydrosphere - I
Lecture 5 - Hydrosphere - II
Lecture 6 - Catchment Hydrology
Lecture 7 - Water Sampling Techniques - I
Lecture 8 - Water Sampling Techniques - II
Lecture 9 - Water Sampling Techniques - III
Lecture 10 - Water Sampling Techniques - IV
Lecture 11 - Instrumentation - I
Lecture 12 - Instrumentation - II
Lecture 13 - Water Quality Parameters - I
Lecture 14 - Water Quality Parameters - II
Lecture 15 - Composition of Natural Waters
Lecture 16 - Thermodynamics - I
Lecture 17 - Thermodynamics - II
Lecture 18 - Thermodynamics - III
Lecture 19 - Thermodynamics - IV
Lecture 20 - Kinetics - I
Lecture 21 - Kinetics - II
Lecture 22 - Acids-Bases - I
Lecture 23 - Acids-Bases - II
Lecture 24 - Acids-Bases - III
Lecture 25 - Redox Reactions - I
Lecture 26 - Redox Reactions - II
Lecture 27 - Aqueous Complexation - I
Lecture 28 - Aqueous Complexation - II
Lecture 29 - Speciation Modelling

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Lecture 30 - Isotope Geochemistry Introduction
Lecture 31 - Isotopes Geochemistry: Radioactivity
Lecture 32 - Radioactive Isotopes - I
Lecture 33 - Radioactive Isotopes - II
Lecture 34 - Rb-Sr system - I
Lecture 35 - Rb-Sr system - II
Lecture 36 - Sm-Nd system
Lecture 37 - Mixing Theory
Lecture 38 - Stable Isotopes - I
Lecture 39 - Stable Isotopes - II
Lecture 40 - Stable Isotopes - III
Lecture 41 - Stable Isotopes in the Hydrosphere
Lecture 42 - Stable Isotopes in the Hydrosphere - I
Lecture 43 - Stable Isotopes in the Hydrosphere - II
Lecture 44 - Stable Isotopes in the Hydrosphere - III
Lecture 45 - Stable Isotopes in the Hydrosphere - IV
Lecture 46 - Tracer - Carbon Isotopes
Lecture 47 - Tracer - Carbon and Nitrogen Isotopes
Lecture 48 - Tracer - Metal Isotopes
Lecture 49 - Tracer - Metal Isotopes â I
Lecture 50 - Organic Chemistry in Aquatic Systems
Lecture 51 - Precipitation Chemistry
Lecture 52 - River Water Chemistry
Lecture 53 - River Water Chemistry (Continued...)
Lecture 54 - Eutrophication in Lakes
Lecture 55 - Groundwater Chemistry - I
Lecture 56 - Groundwater Chemistry - II
Lecture 57 - Composition of the Oceans
Lecture 58 - Composition of the Oceans - II
Lecture 59 - Composition of the Oceans - III
Lecture 60 - Concluding Lectuer

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NPTEL Video Course - Computer Science and Engineering - Natural Language Processing

Subject Co-ordinator - Prof. Pushpak Bhattacharya

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Stages of NLP
Lecture 3 - Stages of NLP Continue...
Lecture 4 - Two approaches to NLP
Lecture 5 - Sequence Labelling and Noisy Channel
Lecture 6 - Noisy Channel
Lecture 7 - Argmax Based Computation
Lecture 8 - Noisy Channel Application to NLP
Lecture 9 - Brief on Probabilistic Parsing & Start of Part of Speech Tagging
Lecture 10 - Part of Speech Tagging
Lecture 11 - Part of Speech Tagging counted ...
Lecture 12 - Part of Speech Tagging counted ... and Indian Language in Focus; Morphology Analysis
Lecture 13 - PoS Tagging contd... , Indian Language Consideration; Accuracy Measure
Lecture 14 - PoS Tagging; Fundamental Principle; Why Challenging; accuracy
Lecture 15 - PoS Tagging; Accuracy Measurement; Word categories
Lecture 16 - AI and Probability; HMM
Lecture 17 - HMM
Lecture 18 - HMM, Viterbi, Forward Backward Algorithm
Lecture 19 - HMM, Viterbi, Forward Backward Algorithm (Continued...)
Lecture 20 - HMM, Forward Backward Algorithms, Baum Welch Algorithm
Lecture 21 - HMM, Forward Backward Algorithms, Baum Welch Algorithm (Continued...)
Lecture 22 - Natural Language Processing and Informational Retrieval
Lecture 23 - CLIA; IR Basics
Lecture 24 - IR Models
Lecture 25 - IR Models
Lecture 26 - NLP and IR
Lecture 27 - Least Square Method; Recap of PCA; Towards Latent Semantic Indexing (LSI)
Lecture 28 - PCA; SVD; Towards Latent Semantic Indexing (LSI)
Lecture 29 - Wordnet and Word Sense Disambiguation

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Lecture 30 - Wordnet and Word Sense Disambiguation (Continued...)
Lecture 31 - Wordnet; Metonymy and Word Sense Disambiguation
Lecture 32 - Word Sense Disambiguation
Lecture 33 - Word Sense Disambiguation; Overlap Based Method; Supervised Method
Lecture 34 - Word Sense Disambiguation
Lecture 35 - Word Sense Disambiguation
Lecture 36 - Resource Constrained WSD; Parsing
Lecture 37 - Parsing
Lecture 38 - Parsing Algorithm
Lecture 39 - Parsing Ambiguous Sentences; Probabilistic Parsing
Lecture 40 - Probabilistic Parsing Algorithms

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NPTEL Video Course - Computer Science and Engineering - Design and Analysis of Algorithms

Subject Co-ordinator - Prof. Sundar Viswanathan, Prof. Ajit A Diwan, Prof. Abhiram G Ranade

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of the course
Lecture 2 - Framework for Algorithms Analysis
Lecture 3 - Algorithms Analysis Framework - II
Lecture 4 - Asymptotic Notations
Lecture 5 - Algorithm Design Techniques
Lecture 6 - Divide And Conquer - I
Lecture 7 - Divide And Conquer - II Median Finding
Lecture 8 - Divide And Conquer - III Surfing Lower Bounds
Lecture 9 - Divide And Conquer - IV Closest Pair
Lecture 10 - Greedy Algorithms - I
Lecture 11 - Greedy Algorithms - II
Lecture 12 - Greedy Algorithms - III
Lecture 13 - Greedy Algorithms - IV
Lecture 14 - Pattern Matching - I
Lecture 15 - Pattern Matching - II
Lecture 16 - Combinational Search and Optimization - I
Lecture 17 - Combinational Search and Optimization - II
Lecture 18 - Dynamic Programming
Lecture 19 - Longest Common Subsequences
Lecture 20 - Matrix Chain Multiplication
Lecture 21 - Scheduling with Startup and Holding Costs
Lecture 22 - Average case Analysis of Quicksort
Lecture 23 - Bipartite Maximum Matching
Lecture 24 - Lower Bounds for Sorting
Lecture 25 - Element Distinctness Lower Bounds
Lecture 26 - NP-Completeness - I - Motivation
Lecture 27 - NP-Completeness - II
Lecture 28 - NP-Completeness - III
Lecture 29 - NP-Completeness - IV

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Lecture 30 - NP-Completeness - V
Lecture 31 - NP-Completeness - VI
Lecture 32 - Approximation Algorithms
Lecture 33 - Approximation Algorithms
Lecture 34 - Approximation Algorithms for NP

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NPTEL Video Course - Computer Science and Engineering - Software Engineering

Subject Co-ordinator - Prof. N.L. Sarda, Prof. Umesh Bellur, Prof. Rushikesh K Joshi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Software Engineering - Challenges
Lecture 2 - Introduction to Software Engineering
Lecture 3 - Overview of Phases
Lecture 4 - Overview of Phases
Lecture 5 - Requirements Engineering / Specification
Lecture 6 - Formal Specification
Lecture 7 - Algebraic Specification Methods
Lecture 8 - Systems Modeling Overview
Lecture 9 - Process Modeling - DFD , Function Decomp
Lecture 10 - Process Modeling - DFD, Function Decomp
Lecture 11 - Data Modeling - ER Diagrams, Mapping
Lecture 12 - Data Modeling - ER Diagrams, Mapping
Lecture 13 - Production Quality Software - Introduction
Lecture 14 - Software Design - Primary Consideration
Lecture 15 - Design Patterns
Lecture 16 - Class and Component Level Design
Lecture 17 - Architectural Design
Lecture 18 - Software Testing - I
Lecture 19 - Software Testing - II
Lecture 20 - Structural Programming and Some implementation
Lecture 21 - Software Metrics and Quality
Lecture 22 - Verification and Validation
Lecture 23 - Case Study
Lecture 24 - Case Study
Lecture 25 - Software Evolution
Lecture 26 - Agile Development
Lecture 27 - Software Reuse CBSE
Lecture 28 - Reuse Continued
Lecture 29 - Introduction to Project Management

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Lecture 30 - Project Scope Management
Lecture 31 - Project Time Management
Lecture 32 - Estimation - I
Lecture 33 - Estimation - II
Lecture 34 - Project Quality Management
Lecture 35 - Quality Management Systems - I
Lecture 36 - Quality Management Systems
Lecture 37 - Project Configuration Management
Lecture 38 - Project Risk Management
Lecture 39 - Other PM Processes

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NPTEL Video Course - Computer Science and Engineering - NOC:Software Testing (2017)

Subject Co-ordinator - Prof. Meenakshi D'souza

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation
Lecture 2 - Terminologies
Lecture 3 - Testing based on Models and Criteria
Lecture 4 - Automation - JUnit as an example
Lecture 5 - Basics of Graphs
Lecture 6 - Structural Graph Coverage Criteria
Lecture 7 - Elementary Graph Algorithms - Part 1
Lecture 8 - Elementary Graph Algorithms - Part 2
Lecture 9 - Algorithms
Lecture 10 - Assignment 2
Lecture 11 - Data Flow Graphs
Lecture 12 - Algorithms
Lecture 13 - Graph Coverage Criteria
Lecture 14 - Testing Source Code
Lecture 15 - Data Flow Graph Coverage Criteria
Lecture 16 - Software Design and Integration Testing
Lecture 17 - Design Integration Testing and Graph Coverage
Lecture 18 - Specification Testing and Graph Coverage
Lecture 19 - Graph Coverage and Finite state Machines
Lecture 20 - Assignment 4
Lecture 21 - Logic
Lecture 22 - Logic
Lecture 23 - Coverage Criteria, (Continued...)
Lecture 24 - Logic Coverage Criteria
Lecture 25 - Logic Coverage Criteria
Lecture 26 - Logic Coverage Criteria
Lecture 27 - Logic Coverage Criteria
Lecture 28 - Logic Coverage Criteria
Lecture 29 - Logic Coverage Criteria

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Lecture 30 - Week 6 Assignment Solving
Lecture 31 - Functional Testing
Lecture 32 - Input Space Partitioning
Lecture 33 - Input Space Partitioning
Lecture 34 - Input Space Partitioning Coverage Criteria
Lecture 35 - Syntax-Based Testing
Lecture 36 - Mutatioon Testing
Lecture 37 - Mutation Testing for Programs
Lecture 38 - Mutation Testing
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Lecture 40 - Assignment Solving for Week8
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Lecture 51 - Symbolic Testing - 2
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Lecture 55 - Testing of Object-Oriented Applications
Lecture 56 - Testing of Mobile Applications
Lecture 57 - Non-Functional System Testing
Lecture 58 - Regression Testing
Lecture 59 - Assignment
Lecture 60 - Software Testing

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NPTEL Video Course - Computer Science and Engineering - NOC:Design and Pedagogy of the Introductory Programmi

Subject Co-ordinator - Prof. Abhiram G Ranade

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Introduction and Survey.0
Lecture 3 - Introduction and Survey.1
Lecture 4 - Introduction and Survey.2
Lecture 5 - Basic Ideas in Our Approach.0
Lecture 6 - Basic Ideas in Our Approach.1
Lecture 7 - Basic Ideas in Our Approach.2
Lecture 8 - Basic Ideas in Our Approach.3
Lecture 9 - Basic Ideas in Our Approach.4
Lecture 10 - Basic Ideas in Our Approach.5
Lecture 11 - Basic Ideas in Our Approach.6
Lecture 12 - Pedagogy.0
Lecture 13 - Pedagogy.1
Lecture 14 - Pedagogy.2
Lecture 15 - Pedagogy.3
Lecture 16 - Pedagogy.4
Lecture 17 - Advanced Programming Topics.0
Lecture 18 - Advanced Programming Topics.1
Lecture 19 - Advanced Programming topics.2
Lecture 20 - In class questions, Assignments, Examinations.0
Lecture 21 - In class questions, Assignments, Examinations.1
Lecture 22 - Summing up

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NPTEL Video Course - Computer Science and Engineering - NOC:An Introduction to Programming through C++

Subject Co-ordinator - Prof. Abhiram G Ranade

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Introduction - Part 3
Lecture 4 - Introduction - Part 4
Lecture 5 - Problem Solving using Computer - Part 1
Lecture 6 - Problem Solving using Computer - Part 2
Lecture 7 - Problem Solving using Computer - Part 3
Lecture 8 - Problem Solving using Computer - Part 4
Lecture 9 - Problem Solving using Computer - Part 5
Lecture 10 - Basic Elements of Program - Part 1
Lecture 11 - Basic Elements of Program - Part 2
Lecture 12 - Basic Elements of Program - Part 3
Lecture 13 - Basic Elements of Program - Part 4
Lecture 14 - Program Design - Part 1
Lecture 15 - Program Design - Part 2
Lecture 16 - Program Design - Part 3
Lecture 17 - Simple cpp Graphics
Lecture 18 - Conditional Execution - Part 1
Lecture 19 - Most general form of if - Part 2
Lecture 20 - More general form of conditions - Part 3
Lecture 21 - A somewhat large program example - Part 4
Lecture 22 - Switch statement and logical data - Part 5
Lecture 23 - Loops - Part 1
Lecture 24 - Mark averaging - Part 2
Lecture 25 - The break and continue statements - Part 3
Lecture 26 - The for statement - Part 4
Lecture 27 - Euclid's algorithm for GCD - Part 5
Lecture 28 - Correctness proof for GCD - Part 6
Lecture 29 - Computing Mathematical Functions - Part 1

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Lecture 30 - Computing Mathematical Functions - Part 2
Lecture 31 - Computing Mathematical Functions - Part 3
Lecture 32 - Computing Mathematical Functions - Part 4
Lecture 33 - Loops in various applications - Part 1
Lecture 34 - Loops in various applications - Part 2
Lecture 35 - Loops in various applications - Part 3
Lecture 36 - Loops in various applications - Part 4
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Lecture 38 - Functions - Part 1
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Lecture 41 - Functions - Part 4
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Lecture 43 - Recursion - Part 1
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Lecture 49 - Program Organization and Functions - Part 1
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Lecture 53 - Advanced Features of Functions - Part 1
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Lecture 60 - Array Part-1 - Part 4
Lecture 61 - Array Part-1 - Part 5
Lecture 62 - Array Part-1 - Part 6
Lecture 63 - Array Part-1 - Part 7
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Lecture 65 - Array Part-1 - Part 9
Lecture 66 - Array Part-2 - Part 1
Lecture 67 - Array Part-2 - Part 2
Lecture 68 - Array Part-2 - Part 3

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Lecture 69 - Array Part-2 - Part 4
Lecture 70 - More on Arrays - Part 1
Lecture 71 - More on Arrays - Part 2
Lecture 72 - More on Arrays - Part 3
Lecture 73 - More on Arrays - Part 4
Lecture 74 - Arrays and recursion - Part 1
Lecture 75 - Arrays and recursion - Part 2
Lecture 76 - Arrays and recursion - Part 3
Lecture 77 - Arrays and recursion - Part 4
Lecture 78 - Arrays and recursion - Part 5
Lecture 79 - Structures - Part 1
Lecture 80 - Structures - Part 2
Lecture 81 - Structures - Part 3
Lecture 82 - Structures - Part 4
Lecture 83 - Structures Part 2 - Part 1
Lecture 84 - Structures Part 2 - Part 2
Lecture 85 - Structures Part 2 - Part 3
Lecture 86 - Classes - Part 1
Lecture 87 - Classes - Part 2
Lecture 88 - Classes - Part 3
Lecture 89 - Classes - Part 4
Lecture 90 - Classes - Part 5
Lecture 91 - Classes - Part 6
Lecture 92 - Representing variable length entities - Part 1
Lecture 93 - Representing variable length entities - Part 2
Lecture 94 - Representing variable length entities - Part 3
Lecture 95 - Representing variable length entities - Part 4
Lecture 96 - Representing variable length entities - Part 5
Lecture 97 - Representing variable length entities - Part 6
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Lecture 99 - The Standard Library - Part 1
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Lecture 103 - The Standard Library - Part 5
Lecture 104 - Data structure based programming - Part 1
Lecture 105 - Data structure based programming - Part 2
Lecture 106 - Data structure based programming - Part 3
Lecture 107 - Data structure based programming - Part 4

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Lecture 108 - Data structure based programming - Part 5
Lecture 109 - Medium size programs - Part 1
Lecture 110 - Medium size programs - Part 2
Lecture 111 - Medium size programs - Part 3
Lecture 112 - Medium size programs - Part 4
Lecture 113 - A graphical editor and solver for circuits - Part 1
Lecture 114 - A graphical editor and solver for circuits - Part 2
Lecture 115 - A graphical editor and solver for circuits - Part 3
Lecture 116 - A graphical editor and solver for circuits - Part 4
Lecture 117 - Cosmological simulation - Part 1
Lecture 118 - Cosmological simulation - Part 2
Lecture 119 - Cosmological simulation - Part 3
Lecture 120 - Cosmological simulation - Part 4

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NPTEL Video Course - Computer Science and Engineering - NOC:Demystifying Networking

Subject Co-ordinator - Prof.Sridhar Iyer

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Analogy for CEO's Problem
Lecture 3 - Discussing the CEO's Problem
Lecture 4 - From the CEO's Company to Layers in a Network
Lecture 5 - Layers in Detail
Lecture 6 - Layered Nature of a Network
Lecture 7 - Introduction to Internet Data Capturing using Wireshark
Lecture 8 - Network data captured while requesting a website
Lecture 9 - What is Cisco Packet Tracer
Lecture 10 - Modes of Cisco Packet Tracer
Lecture 11 - Getting Cisco Packet Tracer
Lecture 12 - Logical and Physical Typologies in Cisco Packet Tracer
Lecture 13 - Devices on Cisco Packet Tracer
Lecture 14 - Introduction to the Cisco Packet Tracer Activity for Week 1
Lecture 15 - Introduction to the campus network on Cisco Packet Tracer
Lecture 16 - Loading the page in Simulation Mode
Lecture 17 - Inspecting the packets in Simulation Mode
Lecture 18 - Editing the dummy website on Cisco Packet Tracer
Lecture 19 - Summary of the Cisco Packet Tracer Activity
Lecture 20 - Introduction to Anupam's Adventure
Lecture 21 - Anupam's adventure brings us to IP Addressing
Lecture 22 - Addressing at various layers
Lecture 23 - IP Addresses
Lecture 24 - Address Translation
Lecture 25 - Introduction to IP Addressing
Lecture 26 - Creating a network with Sub-net mask
Lecture 27 - Nomenclature of a sub-net mask
Lecture 28 - Network addresses and Private networks
Lecture 29 - Introduction to the Addressing Topology

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Lecture 30 - Addressing a local network and DHCP
Lecture 31 - Addressing a local network manually
Lecture 32 - Addressing in Pubilc and Private Networks
Lecture 33 - Verifying Connectivity using Ping
Lecture 34 - Using network address translation to communicate on internet
Lecture 35 - Using Sub nets and Summary of addressing
Lecture 36 - Summary of the week
Lecture 37 - Analogy for the week 2
Lecture 38 - Discussion on dabbawala analogy
Lecture 39 - From dabbawalas to routers and switches
Lecture 40 - What is routing ?
Lecture 41 - Static routing in a router in CPT
Lecture 42 - How does a switch forwards packets CPT
Lecture 43 - How to add static route in a router? (CPT)
Lecture 44 - Traveler's dilemma
Lecture 45 - Duscussing the Traveler's dilemma
Lecture 46 - From Traveler's dilemma to Dynamic Routing
Lecture 47 - Dynamic Routing with Distance Vector
Lecture 48 - Distance Vector Routing in Detail
Lecture 49 - Dynamic Routing with Link State
Lecture 50 - Setting up dynamic routing in Packet Tracer
Lecture 51 - Summary of the week
Lecture 52 - Introduction to analogy for week 3
Lecture 53 - Analogy for week 3
Lecture 54 - Questions on analogy for week 3
Lecture 55 - Understanding the new order requirements
Lecture 56 - Introduction to Tranport Layer
Lecture 57 - Introduction to TCP
Lecture 58 - Introduction to UDP
Lecture 59 - Exploring UDP on Cisco Packet Tracer
Lecture 60 - TCP Connection Establishment
Lecture 61 - TCP Connection Closure
Lecture 62 - Summay of TCP and UDP on Cisco Packet Tracer
Lecture 63 - The story of the delivery fiasco
Lecture 64 - From delivery fisaco to Port Numbers
Lecture 65 - Application Layer in depth
Lecture 66 - Port number in Wireshark
Lecture 67 - Summary of port number and PAT
Lecture 68 - Summary of the entire TCP IP stack

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Lecture 69 - Introducing the analogy for week 4
Lecture 70 - The secret box
Lecture 71 - Questions on analogy for week 4
Lecture 72 - Secret of the secret box
Lecture 73 - From secret box to encryption
Lecture 74 - Introduction to security and CIA
Lecture 75 - Information Security and Defence in Depth
Lecture 76 - Information Classification and Access Control
Lecture 77 - Process Management
Lecture 78 - Introduction to Network Security
Lecture 79 - Network Breach and Countermeasures
Lecture 80 - Internet Security
Lecture 81 - Securing the Internet Usage
Lecture 82 - Internet Security Products
Lecture 83 - Personal Computing Device Recommendations
Lecture 84 - Responsible Behavior on the Internet
Lecture 85 - Best practices for home Network and Media Devices
Lecture 86 - Closing thoughts on security
Lecture 87 - The story of a family trip
Lecture 88 - The troubleshooting approach
Lecture 89 - Troubleshooting Physical and Data Link Layers
Lecture 90 - Troubleshooting Network Layer
Lecture 91 - Troubleshooting Transport and Application Layers
Lecture 92 - Troubleshooting Summary
Lecture 93 - Troubleshooting Heuristics
Lecture 94 - Troubleshooting Challenge - 1
Lecture 95 - Troubleshooting challenge - 2
Lecture 96 - Troubleshooting Challenge - 3
Lecture 97 - Thats How we Troubleshoot
Lecture 98 - Week Summary
Lecture 99 - Course Closure
Lecture 100 - Course Credits

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NPTEL Video Course - Multi Disciplinary - NOC:Learning Analytics Tools

Subject Co-ordinator - Prof. Ramkumar Rajendran

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro to Data Analytics. What is Learning Analytics?
Lecture 2 - Academic Analytics, and Educational Data Mining
Lecture 3 - Four Levels of Analytics
Lecture 4 - Four Levels of Learning Analytics Overview - II
Lecture 5 - Data Collection from Different learning environment
Lecture 6 - Data collection in TELE
Lecture 7 - Data Preprocessing
Lecture 8 - Ethics in Learning Analytics, Student Privacy
Lecture 9 - Demo of Weka
Lecture 10 - Introduction to Machine Learning - Part 1
Lecture 11 - Introduction to Machine Learning - Part 2
Lecture 12 - Training and testing data
Lecture 13 - Performance Metrics - I
Lecture 14 - Performance Metrics - II
Lecture 15 - Performance Metrics - III
Lecture 16 - Demo of Orange
Lecture 17 - Descriptive Analytics - I
Lecture 18 - Descriptive Analytics - II
Lecture 19 - Charts - I
Lecture 20 - Charts - II
Lecture 21 - Charts - III
Lecture 22 - Comparing Charts
Lecture 23 - Descriptive Analytics â Example I
Lecture 24 - Descriptive Analytics â Example II
Lecture 25 - Excel tool
Lecture 26 - Diagnostics Analytics
Lecture 27 - Correlation
Lecture 28 - Correlation Matrix
Lecture 29 - Spearmanâ s Rank Correlation

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Lecture 30 - Data Mining
Lecture 31 - iSAT
Lecture 32 - Diagnostic Analytics - SPM
Lecture 33 - Sequential pattern mining (SPM-II)
Lecture 34 - Differential Sequence Mining (DSM)
Lecture 35 - Process Mining
Lecture 36 - Diagnostic Analytics - Clustering
Lecture 37 - K-means Clustering
Lecture 38 - Hierarchical Clustering
Lecture 39 - Clustering - Examples
Lecture 40 - Predictive Analytics
Lecture 41 - Linear Regression
Lecture 42 - Multiple Regression
Lecture 43 - Logistic Regression
Lecture 44 - Linear Regression - Example
Lecture 45 - Predictive Analytics - II
Lecture 46 - Naive Bayes Classifier
Lecture 47 - Decision Tree
Lecture 48 - Decision Tree Classifier
Lecture 49 - DT, NB - Examples
Lecture 50 - Text Analytics
Lecture 51 - Introduction to NLP
Lecture 52 - NLP-II
Lecture 53 - NLP-Tools
Lecture 54 - NLP-Examples
Lecture 55 - Intro Multimodal Learning Analytics
Lecture 56 - Affective Computing - 1
Lecture 57 - Affective Computing - 2
Lecture 58 - Eye Tracking
Lecture 59 - Revision of Learning Analytics tools course
Lecture 60 - Source of Data collection and Research Community
Lecture 61 - Machine Learning tools used in industry

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NPTEL Video Course - Computer Science and Engineering - NOC:Design and Engineering of Computer Systems

Subject Co-ordinator - Prof. Mythili Vutukuru

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computer Systems
Lecture 2 - Principles of Computer Systems Design
Lecture 3 - Overview of CPU hardware
Lecture 4 - Overview of memory and I/O hardware
Lecture 5 - Introduction to Operating Systems
Lecture 6 - Week 1: Tutorial 1
Lecture 7 - Week 1: Tutorial 2
Lecture 8 - Processes
Lecture 9 - Kernel mode execution
Lecture 10 - Threads
Lecture 11 - CPU scheduling policies
Lecture 12 - Virtual machines and containers
Lecture 13 - Week 2: Tutorial 1
Lecture 14 - Week 2: Tutorial 2
Lecture 15 - Week 2: Tutorial 3
Lecture 16 - Memory management in OS
Lecture 17 - Paging
Lecture 18 - Demand paging
Lecture 19 - File system and memory
Lecture 20 - Optimizing memory access
Lecture 21 - Week 3: Tutorial 1
Lecture 22 - Week 3: Tutorial 2
Lecture 23 - Week 3: Tutorial 3
Lecture 24 - Filesystem Datastructures
Lecture 25 - Filesystem Implementation
Lecture 26 - Network I/O via Sockets
Lecture 27 - Network I/O Implementation
Lecture 28 - Memory and I/O virtualization
Lecture 29 - Week 4: Tutorial 1

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Lecture 30 - Week 4: Tutorial 2
Lecture 31 - Introduction to computer networking
Lecture 32 - Internet Routing and Forwarding
Lecture 33 - Transport protocols
Lecture 34 - Application layer protocols
Lecture 35 - Network Security
Lecture 36 - Week 5: Tutorial 1
Lecture 37 - Week 5: Tutorial 2
Lecture 38 - Multithreaded application design
Lecture 39 - Inter-process communication
Lecture 40 - Multi-tier application design
Lecture 41 - Examples of end-to-end systems design
Lecture 42 - Deployment of computer systems
Lecture 43 - Week 6: Tutorial 1
Lecture 44 - Week 6: Tutorial 2
Lecture 45 - Performance measurement
Lecture 46 - Performance analysis
Lecture 47 - Performance profiling and optimization
Lecture 48 - Caching
Lecture 49 - Performance scalability
Lecture 50 - Week 7: Tutorial 1
Lecture 51 - Fault tolerance and reliability
Lecture 52 - Replication and consistency
Lecture 53 - Atomicity
Lecture 54 - Distributed transactions
Lecture 55 - Case studies of distributed systems design

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NPTEL Video Course - Computer Science and Engineering - NOC:Software Conceptual Design

Subject Co-ordinator - Prof. Sridhar Iyer, Prof. Prajish Prasad, Prof. T. G. Lakshmi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
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Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
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Lecture 25

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Game Theory and Mechanism Design

Subject Co-ordinator - Prof. Swaprava Nath

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Game Theory
Lecture 2 - Introduction: Mechanism Design
Lecture 3 - The game of chess
Lecture 4 - Proof of the chess theorem
Lecture 5 - Normal form games
Lecture 6 - Dominance
Lecture 7 - Nash equilibrium
Lecture 8 - Maxmin strategies
Lecture 9 - Elimination of dominated strategies
Lecture 10 - Preservation of PSNE
Lecture 11 - Matrix games
Lecture 12 - Relation between Maxmin and PSNE in matrix
Lecture 13 - Mixed strategies
Lecture 14 - Mixed strategy Nash equilibrium (MSNE)
Lecture 15 - Find MSNE
Lecture 16 - MSNE characterization theorem proof
Lecture 17 - Algorithm to find MSNE
Lecture 18 - Correlated equilibrium (CE)
Lecture 19 - Computing correlated equilibrium
Lecture 20 - Extensive form games
Lecture 21 - Subgame perfection
Lecture 22 - Limitations of SPNE
Lecture 23 - Imperfect Information Extensive Form Games (IIEFG)
Lecture 24 - Strategies in IIEFGs
Lecture 25 - Equivalence of Strategies in IIEFGs
Lecture 26 - Perfect Recall
Lecture 27 - Equilibrium in IIEFG
Lecture 28 - Game Theory in Practice: P2P file sharing
Lecture 29 - Bayesian Games

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Lecture 30 - Strategy, Utility in Bayesian Games
Lecture 31 - Equilibrium in Bayesian Games
Lecture 32 - Examples of Bayesian Equilibrium
Lecture 33 - Introduction to Mechanism Design
Lecture 34 - Revelation Principle
Lecture 35 - Introduction to Arrow's Impossibility Result
Lecture 36 - Proof of Arrow's Result
Lecture 37 - Introduction to the Social Choice Setup
Lecture 38 - Introduction to Gibbard-Satterthwaite Theorem
Lecture 39 - Proof of Gibbard-Satterthwaite Theorem
Lecture 40 - Domain Restriction
Lecture 41 - Median Voting Rule
Lecture 42 - Median Voter Theorem - Part 1
Lecture 43 - Median Voter Theorem - Part 2
Lecture 44 - The Task Sharing Domain
Lecture 45 - The Uniform Rule
Lecture 46 - Mechanism Design with Transfers
Lecture 47 - Examples of Quasi-linear Preferences
Lecture 48 - Pareto Optimality and Groves Payments
Lecture 49 - Introduction to VCG Mechanism
Lecture 50 - VCG in Combinatorial Allocations
Lecture 51 - Applications to Internet Advertising
Lecture 52 - Slot Allocation and Payments in Position
Lecture 53 - Pros and Cons of VCG Mechanism
Lecture 54 - Affine Maximizers
Lecture 55 - Single Object Allocation
Lecture 56 - Myerson's Lemma
Lecture 57 - Illustration of Myerson's Lemma
Lecture 58 - Optimal Mechanism Design
Lecture 59 - Single Agent Optimal Mechanism Design
Lecture 60 - Multiple Agent Optimal Mechanism Design
Lecture 61 - Examples of Optimal Mechanisms
Lecture 62 - Endnotes and Summary

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Computer and Network Performance

Subject Co-ordinator - Prof. Varsha Apte

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, why do delays happen, contention for resources
Lecture 2 - Performance metrics and parameters
Lecture 3 - Introducing Queuing Systems
Lecture 4 - Memoryless Distributions
Lecture 5 - Operational Laws
Lecture 6 - Asymptotic Analysis of G/G/1, G/G/1/K queues
Lecture 7 - Asymptotic Analysis of G/G/c/K queues
Lecture 8 - Little's Law
Lecture 9 - Littleâ s Law examples and A Case Study of Open Load test on a Web server
Lecture 10 - Some results for M/G/1 queue and Memoryless Arrivals
Lecture 11 - Continuing the Case Study of Open Load test on a web server (Response Time)
Lecture 12 - Open queuing networks - tandem queuing network
Lecture 13 - Open queuing networks - general (Jackson) queuing networks
Lecture 14 - Open queuing networks - examples
Lecture 15 - Closed Queuing Systems
Lecture 16 - Closed Queuing System (Continued...)
Lecture 17 - Case study of Closed Load Test on a Web Server
Lecture 18 - General formulation of Jacksonian Closed Queuing Networks
Lecture 19 - Mean Value Analysis for Closed Queuing Networks
Lecture 20 - Mean Value Analysis examples,Case Study of a Load test on a web server,Closing Remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Games and Information

Subject Co-ordinator - Prof. Ankur A. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, why do delays happen, contention for resources
Lecture 2 - Performance metrics and parameters
Lecture 3 - Introducing Queuing Systems
Lecture 4 - Memoryless Distributions
Lecture 5 - Operational Laws
Lecture 6 - Aumann model of incomplete information: Definition and Examples
Lecture 7 - Knowledge operator: Definition and Examples
Lecture 8 - Common knowledge: Definition and Examples
Lecture 9 - The structural theorem of common knowledge
Lecture 10 - Proof of the structural theorem (forward direction)
Lecture 11 - Proof of the structural theorem (backward direction)
Lecture 12 - Aumann model of incomplete information with belief: Definition and Examples
Lecture 13 - Aumann's agreement theorem
Lecture 14 - Zero-sum game definition and Security strategies
Lecture 15 - Saddle point strategies
Lecture 16 - Further properties of saddle point strategies
Lecture 17 - Mixed strategies
Lecture 18 - Weirstrass lemma and existence of a mixed saddle point strategy
Lecture 19 - Von Nuenmann minmax theorem
Lecture 20 - Computing mixed saddle point startegy: Holmes and Moriarty
Lecture 21 - Computing mixed strategy saddle point: 2X2 matrix game
Lecture 22 - Computing mixed strategy saddle point: 2X3 matrix game
Lecture 23 - Nash equilibrium of a non zero-sum game and its relation with Kakutani fixed
Lecture 24 - Proof: Existence of Nash equilibrium (Condition 1 of Kakutani fixed point)
Lecture 25 - Proof: Existence of Nash equilibrium (Condition 2 of Kakutani fixed point)
Lecture 26 - Existence of Nash equilibrium for infinite strategy space (Using Brower's)
Lecture 27 - Quantal Response: Motivation
Lecture 28 - Quantal Response: Formal model
Lecture 29 - Dynamic games definiton

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Lecture 30 - Solution concept in dynamic games
Lecture 31 - Relation of the heuristic solution with the Nash equilibrium of the standard
Lecture 32 - Example of a Threat equilibrium
Lecture 33 - Interpreting the threat equilibrium in standard normal form of the dynamic game
Lecture 34 - Extensive form games - I
Lecture 35 - Extensive form games - II
Lecture 36 - Single Act Games
Lecture 37 - Informationally inferior games
Lecture 38 - Information Structure in Single Act Games
Lecture 39 - Nested and Ladder Nested Extensive form games
Lecture 40 - Equilibrium Algorithm
Lecture 41 - Stage-wise multi act games
Lecture 42 - Feedback equilibrium
Lecture 43 - Mixed and Behavioral Strategies
Lecture 44 - Conditions for equivalence for mixed and behavioral strategies
Lecture 45 - Kuhn's Theorem - I
Lecture 46 - Kuhn's Theorem - II
Lecture 47 - Kuhn's Theorem - III
Lecture 48 - Games of incomplete information
Lecture 49 - Bayesian Nash equilibrium - I
Lecture 50 - Bayesian Nash equilibrium - II
Lecture 51 - Self-enforcement of Nash equilibrium
Lecture 52 - Stackelberg game
Lecture 53 - Principal-Agent Models - I
Lecture 54 - Principal-Agent Models - II
Lecture 55 - Moral Hazard and Adverse selection
Lecture 56 - Games with contracts
Lecture 57 - Correlated Equilibrium - I
Lecture 58 - Correlated Equilibrium - II
Lecture 59 - Correlated Equilibrium - III
Lecture 60 - Bayesian Game with mediated communication
Lecture 61 - Revelation Principle

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NPTEL Video Course - Computer Science and Engineering - NOC:Distributed Optimization and Machine Learning

Subject Co-ordinator - Prof. Mayank Baranwal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to optimization
Lecture 2 - Analyzing optimization algorithms in continuous time domain
Lecture 3 - Course Outline
Lecture 4 - Basics of optimization problems
Lecture 5 - Convex sets and Convex functions
Lecture 6 - Strictly and strongly convex functions
Lecture 7 - Implications of strong convexity
Lecture 8 - Primal and dual optimization problems
Lecture 9 - Slaters condition
Lecture 10 - Analysis of gradient descent algorithm
Lecture 11 - KKT conditions
Lecture 12 - Acceleration under strong convexity
Lecture 13 - Accelerate the convergence even further
Lecture 14 - Stability theory
Lecture 15 - Connections to optimization problems
Lecture 16 - Exponential stability
Lecture 17 - Bregman Divergance
Lecture 18 - Rescaled Gradient Flow
Lecture 19 - Advanced Results on PL inequality - Part 1
Lecture 20 - Advanced Results on PL inequality - Part 2
Lecture 21 - Constrained Optimization Problem
Lecture 22 - Augmented Lagrangian
Lecture 23 - Method of Multipliers
Lecture 24 - Dual Ascent and Dual Decomposition
Lecture 25 - ADMM Algorithm
Lecture 26 - Basics of Graph Theory - 1
Lecture 27 - Basics of Graph Theory - 2
Lecture 28 - Consensus and Average Consensus - 1
Lecture 29 - Consensus and Average Consensus - 2

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Lecture 30 - Consensus Algorithms
Lecture 31 - Consensus Algorithms - Fixed time
Lecture 32 - Distributed Economic Dispatch Problem
Lecture 33 - Algorithm for Uncapacitated EDP
Lecture 34 - Capacitated EDP
Lecture 35 - Algorithms for Distributed Optimization - 1
Lecture 36 - Algorithms for Distributed Optimization - 2
Lecture 37 - Continuous-time Distributed Optimization Algorithms
Lecture 38 - Introduction to Neural Networks
Lecture 39 - Large Scale Machine Learning
Lecture 40 - Decentralized Stochastic Gradient Descent - 1
Lecture 41 - Decentralized Stochastic Gradient Descent - 2
Lecture 42 - Introduction to Federated Learning
Lecture 43 - FedAvg Algorithm
Lecture 44 - Convergence Analysis of FL
Lecture 45 - Sources of Computational Heterogenity in FL
Lecture 46 - Objective Inconsistency Problem
Lecture 47 - General Update Rule

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NPTEL Video Course - Computer Science and Engineering - NOC:Time Series Modelling and Forecasting with Applic

Subject Co-ordinator - Prof. Sudeep Bapat

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Time series introduction
Lecture 2 - Examples of time series data
Lecture 3 - Stationarity in time series
Lecture 4 - Weak vs.strong stationarity
Lecture 5 - Practical session in R-1
Lecture 6 - Time Series Decomposition
Lecture 7 - Basic Time Series Processes
Lecture 8 - Autocorrelation and the Partial Autocorrelation Functions
Lecture 9 - ACF and PACF for Some Time Series Processes
Lecture 10 - Practical Session in R-2
Lecture 11 - Non-Stationary Time Series
Lecture 12 - Seasonality and its Features
Lecture 13 - Cyclicality and Test for Stationarity
Lecture 14 - Seasonality and SARIMA Model
Lecture 15 - Practical Session in R-3
Lecture 16 - Model Identification
Lecture 17 - Model Estimation
Lecture 18 - Diagnostic Checking - 1
Lecture 19 - Diagnostic Checking - 2
Lecture 20 - Practical Session in R-4
Lecture 21 - Forecasting Basics
Lecture 22 - Measuring Forecast Accuracy
Lecture 23 - Smoothing Techniques (SMA,EMA)
Lecture 24 - Double and Triple Exponential Smoothing
Lecture 25 - Practical Session in R-5
Lecture 26 - Persistent and Long- Memory Processes : Examples and Implications
Lecture 27 - ARFIMA Processes
Lecture 28 - Hurst Exponent - Estimation under ARFIMA
Lecture 29 - Estimation under ARFIMA

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Lecture 30 - Practical Session in R-6
Lecture 31 - Multivariate Time Series Analysis: Examples and Motivation
Lecture 32 - Cross-covariance and Cross-correlation
Lecture 33 - Some Specific Multivariate Time Series Models
Lecture 34 - Further Extensions and Use Cases
Lecture 35 - Practical Session in R-7
Lecture 36 - Cointegration and Further
Lecture 37 - Error Correction Models
Lecture 38 - Tests for Cointegration
Lecture 39 - Testing for Causality
Lecture 40 - Practical Session in R-8
Lecture 41 - Frequency Domain Analysis
Lecture 42 - Spectral Representation of a Series
Lecture 43 - Spectral Density Estimation
Lecture 44 - Numerical Examples and Further
Lecture 45 - Practical Session in R-9
Lecture 46 - Stochastic Volatility Modelling
Lecture 47 - ARCH Models
Lecture 48 - ARCH LM Test and GARCH Models
Lecture 49 - GARCH Model Extensions
Lecture 50 - Practical Session in R-10
Lecture 51 - Nonlinear Time Series Models
Lecture 52 - Regimes and Nonlinear Models
Lecture 53 - Nonlinear Model Extensions
Lecture 54 - Markov Switching Models
Lecture 55 - Practical Session in R-11
Lecture 56 - Machine Learning in Time Series
Lecture 57 - Linear Regression for Time Series and Beyond
Lecture 58 - Other Machine Learning Models for Time Series
Lecture 59 - Neural Networks for Time Series
Lecture 60 - Practical Session in R-12

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NPTEL Video Course - Computer Science and Engineering - Computational Geometry

Subject Co-ordinator - Prof. Sandeep Sen

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Visibility Problems
Lecture 3 - 2D Maxima
Lecture 4 - Line Sweep Method
Lecture 5 - Segment Intersection Problem
Lecture 6 - Line Sweep
Lecture 7 - Convex Hull
Lecture 8 - Convex Hull Contd
Lecture 9 - Quick Hull
Lecture 10 - More Convex Hull Algorithms
Lecture 11 - Intersection of Half Planes and Duality
Lecture 12 - Intersection of Half Planes and Duality Contd
Lecture 13 - Lower Bounds
Lecture 14 - Planar Point Location
Lecture 15 - Point Location and Triangulation Contd...
Lecture 16 - Triangulation of Arbitrary Polygon
Lecture 17 - Voronoi Diagram
Lecture 18 - Voronoi Diagram Construction
Lecture 19 - Delaunay Triangulation
Lecture 20 - Quick sort and Backward Analysis
Lecture 21 - Generalized RIC
Lecture 22 - RIC Continued
Lecture 23 - Arrangements
Lecture 24 - Zone Theorem and Application
Lecture 25 - Levels
Lecture 26 - Range Searching
Lecture 27 - Orthogonal Range searching
Lecture 28 - Priority Search Trees
Lecture 29 - Non - Orthogonal Range Searching

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Lecture 30 - Half - Plane Range Query
Lecture 31 - Well Separated Partitioning
Lecture 32 - Quadtrees Epsilon -WSPD
Lecture 33 - Construction of Epsilon - WSPD
Lecture 34 - Epsilon - WSPD to Geometric Spanner
Lecture 35 - Epsilon-Nets & VC Dimension
Lecture 36 - Epsilon-Nets & VC Dimension contd
Lecture 37 - Geometric Set Cover
Lecture 38 - Geometric Set Cover (with Bounded VC Dimension)
Lecture 39 - Shape Representation
Lecture 40 - Shape Comparison

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NPTEL Video Course - Computer Science and Engineering - Logic for CS

Subject Co-ordinator - Prof. S. Arun Kumar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Propositional Logic Syntax
Lecture 3 - Semantics of Propositional Logic
Lecture 4 - Logical and Algebraic Concepts
Lecture 5 - Identities and Normal forms
Lecture 6 - Tautology Checking
Lecture 7 - Propositional Unsatisfiability
Lecture 8 - Analytic Tableaux
Lecture 9 - Consistency and Completeness
Lecture 10 - The Completeness Theorem
Lecture 11 - Maximally Consistent Sets
Lecture 12 - Formal Theories
Lecture 13 - Proof Theory
Lecture 14 - Derived Rules
Lecture 15 - The Hilbert System
Lecture 16 - The Hilbert System
Lecture 17 - Introduction to Predicate Logic
Lecture 18 - The Semantic of Predicate Logic
Lecture 19 - Subsitutions
Lecture 20 - Models
Lecture 21 - Structures and Substructures
Lecture 22 - First-Order Theories
Lecture 23 - Predicate Logic
Lecture 24 - Existential Quantification
Lecture 25 - Normal Forms
Lecture 26 - Skalemization
Lecture 27 - Substitutions and Instantiations
Lecture 28 - Unification
Lecture 29 - Resolution in FOL

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Lecture 30 - More on Resolution in FOL
Lecture 31 - Resolution
Lecture 32 - Resolution and Tableaux
Lecture 33 - Completeness of Tableaux Method
Lecture 34 - Completeness of the Hilbert System
Lecture 35 - First-Order Theories
Lecture 36 - Towards Logic Programming
Lecture 37 - Verification of Imperative Programs
Lecture 38 - Verification of WHILE Programs
Lecture 39 - References

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NPTEL Video Course - Computer Science and Engineering - Computer Architecture (Prof. Anshul Kumar)

Subject Co-ordinator - Prof. Anshul Kumar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computer Architecture
Lecture 2 - History of Computers
Lecture 3 - Instruction Set Architecture - I
Lecture 4 - Instruction Set Architecture - II
Lecture 5 - Instruction Set Architecture - III
Lecture 6 - Recursive Programs
Lecture 7 - Architecture Space
Lecture 8 - Architecture Examples
Lecture 9 - Performance
Lecture 10 - Performance
Lecture 11 - Binary Arithmetic, ALU Design
Lecture 12 - ALU Design, Overflow
Lecture 13 - Multiplier Design
Lecture 14 - Divider Design
Lecture 15 - Fast Addition , Multiplication
Lecture 16 - Floating Point Arithmetic
Lecture 17 - Processor Design - Introduction
Lecture 18 - Processor Design
Lecture 19 - Processor Design - Simple Design
Lecture 20 - Processor Design - Multi Cycle Approach
Lecture 21 - Processor Design - Control for Multi Cycle
Lecture 22 - Processor Design - Micro programmed Control
Lecture 23 - Processor Design - Exception Handling
Lecture 24 - Pipelined Processor Design Basic Idea
Lecture 25 - Pipelined Processor Design
Lecture 26 - Pipelined Processor Design
Lecture 27 - Pipelined Processor Design
Lecture 28 - Memory Hierarchy
Lecture 29 - Memory Hierarchy

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Lecture 30 - Memory Hierarchy
Lecture 31 - Memory Hierarchy
Lecture 32 - Memory Hierarchy
Lecture 33 - Input / Output Subsystem
Lecture 34 - Input / Output Subsystem
Lecture 35 - Input / Output Subsystem
Lecture 36 - Input / Output Subsystem
Lecture 37 - Input / Output Subsystem
Lecture 38 - Concluding Remarks

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NPTEL Video Course - Computer Science and Engineering - Data Structures And Algorithms

Subject Co-ordinator - Prof. Naveen Garg

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Data Structures and Algorithms
Lecture 2 - Stacks
Lecture 3 - Queues and Linked Lists
Lecture 4 - Dictionaries
Lecture 5 - Hashing
Lecture 6 - Trees
Lecture 7 - Tree Walks / Traversals
Lecture 8 - Ordered Dictionaries
Lecture 9 - Deletion
Lecture 10 - Quick Sort
Lecture 11 - AVL Trees
Lecture 12 - AVL Trees
Lecture 13 - Trees
Lecture 14 - Red Black Trees
Lecture 15 - Insertion in Red Black Trees
Lecture 16 - Disk Based Data Structures
Lecture 17 - Case Study
Lecture 18 - Tries
Lecture 19 - Data Compression
Lecture 20 - Priority Queues
Lecture 21 - Binary Heaps
Lecture 22 - Why Sorting
Lecture 23 - More Sorting
Lecture 24 - Graphs
Lecture 25 - Data Structures for Graphs
Lecture 26 - Two Applications of Breadth First Search
Lecture 27 - Depth First Search
Lecture 28 - Applications of DFS
Lecture 29 - DFS in Directed Graphs

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Lecture 30 - Applications of DFS in Directed Graphs
Lecture 31 - Minimum Spanning Trees
Lecture 32 - The Union
Lecture 33 - Prims Algorithm for Minimum Spanning Trees
Lecture 34 - Single Source Shortest Paths
Lecture 35 - Correctness of Dijkstras Algorithm
Lecture 36 - Single Source Shortest Paths

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NPTEL Video Course - Computer Science and Engineering - Introduction to Computer Graphics

Subject Co-ordinator - Prof. Prem K Kalra

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Raster Graphics
Lecture 3 - Raster Graphics (Continued...)
Lecture 4 - Clipping
Lecture 5 - Polygon Clipping and Polygon Scan Conversion
Lecture 6 - Transformations
Lecture 7 - Transformations (Continued...)
Lecture 8 - 3D Viewing
Lecture 9 - 3D Viewing (Continued...)
Lecture 10 - Curves
Lecture 11 - Assignment - I
Lecture 12 - Curves (Continued...)
Lecture 13 - Curves (Continued...)
Lecture 14 - Curves (Continued...)
Lecture 15 - Curves (Continued...)
Lecture 16 - Surfaces
Lecture 17 - Surfaces (Continued...)
Lecture 18 - Surfaces (Continued...)
Lecture 19 - Surfaces (Continued...)
Lecture 20 - Hierarchical Models
Lecture 21 - Rendering
Lecture 22 - Rendering (Continued...)
Lecture 23 - Rendering (Continued...)
Lecture 24 - Ray Tracing
Lecture 25 - Ray Tracing (Continued...)
Lecture 26 - Ray Tracing (Continued...)
Lecture 27 - Assignment
Lecture 28 - Hidden Surface Elimination
Lecture 29 - Hidden Surface Elimination (Continued...)

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Lecture 30 - Hidden Surface Elimination (Continued...)
Lecture 31 - Fractals
Lecture 32 - Fractals (Continued...)
Lecture 33 - Computer Animation
Lecture 34 - Animation (Continued...)
Lecture 35 - Animation (Continued...)

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NPTEL Video Course - Computer Science and Engineering - Principles of Programming Languages

Subject Co-ordinator - Prof. S. Arun Kumar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Syntax
Lecture 3 - Grammars
Lecture 4 - Ambiguity
Lecture 5 - PLO
Lecture 6 - Semantics
Lecture 7 - Syntactic Classes
Lecture 8 - Transition Systems
Lecture 9 - PL0
Lecture 10 - Binding
Lecture 11 - Environments
Lecture 12 - Declarations
Lecture 13 - Commands
Lecture 14 - Stores
Lecture 15 - Summary
Lecture 16 - Declarations and Commands
Lecture 17 - Blocks
Lecture 18 - Qualification
Lecture 19 - Pragmatics
Lecture 20 - Data
Lecture 21 - Structured Data
Lecture 22 - Sequences
Lecture 23 - Control
Lecture 24 - Non-Determinacy
Lecture 25 - Programming Languages
Lecture 26 - Programming Languages
Lecture 27 - Programming Languages
Lecture 28 - Data as Functions
Lecture 29 - Data and Fixpoints

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Lecture 30 - Normal Forms
Lecture 31 - Programming Languages
Lecture 32 - Monomorphism
Lecture 33 - Polymorphism
Lecture 34 - Type Checking
Lecture 35 - Contexts
Lecture 36 - Abstracts
Lecture 37 - Procedures
Lecture 38 - Meanings
Lecture 39 - Parameters
Lecture 40 - The Future

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NPTEL Video Course - Computer Science and Engineering - Parallel Computing

Subject Co-ordinator - Dr. Subodh Kumar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Parallel Programming Paradigms
Lecture 3 - Parallel Architecture
Lecture 4 - Parallel Architecture (case studies)
Lecture 5 - Open MP
Lecture 6 - Open MP (Continued.)
Lecture 7 - Open MP (Continued..)
Lecture 8 - Open MP & PRAM Model of Computation
Lecture 9 - PRAM
Lecture 10 - Models of Parallel Computation, Complexity
Lecture 11 - Memory Consistency
Lecture 12 - Memory Consistency & Performance Issues
Lecture 13 - Parallel Program Design
Lecture 14 - Shared Memory & Message Passing
Lecture 15 - MPI
Lecture 16 - MPI (Continued.)
Lecture 17 - MPI (Continued..)
Lecture 18 - Algorithmic Techniques
Lecture 19 - Algorithmic Techniques (Continued.)
Lecture 20 - Algorithmic Techniques (Continued..)
Lecture 21 - CUDA
Lecture 22 - CUDA (Continued.)
Lecture 23 - CUDA (Continued..)
Lecture 24 - CUDA (Continued...)
Lecture 25 - CUDA (Continued....)
Lecture 26 - CUDA (Continued.....)
Lecture 27 - CUDA (Continued......)
Lecture 28 - Algorithms, Merging & Sorting
Lecture 29 - Algorithms, Merging & Sorting (Continued.)

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Lecture 30 - Algorithms, Merging & Sorting (Continued..)
Lecture 31 - Algorithms, Merging & Sorting (Continued...)
Lecture 32 - Algorithms, Merging & Sorting (Continued....)
Lecture 33 - Lower Bounds Lock Free Synchronization, Load Stealing
Lecture 34 - Lock Free Synchronization, Graph Algorithms

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NPTEL Video Course - Computer Science and Engineering - Operating Systems

Subject Co-ordinator - Prof. Sorav Bansal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductio to UNIX System Calls - Part 1
Lecture 2 - Introductio to UNIX System Calls - Part 2
Lecture 3 - Threads, Address Spaces, Filesystem Devices
Lecture 4 - PC Architecture
Lecture 5 - x86 Instruction Set, GCC Calling Conventions
Lecture 6 - Physical Memory Map, I/O, Segmentation
Lecture 7 - Segmentation, Trap Handling
Lecture 8 - Traps, Trap Handlers
Lecture 9 - Kernel Data Structures, Memory Management
Lecture 10 - Segmentation Review, Introduction to Paging
Lecture 11 - Paging
Lecture 12 - Process Address Spaces Using Paging
Lecture 13 - Translation Lookaside Buffer, Large Pages, Boot Sector
Lecture 14 - Loading the kernel, Initializing the Page table
Lecture 15 - Setting up page tables for user processes
Lecture 16 - Processes in action
Lecture 17 - Process structure, Context Switching
Lecture 18 - Process Kernel stack, Scheduler, Fork,Context-Switch, Process Control Block, Trap Entry and Retu
Lecture 19 - Creating the first process
Lecture 20 - Handling User Pointers, Concurrency
Lecture 21 - Locking
Lecture 22 - Fine-grained Locking and its challenges
Lecture 23 - Locking variations
Lecture 24 - Condition variables
Lecture 25 - Multiple producer, multiple consumer queue; semaphores; monitors
Lecture 26 - Transcations and lock-free primitives read/write locks
Lecture 27 - Synchronization in xv6
Lecture 28 - More synchronization in xv6
Lecture 29 - Demand Paging; Introduction to Page Replacement

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Lecture 30 - Page Replacement, Thrashing
Lecture 31 - Storage Devices, Filesystem Intrerfaces
Lecture 32 - File System Implementation
Lecture 33 - File System Operation
Lecture 34 - Cash Recovery and Logging
Lecture 35 - Logging in Linux ext3 filesystem
Lecture 36 - Protection and Security
Lecture 37 - Scheduling Policies
Lecture 38 - Lock-free multiprocessor coordination, Read-Copy-Update
Lecture 39 - Microkernel, Exokernel, Multikernel
Lecture 40 - Virtualization, Cloud Computing, Technology Trends

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Architecture (2017)

Subject Co-ordinator - Prof. Smruti R.Sarangi

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computer Architecture
Lecture 2 - The Language of Bits - Part-I
Lecture 3 - The Language of Bits - Part-II
Lecture 4 - The Language of Bits - Part-III
Lecture 5 - Assembly Language - Part-I
Lecture 6 - Assembly Language - Part-II
Lecture 7 - Assembly Language - Part-III
Lecture 8 - ARM Assembly Language - Part-I
Lecture 9 - ARM Assembly Language - Part-II
Lecture 10 - x86 Assembly Language - Part-I
Lecture 11 - x86 Assembly Language - Part-II
Lecture 12 - x86 Assembly Language - Part-III
Lecture 13 - x86 Assembly Language - Part-IV
Lecture 14 - A Primer on Digital Logic - Part-I
Lecture 15 - A Primer on Digital Logic - Part-II
Lecture 16 - A Primer on Digital Logic - Part-III
Lecture 17 - Computer Arithmetic - Part-I
Lecture 18 - Computer Arithmetic - Part-II
Lecture 19 - Computer Arithmetic - Part-III
Lecture 20 - Computer Arithmetic - Part-IV
Lecture 21 - Computer Arithmetic - Part-V
Lecture 22 - Computer Arithmetic - Part-VI
Lecture 23 - Processor Design - Part-I
Lecture 24 - Processor Design - Part-II
Lecture 25 - Processor Design - Part-III
Lecture 26 - Principles of Pipelining - Part-I
Lecture 27 - Principles of Pipelining - Part-II
Lecture 28 - Principles of Pipelining - Part-III
Lecture 29 - Principles of Pipelining - Part-IV

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Lecture 30 - The Memory Systems - Part-I
Lecture 31 - The Memory Systems - Part-II
Lecture 32 - The Memory Systems - Part-III
Lecture 33 - The Memory Systems - Part-IV

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Parallel Programming in OpenMP

Subject Co-ordinator - Dr. Yogish Sabharwal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Parallel Programming
Lecture 2 - Parallel Architectures and Programming Models
Lecture 3 - Pipelining
Lecture 4 - Superpipelining and VLIW
Lecture 5 - Memory Latency
Lecture 6 - Cache and Temporal Locality
Lecture 7 - Cache, Memory bandwidth and Spatial Locality
Lecture 8 - Intuition for Shared and Distributed Memory architectures
Lecture 9 - Shared and Distributed Memory architectures
Lecture 10 - Interconnection networks in Distributed Memory architectures
Lecture 11 - OpenMP: A parallel Hello World Program
Lecture 12 - Program with Single thread
Lecture 13 - Program Memory with Multiple threads and Multi-tasking
Lecture 14 - Context Switching
Lecture 15 - OpenMP: Basic thread functions
Lecture 16 - OpenMP: About OpenMP
Lecture 17 - Shared Memory Consistency Models and the Sequential Consistency Model
Lecture 18 - Race Conditions
Lecture 19 - OpenMP: Scoping variables and some race conditions
Lecture 20 - OpenMP: thread private variables and more constructs
Lecture 21 - Computing sum: first attempt at parallelization
Lecture 22 - Manual distribution of work and critical sections
Lecture 23 - Distributing for loops and reduction
Lecture 24 - Vector-Vector operations (Dot product)
Lecture 25 - Matrix-Vector operations (Matrix-Vector Multiply)
Lecture 26 - Matrix-Matrix operations (Matrix-Matrix Multiply)
Lecture 27 - Introduction to tasks
Lecture 28 - Task queues and task execution
Lecture 29 - Accessing variables in tasks

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Lecture 30 - Completion of tasks and scoping variables in tasks
Lecture 31 - Recursive task spawning and pitfalls
Lecture 32 - Understanding LU Factorization
Lecture 33 - Parallel LU Factorization
Lecture 34 - Locks
Lecture 35 - Advanced Task handling
Lecture 36 - Matrix Multiplication using tasks
Lecture 37 - The OpenMP Shared Memory Consistency Model
Lecture 38 - Applications finite element method
Lecture 39 - Applications deep learning
Lecture 40 - Introduction to MPI and basic calls
Lecture 41 - MPI calls to send and receive data
Lecture 42 - MPI calls for broadcasting data
Lecture 43 - MPI non blocking calls
Lecture 44 - Application distributed histogram updation
Lecture 45 - MPI collectives and MPI broadcast
Lecture 46 - MPI gathering and scattering collectives
Lecture 47 - MPI reduction and alltoall collectives
Lecture 48 - Discussion on MPI collectives design
Lecture 49 - Characteriziation of interconnects
Lecture 50 - Linear arrays 2D mesh and torus
Lecture 51 - d dimensional torus
Lecture 52 - Hypercube
Lecture 53 - Trees and cliques
Lecture 54 - Hockney model
Lecture 55 - Broadcast and Reduce with recursive doubling
Lecture 56 - Scatter and Gather with recursive doubling
Lecture 57 - Reduce scatter and All gather with recursive doubling
Lecture 58 - Discussion of message sizes in analysis
Lecture 59 - Revisiting Reduce scatter on 2D mesh
Lecture 60 - Reduce scatter and Allreduce on the Hypercube
Lecture 61 - Alltoall on the Hypercube
Lecture 62 - Lower bounds
Lecture 63 - Pipeline based algorithm for Allreduce
Lecture 64 - An improved algorithm for Alltoall on the Hypercube using E-cube routing
Lecture 65 - Pipeline based algorithm for Broadcast
Lecture 66 - Introduction to parallel graph algorithms
Lecture 67 - Breadth First Search BFS using matrix algebra
Lecture 68 - BFS Shared memory parallelization using OpenMP

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Lecture 69 - Distributed memory settings and data distribution
Lecture 70 - Distributed BFS algorithm
Lecture 71 - Performance considerations
Lecture 72 - Prims Algorithm
Lecture 73 - OpenMP based shared memory parallelization for MST
Lecture 74 - MPI based distributed memory parallelization for MST
Lecture 75 - Sequential Algorithm Adaptation from Prims
Lecture 76 - Parallelization Strategy for Prims algorithm
Lecture 77 - Dry run with the parallel strategy
Lecture 78 - Johnsons algorithm with 1D data distribution
Lecture 79 - Speedup analysis on a grid graph
Lecture 80 - Floyds algorithm for all pair shortest paths
Lecture 81 - Floyds algorithm with 2D data distribution
Lecture 82 - Adaptation to transitive closures
Lecture 83 - Parallelization strategy for connected components
Lecture 84 - Analysis for parallel connected components

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NPTEL Video Course - Computer Science and Engineering - NOC:Synthesis of Digital Systems

Subject Co-ordinator - Prof. Preeti Ranjan Panda

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Outline - What is Synthesis?
Lecture 2 - Chip Design Flow and Hardware Modelling
Lecture 3 - VHDL
Lecture 4 - VHDL
Lecture 5 - VHDL
Lecture 6 - VHDL
Lecture 7 - Introduction to High-level Synthesis
Lecture 8 - Language front-end Design Representation
Lecture 9 - Compiler Transformation in High Level Synthesis
Lecture 10 - Memory Modelling and Compiler Transformation in High Level Synthesis
Lecture 11 - Compiler Transformations in High Level Synthesis
Lecture 12 - Hardware Transformations and ASAP / ALAP Scheduling
Lecture 13 - Scheduling in High Level Synthesis
Lecture 14 - Force Directed Scheduling and Register Allocation
Lecture 15 - High Level Synthesis and Timing Issues
Lecture 16 - Finite State Machine Synthesis
Lecture 17 - Finite State Machine Synthesis
Lecture 18 - The Retiming Problem
Lecture 19 - Efficient Solution to Retiming and Introduction to Logic Synthesis
Lecture 20 - Binary Decision Diagrams
Lecture 21 - Introduction to Logic Synthesis
Lecture 22 - Two-level Logic Optimisation
Lecture 23 - Multi-Level Logic Optimisation
Lecture 24 - Multi-level Logic Synthesis
Lecture 25 - Introduction to Timing Analysis
Lecture 26 - Timing Analysis and Critical Paths

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NPTEL Video Course - Computer Science and Engineering - NOC:An Introduction to Artificial Intelligence

Subject Co-ordinator - Prof. Mausam

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Introduction
Lecture 5 - Introduction
Lecture 6 - Introduction
Lecture 7 - Introduction
Lecture 8 - Introduction
Lecture 9 - Introduction
Lecture 10 - Uniform Search
Lecture 11 - Uniformed Search
Lecture 12 - Uniformed Search
Lecture 13 - Uniformed Search
Lecture 14 - Uniformed Search
Lecture 15 - Informed Search
Lecture 16 - Informed Search
Lecture 17 - Informed Search
Lecture 18 - Informed Search Proof of optimality of A* - Part 4
Lecture 19 - Informed Search
Lecture 20 - Informed Search
Lecture 21 - Informed Search
Lecture 22 - Local Search
Lecture 23 - Local Search
Lecture 24 - Local Search
Lecture 25 - Local Search
Lecture 26 - Local Search
Lecture 27 - Local Search
Lecture 28 - Local Search
Lecture 29 - Adversarial Search

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Lecture 30 - Adversarial Search
Lecture 31 - Adversarial Search
Lecture 32 - Adversarial Search
Lecture 33 - Adversarial Search
Lecture 34 - Adversarial Search
Lecture 35 - Adversarial Search
Lecture 36 - Constraint Satisfaction Problems
Lecture 37 - Constraint Satisfaction Problems
Lecture 38 - Constraint Satisfaction Problems
Lecture 39 - Constraint Satisfaction Problems
Lecture 40 - Constraint Satisfaction Problems
Lecture 41 - Constraint Satisfaction Problems
Lecture 42 - Logic in AI
Lecture 43 - Logic in AI
Lecture 44 - Logic in AI
Lecture 45 - Logic in AI
Lecture 46 - Logic in AI
Lecture 47 - Logic in AI
Lecture 48 - Logic in AI
Lecture 49 - Logic in AI
Lecture 50 - Uncertainty in AI
Lecture 51 - Uncertainty in AI
Lecture 52 - Uncertainty in AI
Lecture 53 - Bayesian Networks
Lecture 54 - Bayesian Networks
Lecture 55 - Bayesian Networks
Lecture 56 - Bayesian Networks
Lecture 57 - Bayesian Networks
Lecture 58 - Bayesian Networks
Lecture 59 - Bayesian Networks
Lecture 60 - Bayesian Networks
Lecture 61 - Bayesian Networks
Lecture 62 - Bayesian Networks
Lecture 63 - Bayesian Networks
Lecture 64 - Bayesian Networks
Lecture 65 - Introduction, Part 10
Lecture 66 - Decision Theory
Lecture 67 - Decision Theory
Lecture 68 - Probabilistic Uncertainty and Value of perfect information

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Lecture 69 - Expected Utility vs Expected Value
Lecture 70 - Markov Decision Processes
Lecture 71 - Markov Decision Processes
Lecture 72 - Markov Decision Processes
Lecture 73 - Markov Decision Processes
Lecture 74 - Markov Decision Processes
Lecture 75 - Markov Decision Processes
Lecture 76 - Reinforcement Learning
Lecture 77 - Reinforcement Learning
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Lecture 79 - Reinforcement Learning
Lecture 80 - Reinforcement Learning
Lecture 81 - Reinforcement Learning
Lecture 82 - Reinforcement Learning
Lecture 83 - Reinforcement Learning
Lecture 84 - Deep Learning
Lecture 85 - Deep Learning
Lecture 86 - Deep Learning
Lecture 87 - Deep Learning
Lecture 88 - Deep Learning
Lecture 89 - Deep Learning
Lecture 90 - Deep Learning
Lecture 91 - Deep Learning
Lecture 92 - Ethics of AI
Lecture 93 - Ethics of AI
Lecture 94 - Ethics of AI
Lecture 95 - Ethics of AI
Lecture 96 - Wrapup

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NPTEL Video Course - Computer Science and Engineering - NOC:Advanced Computer Architecture (2021)

Subject Co-ordinator - Prof. Smruti R. Sarangi

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Out-of-Order Pipelines - Part I
Lecture 3 - Out-of-Order Pipelines - Part II
Lecture 4 - Out-of-Order Pipelines - Part III
Lecture 5 - The Fetch and Decode Stages - Part I
Lecture 6 - The Fetch and Decode Stages - Part II
Lecture 7 - The Fetch and Decode Stages - Part III
Lecture 8 - The Issue, Execute, and Commit Stages - Part I
Lecture 9 - The Issue, Execute, and Commit Stages - Part II
Lecture 10 - The Issue, Execute, and Commit Stages - Part III
Lecture 11 - The Issue, Execute, and Commit Stages - Part IV
Lecture 12 - Alternative Approaches to Issue and Commit - Part I
Lecture 13 - Alternative Approaches to Issue and Commit - Part II
Lecture 14 - Alternative Approaches to Issue and Commit - Part III
Lecture 15 - Alternative Approaches to Issue and Commit - Part IV
Lecture 16 - Graphics Processors - Part I
Lecture 17 - Graphics Processors - Part II
Lecture 18 - Graphics Processors - Part III
Lecture 19 - Caches - Part I
Lecture 20 - Caches - Part II
Lecture 21 - Caches - Part III
Lecture 22 - Caches - Part IV
Lecture 23 - Caches - Part V
Lecture 24 - Caches - Part VI
Lecture 25 - Multicore Systems - Part I
Lecture 26 - Multicore Systems - Part II
Lecture 27 - Multicore Systems - Part III
Lecture 28 - Multicore Systems - Part IV
Lecture 29 - Multicore Systems - Part V

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Lecture 30 - Multicore Systems - Part VI
Lecture 31 - Multicore Systems - Part VII
Lecture 32 - Multicore Systems - Part VIII
Lecture 33 - Multicore Systems - Part IX

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NPTEL Video Course - Computer Science and Engineering - NOC:Advanced Distributed systems

Subject Co-ordinator - Prof. Smruti R. Sarangi

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 28

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Large Language Models (LLMs)

Subject Co-ordinator - Prof. Tanmoy Chakraborty, Prof. Soumen Chakraborti

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Recent Advances
Lecture 2 - Introduction to Natural Language Processing
Lecture 3 - Introduction to Statistical Language Models
Lecture 4 - Statistical LM: Advanced Smoothing and Evaluation
Lecture 5 - Introduction to Deep Learning
Lecture 6 - Introduction to PyTorch
Lecture 7 - Word Representation: Word2Vec and fastText
Lecture 8 - Word Representation: GloVe
Lecture 9 - Tokenization Strategies
Lecture 10 - Neural Language Models: CNN and RNN
Lecture 11 - Neural Language Models: LSTM and GRU
Lecture 12 - Sequence-to-Sequence Models
Lecture 13 - Decoding Strategies
Lecture 14 - Attention in Sequence-to-Sequence Models
Lecture 15 - Introduction to Transformer: Self and Multi-Head Attention
Lecture 16 - Introduction to Transformer: Positional Encoding and Layer Normalization
Lecture 17 - Implementation of Transformer using PyTorch
Lecture 18 - Pre-Training Strategies: ELMo, BERT
Lecture 19 - Pre-Training Strategies: Encoder-decoder and Decoder-only Models
Lecture 20 - Introduction to Hugging Face
Lecture 21 - Instruction Tuning
Lecture 22 - Prompt-based Learning
Lecture 23 - Advanced Prompting and Prompt Sensitivity
Lecture 24 - Alignment of Language Models - I
Lecture 25 - Alignment of Language Models - II
Lecture 26 - Knowledge and Retrieval: Knowledge Graph
Lecture 27 - Knowledge and Retrieval: Knowledge Graph Completion and Evaluation
Lecture 28 - Knowledge and Retrieval: Translation and Rotation Models
Lecture 29 - Parameter Efficient Fine-Tuning (PEFT)

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Lecture 30 - Quantization, Pruning and Distillation
Lecture 31 - An Alternate Formulation of Transformers: Residual Stream Perspective
Lecture 32 - Interpretability Techniques
Lecture 33 - Knowledge and Retrieval: Multiplicative models
Lecture 34 - Knowledge and Retrieval: Modeling Hierarchies
Lecture 35 - Knowledge and Retrieval: Temporal Knowledge Graphs
Lecture 36 - Responsible LLMs
Lecture 37 - Conclusion: Expert Panel Discussion

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NPTEL Video Course - Computer Science and Engineering - Design Verification and Test of Digital VLSI Circuits

Subject Co-ordinator - Dr. Santosh Biswas, Prof. Jatindra Kumar Deka

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital VLSI Design Flow
Lecture 2 - High Level Design Representation
Lecture 3 - Transformations for High Level Synthesis
Lecture 4 - Introduction to HLS
Lecture 5 - Scheduling Algorithms - 1
Lecture 6 - Scheduling Algorithms - 2
Lecture 7 - Binding and Allocation Algorithms
Lecture 8 - Two level Boolean Logic Synthesis - 1
Lecture 9 - Two level Boolean Logic Synthesis - 2
Lecture 10 - Two level Boolean Logic Synthesis - 3
Lecture 11 - Heuristic Minimization of Two-Level Circuits
Lecture 12 - Finite State Machine Synthesis
Lecture 13 - Multilevel Implementation
Lecture 14 - Introduction to formal methods for design verification
Lecture 15 - Temporal Logic
Lecture 16 - Syntax and Semantics of CTL
Lecture 17 - Syntax and Semantics of CTL â Continued
Lecture 18 - Equivalence between CTL Formulas
Lecture 19 - Introduction to Model Checking
Lecture 20 - Model Checking Algorithms - I
Lecture 21 - Model Checking Algorithms - II
Lecture 22 - Model Checking with Fairness
Lecture 23 - Binary Decision Diagram
Lecture 24 - Ordered Binary Decision Diagram
Lecture 25 - Operation on Ordered Binary Decision Diagram
Lecture 26 - Ordered Binary Decision Diagram for State Transition Systems
Lecture 27 - Symbolic Model Checking
Lecture 28 - Introduction to Digital VLSI Testing
Lecture 29 - Functional and Structural Testing

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Lecture 30 - Fault Equivalence
Lecture 31 - Fault Simulation - 1
Lecture 32 - Fault Simulation - 2
Lecture 33 - Fault Simulation - 3
Lecture 34 - Testability Measures (SCOAP)
Lecture 35 - Introduction to Automatic Test Pattern Generation (ATPG) and ATPG Algebras
Lecture 36 - D-Algorithm - 1
Lecture 37 - D-Algorithm - 2
Lecture 38 - ATPG for Synchronous Sequential Circuits
Lecture 39 - Scan Chain based Sequential Circuit Testing - 1
Lecture 40 - Scan Chain based Sequential Circuit Testing - 2
Lecture 41 - Built in Self Test - 1
Lecture 42 - Built in Self Test - 2
Lecture 43 - Memory Testing - 1
Lecture 44 - Memory Testing - 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Organization and Architecture - A Pedago

Subject Co-ordinator - Prof.Arnab sarkar, Prof.Jatindra Kumar Deka, Dr. Santosh Biswas

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Model of Computer and Working Principle
Lecture 2 - Digital Logic Building Blocks
Lecture 3 - Information Representation and Number Systems
Lecture 4 - Basic Elements of a Processor
Lecture 5 - Storage and I/O Interface
Lecture 6 - Execution of Program and Programming Languages
Lecture 7 - Components of Central Processing Unit (CPU) and External Interface
Lecture 8 - Main Memory
Lecture 9 - Instruction Execution
Lecture 10 - Instruction Format
Lecture 11 - Instruction Set
Lecture 12 - Addressing Modes
Lecture 13 - Flags and Conditional Instructions
Lecture 14 - Instruction
Lecture 15 - Instruction Cycle and Micro-operations
Lecture 16 - Control Signals and Timing Sequence
Lecture 17 - Control Signals for Complete Instruction Execution
Lecture 18 - Handling Different Addressing Modes
Lecture 19 - Handling Control Transfer Instructions
Lecture 20 - Design of Hardwired controlled Control Unit
Lecture 21 - Microinstructions and Microprograms
Lecture 22 - Organization and Optimization of Microprogrammed controlled Control Unit
Lecture 23 - Different Internal CPU Bus Organization
Lecture 24 - Basics of Memory and Cache - Part 1
Lecture 25 - Basics of Memory and Cache - Part 2
Lecture 26 - Direct-mapped Caches
Lecture 27 - Associative and Multi-level Caches
Lecture 28 - Summary - Caches
Lecture 29 - Basics of Virtual Memory and Address Translation

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Lecture 30 - Paging and Segmentation
Lecture 31 - TLBs and Page Fault Handling
Lecture 32 - Cache Indexing and Tagging Variations, Demand Paging
Lecture 33 - Page Replacement Algorithms
Lecture 34 - Page Frame Allocation and Thrashing
Lecture 35 - Summary - Virtual Memory
Lecture 36 - Input-Output Primitives
Lecture 37 - Interrupt Driven I/O
Lecture 38 - DMA Transfer
Lecture 39 - Storage Devices

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NPTEL Video Course - Computer Science and Engineering - NOC:Embedded Systems-Design Verification and Test

Subject Co-ordinator - Prof.Jatindra Kumar Deka, Dr. Santosh Biswas, Prof.Arnab Sarkar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Modeling Techniques - 1
Lecture 3 - Modeling Techniques - 2
Lecture 4 - Hardware/Software Partitioning - 1
Lecture 5 - Hardware/Software Partitioning - 2
Lecture 6 - Introduction to Hardware Design
Lecture 7 - Hardware Architectural Synthesis - 1
Lecture 8 - Hardware Architectural Synthesis - 2
Lecture 9 - Hardware Architectural Synthesis - 3
Lecture 10 - Hardware Architectural Synthesis - 4
Lecture 11 - Hardware Architectural Synthesis - 5
Lecture 12 - Hardware Architectural Synthesis - 6
Lecture 13 - Hardware Architectural Synthesis - 7
Lecture 14 - System Level Analysis
Lecture 15 - Uniprocessor Scheduling - 1
Lecture 16 - Uniprocessor Scheduling - 2
Lecture 17 - Multiprocessor Scheduling - 1
Lecture 18 - Multiprocessor Scheduling - 2
Lecture 19 - Introduction and Basic Operators of Temporal Logic
Lecture 20 - Syntax and Semantics of CTL
Lecture 21 - Equivalence between CTL formulas
Lecture 22 - Model Checking Algorithm
Lecture 23 - Binary Decision Diagram
Lecture 24 - Use of OBDDs for State Transition System
Lecture 25 - Symbolic Model Checking
Lecture 26 - Introduction to Digital VLSI Testing
Lecture 27 - Automatic Test Pattern Generation (ATPG)
Lecture 28 - Scan Chain based Sequential Circuit Testing
Lecture 29 - Software-Hardware Co-validation Fault Models and High Level Testing for Complex Embedded Systems

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Lecture 30 - Testing for embedded cores
Lecture 31 - Bus and Memory Testing
Lecture 32 - Testing for advanced faults in Real time Embedded Systems
Lecture 33 - BIST for Embedded Systems
Lecture 34 - Concurrent Testing for Fault tolerant Embedded Systems - 1
Lecture 35 - Concurrent Testing for Fault tolerant Embedded Systems - 2
Lecture 36 - Testing for Re-programmable hardware
Lecture 37 - Interaction Testing between Hardware and Software

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NPTEL Video Course - Computer Science and Engineering - NOC:Multi-Core Computer Architecture-Storage and Inte

Subject Co-ordinator - Prof. John Jose

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Overview of the Course
Lecture 2 - Instruction Execution Principles
Lecture 3 - Introduction to Instruction Pipeline
Lecture 4 - Introduction to Superscalar Pipelines
Lecture 5 - Instruction Pipeline and Performance - I
Lecture 6 - Instruction Pipeline and Performance - II
Lecture 7 - Introduction to Cache Memory
Lecture 8 - Block Replacement Techniques and Write Strategy
Lecture 9 - gem5 Simulator - An Overview
Lecture 10 - Cache Memory
Lecture 11 - Basic Cache Optimization Techniques
Lecture 12 - gem5 Simulator - Cache Optimisation
Lecture 13 - Advanced Cache Optimization Techniques - I
Lecture 14 - Advanced Cache Optimization Techniques - II
Lecture 15 - Cache Memory Optimizations
Lecture 16 - Introduction to DRAM System
Lecture 17 - DRAM Controllers and Address Mapping
Lecture 18 - Address Translation Mechanisms
Lecture 19 - Main Memory Concepts
Lecture 20 - Introduction to Tiled Chip Multicore Processors
Lecture 21 - Routing Techniques in Network On Chip
Lecture 22 - Network On Chip Router Micro-Architecture
Lecture 23 - gem5 Simulator - NoC Optimisation
Lecture 24 - Energy Efficient Bufferless NoC Routers
Lecture 25 - Sidebuffered Deflection Routers
Lecture 26 - Concepts in Network on Chip
Lecture 27 - QoS of NoC and Caches in TCMP Systems
Lecture 28 - Emerging Trends in Network On Chips
Lecture 29 - Concepts in TCMP Systems

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NPTEL Video Course - Computer Science and Engineering - NOC:Multi-Core Computer Architecture

Subject Co-ordinator - Prof. John Jose

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Basic Computer Organization
Lecture 2 - Instruction Set and Addressing Modes
Lecture 3 - Instruction Encoding
Lecture 4 - Performance Evaluation Methods
Lecture 5 - Tutorial on Performance Evaluvation
Lecture 6 - Introduction to RISC Instruction Pipeline
Lecture 7 - Instruction Pipeline Hazards
Lecture 8 - Tutorial on Instruction Pipeline and Hazards
Lecture 9 - Control Hazards and Branch Prediction
Lecture 10 - MIPS Pipeline for Multi-Cycle Operations
Lecture 11 - Tutorial on Longer Pipeline and Branch Prediction
Lecture 12 - Compiler Techniques to Explore ILP
Lecture 13 - Dynamic Scheduling to Explore ILP
Lecture 14 - Dynamic Scheduling with Tomasulo's Algorithm
Lecture 15 - Dynamic Scheduling with Speculative Execution
Lecture 16 - Tutorial on Static and Dynamic Scheduling
Lecture 17 - Advanced Pipelining and Superscalar Processors
Lecture 18 - Introduction to GPU architectures
Lecture 19 - Case study on GPU architectures
Lecture 20 - Tutorial on Superscalar processors and GPU
Lecture 21 - Introduction to Cache Memory
Lecture 22 - Block Replacement Techniques and Write Strategy
Lecture 23 - Design Concepts in Cache Memory
Lecture 24 - Optimization Techniques in Cache Memory
Lecture 25 - Advanced Cache Optimization Techniques
Lecture 26 - Tutorial on Advanced Concepts in Cache Memory - 1
Lecture 27 - Tutorial on Advanced Concepts in Cache Memory - 2
Lecture 28 - Cache coherence and memory consistency
Lecture 29 - Design Space for snooping protocols

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Lecture 30 - Directory Based Cache coherehce
Lecture 31 - Cache coherence in multiprocessor design [T]
Lecture 32 - Introduction to DRAM System
Lecture 33 - DRAM Controllers and Address Mapping
Lecture 34 - Secondary Storage Systems
Lecture 35 - Design Concepts in Storage Systems
Lecture 36 - Introduction to Tiled Chip Multicore Processors
Lecture 37 - Routing Techniques in Network On Chip
Lecture 38 - Network On Chip Router Micro-Architecture
Lecture 39 - Concepts in Network on Chip
Lecture 40 - Energy Efficient Bufferless NoC Routers
Lecture 41 - Sidebuffered Deflection Routers
Lecture 42 - Concepts in Deflection Routers [T]
Lecture 43 - QoS of NoC and Caches in TCMP Systems
Lecture 44 - Emerging Trends in Network On Chips
Lecture 45 - Domain Specific Accelarators
Lecture 46 - Introduction to VEGA Microprocessors (Case Study)
Lecture 47 - Concepts in TCMP Systems
Lecture 48 - How to Explore Computer Architecture?

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NPTEL Video Course - Computer Science and Engineering - NOC:Randomized Algorithms

Subject Co-ordinator - Prof. Benny George K

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Randomized Algorithms
Lecture 2 - Randomized Mincut Algorithm
Lecture 3 - Randomized Find
Lecture 4 - Probability Review
Lecture 5 - Expectation of Random Variables
Lecture 6 - Conditional Probability and Conditional Expectation2
Lecture 7 - Birthday Paradox
Lecture 8 - Markov and Chebychev's Inequalities
Lecture 9 - Median Algorithm
Lecture 10 - Chernoff Bound
Lecture 11 - Permutation Routing on a Hypercube
Lecture 12 - Permutation Routing on a Hypercube (Analysis)
Lecture 13 - Introduction to Probabilistic Method
Lecture 14 - More Examples on Probabilistic Method
Lecture 15 - Lovasz Local Lemma
Lecture 16 - Introduction to Markov Chains
Lecture 17 - 2-SAT and Markov Chains
Lecture 18 - 3-SAT and Markov Chains
Lecture 19 - Electrical Networks
Lecture 20 - Cover Time
Lecture 21 - Rapid Mixing
Lecture 22 - Introduction to Computational Complexity
Lecture 23 - Pratt's Certificate
Lecture 24 - Primality Testing
Lecture 25 - Miller Rabin Algorithm
Lecture 26 - All pair shortest path - I
Lecture 27 - All pair shortest path - II
Lecture 28 - Randomized MST
Lecture 29 - Introduction to approximate counting

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Lecture 30 - DNF counting
Lecture 31 - Perfect Matching - I
Lecture 32 - Perfect Matching - II
Lecture 33 - Perfect Matching - III
Lecture 34 - Treaps
Lecture 35 - Hashing
Lecture 36 - Probabilistically checkable proofs - I
Lecture 37 - Probabilistically checkable proofs - II
Lecture 38 - Probabilistically checkable proofs - III
Lecture 39 - LFKN Protocol
Lecture 40 - summary

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NPTEL Video Course - Computer Science and Engineering - NOC:Parallel Algorithms

Subject Co-ordinator - Prof. Sajith Gopalan

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Shared Memory Models - 1
Lecture 2 - Shared Memory Models - 2
Lecture 3 - Interconnection Networks
Lecture 4 - Cost and Optimality
Lecture 5 - Basic Techniques - 1
Lecture 6 - Basic Techniques - 2
Lecture 7 - Basic Techniques - 3
Lecture 8 - Basic Techniques - 4
Lecture 9 - Basic Techniques - 5
Lecture 10 - Odd Even Merge Sort (OEMS)
Lecture 11 - OEMS, Bitonic-Sort-Merge Sort (BSMS)
Lecture 12 - BSMS, Optimal List Colouring
Lecture 13 - Description
Lecture 14 - Analysis
Lecture 15 - Applications
Lecture 16 - Applications
Lecture 17 - Fast optimal merge algorithm
Lecture 18 - High level Description
Lecture 19 - Cole's Merge Sort
Lecture 20 - Analysis of Cole's Merge Sort; Lower bound for sorting
Lecture 21 - Sorting Lower bound; Connected Components
Lecture 22 - Connected Components (CREW)
Lecture 23 - Connected Components, Vertex Colouring
Lecture 24 - Sorting on a 2D mesh
Lecture 25 - Sorting on a 2D mesh
Lecture 26 - Sorting, Offline routing on a 2D mesh
Lecture 27 - Sorting on a 3D mesh
Lecture 28 - Mesh of Trees, Hypercube
Lecture 29 - Hypercube (Continued...)

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Lecture 30 - Hypercube (Continued...), butterfly network
Lecture 31 - Butterfly, CCC and Benes Networks
Lecture 32 - Butterfly, CCC and Benes Networks
Lecture 33 - Shuffle Exchange Graphs, de Bruijn Graphs
Lecture 34 - Interconnection Networks Algorithms
Lecture 35 - Circuit Value Problem is P-complete for NC-reductions
Lecture 36 - Ordered DFS is P-complete for NC-reductions
Lecture 37 - Max Flow is P-complete for NC-reductions

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NPTEL Video Course - Computer Science and Engineering - NOC:Discrete Mathematics (Prof. Sajith Gopalan)

Subject Co-ordinator - Prof. Benny George K

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Boolean Functions
Lecture 2 - Propositional Calculus
Lecture 3 - First Order Logic
Lecture 4 - First Order Logic
Lecture 5 - Proof System for Propcal
Lecture 6 - First Order Logic
Lecture 7 - Soundness and Completeness of the First Order Proof System
Lecture 8 - Sets, Relations, Functions
Lecture 9 - Functions, Embedding of the theories of naturals numbers and integers in Set Theory
Lecture 10 - Embedding of the theories of integers and rational numbers in Set Theory; Countable Sets
Lecture 11 - Introduction to graph theory
Lecture 12 - Trees, Cycles, Graph coloring
Lecture 13 - Bipartitie Graphs
Lecture 14 - Bipartitie Graphs; Edge Coloring and Matching
Lecture 15 - Planar Graphs
Lecture 16 - Graph Searching; BFS and DFS
Lecture 17 - Network Flows
Lecture 18 - Counting Spanning Trees in Complete Graphs
Lecture 19 - Embedding of the theory of ral numbers in Set Theory; Paradoxes
Lecture 20 - ZF Axiomatization of Set Theory
Lecture 21 - Partially ordering relations
Lecture 22 - Natural numbers, divisors
Lecture 23 - Lattices
Lecture 24 - GCD, Euclid's Algorithm
Lecture 25 - Prime Numbers
Lecture 26 - Congruences
Lecture 27 - Pigeon Hole Principle
Lecture 28 - Stirling Numbers, Bell Numbers
Lecture 29 - Generating Functions

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Lecture 30 - Product of Generating Functions
Lecture 31 - Composition of Generating Function
Lecture 32 - Principle of Inclusion Exclusion
Lecture 33 - Rook placement problem
Lecture 34 - Solution of Congruences
Lecture 35 - Chinese Remainder Theorem
Lecture 36 - Totient; Congruences; Floor and Ceiling Functions
Lecture 37 - Introduction to Groups
Lecture 38 - Modular Arithmetic and Groups
Lecture 39 - Dihedral Groups, Isomorhphisms
Lecture 40 - Cyclic groups, Direct Products, Subgroups
Lecture 41 - Cosets, Lagrange's theorem
Lecture 42 - Rings and Fields
Lecture 43 - Construction of Finite Fields

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NPTEL Video Course - Computer Science and Engineering - NOC:Advanced Computer Architecture

Subject Co-ordinator - Prof. John Jose

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Basic Computer Organization
Lecture 2 - Perfomance Evaluation Methods
Lecture 3 - Introduction to RISC Instruction Pipeline
Lecture 4 - Instruction Pipeline and Performance
Lecture 5 - Pipeline Hazards
Lecture 6 - Control Hazards and Branch Prediction
Lecture 7 - MIPS Pipeline for Multi-Cycle Operations
Lecture 8 - Tutorial 2
Lecture 9 - Compiler Techniques to Explore ILP
Lecture 10 - Dynamic Scheduling to Explore ILP
Lecture 11 - Dynamic Scheduling with Tomasuloâ s Algorithm
Lecture 12 - Dynamic Scheduling with Speculative Execution
Lecture 13 - Tutorial 3
Lecture 14 - Advanced Pipelining and Superscalar Processors
Lecture 15 - Exploiting DLP
Lecture 16 - Tutorial 4
Lecture 17 - Tutorial 5
Lecture 18 - Introduction to Cache Memory
Lecture 19 - Block Replacement Techniques and Write Strategy
Lecture 20 - Tutorial 6
Lecture 21 - Optimization Techniques in Cache Memory
Lecture 22 - Advanced Cache Optimization Techniques
Lecture 23 - Tutorial 7
Lecture 24 - Tutorial 8
Lecture 25 - Introduction to DRAM System
Lecture 26 - DRAM Controllers and Address Mapping
Lecture 27 - Secondary Storage Systems
Lecture 28 - Tutorial 9
Lecture 29 - Tiled Chip Multicore Processors

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Lecture 30 - Routing Techniques in Network on Chip
Lecture 31 - NoC Router Microarchitecture
Lecture 32 - How to Explore Computer Architecture?
Lecture 33 - Tutorial 10

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NPTEL Video Course - Computer Science and Engineering - NOC:User-centric Computing for Human-Computer Interac

Subject Co-ordinator - Prof. Samit Bhattacharya

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to UCC and history
Lecture 2 - Issues and challenges
Lecture 3 - Latest research trends
Lecture 4 - User-Centric Design and Software Engineering
Lecture 5 - Components of SDLC - Contextual Inquiry
Lecture 6 - Components of SDLC - Design Guidelines
Lecture 7 - Components of SDLC - Prototyping
Lecture 8 - Case study (web site design)
Lecture 9 - Introduction to User-Centric Computing
Lecture 10 - The UCC framework with illustrative case study
Lecture 11 - User-centric models - introduction and descriptive models
Lecture 12 - User-centric models - predictive models and taxonomy
Lecture 13 - Introduction to GOMS family of models
Lecture 14 - Keystroke-Level Model (KLM)
Lecture 15 - (CMN)GOMS Model
Lecture 16 - The Fitts' Law
Lecture 17 - The Hick-Hyman Law
Lecture 18 - 2D and 3D pointing models
Lecture 19 - The Steering Law for constrained navigation
Lecture 20 - Model for hierarchical menu selection
Lecture 21 - Mobile typing models (single finger and two thumb typing)
Lecture 22 - Model for touch performance (FFitts' law)
Lecture 23 - Introduction to formal models in UCD
Lecture 24 - Formal modeling of user-computer dialogue
Lecture 25 - Case studies on the use of models
Lecture 26 - Introduction and research question formulation
Lecture 27 - Variables determination and experiment design
Lecture 28 - Data analysis including model building
Lecture 29 - Introduction to user-centric design evaluation and expert evaluation technique

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Lecture 30 - User evaluation, empirical and model-based evaluation
Lecture 31 - Concluding remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Graphics

Subject Co-ordinator - Prof. Samit Bhattacharya

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to graphics
Lecture 2 - Historical evolution, issues and challenges
Lecture 3 - Basics of a graphics system
Lecture 4 - Introduction to 3D graphics pipeline
Lecture 5 - Introduction and overview on object representation techniques
Lecture 6 - Various Boundary Representation Techniques
Lecture 7 - Spline representation - I
Lecture 8 - Spline representation - II
Lecture 9 - Space representation methods
Lecture 10 - Introduction to modeling transformations
Lecture 11 - Matrix representation and composition of transformations
Lecture 12 - Transformations in 3D
Lecture 13 - Color computation - basic idea
Lecture 14 - Simple lighting model
Lecture 15 - Shading models
Lecture 16 - Intensity mapping
Lecture 17 - Color models and texture synthesis
Lecture 18 - View transformation
Lecture 19 - Projection transformation
Lecture 20 - Windows-to-viewport transformation
Lecture 21 - Clipping introduction and 2D point and line clipping
Lecture 22 - 2D fill-area clipping and 3D clipping
Lecture 23 - Hidden surface removal - I
Lecture 24 - Hidden surface removal - II
Lecture 25 - Scan conversion of basic shapes - I
Lecture 26 - Scan conversion of basic shapes - II
Lecture 27 - Fill area and character scan conversion
Lecture 28 - Anti-aliasing techniques
Lecture 29 - Graphics I/O Devices

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Lecture 30 - Introduction to GPU and Shaders
Lecture 31 - Programming with OpenGL
Lecture 32 - Concluding remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:C-Based VLSI Design

Subject Co-ordinator - Prof. Chandan Karfa

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to C-Based VLSI Design
Lecture 2 - C-based VLSI Design: An Overview
Lecture 3 - C-based VLSI Design: Problem Formulation
Lecture 4 - C-based VLSI Design: Course Plan
Lecture 5 - Introduction to Scheduling
Lecture 6 - ILP formulation of Scheduling
Lecture 7 - ILP formulation of MRLC and MLRC Scheduling
Lecture 8 - Multiprocessor Scheduling
Lecture 9 - Huâ s algorithm for Multiprocessor Scheduling
Lecture 10 - List based Scheduling of MLRC
Lecture 11 - List based Scheduling of MRLC
Lecture 12 - Forced Directed Scheduling
Lecture 13 - Forced Directed MLRC and MRLC Scheduling Algorithm
Lecture 14 - Path Based Scheduling
Lecture 15 - Path Based Scheduling
Lecture 16 - Allocation and Binding Problem Formulation
Lecture 17 - Left Edge Algorithm
Lecture 18 - ILP Formulation of Allocation and Binding
Lecture 19 - Allocation and Binding for Hierarchical Graph
Lecture 20 - Register Allocation and Binding
Lecture 21 - Multi-port Binding Problem
Lecture 22 - Datapath and Controller Synthesis
Lecture 23 - HLS for Arrays
Lecture 24 - HLS for Loops
Lecture 25 - HLS for Loop - pipeline
Lecture 26 - Hardware Efficient C Coding - Part I
Lecture 27 - Hardware Efficient C Coding - Part II
Lecture 28 - Dataflow Optimization in HLS
Lecture 29 - Frontend Optimizations in C

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Lecture 30 - HLS Optimizations: Case Study 1
Lecture 31 - HLS Optimizations: Case Study 1
Lecture 32 - Simulation based Verification
Lecture 33 - RTL to C Reverse Engineering
Lecture 34 - Phase-wise Verification of HLS
Lecture 35 - Equivalence between C and RTL
Lecture 36 - HLS for Security
Lecture 37 - Introduction to Hardware Security
Lecture 38 - Attacks on RTL Logic locking
Lecture 39 - Introduction to Logic Synthesis
Lecture 40 - FPGA Technology Mapping
Lecture 41 - Introduction to Physical Synthesis
Lecture 42 - Introduction to Circuit optimizations
Lecture 43 - Recent Advances in C-Based VLSI Design

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NPTEL Video Course - Computer Science and Engineering - NOC:Design and Implementation of Human-Computer Inter

Subject Co-ordinator - Prof. Samit Bhattacharya

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Interactive Systems
Lecture 2 - Introduction to Usability
Lecture 3 - Engineering for Usability
Lecture 4 - Interactive System Life Cycle
Lecture 5 - Usability Requirements
Lecture 6 - Contexual Inquiry
Lecture 7 - Functional Requirements Specification
Lecture 8 - Case Study on SRS
Lecture 9 - Case Study (Usability Requirement Gathering)
Lecture 10 - Case Study (Other Requirement Gathering)
Lecture 11 - Case Study - Non-Functional Requirements to SRS
Lecture 12 - Introduction to Interface Design
Lecture 13 - Shneiderman's Golden Rules
Lecture 14 - Norman's Principles
Lecture 15 - Prototyping
Lecture 16 - Prototype Evaluation - I
Lecture 17 - Prototype Evaluation - II
Lecture 18 - Case Study on Prototype Evaluation - I
Lecture 19 - Case Study on Prototype Evaluation - II
Lecture 20 - Basics of System Design
Lecture 21 - Data Flow Diagram
Lecture 22 - Entity Relationship Diagram
Lecture 23 - Case Study on DFD and ER
Lecture 24 - Introduction to Object Oriented Design
Lecture 25 - UML
Lecture 26 - UML Case Study
Lecture 27 - Coding Basics
Lecture 28 - Code Testing Basics
Lecture 29 - Review-Based Code Testing

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Lecture 30 - Code Review Case Study
Lecture 31 - Black-Box Testing - I
Lecture 32 - Black-Box Testing - II
Lecture 33 - Black-Box Testing Case Study
Lecture 34 - White-Box Testing
Lecture 35 - White-Box Testing Case Study
Lecture 36 - System Integration and Testing
Lecture 37 - Empirical Usability Evaluation - I
Lecture 38 - Empirical Usability Evaluation - II
Lecture 39 - Experiment Design - I
Lecture 40 - Experiment Design - II
Lecture 41 - Empirical Data Analysis
Lecture 42 - Project Management
Lecture 43 - Note on Agile Development
Lecture 44 - Concluding Remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Digital Design with Verilog

Subject Co-ordinator - Prof. Chandan Karfa, Prof. Aryabartta Sahu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Design with Verilog
Lecture 2 - Switching Algebra
Lecture 3 - Canonical Forms of Switching Functions
Lecture 4 - Number Systems
Lecture 5 - Binary Arithmetic
Lecture 6 - Binary Codes
Lecture 7 - Error Detection and Corrections Codes
Lecture 8 - Minimization of Switching functions-Karnaugh Map
Lecture 9 - Karnaugh Map
Lecture 10 - Minimization of Switching functions-Properties
Lecture 11 - Quine-McCluskey Method
Lecture 12 - Quine-McCluskey Method-Prime Implication Chart
Lecture 13 - ESPRESSO-Heuristic Based Switching Function Minimization
Lecture 14 - Multi-level Logic Minimization
Lecture 15 - Multi-level Logic Minimization-Kernels Extraction
Lecture 16 - Digital Circuits Modelling using Verilog
Lecture 17 - Modelling Techniques in Verilog
Lecture 18 - Behavioral Modelling in Verilog
Lecture 19 - Digital System Design using Verilog
Lecture 20 - Testbench in Verilog
Lecture 21 - Code Conversion, Parity Bit Generator
Lecture 22 - Comparator, Multiplexer
Lecture 23 - Encoder, Decoder
Lecture 24 - Ripple Carry Adder, Carry Look ahead Adder
Lecture 25 - Adder/Subtractor
Lecture 26 - BCD Adder, Multiplier
Lecture 27 - Latch/Storage Design
Lecture 28 - Flipflop Design, Characteristics of Flipflop
Lecture 29 - Flipflop, Register and Memory

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Lecture 30 - Digital Counter
Lecture 31 - Finite State Machine Design and Implementation with many Examples
Lecture 32 - FSM Completeness and Correctness
Lecture 33 - Sync Counter using FSM, Implementation using different FFs and Comparision of types of FSM
Lecture 34 - FSM State Optimization using Row Matching and Partitioning Methods
Lecture 35 - State Optimization using Implication chart and State Encoding
Lecture 36 - RTL Design, Introduction to ASM (Algorithmic State Machine)
Lecture 37 - RTL/ASM Design Examples and Implementation
Lecture 38 - ASM Data Path Inference and Control Path Generation
Lecture 39 - Sequential Multplier the Classic Example of RTL Design
Lecture 40 - Introduction to FPGA and Design Flow
Lecture 41 - Introduction to Electronic Design Automation

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NPTEL Video Course - Computer Science and Engineering - NOC:Parallel Computer Architecture

Subject Co-ordinator - Prof. Hemangee K. Kapoor

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why do we need parallel architecture ?
Lecture 2 - Multicore Revolution
Lecture 3 - What is Parallel Architecture?
Lecture 4 - Performance and Benchmarking
Lecture 5 - Reporting Results
Lecture 6 - Some Laws
Lecture 7 - A shift from sequential to parallel
Lecture 8 - Programming Models
Lecture 9 - Shared Memory Paradigm
Lecture 10 - Message Passing Paradigm
Lecture 11 - Examples
Lecture 12 - Cache Basics
Lecture 13 - Memory hierarchy questions - 1
Lecture 14 - Memory hierarchy questions - 2
Lecture 15 - Six basic cache optimisations - 1
Lecture 16 - Six basic cache optimisations - 2
Lecture 17 - Virtual Memory - 1
Lecture 18 - Virtual Memory - 2
Lecture 19 - Cache Coherence Problem
Lecture 20 - Concept of Serialisation
Lecture 21 - Coherence related Conditions
Lecture 22 - Types of Coherence Protocols - 1
Lecture 23 - Types of Coherence Protocols - 2
Lecture 24 - VI Protocol
Lecture 25 - 3 State: MSI Protocol
Lecture 26 - MESI Protocol
Lecture 27 - Dragon Protocol
Lecture 28 - Coherence misses
Lecture 29 - Coherence misses example

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Lecture 30 - Correctness Requirements
Lecture 31 - Single-Level caches with an Atomic Bus - 1
Lecture 32 - Single-Level caches with an Atomic Bus - 2
Lecture 33 - Multi-Level caches with an Atomic Bus - 1
Lecture 34 - Multi-Level caches with an Atomic Bus - 2
Lecture 35 - Split transaction Bus
Lecture 36 - Phases in Split Transaction Bus
Lecture 37 - Request table and Organization
Lecture 38 - Path of a Cache Miss
Lecture 39 - Multi-Level cache + Split transaction Bus
Lecture 40 - Introduction to Directory Cache Coherence
Lecture 41 - Basic Operation of a Directory
Lecture 42 - Directory Organisations
Lecture 43 - Directory Overhead Optimisations
Lecture 44 - Directory Protocol optimisations
Lecture 45 - Proving Correctness - 1
Lecture 46 - Proving Correctness - 2
Lecture 47 - SGI Origin Architecture
Lecture 48 - Working of protocol
Lecture 49 - Correctness Issues
Lecture 50 - Sequent NUMA-Q Architecture
Lecture 51 - Working of protocol - 1
Lecture 52 - Working of protocol - 2
Lecture 53 - Correctness and Protocol Interaction
Lecture 54 - Sequential Consistency
Lecture 55 - Implications of Sequential Consistency
Lecture 56 - Relaxed Consistency Models - 1
Lecture 57 - Relaxed Consistency Models - 2
Lecture 58 - Relaxing all Orders
Lecture 59 - Uninterruptible Instructions
Lecture 60 - Implementation of atomic instructions
Lecture 61 - Other synchronisation options
Lecture 62 - Interconnect Overview
Lecture 63 - Topologies
Lecture 64 - Routing
Lecture 65 - Flow Control

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundation for Virtual and Augmented Reality Syst

Subject Co-ordinator - Prof Samit Bhattacharya

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Intro to XR
Lecture 2 - Application Domains and System Categories
Lecture 3 - Application Domains and System Categories
Lecture 4 - Definitions
Lecture 5 - Definitions
Lecture 6 - Historical Evolution
Lecture 7 - Historical Evolution
Lecture 8 - Issues and Challenges
Lecture 9 - Issues and Challenges
Lecture 10 - Cybersickness
Lecture 11 - Cybersickness
Lecture 12 - Cybersickness
Lecture 13 - VR Hardware
Lecture 14 - VR Hardware
Lecture 15 - AR Hardware
Lecture 16 - Understanding Tracking - I
Lecture 17 - Understanding Tracking - II
Lecture 18 - Understanding Tracking - III
Lecture 19 - VR Software
Lecture 20 - VR Software
Lecture 21 - AR Software
Lecture 22 - AR Software
Lecture 23 - XR as Interactive Systems
Lecture 24 - XR as Interactive Systems
Lecture 25 - Human Factors in XR
Lecture 26 - Human Factors in XR
Lecture 27 - Visual Perception and Displays - I
Lecture 28 - Visual Perception and Displays - II
Lecture 29 - Auditory Sense and Immersive Experience

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Lecture 30 - Auditory Sense and Immersive Experience
Lecture 31 - Other Senses and Full Immersion
Lecture 32 - Interactive System Development Life Cycle Stages
Lecture 33 - Introduction to Majuli case study
Lecture 34 - Introduction to Majuli case study
Lecture 35 - Usability requirement gathering and specification
Lecture 36 - Usability requirement gathering and specification
Lecture 37 - Usability requirement gathering and specification
Lecture 38 - System Design
Lecture 39 - System Design
Lecture 40 - System Design
Lecture 41 - System Design
Lecture 42 - System Implementation
Lecture 43 - System Implementation
Lecture 44 - System Implementation
Lecture 45 - System Implementation
Lecture 46 - System Implementation
Lecture 47 - System Implementation
Lecture 48 - System Implementation
Lecture 49 - VR experience optimisation
Lecture 50 - VR experience optimisation
Lecture 51 - VR experience optimisation
Lecture 52 - VR experience optimisation
Lecture 53 - VR experience optimisation
Lecture 54 - VR resource optimization
Lecture 55 - VR resource optimization
Lecture 56 - VR resource optimization
Lecture 57 - VR experience optimisation
Lecture 58 - VR experience optimisation
Lecture 59 - VR experience optimisation
Lecture 60 - Linking theory to practice
Lecture 61 - Linking theory to practice
Lecture 62 - Linking theory to practice
Lecture 63 - Concluding remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Neural Networks for Computer Vision and Natural L

Subject Co-ordinator - Prof Arijit Sur

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Learning
Lecture 2 - Supervised Learning (Regression)
Lecture 3 - Gradient Descent
Lecture 4 - Logistics Regression
Lecture 5 - Optimization for supervised models
Lecture 6 - Neural Network - I (Single Layer Perceptron)
Lecture 7 - Neural Network - II (Multi Layer Perceptron)
Lecture 8 - Neural Network - III (Training of the Multi Layer Perceptron)
Lecture 9 - Introduction to Deep Learning - I
Lecture 10 - Introduction to Deep Learning - II
Lecture 11 - Introduction to Deep Learning - III
Lecture 12 - Computer Vision Through Machine Learning
Lecture 13 - Natural Language Processing Through Machine Learning
Lecture 14 - Convolutional Neural Network - I
Lecture 15 - Convolutional Neural Network - II (Model Architecture)
Lecture 16 - Optimizing Convolutional Neural Network - I
Lecture 17 - Optimizing Convolutional Neural Network - II
Lecture 18 - Optimizing Convolutional Neural Network - III
Lecture 19 - CNN With Residual Connections - ResNet
Lecture 20 - Recurrent Neural Network - I
Lecture 21 - Recurrent Neural Network - II
Lecture 22 - LSTM
Lecture 23 - Sequential Modelling - Part II
Lecture 24 - Generative AI
Lecture 25 - Generative Modelling
Lecture 26 - Generative Adversarial Network - I
Lecture 27 - Generative Adversarial Network - II
Lecture 28 - Variational Auto-Encoder - I
Lecture 29 - Variational Auto-Encoder - II

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Lecture 30 - Diffusion Model - I
Lecture 31 - Diffusion Model - II
Lecture 32 - Auto-Regressive Models
Lecture 33 - Transormers - I
Lecture 34 - Transormers - II
Lecture 35 - Large Language Model - I
Lecture 36 - Large Language Model - II
Lecture 37 - Encoder only Transformer Model
Lecture 38 - Decoder only Transformer Model
Lecture 39 - Deep Learning for Vision Applications
Lecture 40 - Image and Video Restoration
Lecture 41 - Medical Imaging
Lecture 42 - Zero-shot Learning
Lecture 43 - Few-shot Learning
Lecture 44 - Multimodal Deep Learning
Lecture 45 - Multimodal Deep Models
Lecture 46 - Visual Simultaneous Localization and Mapping
Lecture 47 - Self-Supervised Learning

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NPTEL Video Course - Computer Science and Engineering - Computer Algorithms - 2

Subject Co-ordinator - Prof. Shashank K. Mehta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Graph_Basics
Lecture 2 - Breadth_First_Search
Lecture 3 - Dijkstra_Algo
Lecture 4 - All Pair Shortest Path
Lecture 5 - Matriods
Lecture 6 - Minimum Spanning Tree
Lecture 7 - Edmond's Matching Algo I
Lecture 8 - Edmond's Matching Algo II
Lecture 9 - Flow Networks
Lecture 10 - Ford Fulkerson Method
Lecture 11 - Edmond Karp Algo
Lecture 12 - Matrix Inversion
Lecture 13 - Matrix Decomposition
Lecture 14 - Knuth Morris Pratt Algo
Lecture 15 - Rabin Karp Algo
Lecture 16 - NFA Simulation
Lecture 17 - Integer-Polynomial Ops-I
Lecture 18 - Integer-Polynomial Ops-II
Lecture 19 - Integer-Polynomial Ops-III
Lecture 20 - Chinese Remainder-I
Lecture 21 - Chinese Remainder-II
Lecture 22 - Chinese Remainder-III
Lecture 23 - Discrete Fourier Transform-I
Lecture 24 - Discrete Fourier Transform-II
Lecture 25 - Discrete Fourier Transform-III
Lecture 26 - Schonhage Strassen Algo
Lecture 27 - Linear Programming-I
Lecture 28 - Linear Programming-II
Lecture 29 - Geometry-I

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Lecture 30 - Geometry-II
Lecture 31 - Geometry-III
Lecture 32 - Approximation Algo-I
Lecture 33 - Approximation Algo-II
Lecture 34 - Approximation Algo-III
Lecture 35 - General

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NPTEL Video Course - Computer Science and Engineering - Theory of Computation

Subject Co-ordinator - Prof. Somenath Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is theory of computation? Set membership problem, basic notions like alphabet, strings, form
Lecture 2 - Introduction to finite automaton
Lecture 3 - Finite automata continued, deterministic finite automata(DFAs), language accepted by a DFA
Lecture 4 - Regular languages, their closure properties
Lecture 5 - DFAs solve set membership problems in linear time, pumping lemma
Lecture 6 - More examples of nonregular languages, proof of pumping lemma, pumping lemma as a game, converse
Lecture 7 - A generalization of pumping lemma, nondeterministic finite automata (NFAs), computation trees for
Lecture 8 - Formal description of NFA, language accepted by NFA, such languages are also regular
Lecture 9 - 'Guess and verify' paradigm for nondeterminism
Lecture 10 - NFA's with epsilon transitions
Lecture 11 - Regular expressions, they denote regular languages
Lecture 12 - Construction of a regular expression for a language given a DFA accepting it. Algebraic closure
Lecture 13 - Closure properties (Continued...)
Lecture 14 - Closure under reversal, use of closure properties
Lecture 15 - Decision problems for regular languages
Lecture 16 - About minimization of states of DFAs. Myhill-Nerode theorem
Lecture 17 - Continuation of proof of Myhill-Nerode theorem
Lecture 18 - Application of Myhill-Nerode theorem. DFA minimization
Lecture 19 - DFA minimization (Continued...)
Lecture 20 - Introduction to context free languages (cfls) and context free grammars (cfgs). Derivation of st
Lecture 21 - Languages generated by a cfg, leftmost derivation, more examples of cfgs and cfls
Lecture 22 - Parse trees, inductive proof that L is L(G). All regular languages are context free
Lecture 23 - Towards Chomsky normal forms
Lecture 24 - Simplification of cfgs continued, Removal of epsilon productions
Lecture 25 - Elimination of unit productions. Converting a cfg into Chomsky normal form. Towards pumping lemm
Lecture 26 - Pumping lemma for cfls. Adversarial paradigm
Lecture 27 - Completion of pumping lemma proof. Examples of use of pumping lemma. Converse of lemma does not
Lecture 28 - Closure properties continued. cfls not closed under complementation
Lecture 29 - Another example of a cfl whose complement is not a cfl. Decision problems for cfls

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Lecture 30 - More decision problems. CYK algorithm for membership decision
Lecture 31 - Introduction to pushdown automata (pda)
Lecture 32 - pda configurations, acceptance notions for pdas. Transition diagrams for pdas
Lecture 33 - Equivalence of acceptance by empty stack and acceptance by final state
Lecture 34 - Turing machines (TM)
Lecture 35 - Execution trace, another example (unary to binary conversion)
Lecture 36 - Example continued. Finiteness of TM description, TM configuration, language acceptance, definiti
Lecture 37 - Notion of non-acceptance or rejection of a string by a TM. Multitrack TM, its equivalence to sta
Lecture 38 - Simulation of multitape TMs by basic model. Nondeterministic TM (NDTM). Equivalence of NDTMs wit
Lecture 39 - Counter machines and their equivalence to basic TM model
Lecture 40 - TMs can simulate computers, diagonalization proof
Lecture 41 - Existence of non-r.e. languages, recursive languages, notion of decidability
Lecture 42 - Separation of recursive and r.e. classes, halting problem and its undecidability

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NPTEL Video Course - Computer Science and Engineering - Introduction to Problem Solving and Programming

Subject Co-ordinator - Prof. D. Gupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Computer Science and Engineering - Riemann Hypothesis and its Applications

Subject Co-ordinator - Prof. Manindra Agrawal

Co-ordinating Institute - IIT - Kanpur

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Lecture - 30

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NPTEL Video Course - Computer Science and Engineering - Biometrics

Subject Co-ordinator - Prof. Phalguni Gupta

Co-ordinating Institute - IIT - Kanpur

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Lecture 26 - Biometrics

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NPTEL Video Course - Computer Science and Engineering - Parallel Algorithm

Subject Co-ordinator - Prof. Phalguni Gupta

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Computer Science and Engineering - Computer Architecture (Dr. Mainak Chaudhuri)

Subject Co-ordinator - Dr. Mainak Chaudhuri

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Amdahl's law, CPI equation
Lecture 2 - CPI equation, research practices, instruction set architecture
Lecture 3 - Instruction set architecture
Lecture 4 - Instruction set architecture
Lecture 5 - Instruction set architecture, case study with MIPS-I
Lecture 6 - Case study with MIPS-I
Lecture 7 - Case study with MIPS-I
Lecture 8 - Binary instrumentation for architectural studies
Lecture 9 - Binary instrumentation for architectural studies
Lecture 10 - Basic pipelining, branch prediction
Lecture 11 - Basic pipelining, branch prediction
Lecture 12 - Basic pipelining, branch prediction
Lecture 13 - Basic pipelining, branch prediction
Lecture 14 - Basic pipelining, branch prediction
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Lecture 18 - Basic pipelining, branch prediction
Lecture 19 - Basic pipelining, branch prediction
Lecture 20 - Dynamic scheduling, speculative execution
Lecture 21 - Dynamic scheduling, speculative execution
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Lecture 24 - Dynamic scheduling, speculative execution
Lecture 25 - Virtual memory and caches
Lecture 26 - Virtual memory and caches
Lecture 27 - Virtual memory and caches
Lecture 28 - Topics in memory system, DRAM and SRAM technology
Lecture 29 - Topics in memory system, DRAM and SRAM technology

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Lecture 30 - Topics in memory system, DRAM and SRAM technology
Lecture 31 - Case study
Lecture 32 - Case study
Lecture 33 - Case study
Lecture 34 - Case study
Lecture 35 - Input/Output
Lecture 36 - Simultaneous multithreading, multi-cores

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NPTEL Video Course - Computer Science and Engineering - Compiler Design (Prof. Sanjeev K Aggarwal)

Subject Co-ordinator - Prof. Sanjeev K Aggarwal

Co-ordinating Institute - IIT - Kanpur

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Lecture 30 - Compiler Design

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to programming in C

Subject Co-ordinator - Prof. Satyadev Nandakumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro - Process of programming
Lecture 2 - Intro - GCD
Lecture 3 - Intro - Programming cycle
Lecture 4 - Intro - Tracing a simple program
Lecture 5 - Intro - Variables
Lecture 6 - Intro - Operators
Lecture 7 - Loops - While
Lecture 8 - Loops - While example
Lecture 9 - Loops - While GCD example
Lecture 10 - Loops - Longest 1
Lecture 11 - Loops - Longest 2
Lecture 12 - Loops - Longest 3
Lecture 13 - Loops - Do-while
Lecture 14 - Loops - Matrix using nested loops
Lecture 15 - Loops - For
Lecture 16 - Loops - Matrix using nested for loops
Lecture 17 - Loops - Break statement
Lecture 18 - Loops - Continue statement
Lecture 19 - Loops - Continue statement example
Lecture 20 - Data types in C
Lecture 21 - ASCII code
Lecture 22 - Operators Expressions Associativity
Lecture 23 - Precedence of operators
Lecture 24 - Expression evaluation
Lecture 25 - Functions - Introduction
Lecture 26 - Functions - How functions are executed
Lecture 27 - Functions - Examples - 1
Lecture 28 - Functions - Examples - 2
Lecture 29 - Arrays in C

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Lecture 30 - Initializing arrays
Lecture 31 - Initializing character arrays
Lecture 32 - Pointers in C
Lecture 33 - Pointer arithmetic
Lecture 34 - Function with pointer arguments
Lecture 35 - Example - copy a subarray
Lecture 36 - Programming using arrays and pointers
Lecture 37 - Sizeof operator
Lecture 38 - Returning pointers from functions
Lecture 39 - Example - return duplicate of a string
Lecture 40 - Recursion - Linear Recursion
Lecture 41 - Recursion - Linear Recursion - 2
Lecture 42 - Recursion - Two-way Recursion
Lecture 43 - Multidimensional Arrays
Lecture 44 - Multidimensional Arrays and Pointers
Lecture 45 - Multidimensional Arrays and Pointers - continued (2)
Lecture 46 - Multidimensional Arrays and Pointers - continued (3)
Lecture 47 - File Handling
Lecture 48 - Some other file-handling functions
Lecture 49 - Structures in C - 1
Lecture 50 - Structures in C - 2
Lecture 51 - Singly Linked Lists
Lecture 52 - Doubly Linked Lists - introduction
Lecture 53 - Organizing code into multiple files - 1
Lecture 54 - Organizing code into multiple files - 2
Lecture 55 - Pre and post increment

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NPTEL Video Course - Computer Science and Engineering - NOC:Fundamentals of Database Systems

Subject Co-ordinator - Dr. Arnab Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Databases
Lecture 2 - Relational Data Model
Lecture 3 - Relational Algebra Basic Operators
Lecture 4 - Relational Algebra Composition of Operators
Lecture 5 - Relational Algebra Additional Operators
Lecture 6 - Relational Algebra Extended Relational Algebra
Lecture 7 - Relational Algebra
Lecture 8 - SQL
Lecture 9 - SQL
Lecture 10 - SQL
Lecture 11 - SQL
Lecture 12 - Normalization Theory
Lecture 13 - Normalization Theory
Lecture 14 - Normalization Theory
Lecture 15 - Normalization Theory
Lecture 16 - Normalization Theory
Lecture 17 - Physical Design
Lecture 18 - Database Indexing
Lecture 19 - Database Indexing
Lecture 20 - Query Processing
Lecture 21 - Query Processing
Lecture 22 - Query Processing
Lecture 23 - Query Processing
Lecture 24 - Query Optimization
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Lecture 26 - Query Optimization
Lecture 27 - Query Optimization
Lecture 28 - Database Transactions
Lecture 29 - Database Transactions

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Lecture 30 - Recovery Systems
Lecture 31 - Recovery Systems
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Lecture 38 - Concurrency Control
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Lecture 45 - NoSQL
Lecture 46 - NoSQL
Lecture 47 - NoSQL
Lecture 48 - Big Data

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NPTEL Video Course - Computer Science and Engineering - NOC:Theory of Computation

Subject Co-ordinator - Prof. Raghunath Tewari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Finite Automata
Lecture 2 - Basic Notation and Convention, DFA Edit Lesson
Lecture 3 - Example of DFAs
Lecture 4 - Computation by DFA and Regular operation
Lecture 5 - Introduction to Nondeterminism
Lecture 6 - NFA, definition and examples
Lecture 7 - Equivalence of NFA and DFA, Closure properties
Lecture 8 - Regular expressions
Lecture 9 - Algebraic properties, RE to NFA conversion
Lecture 10 - GNFA to RE conversion
Lecture 11 - More closure properties of regular languages
Lecture 12 - Non-regular languages and pumping lemma
Lecture 13 - Examples of non-regular languages
Lecture 14 - DFA minimization
Lecture 15 - Introduction to CFGs
Lecture 16 - Examples of CFGs, Reg subset of CFL
Lecture 17 - Parse tree, derivation, ambiguity
Lecture 18 - Normal forms, Chomsky normal form
Lecture 19 - Non-CFLs, pumping lemma
Lecture 20 - Examples of non- CFLs
Lecture 21 - Pushdown Automata
Lecture 22 - Pushdown Automata - Definition and Example
Lecture 23 - Pushdown Automata - Examples and Relation with CFGs
Lecture 24 - Closure Properties of CFLs
Lecture 25 - Deterministic Context Free Languages
Lecture 26 - Turing Machine
Lecture 27 - More on Turing Machine
Lecture 28 - Non deterministic Turing Machine Edit Lesson
Lecture 29 - Configuration Graphs

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Lecture 30 - Closure Properties of Decidable and Turing recognizable languages
Lecture 31 - Decidability properties of Regular and Context Free Languages
Lecture 32 - Undecidability
Lecture 33 - More on Undecidability
Lecture 34 - Reduction
Lecture 35 - Applications of Reduction
Lecture 36 - Rice's theorem
Lecture 37 - Introduction to Computational Complexity Theory
Lecture 38 - More on the class NP
Lecture 39 - NP-Completeness
Lecture 40 - More on NP-Completeness

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NPTEL Video Course - Computer Science and Engineering - NOC:Modern Algebra

Subject Co-ordinator - Prof. Manindra Agrawal

Co-ordinating Institute - IIT - Kanpur

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Lecture 11 - Rings
Lecture 12 - Rings
Lecture 13 - Rings
Lecture 14 - Fields
Lecture 15 - Cauchy sequences and real numbers
Lecture 16 - Properties of Fields
Lecture 17 - Finite Fields
Lecture 18 - Application of Fields

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NPTEL Video Course - Computer Science and Engineering - NOC:Advanced Graph Theory

Subject Co-ordinator - Dr.Rajiv Misra

Co-ordinating Institute - IIT - Patna

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Lecture 1 - Graph Theory
Lecture 2 - Paths, Cycles and Trails
Lecture 3 - Eulerian Circuits, Vertex Degrees and Counting
Lecture 4 - The Chinese Postman Problem and Graphic Sequences
Lecture 5 - Trees and Distance
Lecture 6 - Spanning Trees and Enumeration
Lecture 7 - Matchings and Covers
Lecture 8 - Independent Sets, Covers and Maximum Bipartite Matching
Lecture 9 - Weighted Bipartite Matching
Lecture 10 - Stable Matchings and Faster Bipartite Matching
Lecture 11 - Factors and Perfect Matching in General Graphs
Lecture 12 - Matching in General Graphs
Lecture 13 - Connectivity and Paths
Lecture 14 - k-Connected Graphs
Lecture 15 - Network Flow Problems
Lecture 16 - Vertex Coloring and Upper Bounds
Lecture 17 - Brooksâ Theorem and Color-Critical Graphs
Lecture 18 - Counting Proper Colorings
Lecture 19 - Planar Graphs
Lecture 20 - Characterization of Planar Graphs
Lecture 21 - Line Graphs and Edge-coloring
Lecture 22 - Hamiltonian Graph, Traveling Salesman Problem and NP-Completeness
Lecture 23 - Connected Dominating Set and Distributed Algorithm

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NPTEL Video Course - Computer Science and Engineering - NOC:Cloud Computing and Distributed Systems

Subject Co-ordinator - Dr.Rajiv Misra

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Introduction to Cloud Computing
Lecture 2 - Virtualization
Lecture 3 - Hotspot Mitigation for Virtual Machine Migration
Lecture 4 - Server Virtualization
Lecture 5 - Software Defined Network
Lecture 6 - Geo-distributed Cloud Data Centers
Lecture 7 - Leader Election in Rings (Classical Distributed Algorithms)
Lecture 8 - Leader Election (Ring LE and Bully LE Algorithm)
Lecture 9 - Design of Zookeeper
Lecture 10 - Time and Clock Synchronization in Cloud Data Centers
Lecture 11 - Global State and Snapshot Recording Algorithms
Lecture 12 - Distributed Mutual Exclusion
Lecture 13 - Consensus in Cloud Computing and Paxos
Lecture 14 - Byzantine Agreement
Lecture 15 - Failures and Recovery Approaches in Distributed Systems
Lecture 16 - Design of Key-Value Stores
Lecture 17 - Design of HBase
Lecture 18 - Peer to Peer Systems in Cloud Computing
Lecture 19 - MapReduce
Lecture 20 - Introduction to Spark
Lecture 21 - Introduction to Kafka

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NPTEL Video Course - Computer Science and Engineering - NOC:Big Data Computing

Subject Co-ordinator - Dr. Rajiv Misra

Co-ordinating Institute - IIT - Patna

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Lecture 1 - Introduction to Big Data
Lecture 2 - Big Data Enabling Technologies
Lecture 3 - Hadoop Stack for Big Data
Lecture 4 - Hadoop Distributed File System (HDFS)
Lecture 5 - Hadoop MapReduce 1.0
Lecture 6 - Hadoop MapReduce 2.0 - Part I
Lecture 7 - Hadoop MapReduce 2.0 - Part II
Lecture 8 - MapReduce Examples
Lecture 9 - Parallel Programming with Spark
Lecture 10 - Introduction to Spark
Lecture 11 - Spark Built-in Libraries
Lecture 12 - Design of Key-Value Stores
Lecture 13 - Data Placement Strategies
Lecture 14 - CAP Theorem
Lecture 15 - Consistency Solutions
Lecture 16 - Design of Zookeeper
Lecture 17 - CQL (Cassandra Query Language)
Lecture 18 - Design of HBase
Lecture 19 - Spark Streaming and Sliding Window Analytics - Part I
Lecture 20 - Spark Streaming and Sliding Window Analytics - Part II
Lecture 21 - Sliding Window Analytics
Lecture 22 - Introduction to Kafka
Lecture 23 - Big Data Machine Learning - Part I
Lecture 24 - Big Data Machine Learning - Part II
Lecture 25 - Machine Learning Algorithm K-means using Map Reduce for Big Data Analytics
Lecture 26 - Parallel K-means using Map Reduce on Big Data Cluster Analysis
Lecture 27 - Decision Trees for Big Data Analytics
Lecture 28 - Big Data Predictive Analytics - Part I
Lecture 29 - Big Data Predictive Analytics - Part II

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Lecture 30 - Parameter Servers
Lecture 31 - PageRank Algorithm in Big Data
Lecture 32 - Spark GraphX and Graph Analytics - Part I
Lecture 33 - Spark GraphX and Graph Analytics - Part II
Lecture 34 - Case Study

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Blockchain Technology and Applica

Subject Co-ordinator - Prof. Sandeep Shukla

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Computer Science and Engineering - NOC:Arithmetic Circuit Complexity

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Turing Machines and Introduction to Arithmetic Circuits
Lecture 2 - Arithmetic complexity classes
Lecture 3 - Determinant is in VP
Lecture 4 - Determinant vs Arithmetic Branching Programs (ABP)
Lecture 5 - Determinant as signed sum of clow sequence
Lecture 6 - Determinant has small ABP and Strassen's homogenization
Lecture 7 - Depth reduction for arithmetic formulas
Lecture 8 - Depth reduction for arithmetic circuits
Lecture 9 - Depth 4 reduction
Lecture 10 - Depth 3 reduction
Lecture 11 - Equivalence of Formulas and Width 3 ABP
Lecture 12 - Width-2 ABP Chasm
Lecture 13 - Grigoriev-Karpinski Measure
Lecture 14 - Lower Bound of Depth-3 circuit over finite fields
Lecture 15 - Lower Bound for depth 3 Multilinear Circuits
Lecture 16 - Lower Bound for Constant depth Multilinear Circuits
Lecture 17 - Structural lemma for constant depth multilinear circuits
Lecture 18 - Extending the proof for multilinear formulas
Lecture 19 - Shifted Partial Derivative Measure
Lecture 20 - Exponential Lower Bound for General depth-4 CIrcuits
Lecture 21 - Lower Bound on Homogeneous Depth-4 circuits
Lecture 22 - Introduction to PIT
Lecture 23 - Hitting Set and Hitting Set Generator
Lecture 24 - PIT vs Lower Bounds

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NPTEL Video Course - Computer Science and Engineering - NOC:Computational Complexity Theory

Subject Co-ordinator - Prof. Raghunath Tewari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - NP Completeness
Lecture 3 - SAT is NP-complete
Lecture 4 - More on NP completeness
Lecture 5 - Hierarchy Theorems
Lecture 6 - Introduction to Space Complexity
Lecture 7 - Savitchâ s Theorem
Lecture 8 - Immerman-Szelepscenyi Theorem
Lecture 9 - Polynomial Hierarchy
Lecture 10 - A PSPACE Complete Problem
Lecture 11 - More on Polynomial Hierarchy
Lecture 12 - Alternating Turing Machines
Lecture 13 - Equivalence of Quantifier and Oracle Based Definitions of Polynomial Hierarchy
Lecture 14 - Boolean Circuits
Lecture 15 - Shannonâ s Theorem and Karp-Lipton-Sipser Theorem
Lecture 16 - Bounded Depth Circuit Classes
Lecture 17 - Kannanâ s Theorem
Lecture 18 - Probabilistic Complexity
Lecture 19 - StrongBPP and WeakBPP
Lecture 20 - One-sided and Zero-sided Error Probabilistic Complexity Classes
Lecture 21 - Error Reduction for BPP
Lecture 22 - BPP in PH and Logspace Randomized Classes
Lecture 23 - Valiant-Vazirani Theorem - I
Lecture 24 - Valiant-Vazirani Theorem - II
Lecture 25 - Amplified version of Valiant-Vazirani Theorem
Lecture 26 - Todaâ s Theorem - I
Lecture 27 - Todaâ s Theorem - II
Lecture 28 - Permanent and Determinant Functions
Lecture 29 - Permanent is hard for #P

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Lecture 30 - Interactive Proofs
Lecture 31 - Graph Non-Isomorphism is in IP[2]
Lecture 32 - Set Lower Bound Protocol
Lecture 33 - MA is in AM
Lecture 34 - Sumcheck Protocol - I
Lecture 35 - Sumcheck Protocol - II
Lecture 36 - Parity not in AC0 - I
Lecture 37 - Parity not in AC0 - II
Lecture 38 - Circuits with Counters
Lecture 39 - Communication Complexity - I
Lecture 40 - PCP Theorem
Lecture 41 - Communication Complexity - II

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NPTEL Video Course - Computer Science and Engineering - NOC:Randomized Methods in Complexity

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline
Lecture 2 - Circuits and Polynomial Identity Testing
Lecture 3 - Derandomization and Lower Bounds
Lecture 4 - IP=PSPACE
Lecture 5 - ACC0 Lower Bounds
Lecture 6 - ACC0 Lower Bounds (Continued...)
Lecture 7 - Monotone Circuits
Lecture 8 - Monotone Circuit Lower Bound and Sunflower Lemma
Lecture 9 - Undirected Graph Connectivity in randomized logspace
Lecture 10 - Graph Expansion Properties
Lecture 11 - Expanders
Lecture 12 - Error Reduction using Expanders
Lecture 13 - Ajtai-Komlos-Szemeredi Theorem
Lecture 14 - Explicit construction of expanders and Zig-Zag product
Lecture 15 - Spectral analysis of Zig-Zag product
Lecture 16 - Undirected Path in logspace
Lecture 17 - Explicit Prg to derandomizing classes
Lecture 18 - Hardness vs Randomness
Lecture 19 - Hardness to NW-Generator to PRG
Lecture 20 - Partial derandomization from worst-case hardness of permanent
Lecture 21 - Error-correcting codes
Lecture 22 - Introduction to various linear explicit codes
Lecture 23 - Introduction of efficient decoding
Lecture 24 - Local decoding of WH, Reed-Muller and Concatenated codes
Lecture 25 - Introduction to List Decoding
Lecture 26 - Local List decoding of WH, RM

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NPTEL Video Course - Computer Science and Engineering - NOC:Probability for Computer Science

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory examples
Lecture 2 - Examples and Course outline
Lecture 3 - Probability over discrete space
Lecture 4 - Inclusion-Exclusion principle
Lecture 5 - Probability over infinite space
Lecture 6 - Conditional probability, Partition formula
Lecture 7 - Independent events, Bayes theorem
Lecture 8 - Fallacies, Random variables
Lecture 9 - Expection
Lecture 10 - Conditional Expectation
Lecture 11 - Important Random Variables
Lecture 12 - Continuous Random Variables
Lecture 13 - Equality Checking, Poisson Distribution
Lecture 14 - Concentration Inequivalities, Variance
Lecture 15 - Weak Linearity of Variance, Law of Large Numbers
Lecture 16 - Chernoff's Bound. K-wise Independence
Lecture 17 - Union and Factorial Estimates
Lecture 18 - Stochastic Process: Markov Chains
Lecture 19 - Drunkard's walk, Evolution of Markov Chains
Lecture 20 - Stationary Distribution
Lecture 21 - Perron-Frobenius Theorem, Page Rank Algorithm
Lecture 22 - Page Rank Algorithm: Ergodicity
Lecture 23 - Cell Genetics
Lecture 24 - Random Sampling
Lecture 25 - Biased Coin Tosses, Hashing
Lecture 26 - Hashing, Introduction to Probabilistic Methods
Lecture 27 - Ramsey Numbers, Large Cuts in Graphcs
Lecture 28 - Sum Free Subsets, Discrepancy
Lecture 29 - Extremal Set Families

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Lecture 30 - Super Concentrators
Lecture 31 - Streaming Algorithms - I
Lecture 32 - Streaming Algorithms - II

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NPTEL Video Course - Computer Science and Engineering - NOC:Circuit Complexity Theory

Subject Co-ordinator - Prof. Raghunath Tewari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Standard Bounds
Lecture 3 - Shannon's Theorem
Lecture 4 - Riordon-Shannon Theorem
Lecture 5 - Khrapchenko's Theorem
Lecture 6 - Proof of Khrapchenko's Theorem
Lecture 7 - Application of Khrapchenko's Theorem
Lecture 8 - Nechiporuk's Theorem
Lecture 9 - Application of Nechiporuk's Theorem
Lecture 10 - Subbotovskaya's Theorem - I
Lecture 11 - Subbotovskaya's Theorem - II
Lecture 12 - Applications of Subbotovskaya's Theorem
Lecture 13 - Upper and Lower Bounds on the Andreev Function
Lecture 14 - Upper and Lower Bounds on the Andreev Function
Lecture 15 - Polynomial Size Monotone Formula for MAJORITY (Valiant's Theorem) - II
Lecture 16 - Circuits for Addition - Ripple Adder and Carry Lookahead Adder
Lecture 17 - Circuits for Addition - Parallel Prefix Sum Method
Lecture 18 - Circuits for Iterated Addition and Multiplication
Lecture 19 - Bounded Depth Circuit Classes
Lecture 20 - Basic Circuit for Division using Newton-Raphson Method
Lecture 21 - Division in NC1 (Beame, Cook, Hoover Theorem) - I
Lecture 22 - Division in NC1 (Beame, Cook, Hoover Theorem) - II
Lecture 23 - Division in NC1 (Beame, Cook, Hoover Theorem) - III
Lecture 24 - Division in NC1 (Beame, Cook, Hoover Theorem) - IV
Lecture 25 - Division in NC1 (Beame, Cook, Hoover Theorem) - V
Lecture 26 - Division in NC1 (Beame, Cook, Hoover Theorem) - VI
Lecture 27 - Relation between Bounded Depth Circuit Classes and Uniform Complexity Classes - I
Lecture 28 - Relation between Bounded Depth Circuit Classes and Uniform Complexity Classes - II
Lecture 29 - Reducing Circuit Depth

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Lecture 30 - P is in P/poly
Lecture 31 - Discussion on Lower Circuit Bounds for Bounded Depth Circuit Classes
Lecture 32 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - I
Lecture 33 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - II
Lecture 34 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - III
Lecture 35 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - IV
Lecture 36 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - V
Lecture 37 - Monotone Circuit Lower Bound for Clique (Razborov's Theorem) - VI
Lecture 38 - Circuit Lower Bound for Parity by Approximating Circuits using Polynomials (Razborov-Smolensky T
Lecture 39 - Circuit Lower Bound for Parity by Approximating Circuits using Polynomials (Razborov-Smolensky T
Lecture 40 - Circuit Lower Bound for Parity by Approximating Circuits using Polynomials (Razborov-Smolensky T
Lecture 41 - Circuit Lower Bound for Parity using Switching Lemma (Hastad's Theorem)
Lecture 42 - Circuit Lower Bound for Parity using Switching Lemma (Hastad's Theorem)
Lecture 43 - Circuit Lower Bound for Parity using Switching Lemma (Hastad's Theorem)
Lecture 44 - Proof of Hastad's Switching Lemma - I
Lecture 45 - Proof of Hastad's Switching Lemma - II
Lecture 46 - Communication Complexity of a Function
Lecture 47 - Relation Between Communication Complexity and Circuit Depth (Karchmer-Wigderson Theorem) - I
Lecture 48 - Relation Between Communication Complexity and Circuit Depth (Karchmer-Wigderson Theorem) - II
Lecture 49 - Bounded Width Branching Programs = NC1 (Barrington's Theorem) - I
Lecture 50 - Bounded Width Branching Programs = NC1 (Barrington's Theorem) - II
Lecture 51 - Width 3 Branching Programs = MOD3 o MOD2 Circuits (Barrington's Theorem) - I
Lecture 52 - Width 3 Branching Programs = MOD3 o MOD2 Circuits (Barrington's Theorem) - II
Lecture 53 - Uniform AC0 can be simulated by depth 3 Threshold circuits of quasipolynomial size (Allender-Her
Lecture 54 - Uniform AC0 can be simulated by depth 3 Threshold circuits of quasipolynomial size (Allender-Her
Lecture 55 - Valient-Vazirani Theorem - I
Lecture 56 - Valient-Vazirani Theorem - II
Lecture 57 - Natural Proof Barrier (Razborov-Rudich Theorem) - I
Lecture 58 - Natural Proof Barrier (Razborov-Rudich Theorem) - II
Lecture 59 - Pseudorandom Function Generator by Goldreich, Goldwasser and Micali - I
Lecture 60 - Pseudorandom Function Generator by Goldreich, Goldwasser and Micali - II

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundation of Cloud IoT Edge ML

Subject Co-ordinator - Prof. Rajiv Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Edge Computing
Lecture 2 - Introduction to Cloud
Lecture 3 - Introduction to IoT Platform
Lecture 4 - Time and Clock Synchronization in IoT
Lecture 5 - Enabling Intelligence at Edge Layer for IoT
Lecture 6 - ML-based Image Classifier at IoT-Edge
Lecture 7 - Introduction to Docker Containers and Kubernetes
Lecture 8 - ML based Predictive Maintenance at IoT Edge
Lecture 9 - Deep Reinforcement Learning for Cloud Edge
Lecture 10 - Deep Reinforcement Learning for Cloud Edge Example
Lecture 11 - Public Cloud Services Case Study of AWS Services
Lecture 12 - Mathematical formulations for task offloading in Edge Cloud
Lecture 13 - Task Offloading Based on LSTM Prediction and Deep Reinforcement Learning
Lecture 14 - Vertical and Horizontal Offloading for Cloud Edge
Lecture 15 - Global State and Snapshot Recording Algorithms
Lecture 16 - Hot Data Analytics for Real Time Streaming in IoT Platform
Lecture 17 - Introduction to MQTT and Kafka in IoT Platform
Lecture 18 - Introduction to Edge Data Center for IoT Platform
Lecture 19 - Design of Key Value Stores for IoT Edge Storage
Lecture 20 - Introduction to Edge ML with AWS IoT platform
Lecture 21 - Introduction to Federated Learning at IoT Edge
Lecture 22 - ML for Autonomous Driving Car

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NPTEL Video Course - Computer Science and Engineering - NOC:Linear Programming and its Applications to Comput

Subject Co-ordinator - Prof. Rajat Mittal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Linear Programming, an Example
Lecture 2 - Introduction to Linear Programming
Lecture 3 - Gaussian Elimination with Examples
Lecture 4 - Summary of Gaussian Elimination
Lecture 5 - Vector Space over real numbers
Lecture 6 - Linear Operators
Lecture 7 - Solutions of Linear Equations
Lecture 8 - Resource Allocation as LP
Lecture 9 - Approximate Degree as LP
Lecture 10 - Equivalent LP's
Lecture 11 - Introduction to Convexity
Lecture 12 - Different Kind of Convex Sets
Lecture 13 - Feasible Region of LP
Lecture 14 - Proof of Weyl's Theorem
Lecture 15 - Definition of Convex Functions
Lecture 16 - Properties of Convex Functions and Examples
Lecture 17 - Basic Feasible Solution
Lecture 18 - BFS and Vertices
Lecture 19 - Simplex Algorithm
Lecture 20 - Details of Simplex Algorithm
Lecture 21 - Starting BFS
Lecture 22 - Degeneracy
Lecture 23 - Introduction to Duality
Lecture 24 - Hyperplane Separation Theorems
Lecture 25 - Farkas Lemma
Lecture 26 - How to take dual
Lecture 27 - Examples of taking dual
Lecture 28 - Strong Duality
Lecture 29 - Proof of Strong Duality

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Lecture 30 - Complementary Slackness
Lecture 31 - Introduction to Algorithmic Game Theory
Lecture 32 - Nash Equilibrium
Lecture 33 - Minimax and Nash Equilibrium
Lecture 34 - Deterministic Communication Complexity
Lecture 35 - Randomized Communication Complexity
Lecture 36 - Yao's Minimax Theorem
Lecture 37 - Lower bounds using Yao's Minimax
Lecture 38 - Set Disjointness Problem
Lecture 39 - LP for mass flow problem
Lecture 40 - LP for min cut problem
Lecture 41 - Max flow = Min cut
Lecture 42 - Primal dual approach
Lecture 43 - Primal dual for max flow
Lecture 44 - Set cover problem
Lecture 45 - Rounding for set cover
Lecture 46 - Analysis of Rounding
Lecture 47 - Algorithm for Set Cover
Lecture 48 - Linear Regression through LP
Lecture 49 - Linear Classifiers through LP

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NPTEL Video Course - Computer Science and Engineering - NOC:Basics of Computational Complexity

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Outline
Lecture 3 - Formalize Problems and Machines
Lecture 4 - Turing Machine
Lecture 5 - Asymptotics, Church-Turing Thesis and UTM
Lecture 6 - Halting Problem and Diagonalization
Lecture 7 - Classes P, NP, EXP
Lecture 8 - Comparison of Classes and Non-determination
Lecture 9 - NP Vs Ntime
Lecture 10 - SAT is NP-hard
Lecture 11 - Cook-Levin Theorem
Lecture 12 - NP-Hardness and Co-Classes
Lecture 13 - NEXP and Godel's Computation Question
Lecture 14 - Time, Space Hierarchy
Lecture 15 - NDTM Hierarchy
Lecture 16 - Ladner's Theorem and Introduction to Oracles
Lecture 17 - Oracle and Relativizing Proofs
Lecture 18 - Non Relativizing P=NP and Introduction to Space Complexity
Lecture 19 - PSpace Completeness
Lecture 20 - QBF Game and NSpace
Lecture 21 - NL Complete
Lecture 22 - NL = coNL
Lecture 23 - Polynomial Hierarchy
Lecture 24 - Polynomial Hierarchy
Lecture 25 - PH Complete and Oracle TM
Lecture 26 - NP^NP and #SAT
Lecture 27 - Counting Classes #P and PP
Lecture 28 - Permanent and its Cycle cover of a Graph
Lecture 29 - #P-Complete: Graph Gadgets

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Lecture 30 - #P-Hard: Analyse XOR
Lecture 31 - Valient-Vazirani Lemma and Hashing
Lecture 32 - SAT to Parity-SAT
Lecture 33 - Parity Quantification
Lecture 34 - Randomized Reduction of PH to Parity-P
Lecture 35 - PH to #P
Lecture 36 - Probabilistic TM
Lecture 37 - Example of PTM and Introduction to RP and ZPP
Lecture 38 - ZPP = RP and coRP
Lecture 39 - Probability Amplification
Lecture 40 - BPP in PH
Lecture 41 - GNI is in BP.NP
Lecture 42 - GI is NP-hard
Lecture 43 - GI is NP-hard (Continued...) Going Beyond TMs
Lecture 44 - Circuit Complexity
Lecture 45 - TM with Advice - P/poly
Lecture 46 - Circuits for NP and EXP
Lecture 47 - Parallel Computation
Lecture 48 - P-completeness and NEXP-completeness

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NPTEL Video Course - Computer Science and Engineering - NOC:Edge Computing

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Cloud Computing
Lecture 2 - Cloud Computing and its Limitation to Support Low Latency and RTT
Lecture 3 - Introduction to Edge Computing
Lecture 4 - Edge Computing Paradigms - 004
Lecture 5 - Overview of Virtualization
Lecture 6 - Docker Containers
Lecture 7 - Kubernetes
Lecture 8 - NoSQL Databases and Key Value Stores
Lecture 9 - Edge AI Intelligence at the Edge
Lecture 10 - Edge AI Intelligence at the Edge
Lecture 11 - Mobile Edge Computing
Lecture 12 - Geo-distributed Data Centers
Lecture 13 - Time and Clock Synchronization
Lecture 14 - Edge Computing Security and Privacy
Lecture 15 - Network Virtualization
Lecture 16 - Resource Allocation in Private and Public Edge-Cloud Systems

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NPTEL Video Course - Computer Science and Engineering - NOC:Practical Cyber Security for Cyber Security Pract

Subject Co-ordinator - Prof. Sandeep K. Shukla

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course - Practical Cyber Security for Cyber Practitioners
Lecture 2 - Introduction to Cyber Kill Chains - Lockheed Martin Kill Chain
Lecture 3 - Understanding Cyber Kill Chain - Delivery, Exploitation, and Installation
Lecture 4 - Mastering the Cyber Kill Chain: Command and Control and Actions on Objectives
Lecture 5 - Introduction to MITRE ATT&CK framework
Lecture 6 - Understanding MITRE ATT&CK: A Guide to Cyber Threat Intelligence
Lecture 7 - Mapping to ATT&CK from Finished Cyber Incident
Lecture 8 - Introduction to Mapping to ATT&CK from Raw Data
Lecture 9 - Mapping to ATT&CK from RAW Data
Lecture 10 - Storing and Analyzing ATT&CK-Mapped Data
Lecture 11 - Making Defensive Recommendations from ATT&CK-Mapped Data
Lecture 12 - TTP Mapping and Introduction to Unified Kill Chain
Lecture 13 - Deep Dive into Unified Kill Chain - Part 1
Lecture 14 - Deep Dive into Unified Kill Chain - Part 2
Lecture 15 - Introduction to MITRE DEF3ND Framework
Lecture 16 - Deep dive into MITRE DEF3ND framework - I
Lecture 17 - Deep dive into MITRE DEF3ND framework - II
Lecture 18 - MITRE DEF3ND Framework Conclusion and Introduction to Risk Identification and Assessment
Lecture 19 - Deep dive into Risk Assessment - I
Lecture 20 - Deep dive into Risk Assessment - II
Lecture 21 - Introduction to Cyber Crisis Management
Lecture 22 - Cyber Crisis Conclusion and Introduction to Cyber Resilience
Lecture 23 - Deep dive into Cyber Resilience - I
Lecture 24 - Deep dive into Cyber Resilience - II
Lecture 25 - Cyber Resilience Review (Self-Assessment)
Lecture 26 - Cyber Threat Intelligence Sharing - STIX Tutorial - Part 1
Lecture 27 - Cyber Threat Intelligence Sharing - STIX Tutorial - Part 2
Lecture 28 - Introduction to SCAP, CVE and CCE
Lecture 29 - Deep Dive into CVE, CCE, CPE, CVSS Scoring, XCCDF, OVAL Languages - Part 1

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Lecture 30
Lecture 31

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NPTEL Video Course - Computer Science and Engineering - NOC:Computational Arithmetic - Geometry for Algebraic

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course outline and Fundamentals
Lecture 2 - Ideals and Varieties
Lecture 3 - Dimension of Varieties
Lecture 4 - Projective varieties
Lecture 5 - Morphisms and rational functions
Lecture 6 - Local rings
Lecture 7 - Rational maps and Birationality
Lecture 8 - Tangent space and Singularities
Lecture 9 - Resolution of singularities
Lecture 10 - Discrete valuation rings
Lecture 11 - Existence of nonsingular model
Lecture 12 - Nonsingular curves
Lecture 13 - Divisor on Curves
Lecture 14 - Riemann-Roch Spaces - I
Lecture 15 - Riemann-Roch Spaces - II
Lecture 16 - Divisor Class Group
Lecture 17 - Genus of a curve
Lecture 18 - Riemann-Roch and Adeles
Lecture 19 - Differentials and Riemann-Roch
Lecture 20 - Canonical divisor and proof of Riemann-Roch
Lecture 21 - Jacobian of a curve
Lecture 22 - Zeta function of curves
Lecture 23 - Functional equation and point counting
Lecture 24 - Riemann hypothesis for curves
Lecture 25 - Proof of RH for curves: Galois covers
Lecture 26 - Proof of RH for curves II: Multilinear algebra
Lecture 27 - Cohomological interpretation of zeta function

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NPTEL Video Course - Computer Science and Engineering - NOC:Discrete Mathematics for CS

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline
Lecture 2 - Whar are Proofs - I
Lecture 3 - What are Proofs - II
Lecture 4 - What are Proofs - III
Lecture 5 - How to Count - I
Lecture 6 - How to Count - II
Lecture 7 - How to Count - III
Lecture 8 - How to Count - IV and What's Combinatorics - I
Lecture 9 - What's Combinatorics - II
Lecture 10 - What's Combinatorics - III and What are Posets - I
Lecture 11 - What are Posets - II
Lecture 12 - What are Posets - III and What are Graphs - I
Lecture 13 - What are Graphs - II
Lecture 14 - What are Graphs - III
Lecture 15 - What are Graphs - IV
Lecture 16 - What are Graphs - V and Graph Properties - I
Lecture 17 - Graph Properties - II
Lecture 18 - Colorings and Matchings - I
Lecture 19 - Colorings and Matchings - II
Lecture 20 - Colorings and Matchings - III and Properties of Numbers - I
Lecture 21 - Properties of Numbers - II
Lecture 22 - Properties of Numbers - III
Lecture 23 - Properties of Numbers - IV
Lecture 24 - Properties of Numbers - V and Primes and Cryptography - I
Lecture 25 - Primes and Cryptography - II
Lecture 26 - Primes and Cryptography - III and Fields and Applications - I
Lecture 27 - Fields and Applications - II
Lecture 28 - Fields and Applications - III
Lecture 29 - Fields and Applications - IV

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Lecture 30 - Fields and Applications - V
Lecture 31 - Fields and Applications - VI
Lecture 32 - Fields and Applications - VII and What's a Group - I
Lecture 33 - What's a Group - II
Lecture 34 - What's a Group - III
Lecture 35 - Burnside's Lemma and Normal Subgroups

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NPTEL Video Course - Computer Science and Engineering - NOC:Practical High-Performance Computing

Subject Co-ordinator - Prof. Mahendra Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to High Performance Computation (Bird's-eye View of Computer Systems)
Lecture 2 - L2 Part A : Basic Design (Bird's-eye View of Computer Systems)
Lecture 3 - L2 Part B : Processors (Bird's-eye View of Computer Systems)
Lecture 4 - L3 Part A : Vectorization (Bird's-eye View of Computer Systems)
Lecture 5 - L3 Part B : Multicore Processors (Bird's-eye View of Computer Systems)
Lecture 6 - L4 Part A : Memory (Basics of Operating System)
Lecture 7 - L4 Part B : Basics of Operating System (Basics of Operating System)
Lecture 8 - L4 Part C : RAM (Basics of Operating System)
Lecture 9 - L4 Part D : Interconnect (Basics of Operating System)
Lecture 10 - L5 Part A : Parallel Computer Classification (Basics of Operating System)
Lecture 11 - L5 Part B : Classes of Parallelism (Basics of Operating System)
Lecture 12 - L5 Part C : Networks (Basics of Operating System)
Lecture 13 - L6 Part A : Top-10 HPC Systems (High Performance Computing (HPC) Clusters)
Lecture 14 - L6 Part B : Using GPUs for HPC (High Performance Computing (HPC) Clusters)
Lecture 15 - L7 Part A : Scaling (High Performance Computing (HPC) Clusters)
Lecture 16 - L7 Part B : Programming Practices (High Performance Computing (HPC) Clusters)
Lecture 17 - L8 Part A : Programming Language (C and Python)
Lecture 18 - L8 Part B : Classes in Python (C and Python)
Lecture 19 - L8 Part C : Inheritance (C and Python)
Lecture 20 - L9 Part A : Modules in Python (C and Python)
Lecture 21 - L9 Part B : Python Pitfalls (C and Python)
Lecture 22 - L9 Part C : Python Arrays (C and Python)
Lecture 23 - L10 Part A : C Arrays 1D (C and Python)
Lecture 24 - L10 Part B : Higher-Dimensional C Arrays (C and Python)
Lecture 25 - L11 Part A : Python Codes Optimization 1 (Programming Paradigm)
Lecture 26 - L11 Part B : C++ Codes Optimization 1 (Programming Paradigm)
Lecture 27 - L12 Part A : Python Codes Optimization 2 (Programming Paradigm)
Lecture 28 - L12 Part B : C++ Codes Optimization 2 (Programming Paradigm)
Lecture 29 - L13 Part A : C++ Codes Optimization 3 (Cache Locality) (Programming Paradigm)

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Lecture 30 - L13 Part B : Speeding up Using Numba (Programming Paradigm)
Lecture 31 - L14 Part A : Finite Difference Method (Multiprocessing and Multithreading)
Lecture 32 - L14 Part B : Particle Simulations (Molecular Dynamics) (Multiprocessing and Multithreading)
Lecture 33 - L14 Part C : Using Multiprocessing Module (Multiprocessing and Multithreading)
Lecture 34 - L15 Part A : Cache Issues in Multiprocessing (Multiprocessing and Multithreading)
Lecture 35 - L15 Part B : Using Multithreading Module (Multiprocessing and Multithreading)
Lecture 36 - L15 Part C : Computing Sum(a*b) with Multithreads (Multiprocessing and Multithreading)
Lecture 37 - L15 Part D : Computing AX=Y with Multithreads (Multiprocessing and Multithreading)
Lecture 38 - L16 Part A : MPI Using Mpi4py (Message Passing Interface - MPI)
Lecture 39 - L16 Part B : Point-to-Point Communication (1) (Message Passing Interface - MPI)
Lecture 40 - L16 Part C : Point-to-Point Communication (2) (Message Passing Interface - MPI)
Lecture 41 - L17 Part A : Unblocking Send/Recv (Message Passing Interface - MPI)
Lecture 42 - L17 Part B : Collective Communication and Reduction Operation (Message Passing Interface - MPI)
Lecture 43 - L17 Part C : Send/Receive for Finite Difference Scheme (Message Passing Interface - MPI)
Lecture 44 - L17 Part D : MPI Sum with Examples (Message Passing Interface - MPI)
Lecture 45 - L18 Part A : Introduction to CUDA Programming (CUDA Programming)
Lecture 46 - L18 Part B : Introduction to C (1) (CUDA Programming)
Lecture 47 - L18 Part C : Introduction to C (2) (CUDA Programming)
Lecture 48 - L18 Part D : CUDA Programming (1) (CUDA Programming)
Lecture 49 - L19 Part A : CUDA Programming (2) (CUDA Programming)
Lecture 50 - L19 Part B : Examples Using CUDA Programming (CUDA Programming)
Lecture 51 - L19 Part C : Matrix Multiplication (CUDA Programming)
Lecture 52 - L19 Part D : Derivative Computation Using Finite Difference (CUDA Programming)
Lecture 53 - L20 Part A : Cupy Programming (Cupy/Numba/OpenACC Programming)
Lecture 54 - L20 Part B : CUDA Programming with Numba (Cupy/Numba/OpenACC Programming)
Lecture 55 - L20 Part C : Introduction to OpenACC Programming 1 (Cupy/Numba/OpenACC Programming)
Lecture 56 - L21 Part A : Introduction to OpenACC Programming 2 (Cupy/Numba/OpenACC Programming)
Lecture 57 - L21 Part B : Solving Laplace Equation / OpenACC UPDATE Directives and Clauses (Cupy/Numba/OpenAC
Lecture 58 - L22 Part A : Introduction to MPI in C (MPI in C)
Lecture 59 - L22 Part B : MPI Environment (MPI in C)
Lecture 60 - L22 Part C : Point to Point Communications (MPI in C)
Lecture 61 - L23 Part A : Collective Communication and Reduction Operation (MPI in C)
Lecture 62 - L23 Part B : Using OPENMP (MPI in C)
Lecture 63 - L24 Part A : FFT (FFT + Profiling + Paraview)
Lecture 64 - L24 Part B : Spectral Method (FFT + Profiling + Paraview)
Lecture 65 - L24 Part C : Profiling (FFT + Profiling + Paraview)
Lecture 66 - L24 Part D : Paraview (FFT + Profiling + Paraview)
Lecture 67 - L25 Part A : Project 1: Cahn-Hilliard Equation (Projects + Summary)
Lecture 68 - L25 Part B : Project 2: Compressible Flow (Projects + Summary)

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Lecture 69 - L25 Part C : Project 3: Ising Model (Projects + Summary)
Lecture 70 - L25 Part D : Project 4: Magnetohydodynamics (Projects + Summary)
Lecture 71 - L25 Part E : Project 5: Molecular Dynamics (Projects + Summary)
Lecture 72 - L25 Part F : Project 6: Nonlinear Shrodinger Equation (Projects + Summary)
Lecture 73 - L25 Part G : Project 7: XY Model (Projects + Summary)
Lecture 74 - L26 : Summary (Projects + Summary)

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NPTEL Video Course - Computer Science and Engineering - NOC:Data Structures and Algorithms Design

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is an Algorithm ?
Lecture 2 - Efficient Algorithms
Lecture 3 - Sorting, Searching and Arrays
Lecture 4 - Clever Algorithms
Lecture 5 - Asymptotics, Fast Max-Sum Subarray
Lecture 6 - Local Minima in 1D
Lecture 7 - Local Minima in 2D
Lecture 8 - Efficient Local Minima in 2D
Lecture 9 - Recurrence and Efficient Data Structures
Lecture 10 - Range Minima in 1D array
Lecture 11 - Abstract Data Structures: Lists
Lecture 12 - Linked Lists
Lecture 13 - Binary Search Inspired Tree
Lecture 14 - BST : Search, Insertion
Lecture 15 - Balancing a BST, Stack Data Structure
Lecture 16 - Stack: Expression Evaluation
Lecture 17 - Queue DS
Lecture 18 - Red Black Tree DS
Lecture 19 - RB Tree: Balance
Lecture 20 - Divide and Conquer Paradigm
Lecture 21 - Integer Multiplication and Inversions
Lecture 22 - Graph Theory and Algorithms
Lecture 23 - Graph DS and Breadth First Search
Lecture 24 - Complexity and Applications of BFS
Lecture 25 - Check Bipartiteness using BFS, Depth First Search
Lecture 26 - DFS tree and biconnected graph
Lecture 27 - Articulation Points, Heap Data Structure
Lecture 28 - Binary Heap
Lecture 29 - Heapification

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Lecture 30 - Augmented tree Data Structure
Lecture 31 - Multi Increment and Dynamic Range Min Problems
Lecture 32 - Disjoint-Set Data Structure
Lecture 33 - Fast Union and the i-th Statistic Problem
Lecture 34 - i-th Statistic Problem: Approx Median
Lecture 35 - Greedy Algorithms: Job Scheduling
Lecture 36 - Minimum Spanning Tree
Lecture 37 - MST Cycle, Mobile Towers
Lecture 38 - Shortest Path Algorithm
Lecture 39 - Djikstra's Algorithm
Lecture 40 - Counting Sort, Radix Sort

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NPTEL Video Course - Computer Science and Engineering - NOC:Bayesian Data Analysis for the Behavioral Science

Subject Co-ordinator - Prof. Himanshu Yadav

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sets
Lecture 2 - Probability Axioms
Lecture 3 - Probability Assignment
Lecture 4 - Probability Assigner Functions
Lecture 5 - Random Variables
Lecture 6 - Probability Distributions and Statistical Inference
Lecture 7 - Discrete Random variables: Binomial and Poisson Distributions
Lecture 8 - Continuous Random Variables
Lecture 9 - Normal Distribution
Lecture 10 - Lognormal Distribution and Beta Distribution
Lecture 11 - Probability Distributions in R
Lecture 12 - Likelihood Function
Lecture 13 - Graph of a Likelihood Function
Lecture 14 - Conditional Probability
Lecture 15 - Bayes' Theorem
Lecture 16 - Bayesian Inference
Lecture 17 - Likelihood, Prior and Posterior in R
Lecture 18 - How the data, prior affects the posterior
Lecture 19 - Prior and Posterior Predictions
Lecture 20 - Generating Prior and Posterior Prediction in R
Lecture 21 - Posterior Predictive Checks
Lecture 22 - Model Building in the Bayesian Framework
Lecture 23 - Bayesian Modeling Workflow in R
Lecture 24 - Bayesian Learning
Lecture 25 - Specifying Priors
Lecture 26 - Parameter Estimation Method
Lecture 27 - Analytical Methods of Posterior Estimation
Lecture 28 - Grid Approximation
Lecture 29 - Importance Sampling

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Lecture 30 - Introduction to Markov Chain Monte Carlo
Lecture 31 - MCMC Sampler
Lecture 32 - MCMC Implementation
Lecture 33 - MCMC Diagnostics
Lecture 34 - MCMC Examples
Lecture 35 - MCMC Sampling for Data with Multiple Observations
Lecture 36 - Hamiltonian Monte Carlo
Lecture 37 - HMC Implementation
Lecture 38 - HMC Example
Lecture 39 - Introduction to brms
Lecture 40 - Parameter Estimation using brms
Lecture 41 - Introduction to Regression Models
Lecture 42 - Regression Modeling using brms
Lecture 43 - Logistic and Poisson Regression
Lecture 44 - Regression Modelling Examples
Lecture 45 - Interaction Effect and Nested Contrast
Lecture 46 - Posterior Predictive Checks
Lecture 47 - Information- Theoretic Measures of Predictive Accuracy
Lecture 48 - Expected Log Predictive Density (ELPD)
Lecture 49 - Cross Validation
Lecture 50 - Cross Validation Implementation
Lecture 51 - Validations with Brms
Lecture 52 - Bayes Factor
Lecture 53 - Bayes factor Implementation
Lecture 54 - Hypothesis Testing using Bayes Factors
Lecture 55 - Computing Bayes Factor using Bridge Sampling
Lecture 56 - Bayesian Hierarchical Models
Lecture 57 - Hierarchical Regression Models
Lecture 58 - ndividual Difference Models
Lecture 59 - Hierarchical Modeling with brms
Lecture 60 - Theory Testing and Computational Modeling

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NPTEL Video Course - Computer Science and Engineering - NOC:Quantum Computing: Algorithms and Limitations Thr

Subject Co-ordinator - Prof. Rajat Mittal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Quantum Algorithms
Lecture 2 - Why Quantum Algorithms - Part 1
Lecture 3 - Why Quantum Algorithms - Part 2
Lecture 4 - Analyzing Computation Through Linear Algebra - Part 1
Lecture 5 - Analyzing Computation Through Linear Algebra - Part 2
Lecture 6 - States of Probabilistic Computation - Part 1
Lecture 7 - States of Probabilistic Computation - Part 2
Lecture 8 - States of Quantum Computation (First Postulate) - Part 1
Lecture 9 - States of Quantum Computation (First Postulate) - Part 2
Lecture 10 - Eigenvalues of a Unitary Matrix - Part 1
Lecture 11 - Eigenvalues of a Unitary Matrix - Part 2
Lecture 12 - Operations (Gates) in Quantum Computation - Part 1
Lecture 13 - Operations (Gates) in Quantum Computation - Part 2
Lecture 14 - Projectors and the Third Postulate - Part 1
Lecture 15 - Projectors and the Third Postulate - Part 2
Lecture 16 - Quantum Circuits - Part 1
Lecture 17 - Quantum Circuits - Part 2
Lecture 18 - Example of Quantum Circuits - Part 1
Lecture 19 - Example of Quantum Circuits - Part 2
Lecture 20 - Circuit Representation for Elitzur-Vaidman - Part 1
Lecture 21 - Circuit Representation for Elitzur-Vaidman - Part 2
Lecture 22 - Deutsch's Algorithm - Part 1
Lecture 23 - Deutsch's Algorithm - Part 2
Lecture 24 - Randomized Algorithms - Part 1
Lecture 25 - Randomized Algorithms - Part 2
Lecture 26 - Examples of Randomized Algorithms - Part 1
Lecture 27 - Examples of Randomized Algorithms - Part 2
Lecture 28 - Bernstein-Vazirani Algorithm and Simon's algorithm - Part 1
Lecture 29 - Bernstein-Vazirani Algorithm and Simon's algorithm - Part 2

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Lecture 30 - Basics of Group Theory for Fourier Analysis - Part 1
Lecture 31 - Basics of Group Theory for Fourier Analysis - Part 2
Lecture 32 - Quantum Fourier Transform - Part 1
Lecture 33 - Quantum Fourier Transform - Part 2
Lecture 34 - Phase estimation and Shor - Part 1
Lecture 35 - Phase estimation and Shor - Part 2
Lecture 36 - From Randomized Search to Grover Search - Part 1
Lecture 37 - From Randomized Search to Grover Search - Part 2
Lecture 38 - Variations of Grover Search
Lecture 39 - Quantum Walks - Part 1
Lecture 40 - Quantum Walks - Part 2
Lecture 41 - Optimality of Randomized Search - Part 1
Lecture 42 - Optimality of Randomized Search - Part 2
Lecture 43 - Optimality of Grover Search - Part 1
Lecture 44 - Optimality of Grover Search - Part 2
Lecture 45 - Quantum Advantage for Total Functions - Part 1
Lecture 46 - Quantum Advantage for Total Functions - Part 2
Lecture 47 - Huang's Sensitivity Theorem - Part 1
Lecture 48 - Huang's Sensitivity Theorem - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Exploratory Data Analysis for Data Science with R

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - How to Learn and Follow the Course
Lecture 2 - Data Science - Why, What and How ?
Lecture 3 - Introduction to R Software
Lecture 4 - Calculations with R Software - Basics and R as a Calculator
Lecture 5 - Calculations with R Software - Calculations with Data Vectors
Lecture 6 - Calculations with R Software - Built-in Commands and Missing Data Handling
Lecture 7 - Calculations with R Software - Operations with Matrices
Lecture 8 - Data Preparation - CSV and TXT Data Files
Lecture 9 - Data Preparation - Excel Files and Data Frame
Lecture 10 - Introduction to Exploratory Data Analysis - Objectives, Steps and Basic Definitions
Lecture 11 - Introduction to Exploratory Data Analysis - Variables and Types of Data
Lecture 12 - Frequency Distribution - Absolute, Relative and Cumulative Frequencies of Attribute and Discrete
Lecture 13 - Frequency Distribution - Absolute, Relative and Cumulative Frequencies of Continuous Data
Lecture 14 - Frequency Distribution - Frequency Distribution with R Package
Lecture 15 - Univariate Graphics and Plots - Bar Diagrams
Lecture 16 - Univariate Graphics and Plots - Subdivided Bar Plots and Pie Diagrams
Lecture 17 - Univariate Graphics and Plots - 3D Pie Diagram and Tree Map
Lecture 18 - Univariate Graphics and Plots - Histogram, Kernel Density and Stem-Leaf Plots
Lecture 19 - Univariate Graphics and Plots - Graphics with ggplot2 Package
Lecture 20 - Univariate Graphics and Plots - Creating Graphics with ggplot2 Package
Lecture 21 - Univariate Graphics and Plots - Bar Diagram and Tree Map with ggplot2
Lecture 22 - Univariate Graphics and Plots - Grouped Bar and Scatter Diagrams with ggplot2 Package
Lecture 23 - Univariate Graphics and Plots - Histogram, Dot Chart and Kernel Density Plots with ggplot2
Lecture 24 - Central Tendency of Data - Arithmetic Mean
Lecture 25 - Central Tendency of Data - Median
Lecture 26 - Central Tendency of Data - Quantiles
Lecture 27 - Central Tendency of Data - Mode
Lecture 28 - Central Tendency of Data - Geometric Mean and Harmonic Mean
Lecture 29 - Variation in Data - Range, Interquartile Range and Quartile Deviation

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Lecture 30 - Variation in Data - Absolute Deviation and Absolute Mean Deviation
Lecture 31 - Variation in Data - Mean Squared Error, Variance and Standard Deviation
Lecture 32 - Variation in Data - Computation of Variance and Standard Error with R
Lecture 33 - Variation in Data - Coefficient of Variation and Summary
Lecture 34 - Variation in Data - Box Plots and Violin Plots
Lecture 35 - Moments - Raw, Central and Absolute Moments
Lecture 36 - Moments - Computation of Moments in R
Lecture 37 - Moments - Skewness and Kurtosis
Lecture 38 - Scaling of Data - Centering, Scaling and Z-Scores
Lecture 39 - Association of Variables - Scatter and Smooth Scatter Plots
Lecture 40 - Association of Variables - Line Chart, Time Series Plot and Bubble Chart
Lecture 41 - Association of Variables - Quantile - Quantile Plot
Lecture 42 - Association of Variables - Three-Dimensional Plots, Heat Maps and Word Cloud
Lecture 43 - Association of Variables - Correlation Coefficient
Lecture 44 - Association of Variables - Correlation Coefficient using R Software
Lecture 45 - Association of Variables - Rank Correlation Coefficient
Lecture 46 - Association of Variables - Measures of Association for Discrete and Counting Variables: Bivariat
Lecture 47 - Association of Variables - Measures of Association for Discrete and Counting Variables with R Co
Lecture 48 - Modelling of Variables : Least Squares Method - One Variable
Lecture 49 - Modelling of Variables : Least Squares Method - More than One Variable and R Commands
Lecture 50 - Handling Text Data : Basic Operations with Text and Strings
Lecture 51 - Handling Text Data : Operations for Finding Patterns in Text Data with Pipe Operator
Lecture 52 - Handling Text Data : Operations for Finding Patterns in Text Data without Pipe Operator
Lecture 53 - Handling Text Data : Analysis of Text Data - Frequency and Plots
Lecture 54 - Selection of Sample : Simple Random Sampling
Lecture 55 - Selection of Sample : Simple Random Sampling with R
Lecture 56 - EDA with Multivariate Data : Sum and Mean Vectors
Lecture 57 - EDA with Multivariate Data : Covariance and Correlation Matrices

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NPTEL Video Course - Computer Science and Engineering - Cryptography and Network Security

Subject Co-ordinator - Dr. Debdeep Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Overview on Modern Cryptography
Lecture 3 - Introduction to Number Theory
Lecture 4 - Probability and Information Theory
Lecture 5 - Classical Cryptosystems
Lecture 6 - Cryptanalysis of Classical Ciphers
Lecture 7 - Shannons Theory
Lecture 8 - Shannons Theory (Continued...1)
Lecture 9 - Shannons Theory (Continued...2)
Lecture 10 - Symmetric Key Ciphers
Lecture 11 - Block Cipher Standards (DES)
Lecture 12 - Block Cipher Standards (AES)
Lecture 13 - Block Cipher Standards (AES) (Continued...)
Lecture 14 - Linear Cryptanalysis
Lecture 15 - Differential Cryptanalysis
Lecture 16 - Few other Cryptanalytic Techniques
Lecture 17 - Overview on S-Box Design Principles
Lecture 18 - Modes of Operation of Block Ciphers
Lecture 19 - Stream Ciphers
Lecture 20 - Stream Ciphers (Continued...1)
Lecture 21 - Stream Ciphers (Continued...2)
Lecture 22 - Pseudorandomness
Lecture 23 - Cryptographic Hash Functions
Lecture 24 - Cryptographic Hash Functions (Continued...1)
Lecture 25 - Cryptographic Hash Functions (Continued...2)
Lecture 26 - Message Authentication Codes
Lecture 27 - More Number Theoretic Results
Lecture 28 - The RSA Cryptosystem
Lecture 29 - Primality Testing

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Lecture 30 - Factoring Algorithms
Lecture 31 - Some Comments on the Security of RSA
Lecture 32 - Discrete Logarithm Problem (DLP)
Lecture 33 - The Diffie-Hellman Problem and Security of ElGamal Systems
Lecture 34 - An Introduction to Elliptic Curve Cryptography
Lecture 35 - Application of Elliptic Curves to Cryptography
Lecture 36 - Implementation of Elliptic Curve Cryptography
Lecture 37 - Secret Sharing Schemes
Lecture 38 - A Tutorial on Network Protocols
Lecture 39 - System Security
Lecture 40 - Firewalls and Intrusion Detection Systems
Lecture 41 - Side Channel Analysis of Cryptographic Implementations

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NPTEL Video Course - Computer Science and Engineering - High Performance Computer Architecture

Subject Co-ordinator - Prof. Ajit Pal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction & Course Outline
Lecture 2 - Performance
Lecture 3 - Instruction Set Architecture
Lecture 4 - MIPS ISA and Processor
Lecture 5 - MIPS ISA and Processor (Continued...)
Lecture 6 - Pipelining - Introduction
Lecture 7 - Instruction Pipelining
Lecture 8 - Pipeline Hazards
Lecture 9 - Data Hazards
Lecture 10 - Software Pipelining
Lecture 11 - In Quest of Higher ILP
Lecture 12 - In Quest of Higher ILP (Continued...)
Lecture 13 - Dynamic Instruction Scheduling
Lecture 14 - Dynamic Instruction Scheduling (Continued...)
Lecture 15 - Control Hazards
Lecture 16 - Branch Prediction
Lecture 17 - Branch Prediction (Continued...)
Lecture 18 - Dynamic Instruction Scheduling with Branch Prediction
Lecture 19 - Hardware-based Speculation
Lecture 20 - Tutorial - I
Lecture 21 - Hierarchical Memory Organization
Lecture 22 - Hierarchical Memory Organization (Continued...1)
Lecture 23 - Hierarchical Memory Organization (Continued...2)
Lecture 24 - Hierarchical Memory Organization (Continued...3)
Lecture 25 - Cache Optimization Techniques (Continued...1)
Lecture 26 - Cache Optimization Techniques (Continued...2)
Lecture 27 - Main Memory Organization
Lecture 28 - Main Memory Optimizations
Lecture 29 - Virtual Memory

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Lecture 30 - Virtual Memory (Continued...)
Lecture 31 - Virtual Machines
Lecture 32 - Storage Technology
Lecture 33 - Storage Technology (Continued...)
Lecture 34 - Case Studies
Lecture 35 - Case Studies (Continued...1)
Lecture 36 - Case Studies (Continued...2)
Lecture 37 - Multithreading & Multiprocessing
Lecture 38 - Simultaneous Multithreading
Lecture 39 - Symmetric Multiprocessors
Lecture 40 - Distributed Memory Multiprocessors
Lecture 41 - Cluster, Grid and Cloud Computing

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NPTEL Video Course - Computer Science and Engineering - Low Power VLSI Circuits and Systems

Subject Co-ordinator - Prof. Ajit Pal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction & Course Outline
Lecture 2 - MOS Transistors - I
Lecture 3 - MOS Transistors - II
Lecture 4 - MOS Transistors - III
Lecture 5 - MOS Transistors - IV
Lecture 6 - MOS Inverters - I
Lecture 7 - MOS Inverters - II
Lecture 8 - MOS Inverters - III
Lecture 9 - MOS Inverters - IV
Lecture 10 - Static CMOS Circuits - I
Lecture 11 - Static CMOS Circuits - II
Lecture 12 - MOS Dynamic Circuits - I
Lecture 13 - MOS Dynamic Circuits - II
Lecture 14 - Pass Transistor Logic Circuits - I
Lecture 15 - Pass Transistor Logic Circuits - II
Lecture 16 - MOS Memories
Lecture 17 - Finite State Machines
Lecture 18 - Switching Power Dissipation
Lecture 19 - Tutorial - I
Lecture 20 - Dynamic Power Dissipation
Lecture 21 - Leakage Power Dissipation
Lecture 22 - Supply Voltage Scaling - I
Lecture 23 - Supply Voltage Scaling - II
Lecture 24 - Supply Voltage Scaling - III
Lecture 25 - Supply Voltage Scaling - IV
Lecture 26 - Tutorial - II
Lecture 27 - Minimizing Switched Capacitance - I
Lecture 28 - Minimizing Switched Capacitance - II
Lecture 29 - Minimizing Switched Capacitance - III

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Lecture 30 - Minimizing Switched Capacitance - IV
Lecture 31 - Minimizing Switched Capacitance - V
Lecture 32 - Minimizing Leakage Power - I
Lecture 33 - Minimizing Leakage Power - II
Lecture 34 - Minimizing Leakage Power - III
Lecture 35 - Variation Tolerant Design
Lecture 36 - Adiabatic Logic Circuits
Lecture 37 - Battery-Driven System Design
Lecture 38 - CAD Tools for Low Power
Lecture 39 - Tutorial - III
Lecture 40 - Course Summary

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NPTEL Video Course - Computer Science and Engineering - Real Time Systems

Subject Co-ordinator - Prof. Rajib Mall

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Real - Time System Characteristics
Lecture 3 - Few Basic Issues
Lecture 4 - Modelling Timing Constraints
Lecture 5 - Modelling Timing Constraints (Continued.)
Lecture 6 - Basics of Real - Time Task Scheduling
Lecture 7 - Cyclic Scheduler
Lecture 8 - Event - Driven Scheduling
Lecture 9 - Rate Monotonic Scheduler
Lecture 10 - RMA Scheduling
Lecture 11 - Deadline Monotonic Scheduling and Other Issues
Lecture 12 - Few Issues in Use of RMA
Lecture 13 - Resource Sharing Among Real-Time Tasks
Lecture 14 - Highest Locker and Priority Ceiling Protocols
Lecture 15 - An Analysis of Priority Ceiling Protocol
Lecture 16 - Handling Task Dependencies
Lecture 17 - Real-Time Task Scheduling on Multiprocessors and Distributed Systems
Lecture 18 - Real-Time Task Scheduling on Multiprocessors and Distributed Systems (Continued.)
Lecture 19 - Clock Synchronization in Distributed Real-Time Systems
Lecture 20 - Internal Clock Synchronization in Presence of Byzantine Clocks
Lecture 21 - A Few Basic Issues in Real-Time Operating Systems
Lecture 22 - Tutorial - I
Lecture 23 - A Few Basic Issues in Real-Time Operating Systems (Continued.)
Lecture 24 - Unix and Windows as RTOS
Lecture 25 - Real - Time POSIX
Lecture 26 - Real - Time POSIX (Continued.)
Lecture 27 - Open Source and Commercial RTOS
Lecture 28 - Open Source and Commercial RTOS (Continued.)
Lecture 29 - Benchmarking Real - Time Computer & Operating Systems

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Lecture 30 - Benchmarking Real - Time Computer & Operating Systems (Continued.)
Lecture 31 - Real - Time Communications
Lecture 32 - Few Basic Issues in Real - Time Communications
Lecture 33 - Review of Computer Networking
Lecture 34 - Real - Time Communication in a LAN
Lecture 35 - Real - Time Communication in a LAN (Continued.)
Lecture 36 - Performance of Two Real -Time Communication Protocols
Lecture 37 - Real - Time Communication over Packet Switched Networks
Lecture 38 - Real - Time Communication over Packet Switched Networks (Continued.)
Lecture 39 - Real - Time Communication over Packet Switched Networks (Continued.)
Lecture 40 - Real - Time Databases

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NPTEL Video Course - Computer Science and Engineering - Artificial Intelligence (Prof. Anupam Basu)

Subject Co-ordinator - Prof. Sudeshna Sarkar, Prof. Anupam Basu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Artificial Intelligence
Lecture 2 - Intelligent Agents
Lecture 3 - State Space Search
Lecture 4 - Uninformed Search
Lecture 5 - Informed Search
Lecture 6 - Informed Search - 2
Lecture 7 - Two Players Games - I
Lecture 8 - Two Players Games - II
Lecture 9 - Constraint Satisfaction Problems - 1
Lecture 10 - Constraint Satisfaction Problems - 2
Lecture 11 - Knowledge Representation and Logic
Lecture 12 - Interface in Propositional Logic
Lecture 13 - First Order Logic
Lecture 14 - Reasoning Using First Order Logic
Lecture 15 - Resolution in FOPL
Lecture 16 - Rule Based System
Lecture 17 - Rule Based Systems II
Lecture 18 - Semantic Net
Lecture 19 - Reasoning in Semantic Net
Lecture 20 - Frames
Lecture 21 - Planning - 1
Lecture 22 - Planning - 2
Lecture 23 - Planning - 3
Lecture 24 - Planning - 4
Lecture 25 - Rule Based Expert System
Lecture 26 - Reasoning with Uncertainty - I
Lecture 27 - Reasoning with Uncertainty - II
Lecture 28 - Reasoning with Uncertainty - III
Lecture 29 - Reasoning with Uncertainty - IV

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Lecture 30 - Fuzzy Reasoning - I
Lecture 31 - Fuzzy Reasoning - II
Lecture 32 - Introduction to Learning - I
Lecture 33 - Introduction to Learning - II
Lecture 34 - Rule Induction and Decision Trees - I
Lecture 35 - Rule Induction and Decision Trees - II
Lecture 36 - Learning Using neural Networks - I
Lecture 37 - Learning Using Neural Networks - II
Lecture 38 - Probabilistic Learning
Lecture 39 - Natural Language Processing - I
Lecture 40 - Natural Language Processing - II

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NPTEL Video Course - Computer Science and Engineering - Artificial Intelligence (Prof. P. Dasgupta)

Subject Co-ordinator - Prof. P. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Artificial Intelligence
Lecture 2 - Problem Solving by Search
Lecture 3 - Searching with Costs
Lecture 4 - Informed State Space Search
Lecture 5 - Heuristic Search
Lecture 6 - Problem Reduction Search
Lecture 7 - Searching Game Trees
Lecture 8 - Knowledge Based Systems
Lecture 9 - First Order Logic
Lecture 10 - Inference in First Order Logic
Lecture 11 - Resolution - Refutation Proofs
Lecture 12 - Resolution Refutation Proofs
Lecture 13 - Logic Programming
Lecture 14 - Prolog Programming
Lecture 15 - Prolog
Lecture 16 - Additional Topics
Lecture 17 - Introduction to Planning
Lecture 18 - Partial Order Planning
Lecture 19 - GraphPLAN and SATPlan
Lecture 20 - SATPlan
Lecture 21 - Reasoning under uncertainty
Lecture 22 - Bayesian Networks
Lecture 23 - Reasoning with Bayes Networks
Lecture 24 - Reasoning with Bayes networks (Contd.)
Lecture 25 - Reasoning under uncertainty
Lecture 26 - Learning
Lecture 27 - Learning
Lecture 28 - Back Propagation Learning

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NPTEL Video Course - Computer Science and Engineering - Computer Networks

Subject Co-ordinator - Prof. Sujoy Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Emergence of Networks & Reference Models
Lecture 2 - Network Topology
Lecture 3 - Physical Medium - I
Lecture 4 - Physical Medium - II
Lecture 5 - Multiplexing (Sharing a Medium)
Lecture 6 - Telecom Networks
Lecture 7 - Switches - I
Lecture 8 - Pocket Switches
Lecture 9 - SONET/SDH
Lecture 10 - Fiber Optic Components
Lecture 11 - Routing and Wavelength Assignment
Lecture 12 - Protection and Restoration
Lecture 13 - Multiple Access
Lecture 14 - Token Based Mac
Lecture 15 - Data Link Protocols
Lecture 16 - Error Control
Lecture 17 - Stop & Wait Protocol
Lecture 18 - Satellite Communication
Lecture 19 - Ethernet - CSMA/CD
Lecture 20 - Modern Ethernet
Lecture 21 - Local Internetworking
Lecture 22 - Cellular Networks
Lecture 23 - Wireless Network
Lecture 24 - ATM
Lecture 25 - ATM Signaling, Routing and LAN Emulation
Lecture 26 - Introduction to Routing
Lecture 27 - RIP - Distance Vector Routing
Lecture 28 - IP version 4
Lecture 29 - IP Version 6 & Mobile IP

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Lecture 30 - UDP & Client Server
Lecture 31 - TCP
Lecture 32 - IP Multicasting
Lecture 33 - DHCP and ICMP
Lecture 34 - DNS & Directory
Lecture 35 - Congestion Control
Lecture 36 - QOS & Multimedia
Lecture 37 - Network Management
Lecture 38 - Security
Lecture 39 - FTP - SMTP
Lecture 40 - HTTP

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NPTEL Video Course - Computer Science and Engineering - Data Communication

Subject Co-ordinator - Prof. Ajit Pal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Course Outline - Data Communication
Lecture 2 - Layered Architecture
Lecture 3 - Data and Signal
Lecture 4 - Transmission Impairments and Channel Capacity
Lecture 5 - Guided Transmission Media
Lecture 6 - Unguided Media
Lecture 7 - Transmission of Digital Signal - I
Lecture 8 - Transmission of Digital Signal - II
Lecture 9 - Transmission of Analog Signal - I
Lecture 10 - Transmission of Analog Signal - II
Lecture 11 - Multiplexing
Lecture 12 - Multiplexing
Lecture 13 - Multiplexing Applications - I
Lecture 14 - Multiplexing Applications - II
Lecture 15 - Interfacing to the Media
Lecture 16 - Error Detection and Correction
Lecture 17 - Flow and Error Control
Lecture 18 - Data Link Control
Lecture 19 - Switching Techniques Circuit Switching
Lecture 20 - Switching Techniques Packet Switching
Lecture 21 - Routing - I
Lecture 22 - Routing - II
Lecture 23 - Congestion Control
Lecture 24 - X.25 and Frame Relay
Lecture 25 - ATM
Lecture 26 - Medium Access Control - I
Lecture 27 - Medium Access Control - II
Lecture 28 - Medium Access Control - III
Lecture 29 - IEEE 802 LANs

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Lecture 30 - High Speed LANs
Lecture 31 - Wireless LANs
Lecture 32 - Cellular Telephone Systems
Lecture 33 - Satellite Communications
Lecture 34 - Internet and Internetworking
Lecture 35 - TCP/IP - I
Lecture 36 - TCP/IP - II
Lecture 37 - Multimedia Networks
Lecture 38 - Audio and Video Compression
Lecture 39 - Multimedia Services
Lecture 40 - Secured Communication - I
Lecture 41 - Secured Communication - II

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NPTEL Video Course - Computer Science and Engineering - Electronic Design Automation

Subject Co-ordinator - Prof. Indranil Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Verilog
Lecture 3 - Verilog
Lecture 4 - Verilog
Lecture 5 - Verilog
Lecture 6 - Verilog
Lecture 7 - Verilog
Lecture 8 - Synthesis
Lecture 9 - Synthesis
Lecture 10 - Synthesis
Lecture 11 - Synthesis
Lecture 12 - Synthesis
Lecture 13 - Synthesis
Lecture 14 - Synthesis
Lecture 15 - Backend Design
Lecture 16 - Backend Design
Lecture 17 - Backend Design
Lecture 18 - Backend Design
Lecture 19 - Backend Design
Lecture 20 - Backend Design
Lecture 21 - Backend Design
Lecture 22 - Backend Design
Lecture 23 - Backend Design
Lecture 24 - Backend Design
Lecture 25 - Backend Design
Lecture 26 - Backend Design
Lecture 27 - Backend Design
Lecture 28 - Backend Design
Lecture 29 - Backend Design

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Lecture 30 - Testing Part - I
Lecture 31 - Testing Part - II
Lecture 32 - Testing Part - III
Lecture 33 - Testing Part - IV
Lecture 34 - Testing Part - V
Lecture 35 - Testing Part - VI

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NPTEL Video Course - Computer Science and Engineering - Internet Technology

Subject Co-ordinator - Prof. Indranil Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Internet
Lecture 2 - Review Of Network Technologies
Lecture 3 - TCP/IP - Part-I
Lecture 4 - TCP/IP - Part-II
Lecture 5 - TCP/IP - Part-III
Lecture 6 - IP Subnetting and Addressing
Lecture 7 - Internet Routing Protocol - Part-I
Lecture 8 - Internet Routing Protocol - Part-II
Lecture 9 - Client Server Concepts DNS, Telnet, FTP
Lecture 10 - Electronic Mail
Lecture 11 - World Wide Web - Part-I
Lecture 12 - World Wide Web - Part-II
Lecture 13 - HTML
Lecture 14 - HTML
Lecture 15 - HTML
Lecture 16 - Extensible Markup Language (XML)
Lecture 17 - HTML Forms
Lecture 18 - Image Maps
Lecture 19 - CGI Scripts
Lecture 20 - Other Technologies
Lecture 21 - PERL - Part-I
Lecture 22 - PERL - Part II
Lecture 23 - PERL - Part III
Lecture 24 - PERL - Part IV
Lecture 25 - Javascript
Lecture 26 - Javascript Examples (Continued)
Lecture 27 - Using Cookies
Lecture 28 - Java Applets
Lecture 29 - Java Applets

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Lecture 30 - Client-Server Programming In Java
Lecture 31 - Intranet, Extranet, Firewall
Lecture 32 - Basic Cryptographic Concepts Part - I
Lecture 33 - Basic Cryptographic Concepts Part - II
Lecture 34 - Basic Cryptographic Concepts Part - III
Lecture 35 - Electronic Commerce
Lecture 36 - Streaming Multimedia Applications
Lecture 37 - Internet Telephony
Lecture 38 - Search Engine And Web Crawlers
Lecture 39 - Search Engine And Web Crawlers
Lecture 40 - Course Summary And Conclusion

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NPTEL Video Course - Computer Science and Engineering - Programming and Data Structure

Subject Co-ordinator - Dr. P.P. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - C Programming - I
Lecture 3 - C Programming - II
Lecture 4 - C Programming - III
Lecture 5 - Data Structuring
Lecture 6 - Data Structuring
Lecture 7 - Data Structuring
Lecture 8 - Problem Decomposition By Recursion - I
Lecture 9 - Problem Decomposition By Recursion - II
Lecture 10 - Problem Decomposition By Recursion - III
Lecture 11 - Merge sort And Quick sort
Lecture 12 - Characters And Strings
Lecture 13 - Arrays
Lecture 14 - Structures - I
Lecture 15 - Structures - II
Lecture 16 - Dynamic Allocation Part - I
Lecture 17 - Linked Lists - I
Lecture 18 - Complexity (Efficiency) of Algorithms
Lecture 19 - Asymptotic Growth Functions
Lecture 20 - Asymptotic Analysis of Algorithms
Lecture 21 - Data Structuring
Lecture 22 - Search Trees
Lecture 23 - Search Trees - II
Lecture 24 - Search Trees - III
Lecture 25 - 2-3 Trees
Lecture 26 - Algorithm Design - I
Lecture 27 - Algorithm Design - II
Lecture 28 - Algorithm Design - III
Lecture 29 - Graphs - I

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Lecture 30 - Graphs - II
Lecture 31 - Graphs - III
Lecture 32 - Conclusions

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NPTEL Video Course - Computer Science and Engineering - NOC:Software Testing

Subject Co-ordinator - Prof. Rajib Mall

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Levels of Testing
Lecture 3 - Basic Concepts in Testing
Lecture 4 - Basic Concepts in Testing (Continued...)
Lecture 5 - Unit Testing
Lecture 6 - Equivalence and BV Testing
Lecture 7 - Special Value Testing
Lecture 8 - Combinatorial Testing
Lecture 9 - Pairwise Testing
Lecture 10 - White Box Testing
Lecture 11 - MC/DC Testing
Lecture 12 - MC/DC Testing (Continued...)
Lecture 13 - Path Testing
Lecture 14 - Dataflow and Mutation Testing
Lecture 15 - Mutation Testing
Lecture 16 - Integration Testing
Lecture 17 - System Testing
Lecture 18 - Regression Testing
Lecture 19 - Testing Object-Oriented Program - Part 1
Lecture 20 - Testing Object-Oriented Program - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming in C++

Subject Co-ordinator - Prof. Partha Pratim Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1
Lecture 2 - Module 1
Lecture 3 - Module 1
Lecture 4 - Module 2
Lecture 5 - Module 3
Lecture 6 - Module 4
Lecture 7 - Module 5
Lecture 8 - Module 6
Lecture 9 - Module 6
Lecture 10 - Module 7
Lecture 11 - Module 7
Lecture 12 - Module 8
Lecture 13 - Module 8
Lecture 14 - Module 8
Lecture 15 - Module 9
Lecture 16 - Module 9
Lecture 17 - Module 10
Lecture 18 - Module 10
Lecture 19 - Module 11
Lecture 20 - Module 11
Lecture 21 - Module 12
Lecture 22 - Module 12
Lecture 23 - Module 13
Lecture 24 - Module 13
Lecture 25 - Module 13
Lecture 26 - Module 14
Lecture 27 - Module 14
Lecture 28 - Module 14
Lecture 29 - Module 15

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Lecture 30 - Module 15
Lecture 31 - Module 16
Lecture 32 - Module 17
Lecture 33 - Module 18
Lecture 34 - Module 19
Lecture 35 - Module 20
Lecture 36 - Module 21
Lecture 37 - Module 22
Lecture 38 - Module 23
Lecture 39 - Module 24
Lecture 40 - Module 25
Lecture 41 - Module 26
Lecture 42 - Module 27
Lecture 43 - Module 28
Lecture 44 - Module 29
Lecture 45 - Module 30
Lecture 46 - Module 31
Lecture 47 - Module 32
Lecture 48 - Module 33
Lecture 49 - Module 34
Lecture 50 - Module 35
Lecture 51 - Module 35
Lecture 52 - Module 36
Lecture 53 - Module 37
Lecture 54 - Module 38
Lecture 55 - Module 39
Lecture 56 - Module 40

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Machine Learning

Subject Co-ordinator - Prof. S. Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Different Types of Learning
Lecture 3 - Hypothesis Space and Inductive Bias
Lecture 4 - Evaluation and Cross-Validation
Lecture 5 - Tutorial - I
Lecture 6 - Linear Regression
Lecture 7 - Introduction to Decision Trees
Lecture 8 - Learning Decision Tree
Lecture 9 - Overfitting
Lecture 10 - Python Exercise on Decision Tree and Linear Regression
Lecture 11 - Tutorial - II
Lecture 12 - k-Nearest Neighbour
Lecture 13 - Feature Selection
Lecture 14 - Feature Extraction
Lecture 15 - Collaborative Filtering
Lecture 16 - Python Exercise on kNN and PCA
Lecture 17 - Tutorial - III
Lecture 18 - Bayesian Learning
Lecture 19 - Naive Bayes
Lecture 20 - Bayesian Network
Lecture 21 - Python Exercise on Naive Bayes
Lecture 22 - Tutorial - IV
Lecture 23 - Logistic Regression
Lecture 24 - Introduction Support Vector Machine
Lecture 25 - SVM
Lecture 26 - SVM
Lecture 27 - Nonlinear SVM and Kennel Function
Lecture 28 - SVM
Lecture 29 - Python Exercise on SVM

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Lecture 30 - Introduction
Lecture 31 - Multilayer Neural Network
Lecture 32 - Neural Network and Backpropagation Algorithm
Lecture 33 - Deep Neural Network
Lecture 34 - Python Exercise on Neural Network
Lecture 35 - Tutorial - VI
Lecture 36 - Introduction to Computational Learning Theory
Lecture 37 - Sample Complexity
Lecture 38 - VC Dimension
Lecture 39 - Introduction to Ensembles
Lecture 40 - Bagging and Boosting
Lecture 41 - Introduction to Clustering
Lecture 42 - Kmeans Clustering
Lecture 43 - Agglomerative Hierarchical Clustering
Lecture 44 - Python Exercise on kmeans clustering

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NPTEL Video Course - Computer Science and Engineering - NOC:Object-Oriented Analysis and Design

Subject Co-ordinator - Prof. Partha Pratim Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Challanges in Software Engineering
Lecture 2 - Complexity of Software
Lecture 3 - Complexity of Software (Continued...)
Lecture 4 - Structure and Attributes of a Complex System
Lecture 5 - Structure and Attributes of a Complex System (Continued...)
Lecture 6 - Object-Oriented Analysis and Design
Lecture 7 - Bringing Order to Chaos
Lecture 8 - Bringing Order to Chaos (Continued...)
Lecture 9 - Evolution of Object Models - Programming Languages and Paradigms
Lecture 10 - Foundations of the Object Model - OOA, OOD and OOP
Lecture 11 - Foundations of the Object Model - OOA, OOD and OOP (Continued...)
Lecture 12 - Elements of Object Model (Major)
Lecture 13 - Elements of Object Model (Major)
Lecture 14 - Elements of the Object Model (Major)
Lecture 15 - Elements of the Object Model (Major)
Lecture 16 - Elements of the Object Model (Minor)
Lecture 17 - Elements of the Object Model (Minor)
Lecture 18 - Nature of an object
Lecture 19 - Nature of an object
Lecture 20 - Relationships among objects
Lecture 21 - Relationships among objects (Continued...)
Lecture 22 - Nature of a class
Lecture 23 - Nature of a class
Lecture 24 - Relationships among classes
Lecture 25 - Relationships among classes (Continued...)
Lecture 26 - How to Build Quality Classes and Objects
Lecture 27 - Tutorial
Lecture 28 - How to Identify Classes and Objects ?
Lecture 29 - Identification of Classes, Objects and Relationship in LMS

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Lecture 30 - Identification of Classes, Objects and Relationship in LMS (Continued...)
Lecture 31 - Identification of Classes, Objects and Relationship in LMS (Continued...)
Lecture 32 - Identification of Classes, Objects and Relationship in LMS (Continued...)
Lecture 33 - Overview of UML
Lecture 34 - SDLC Phases and UML Diagrams
Lecture 35 - Use-Case Diagrams - Part I
Lecture 36 - Use-Case Diagrams - Part II
Lecture 37 - Use-Case Diagrams - Part III
Lecture 38 - Class Diagrams - Part 1 (Class, Property and Operation)
Lecture 39 - Class Diagrams - Part 2 (Association, Weak and Strong Aggregation)
Lecture 40 - Class Diagrams - Part 3 (Generalization, Dependency and Constraints)
Lecture 41 - Sequence Diagrams - Part 1
Lecture 42 - Sequence Diagrams - Part 2
Lecture 43 - Communication Diagram
Lecture 44 - Activity Diagrams - Part II
Lecture 45 - Activity Diagrams - Part II
Lecture 46 - Activity Diagrams - Part III
Lecture 47 - Interaction Overview Diagram
Lecture 48 - State Machine Diagrams - Part I
Lecture 49 - State Machine Diagrams - Part II
Lecture 50 - State Machine Diagrams - Part III
Lecture 51 - Various UML Diagrams
Lecture 52 - Closing Comments

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NPTEL Video Course - Computer Science and Engineering - NOC:Complex Network : Theory and Application

Subject Co-ordinator - Prof. Animesh Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Network Analysis - I
Lecture 3 - Network Analysis - II
Lecture 4 - Network Analysis - III
Lecture 5 - Network Analysis - IV
Lecture 6 - Network Analysis - V
Lecture 7 - Network Analysis - VI
Lecture 8 - Social Network Principles - I
Lecture 9 - Social Network Principles - II
Lecture 10 - Social Network Principles - III
Lecture 11 - Social Network Principles - IV
Lecture 12 - Community Analysis - I
Lecture 13 - Community Analysis - II
Lecture 14 - Community Analysis - III
Lecture 15 - Community Analysis - IV
Lecture 16 - Community Analysis - V
Lecture 17 - Community Analysis - VI
Lecture 18 - Citation Analysis - I
Lecture 19 - Citation Analysis - II
Lecture 20 - Citation Analysis - III
Lecture 21 - Citation Analysis - IV

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NPTEL Video Course - Computer Science and Engineering - Fundamental Algorithms:Design and Analysis

Subject Co-ordinator - Prof.Sourav Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Insertion Sort and Asymptotic Analysis
Lecture 2 - Solving Recurrences
Lecture 3 - Divide and Conquer Paradigm
Lecture 4 - Quick Sort
Lecture 5 - Heap Sort
Lecture 6 - Decision Tree
Lecture 7 - Linear Time Sorting
Lecture 8 - Order Statistics
Lecture 9 - Hashing
Lecture 10 - Universal Hashing, BST Sort
Lecture 11 - Red-Black Tree
Lecture 12 - Augmenting Data Structure
Lecture 13 - Computational Geometry
Lecture 14 - Van Emde Boas Data Structure
Lecture 15 - Dynamic Programming
Lecture 16 - Graph Algorithm
Lecture 17 - BFS and DFS
Lecture 18 - Dijkstra
Lecture 19 - Bellman Ford
Lecture 20 - Floyd Marshall

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NPTEL Video Course - Computer Science and Engineering - NOC:Natural Language Processing

Subject Co-ordinator - Prof. Pawan Goyal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - What Do We Do in NLP
Lecture 3 - Why is NLP hard
Lecture 4 - Empirical Laws
Lecture 5 - Text Processing
Lecture 6 - Spelling Correction
Lecture 7 - Weighted Edit Distance, Other Variations
Lecture 8 - Noisy Channel Model for Spelling Correction
Lecture 9 - N-Gram Language Models
Lecture 10 - Evaluation of Language Models, Basic Smoothing
Lecture 11 - Tutorial I
Lecture 12 - Language Modeling
Lecture 13 - Computational Morphology
Lecture 14 - Finite - State Methods for Morphology
Lecture 15 - Introduction to POS Tagging
Lecture 16 - Hidden Markov Models for POS Tagging
Lecture 17 - Viterbi Decoding for HMM, Parameter Learning
Lecture 18 - Baum Welch Algorithm
Lecture 19 - Maximum Entropy Models - I
Lecture 20 - Maximum Entropy Models - II
Lecture 21 - Conditional Random Fields
Lecture 22 - Syntax - Introduction
Lecture 23 - Syntax - Parsing I
Lecture 24 - Syntax - CKY, PCFGs
Lecture 25 - PCFGs - Inside-Outside Probabilities
Lecture 26 - Inside-Outside Probabilities
Lecture 27 - Dependency Grammars and Parsing - Introduction
Lecture 28 - Transition Based Parsing
Lecture 29 - Transition Based Parsing

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Lecture 30 - MST-Based Dependency Parsing
Lecture 31 - MST-Based Dependency Parsing
Lecture 32 - Distributional Semantics - Introduction
Lecture 33 - Distributional Models of Semantics
Lecture 34 - Distributional Semantics
Lecture 35 - Word Embeddings - Part I
Lecture 36 - Word Embeddings - Part II
Lecture 37 - Lexical Semantics
Lecture 38 - Lexical Semantics - Wordnet
Lecture 39 - Word Sense Disambiguation - I
Lecture 40 - Word Sense Disambiguation - II
Lecture 41 - Novel Word Sense detection
Lecture 42 - Topic Models
Lecture 43 - Latent Dirichlet Allocation
Lecture 44 - Gibbs Sampling for LDA, Applications
Lecture 45 - LDA Variants and Applications - I
Lecture 46 - LDA Variants and Applications - II
Lecture 47 - Entity Linking - I
Lecture 48 - Entity Linking - II
Lecture 49 - Information Extraction - Introduction
Lecture 50 - Relation Extraction
Lecture 51 - Distant Supervision
Lecture 52 - Text Summarization - LEXRANK
Lecture 53 - Optimization based Approaches for Summarization
Lecture 54 - Summarization Evaluation
Lecture 55 - Text Classification - I
Lecture 56 - Text Classification - II
Lecture 57 - Tutorial II
Lecture 58 - Tutorial III
Lecture 59 - Tutorial IV
Lecture 60 - Tutorial V
Lecture 61 - Sentiment Analysis - Introduction
Lecture 62 - Sentiment Analysis - Affective Lexicons
Lecture 63 - Learning Affective Lexicons
Lecture 64 - Computing with Affective Lexicons
Lecture 65 - Aspect - Based Sentiment Analysis

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NPTEL Video Course - Computer Science and Engineering - NOC:Embedded Systems Design

Subject Co-ordinator - Prof. Anupam Basu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Processors
Lecture 3 - General Purpose and ASIPs Processor
Lecture 4 - Designing a Single Purpose Processor
Lecture 5 - Optimization Issues
Lecture 6 - Introduction to FPFA
Lecture 7 - FPGA (Continued...)
Lecture 8 - Behaviour Synthesis on FPGA using VHDL
Lecture 9 - Tutorial - I
Lecture 10 - Tutorial - II
Lecture 11 - Tutorial - III
Lecture 12 - Tutorial - IV
Lecture 13 - Sensors and Signals
Lecture 14 - Discretization of Signals and A/D Converter
Lecture 15 - Quantization Noise, SNR and D/A Converter
Lecture 16 - Arduino Uno
Lecture 17 - Arduino Uno (Continued...), Serial Communication and Timer
Lecture 18 - Controller Design using Arduino
Lecture 19 - Tutorial - V
Lecture 20 - Power Aware Embedded System - I
Lecture 21 - Power Aware Embedded System - II
Lecture 22 - SD and DD Algorithm
Lecture 23 - Parallel Operations and VLIW
Lecture 24 - Code Efficiency
Lecture 25 - DSP Application and Address Generation Unit
Lecture 26 - Real Time O.S - I
Lecture 27 - Real Time O.S - II
Lecture 28 - RMS Algorithm
Lecture 29 - EDF Algorithm and Resource Constraint Issue

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Lecture 30 - Priority Inversion and Priority Inheritance Protocol
Lecture 31 - Modeling and Specification - I
Lecture 32 - Modeling and Specification - II
Lecture 33 - FSM and Statechart
Lecture 34 - Statechart and Statemate Semantics
Lecture 35 - Statecharts (Continued...)
Lecture 36 - Program State Machines
Lecture 37 - SDL
Lecture 38 - Data Flow Model - I
Lecture 39 - Data Flow Model - II
Lecture 40 - Hardware Synthesis - I
Lecture 41 - Hardware Synthesis - II
Lecture 42 - Scheduling
Lecture 43 - Digital Camera Design
Lecture 44 - Digital Camera - Iterative Design
Lecture 45 - HW-SW Partitioning
Lecture 46 - Optimization - I
Lecture 47 - Optimization - II
Lecture 48 - Simulation
Lecture 49 - Formal Verification

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NPTEL Video Course - Computer Science and Engineering - NOC:Wireless Ad Hoc and Sensor Networks

Subject Co-ordinator - Prof. Sudip Misra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Self-organizing Behaviour of Wireless Ad Hoc Networks
Lecture 4 - Cooperation in Mobile Ad Hoc Networks - Part-I
Lecture 5 - Cooperation in Mobile Ad Hoc Networks - Part-II
Lecture 6 - MAC Protocols in MANETs - Part-I
Lecture 7 - MAC Protocols in MANETs - Part-II
Lecture 8 - Routing in MANETs - Part-I
Lecture 9 - Routing in MANETs - Part-II
Lecture 10 - Routing in MANETs - Part-III
Lecture 11 - Multicasting in MANETs
Lecture 12 - Mobility Models for MANETs
Lecture 13 - Transport Protocols for MANETs - Part-I
Lecture 14 - Transport Protocols for MANETs - Part-II
Lecture 15 - Opportunistic Mobile Networks - Part-I
Lecture 16 - Opportunistic Mobile Networks - Part-II
Lecture 17 - Opportunistic Mobile Networks - Part-III
Lecture 18 - UAV Networks - Part-I
Lecture 19 - UAV Networks - Part-II
Lecture 20 - UAV Networks - Part-III
Lecture 21 - Introduction
Lecture 22 - Introduction
Lecture 23 - WSN Coverage and Placement - Part-I
Lecture 24 - Topology Mangement in Wireless Sensor Network
Lecture 25 - Mobile Wireless Sensor Networks
Lecture 26 - Mobile Wireless Sensor Networks
Lecture 27 - Medium Access Control in Wireless Networks - Part-I
Lecture 28 - Medium Access Control in Wireless Networks - Part-II
Lecture 29 - Routing in Wireless Sensor Networks - Part-I

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Lecture 30 - Routing in Wireless Sensor Networks - Part-II
Lecture 31 - Congestion and Flow Control - Part-I
Lecture 32 - Congestion and Flow Control - Part-II
Lecture 33 - Underwater Sensor Networks - Part-I
Lecture 34 - Underwater Sensor Networks - Part-II
Lecture 35 - Underwater Sensor Networks - Part-III
Lecture 36 - Underwater Sensor Networks - Part-IV
Lecture 37 - Security of Wireless Sensor Networks - Part-I
Lecture 38 - Security of Wireless Sensor Networks - Part-II
Lecture 39 - Hardware Design of Sensor Node
Lecture 40 - Real Life Deployment of WSN

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NPTEL Video Course - Computer Science and Engineering - NOC:VLSI Physical Design

Subject Co-ordinator - Prof. Indranil Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Design Representation
Lecture 3 - VLSI Design Styles - Part 1
Lecture 4 - VLSI Design Styles - Part 2
Lecture 5 - VLSI Physical Design Automation - Part 1
Lecture 6 - VLSI Physical Design Automation - Part 2
Lecture 7 - Partitioning
Lecture 8 - Floor planning
Lecture 9 - Floor planning Algorithms
Lecture 10 - Pin Assignment
Lecture 11 - Placement - Part 1
Lecture 12 - Placement - Part 2
Lecture 13 - Placement - Part 3
Lecture 14 - Placement - Part 4
Lecture 15 - Grid Routing - Part 1
Lecture 16 - Grid Routing - Part 2
Lecture 17 - Grid Routing - Part 3
Lecture 18 - Global Routing - Part 1
Lecture 19 - Global Routing - Part 2
Lecture 20 - Detailed Routing - Part 1
Lecture 21 - Detailed Routing - Part 2
Lecture 22 - Detailed Routing - Part 3
Lecture 23 - Detailed Routing - Part 4
Lecture 24 - Clock Design - Part 1
Lecture 25 - Clock Design - Part 2
Lecture 26 - Clock Design - Part 3
Lecture 27 - Clock Network Synthesis - Part 1
Lecture 28 - Clock Network Synthesis - Part 2
Lecture 29 - Clock Network Synthesis - Part 3

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Lecture 30 - Clock Network Synthesis - Part 4
Lecture 31 - Power and Ground Routing
Lecture 32 - Time Closure - Part 1
Lecture 33 - Time Closure - Part 2
Lecture 34 - Time Closure - Part 3
Lecture 35 - Time Closure - Part 4
Lecture 36 - Time Closure - Part 5
Lecture 37 - Timing Driven Placement
Lecture 38 - Timing Driven Routing
Lecture 39 - Physical Synthesis - Part 1
Lecture 40 - Physical Synthesis - Part 2
Lecture 41 - Performance-Driven Design Flow
Lecture 42 - Miscellaneous Approaches to Timing Optimization
Lecture 43 - Interconnect Modeling - Part 1
Lecture 44 - Interconnect Modeling - Part 2
Lecture 45 - Design Rule Check
Lecture 46 - Layout Compaction - Part 1
Lecture 47 - Layout Compaction - Part 2
Lecture 48
Lecture 49
Lecture 50
Lecture 51
Lecture 52
Lecture 53 - Test Pattern Generation
Lecture 54 - Design for Testability
Lecture 55 - Boundary Scan Standard
Lecture 56 - Built-in Self-Test - Part 1
Lecture 57 - Built-in Self-Test - Part 2
Lecture 58 - Low Power VLSI Design
Lecture 59 - Techniques to Reduce Power
Lecture 60 - Gate Level Design for Low Power - Part 1
Lecture 61 - Gate Level Design for Low Power - Part 2
Lecture 62 - Other Low Power Design Techniques
Lecture 63 - Algorithmic Level Techniques for Low Power Design
Lecture 64 - Summarization of the Course

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NPTEL Video Course - Computer Science and Engineering - NOC:Cryptography And Network Security

Subject Co-ordinator - Prof. Sourav Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cryptography
Lecture 2 - Classical Cryptosystem
Lecture 3 - Cryptanalysis on Substitution Cipher (Frequency Analysis)
Lecture 4 - Play Fair Cipher
Lecture 5 - Block Cipher
Lecture 6 - Data Encryption Standard (DES)
Lecture 7 - DES (Continued...)
Lecture 8 - Triple DES and Modes of Operation
Lecture 9 - Stream Cipher
Lecture 10 - Pseudorandom Sequence
Lecture 11 - LFSR Based StreamCipher
Lecture 12 - Mathematical Background
Lecture 13 - Abstract Algebra (Continued...)
Lecture 14 - Number Theory
Lecture 15 - Number Theory (Continued...)
Lecture 16 - Modular Inverse
Lecture 17 - Extended Euclidean Algorithm
Lecture 18 - Fermat's Little Theorem, Euler Phi-Function
Lecture 19 - Euler's theorem, Quadratic Residue
Lecture 20 - Polynomial Arithmetic
Lecture 21 - Advanced Encryption Standard (AES)
Lecture 22 - Advanced Encryption Standard (AES) (Continued...)
Lecture 23 - Introduction to Public Key Cryptosystem, Diffie-Hellman Key Exchange
Lecture 24 - Knapsack Cryptosystem
Lecture 25 - RSA Cryptosystem
Lecture 26 - More on RSA
Lecture 27 - Primarily Testing
Lecture 28 - ElGamal Cryptosystem
Lecture 29 - Elliptic Curve over the Reals

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Lecture 30 - Elliptic curve Modulo a Prime
Lecture 31 - Generalised ElGamal Public Key Cryptosystem
Lecture 32 - Chinese Remainder Theorem
Lecture 33 - Rabin Cryptosystem
Lecture 34 - Legendre and Jacobi Symbol
Lecture 35 - Jacobi Symbol (Continued...)
Lecture 36 - Message Authentication
Lecture 37 - Digital Signature
Lecture 38 - Key Management
Lecture 39 - Key Exchange
Lecture 40 - Hash Function
Lecture 41 - Universal Hashing
Lecture 42 - Cryptographic Hash Function
Lecture 43 - Secure Hash Algorithm (SHA)
Lecture 44 - Digital Signature Standard (DSS)
Lecture 45 - More on Key Exchange Protocol
Lecture 46 - Cryptoanalisis
Lecture 47 - Memory Trade off Attack
Lecture 48 - Differential Cryptoanalysis
Lecture 49 - More on Differential Cryptoanalysis
Lecture 50 - Linear Cryptoanalysis
Lecture 51 - Cryptoanalysis and Stream Cipher
Lecture 52 - Modern Stream Cipher
Lecture 53 - Shamir Secret Sharing
Lecture 54 - Identity Based Eneryption (IBE)
Lecture 55 - Attribute Based Encryption
Lecture 56 - Functional Encryption (Introduction)
Lecture 57 - Discrete Logarithm Problem (DLP)
Lecture 58 - Implementation Attacks
Lecture 59 - The Secure Sockets layer (SSL)
Lecture 60 - Pretty Good Privacy (PGP)

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Architecture and Organization

Subject Co-ordinator - Prof. Indranil Sengupta, Prof. Kamalika Datta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of Computer Systems
Lecture 2 - Basic Operation of a Computer
Lecture 3 - Memory Addressing and Languages
Lecture 4 - Software and Architecture Types
Lecture 5 - Instruction Set Architecture
Lecture 6 - Number Representation
Lecture 7 - Instruction Format and Addressing Modes
Lecture 8 - CISC and RISC Architecture
Lecture 9 - MIPS32 Instruction Set
Lecture 10 - MIPS Programming Examples
Lecture 11 - Spim â A Mips32 Simulator
Lecture 12 - Measuring Cpu Performance
Lecture 13 - Choice Of Benchmarks
Lecture 14 - Summarizing Performance Results
Lecture 15 - Amadahlâ s Law - Part 1
Lecture 16 - Amadahlâ s Law - Part 2
Lecture 17 - Design Of Control Unit - Part 1
Lecture 18 - Design Of Control Unit - Part 2
Lecture 19 - Design Of Control Unit - Part 3
Lecture 20 - Design Of Control Unit - Part 4
Lecture 21 - Mips Implementation - Part 1
Lecture 22 - Mips Implementation - Part 2
Lecture 23 - Processor Memory Interaction
Lecture 24 - Static And Dynamic Ram
Lecture 25 - Asynchronous Dram
Lecture 26 - Synchronous Dram
Lecture 27 - Memory Interfacing And Addressing
Lecture 28 - Memory Hierarchy Design - Part 1
Lecture 29 - Memory Hierarchy Design - Part 2

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Lecture 30 - Cache Memory - Part 1
Lecture 31 - Cache Memory - Part 2
Lecture 32 - Improving Cache Performance
Lecture 33 - Design Of Adders - Part 1
Lecture 34 - Design Of Adders - Part 2
Lecture 35 - Design Of Multipliers - Part 1
Lecture 36 - Design Of Multipliers - Part 2
Lecture 37 - Design Of Dividers
Lecture 38 - Floating-Point Numbers
Lecture 39 - Floating-Point Arithmetic
Lecture 40 - Basic Pipelining Concepts
Lecture 41 - Pipeline Scheduling
Lecture 42 - Arithmetic Pipeline
Lecture 43 - Secondary Storage Devices
Lecture 44 - Input-Output Organization
Lecture 45 - Data Transfer Techniques
Lecture 46 - Interrupt Handling - Part 1
Lecture 47 - Interrupt Handling - Part 2
Lecture 48 - Direct Memory Access
Lecture 49 - Some Example Device Interfacing
Lecture 50 - Exercises On I/O Transfer
Lecture 51 - Bus Standards
Lecture 52 - Bus Standards
Lecture 53 - Pipelining The Mips32 Data Path
Lecture 54 - Mips Pipeline (Continued...
Lecture 55 - Pipeline Hazards - Part 1
Lecture 56 - Pipeline Hazards - Part 2
Lecture 57 - Pipeline Hazards - Part 3
Lecture 58 - Pipeline Hazards - Part 4
Lecture 59 - Multicycle Operations In Mips32
Lecture 60 - Exploiting Instruction Level Parallelism
Lecture 61 - Vector Processors
Lecture 62 - Multi-Core Processors
Lecture 63 - Some Case Studies
Lecture 64 - Summarization Of The Course

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Algorithms and Analysis

Subject Co-ordinator - Prof. Sourav Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Insertion sort
Lecture 2 - Analysis of Insertion Sort
Lecture 3 - Asymptotic Analysis
Lecture 4 - Recurrence of Merge Sort
Lecture 5 - Substitution Method
Lecture 6 - The Master Method
Lecture 7 - Divide-and-Conquer
Lecture 8 - Divide-and-Conquer (Continued...)
Lecture 9 - Straseen's Algorithms
Lecture 10 - QuickSort
Lecture 11 - Analysis of Quicksort
Lecture 12 - Randomized Quicksort
Lecture 13 - Heap
Lecture 14 - Heap Sort
Lecture 15 - Decision Tree
Lecture 16 - Linear time Sorting
Lecture 17 - Radix Sort and Bucket Sort
Lecture 18 - Order Statistics
Lecture 19 - Randomised Order Statistics
Lecture 20 - Worst case linear time order statistics
Lecture 21 - Hash Function
Lecture 22 - Open Addressing
Lecture 23 - Universal Hashing
Lecture 24 - Perfect Hashing
Lecture 25 - Binary Search Tree (BST) Sort
Lecture 26 - Randomly build BST
Lecture 27 - Red Black Tree
Lecture 28 - Red Black Tree (Continued...)
Lecture 29 - Augmentation of data structure

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Lecture 30 - Interval trees
Lecture 31 - Fixed universe successor
Lecture 32 - Van Emde Boas data structure
Lecture 33 - Amortized analysis
Lecture 34 - Computational Geometry
Lecture 35 - Computational Geometry (Continued...)
Lecture 36 - Dynamic Programming
Lecture 37 - Longest common subsequence
Lecture 38 - Graphs
Lecture 39 - Prim's Algorithms
Lecture 40 - Graph Search
Lecture 41
Lecture 42
Lecture 43
Lecture 44
Lecture 45
Lecture 46
Lecture 47
Lecture 48
Lecture 49
Lecture 50
Lecture 51
Lecture 52 - Union-Find
Lecture 53 - Augmented disjoint set data structure
Lecture 54 - Network flow
Lecture 55 - Network Flow (Continued...)

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NPTEL Video Course - Computer Science and Engineering - NOC:Hardware Modeling using Verilog

Subject Co-ordinator - Prof. Indranil Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6 - Verilog Language Features - Part 1
Lecture 7 - Verilog Language Features - Part 2
Lecture 8 - Verilog Language Features - Part 3
Lecture 9 - Verilog Operators
Lecture 10 - Verilog Modeling Examples
Lecture 11 - Verilog Modeling Examples (Continued...)
Lecture 12 - Verilog Description Styles
Lecture 13 - Procedural Assignment
Lecture 14 - Procedural Assignment (Continued...)
Lecture 15 - Procedural Assignment (Examples)
Lecture 16 - Blocking / Non-Blocking Assignments - Part 1
Lecture 17 - Blocking / Non-Blocking Assignments - Part 2
Lecture 18 - Blocking / Non-Blocking Assignments - Part 3
Lecture 19 - Blocking / Non-Blocking Assignments - Part 4
Lecture 20 - User Defined Primitives
Lecture 21 - Verilog Test Bench
Lecture 22 - Writing Verilog Test Benches
Lecture 23 - Modeling Finite State Machines
Lecture 24 - Modeling Finite State Machines (Continued...)
Lecture 25 - Datapath And Controller Design - Part 1
Lecture 26 - Datapath And Controller Design - Part 2
Lecture 27 - Datapath And Controller Design - Part 3
Lecture 28 - Synthesizable Verilog
Lecture 29 - Some Recommended Practices

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Lecture 30 - Modeling Memory
Lecture 31 - Modeling Register Banks
Lecture 32 - Basic Pipelining Concepts
Lecture 33 - Pipeline Modeling - Part 1
Lecture 34 - Pipeline Modeling - Part 2
Lecture 35 - Switch Level Modeling - Part 1
Lecture 36 - Switch Level Modeling - Part 2
Lecture 37 - Pipeline Implementation Of A Processor - Part 1
Lecture 38 - Pipeline Implementation Of A Processor - Part 2
Lecture 39 - Pipeline Implementation Of A Processor - Part 3
Lecture 40 - Verilog Modeling Of The Processor - Part 1
Lecture 41 - Verilog Modeling Of The Processor - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Internet of Things

Subject Co-ordinator - Prof. Sudip Misra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to IoT- Part I
Lecture 2 - Introduction to IoT- Part II
Lecture 3 - Sensing
Lecture 4 - Actuation
Lecture 5 - Basics of IoT Networking - Part I
Lecture 6 - Basics of IoT Networking - Part II
Lecture 7 - Basics of IoT Networking - Part III
Lecture 8 - Basics of IoT Networking - Part IV
Lecture 9 - Connectivity Technologies - Part I
Lecture 10 - Connectivity Technologies - Part II
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26 - Introduction to Python Programming - I
Lecture 27 - Introduction to Python Programming - II
Lecture 28 - Introduction to Raspberry Pi - I
Lecture 29 - Introduction to Raspberry Pi - II

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Lecture 30 - Implementation of IoT with Raspberry Pi - I
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36 - Software Defined IoT Networking - II
Lecture 37 - Cloud Computing-Fundamental
Lecture 38 - Cloud Computing-Service Model
Lecture 39 - Cloud Computing-Service Management and Security
Lecture 40 - Cloud Computing - Case Studies
Lecture 41 - Cloud Computing - Practical
Lecture 42 - Sensor-Cloud - I
Lecture 43 - Sensor-Cloud - II
Lecture 44 - Fog Computing - I
Lecture 45 - Fog Computing - II
Lecture 46 - Smart Cities and Smart Homes - I
Lecture 47 - Smart Cities and Smart Homes - II
Lecture 48 - Smart Cities and Smart Homes - III
Lecture 49 - Connected Vehicles - I
Lecture 50 - Connected Vehicles - II
Lecture 51 - Smart Grid - I
Lecture 52 - Smart Grid - II
Lecture 53 - Industrial Internet of Things - I
Lecture 54 - Industrial Internet of Things - II
Lecture 55 - Data Handling and Analytics - I
Lecture 56 - Data Handling and Analytics - II
Lecture 57 - Case Study
Lecture 58 - Case Study
Lecture 59 - Case Study
Lecture 60 - Case Study

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NPTEL Video Course - Computer Science and Engineering - NOC:Cloud Computing

Subject Co-ordinator - Prof. Soumya Kanti Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Cloud Computing Overview
Lecture 2 - Cloud Computing Overview (Continued...)
Lecture 3 - Cloud Computing - Introduction
Lecture 4 - Cloud Computing Architecture
Lecture 5 - Cloud Computing Architecture (Continued...)
Lecture 6 - Cloud Computing Architecture - Deployment Models
Lecture 7 - Cloud Computing Virtualization
Lecture 8 - Cloud Computing XML Basics
Lecture 9 - Cloud Computing XML Basics - II
Lecture 10 - Cloud Computing Web Services, Service Oriented Architecture
Lecture 11 - Service Level Agreement
Lecture 12 - Cloud Economics
Lecture 13 - Managing Data
Lecture 14 - Introduction to MapReduce
Lecture 15 - Open Stack
Lecture 16 - Cloud Computing - Opensource Cloud - Openstack Demo
Lecture 17 - Cloud Computing Case Study with a commercial Cloud - Microsoft Azure
Lecture 18 - Cloud Computing Demo - Microsoft Azure
Lecture 19 - Cloud Computing Case Study - Google Cloud Platform (GCP)
Lecture 20 - Cloud Computing Demo - Google Cloud Platform (GCP)
Lecture 21 - SLA-Tutorial
Lecture 22 - Cloudonomics-Tutorial
Lecture 23 - MapReduce-Tutorial
Lecture 24 - Resource Management - I
Lecture 25 - Resource Management - II
Lecture 26 - Cloud Computing: Security - I
Lecture 27 - Cloud Computing: Security - II
Lecture 28 - Cloud Computing: Security - III
Lecture 29 - Cloud Computing: Security Issues in Collaborative SaaS Cloud

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Lecture 30 - Cloud Computing: Broker for Cloud Marketplace
Lecture 31 - Mobile Cloud Computing - I
Lecture 32 - Mobile Cloud Computing - II
Lecture 33 - Fog Computing - I
Lecture 34 - Fog Computing - II
Lecture 35 - Use Case-Geo-spatial Cloud
Lecture 36 - Introduction to DOCKER Container
Lecture 37 - Green Cloud
Lecture 38 - Sensor Cloud Computing
Lecture 39 - IoT Cloud
Lecture 40 - Course Summary and Research Areas
Lecture 41 - Cloud-Fog Computing - Overview
Lecture 42 - Resource Management - I
Lecture 43 - Resource Management - II
Lecture 44 - Cloud Federation
Lecture 45 - VM Migration - Basics Migration strategies
Lecture 46 - VM Migration - Basics Migration strategies
Lecture 47 - Containers Container based Virtualization Kubernetes Docker Container
Lecture 48 - Docker Container - Overview Docker - Components Docker - Architecture
Lecture 49 - Docker Container - Demo
Lecture 50 - Docker Container - Demo
Lecture 51 - Dew Computing
Lecture 52 - Serverless Computing - I
Lecture 53 - Serverless Computing - II
Lecture 54 - Sustainable Cloud Computing - I
Lecture 55 - Sustainable Cloud Computing - II
Lecture 56 - Cloud Computing in 5G Era
Lecture 57 - CPS and Cloud Computing
Lecture 58 - Case Study I (Spatial Cloud Computing)
Lecture 59 - Case Study II (Internet of Health Things) - Part A
Lecture 60 - Case Study II (Internet of Health Things) - Part B

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NPTEL Video Course - Computer Science and Engineering - NOC:Problem Solving through Programming in C

Subject Co-ordinator - Prof.Arnab sarkar, Prof.Jatindra Kumar Deka, Dr. Santosh Biswas

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Idea of Algorithms
Lecture 3 - Flow Chart and Pseudocode
Lecture 4 - Introduction to Programming Language Concepts
Lecture 5 - Variables and Memory
Lecture 6 - Types of Software and Compilers
Lecture 7 - Introduction to C Programming Language
Lecture 8 - Variables and Variable Types in C
Lecture 9 - Introducing Functions
Lecture 10 - Address and Content of Variables and Types
Lecture 11 - Assignment Statement and Operators in C
Lecture 12 - Arithmetic Expressions and Relational Expressions
Lecture 13 - Logical Operators and Change in Control Flow
Lecture 14 - Use of Logical Operaotrs in Branching
Lecture 15 - Branching
Lecture 16 - IF-ELSE Statement (Continued...)
Lecture 17 - Switch statement
Lecture 18 - Switch Statement (Continued...) and Introduction to Loops
Lecture 19 - Implementing Repetitions (Loops)
Lecture 20 - Implementation of Loops with for Statement (Continued...)
Lecture 21 - For Statement (Continued...)
Lecture 22 - Example of If-Else
Lecture 23 - Example of Loops
Lecture 24 - Example of Loops (Continued...)
Lecture 25 - Example of Loops (Continued...), Use of FOR Loops
Lecture 26 - Introduction to Arrays
Lecture 27 - Arrays (Continued...)
Lecture 28 - Arrays (Continued...)
Lecture 29 - Program using Arrays

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Lecture 30 - Array Problem
Lecture 31 - Linear Search
Lecture 32 - Character Array and Strings
Lecture 33 - String Operations
Lecture 34 - 2-D Array Operation
Lecture 35 - Introducing Functions
Lecture 36 - More on Functions
Lecture 37 - Function (Continued...)
Lecture 38 - Scanf and Printf Functions; Function Prototype
Lecture 39 - Parameter Passing in Function Revision
Lecture 40 - Parameter Passing in Function Revision (Continued...)
Lecture 41 - Substitution of # include and Macro
Lecture 42 - search as a function
Lecture 43 - Binary Search
Lecture 44 - Binary Search (Continued...)
Lecture 45 - Sorting Methods
Lecture 46 - Bubble Sort (Continued...)
Lecture 47 - Use of Pointer in Function
Lecture 48 - Arrays at Strings
Lecture 49 - Data Representation
Lecture 50 - Bisection Method
Lecture 51 - Interpolation
Lecture 52 - Trapezoidal Rule and Runge-Kutta Method
Lecture 53 - Recursion
Lecture 54 - Recursion (Continued...)
Lecture 55 - Structure
Lecture 56 - Structure (Continued...)
Lecture 57 - Structure with typedef
Lecture 58 - Pointer
Lecture 59 - Pointer (Continued...)
Lecture 60 - Pointer in Structures
Lecture 61 - Dynamic Allocation and File

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NPTEL Video Course - Computer Science and Engineering - NOC:Real Time Operating System

Subject Co-ordinator - Prof. Rajib Mall

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics of Tast scheduling
Lecture 3 - Cyclic executives
Lecture 4 - Cyclic Scheduler
Lecture 5 - Cyclic Scheduler
Lecture 6 - Exercises on Frame size Selectoin
Lecture 7 - Event-driven schedulers
Lecture 8 - Rate Monotonic Algorithm
Lecture 9 - RMA Task Schedulability
Lecture 10 - Rate Monotonic Analysis
Lecture 11 - RMA Generalizations
Lecture 12 - Further RMA Generalizations
Lecture 13 - Resource Sharing among Real-Time Tasks
Lecture 14 - Solution to Priority Inversion Problem
Lecture 15 - Highest Locker Protocol
Lecture 16 - Priority Ceiling Protocol
Lecture 17 - PCP Priority Inversions
Lecture 18 - Analysis of PCP priority inversions
Lecture 19 - Some basic issues in Real-Time Operating Systems
Lecture 20 - Unix as a Real-Time operating System

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Soft Computing

Subject Co-ordinator - Prof. Debasis Samanta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to soft computing
Lecture 2 - Introduction to Fuzzy Logic
Lecture 3 - Fuzzy membership functions (Continued...) and Defining Membership functions
Lecture 4 - Fuzzy operations
Lecture 5 - Fuzzy relations
Lecture 6 - Fuzzy Relations (Continued...) and Fuzzy propositions
Lecture 7 - Fuzzy implications
Lecture 8 - Fuzzy Inferences
Lecture 9 - Defuzzification techniques (Part-I)
Lecture 10 - Defuzzification Techniques (Part-I) (Continued...)
Lecture 11 - Fuzzy logic controller
Lecture 12 - Fuzzy Logic Controller (Continued...)
Lecture 13 - Fuzzy logic controller (Continued...)
Lecture 14 - Concept of Genetic Algorithm
Lecture 15 - Concept of Genetic Algorithm (Continued...) and GA Strategies
Lecture 16 - GA Operator
Lecture 17 - GA operator
Lecture 18 - GA Operator
Lecture 19 - GA Operator
Lecture 20 - GA Operator
Lecture 21 - GA Operator
Lecture 22 - GA Operator
Lecture 23 - GA Operator
Lecture 24 - Multi-objective optimization problem solving
Lecture 25 - Multi-objective optimization problem solving (Continued...)
Lecture 26 - Concept of domination
Lecture 27 - Non-Pareto based approaches to solve MOOPs
Lecture 28 - Non-Pareto based approaches to solve MOOPs (Continued...)
Lecture 29 - Pareto-Based approaches to solve MOOPs

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Lecture 30 - Pareto-based approaches to solve MOOPs (Continued....)
Lecture 31 - Pareto-based approach to solve MOOPs
Lecture 32 - Pareto-based approach to solve MOOPs (Continued...)
Lecture 33 - Pareto-based approach to solve MOOPs (Continued...)
Lecture 34 - Introduction to Artificial Neural Network
Lecture 35 - ANN Architectures
Lecture 36 - Training ANNs
Lecture 37 - Training ANNs (Continued....)
Lecture 38 - Training ANNs (Continued....)
Lecture 39 - Training ANNs (Continued....)
Lecture 40 - Soft computing tools

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NPTEL Video Course - Computer Science and Engineering - NOC:Data Mining

Subject Co-ordinator - Prof. Pabitra Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Knowledge Discovery Process
Lecture 2 - Data Preprocessing - I
Lecture 3 - Data Preprocessing - II
Lecture 4 - Association Rules
Lecture 5 - Apriori algorithm
Lecture 6 - Rule generation
Lecture 7 - Classification
Lecture 8 - Decision Tree - I
Lecture 9 - Decision Tree - II
Lecture 10 - Decision Tree - III
Lecture 11 - Decision Tree - IV
Lecture 12 - Bayes Classifier - I
Lecture 13 - Bayes Classifier - II
Lecture 14 - Bayes Classifier - III
Lecture 15 - Bayes Classifier - IV
Lecture 16 - Bayes Classifier - V
Lecture 17 - K Nearest Neighbor - I
Lecture 18 - K Nearest Neighbor - II
Lecture 19
Lecture 20
Lecture 21
Lecture 22 - Support Vector Machine - I
Lecture 23 - Support Vector Machine - II
Lecture 24 - Support Vector Machine - III
Lecture 25 - Support Vector Machine - IV
Lecture 26 - Support Vector Machine - V
Lecture 27 - Kernel Machines
Lecture 28 - Artificial Neural Networks - I
Lecture 29 - Artificial Neural Networks - II

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Lecture 30 - Artificial Neural Networks - III
Lecture 31 - Artificial Neural Networks - IV
Lecture 32 - Clustering - I
Lecture 33 - Clustering - II
Lecture 34 - Clustering - III
Lecture 35 - Clustering - IV
Lecture 36 - Clustering - V
Lecture 37 - Regression - I
Lecture 38 - Regression - II
Lecture 39 - Regression - III
Lecture 40 - Regression - IV
Lecture 41 - Dimensionality Reduction - I
Lecture 42 - Dimensionality Reduction - II
Lecture 43 - Tutorial
Lecture 44 - Live Session

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NPTEL Video Course - Computer Science and Engineering - NOC:Data Base Management System

Subject Co-ordinator - Prof. Partha Pratim Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Introduction to DBMS/1
Lecture 3 - Introduction to DBMS/2
Lecture 4 - Introduction to Relational Model/1
Lecture 5 - Introduction to Relational Model/2
Lecture 6 - Introduction to SQL/1
Lecture 7 - Introduction to SQL/2
Lecture 8 - Introduction to SQL/3
Lecture 9 - Intermediate SQL/1
Lecture 10 - Intermediate SQL/2
Lecture 11 - Advanced SQL
Lecture 12 - Formal Relational Query Languages
Lecture 13 - Entity-Relationship Model/1
Lecture 14 - Entity-Relationship Model/2
Lecture 15 - Entity-Relationship Model/3
Lecture 16 - Relational Database Design
Lecture 17 - Relational Database Design (Continued...)
Lecture 18 - Relational Database Design/3
Lecture 19 - Relational Database Design (Continued...)
Lecture 20 - Relational Database Design/5
Lecture 21 - Application Design and Development/1
Lecture 22 - Application Design and Development/2
Lecture 23 - Application Design and Development/3
Lecture 24 - Storage and File Structure/1
Lecture 25 - Storage and File Structure/2
Lecture 26 - Indexing and Hashing/1
Lecture 27 - Indexing and Hashing/2
Lecture 28 - Indexing and Hashing/3
Lecture 29 - Indexing and Hashing/4

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Lecture 30 - Indexing and Hashing/5
Lecture 31 - Transactions/1
Lecture 32 - Transactions/2
Lecture 33 - Transactions/3
Lecture 34 - Concurrency Control/1
Lecture 35 - Concurrency Control/2
Lecture 36 - Recovery/1
Lecture 37 - Recovery/2
Lecture 38 - Query Processing and Optimization/1
Lecture 39 - Query Processing and Optimization/2
Lecture 40 - Course Summarization
Lecture 41 - Live Session
Lecture 42 - Live Session - 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Software Engineering

Subject Co-ordinator - Prof. Rajib Mall

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Introduction - III
Lecture 4 - Introduction - IV
Lecture 5 - Introduction - V
Lecture 6 - Life Cycle Model
Lecture 7 - Life Cycle Model
Lecture 8 - Waterfall Model
Lecture 9 - Waterfall Derivatives
Lecture 10 - Incremental Model
Lecture 11 - Evolutionary Model
Lecture 12 - Agile Model
Lecture 13 - Extreme Programming and Scrum
Lecture 14 - Scrum
Lecture 15 - Introduction to requirement specification
Lecture 16 - Requirement gathering and analysis
Lecture 17 - Functional requirements
Lecture 18 - Representation of complex programming logic
Lecture 19 - Design Fundamentals
Lecture 20 - Modular Design
Lecture 21 - Classification of Cohesion
Lecture 22 - Classification of Coupling
Lecture 23 - Introduction to structured analysis and structured design
Lecture 24 - Basics of Data Flow Diagrams (DFD)
Lecture 25 - Developing DFD Model
Lecture 26 - Examples of DFD Model development
Lecture 27 - DFD Model - More Examples
Lecture 28 - Essentials of Structure Chart
Lecture 29 - Transform Analysis, Transaction Analysis

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Lecture 30 - Structured Design Examples
Lecture 31 - Use Case Modelling
Lecture 32 - Factoring Use Cases
Lecture 33 - Overview of Class diagram
Lecture 34 - Inheritance relationship
Lecture 35 - Association relationship
Lecture 36 - Aggregation/ Composition and dependency relations
Lecture 37 - Interation Modelling
Lecture 38 - Development of Sequence diagrams
Lecture 39 - State-Machine diagram
Lecture 40 - An Object-Oriented design process
Lecture 41 - Domain Analysis
Lecture 42 - Examples of object-oriented design
Lecture 43 - Basic concepts in Testing - I
Lecture 44 - Basic concepts in Testing - II
Lecture 45 - Basic concepts in Testing - III
Lecture 46 - Unit testing strategies - I
Lecture 47 - Unit testing strategies - II
Lecture 48 - Equivalance Class Testing - I
Lecture 49 - Equivalance Class Testing - II
Lecture 50 - Special Value Testing
Lecture 51 - Combinatorial Testing
Lecture 52 - Decision Table Testing
Lecture 53 - Cause effect graphing
Lecture 54 - Pairwise Testing
Lecture 55 - White box Testing
Lecture 56 - Condition Testing
Lecture 57 - MC/DC Coverage
Lecture 58 - MC/DC Testing
Lecture 59 - Path Testing
Lecture 60 - Dataflow and Mutation Testing

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Networks and Internet Protocol

Subject Co-ordinator - Prof. Sandip Chakraborty, Prof. Soumya Kanti Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computer Networks - A brief history
Lecture 2 - Data Networks - from Circuit Switching Network to Packet Switching Network
Lecture 3 - Network Protocol Stack
Lecture 4 - Services at the Different Layers of the Protocol Stack
Lecture 5 - Application Layer I - Different Protocols at the Application Layer
Lecture 6 - Application Layer II - Domain Name Systems
Lecture 7 - Application Layer III - The Web
Lecture 8 - Application Layer III - Hypertext Transfer Protocol
Lecture 9 - Application Layer III - Internet Mail Transfer
Lecture 10 - Application Layer IV - File Transfer (FTP)
Lecture 11 - Transport Layer I - Services
Lecture 12 - Transport Layer II - Connection
Lecture 13 - Transport Layer II - Connection (Continued...)
Lecture 14 - Transport Layer IV - Reliability
Lecture 15 - Transport Layer V - Sliding Window Protocols
Lecture 16 - Transport Layer Performance
Lecture 17 - Buffer Management and Congestion Control
Lecture 18 - Transport Layer Primitives
Lecture 19 - Transmission Control Protocol I - Basics
Lecture 20 - Transmission Control Protocol II - Connections
Lecture 21 - Transmission Control Protocol III - Flow Control
Lecture 22 - Transmission Control Protocol IV - Congestion Control
Lecture 23 - User Datagram Protocol
Lecture 24 - Socket Programming - I
Lecture 25 - Socket Programming - II
Lecture 26 - Network Layer I - Introduction
Lecture 27 - IP Addressing (IPv4) I - Classful addressing
Lecture 28 - IP Addressing (IPv4) II - CIDR
Lecture 29 - IP Addressing (IPv4) III - Network Address Translation (NAT)

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Lecture 30 - IPv6 Addressing
Lecture 31 - Internet QoS - I (What is QoS)
Lecture 32 - Internet QoS - II (Basic QoS Architecture)
Lecture 33 - Internet QoS - III (Traffic Policing and Traffic Shaping)
Lecture 34 - Internet QoS - IV (Traffic Scheduling)
Lecture 35 - Internet QoS - V (Integrated and Differentiated Service Architecture)
Lecture 36 - IP Routing Table
Lecture 37 - Routing in the Internet I - Intra-domain routing
Lecture 38 - Routing in the Internet II - Routing protocols
Lecture 39 - Routing in the Internet III - Inter-domain Routing
Lecture 40 - Routing in the Internet IV - Border Gateway Protocol
Lecture 41 - IP Routers
Lecture 42 - IP Routers Demo
Lecture 43 - Software Defined Networking - I (Basics)
Lecture 44 - Software Defined Networking - II (Open Flow)
Lecture 45 - Software Defined Networking - III (Demo)
Lecture 46 - Data Link Layer - Overview
Lecture 47 - Data Link Layer - Basic Concepts
Lecture 48 - Data Link Layer - Ethernet
Lecture 49 - Data Link Layer - Ethernet (Continued...)
Lecture 50 - Data Link Layer - Flow and Error Control
Lecture 51 - ARP-RAPP-BOOTP-DHCP
Lecture 52 - ARP-RAPP-BOOTP-DHCP (Continued...)
Lecture 53
Lecture 54 - Wireless LANs
Lecture 55 - Layer 1
Lecture 56 - Layer 1
Lecture 57 - Layer 1
Lecture 58 - Network Security - Overview
Lecture 59 - Network Security - II
Lecture 60 - Network Security - III [TCP/IP Security]

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NPTEL Video Course - Computer Science and Engineering - NOC:Blockchain Architecture Design and Use Cases

Subject Co-ordinator - Praveen Jayachandran, Prof. Sandip Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Blockchain - I (Basics)
Lecture 2 - Introduction to Blockchain - II (History)
Lecture 3 - Introduction to Blockchain - III (Architecture)
Lecture 4 - Introduction to Blockchain - IV (Conceptualization)
Lecture 5 - Basic Crypto Primitives - I
Lecture 6 - Basic Crypto Primitives - II
Lecture 7 - Bitcoin Basics - I
Lecture 8 - Bitcoin Basics - II
Lecture 9 - Bitcoin Basics - III
Lecture 10 - Distributed Consensus
Lecture 11 - Consensus in Bitcoin - I (The Basics)
Lecture 12 - Consensus in Bitcoin - II (PoW and Beyond)
Lecture 13 - Consensus in Bitcoin - III (The Miners)
Lecture 14 - Permissioned Blockchain - I (Basics)
Lecture 15 - Permissioned Blockchain - II (Consensus)
Lecture 16 - Permissioned Blockchain - III (RAFT Consensus)
Lecture 17 - Permissioned Blockchain - IV (Byzantine General Problem)
Lecture 18 - Permissioned Blockchain - V (Practical Byzantine Fault Tolerance)
Lecture 19 - Blockchain for Enterprise - Overview
Lecture 20 - Blockchain Components and Concepts
Lecture 21 - Hyperledger Fabric - Transaction Flow
Lecture 22 - Hyperledger Fabric Details
Lecture 23 - Fabric - Membership and Identity Management
Lecture 24 - Hyperledger Fabric Network Setup
Lecture 25 - Fabric Demo on IBM Blockchain Cloud - I
Lecture 26 - Fabric Demo on IBM Blockchain Cloud - II
Lecture 27 - Fabric Demo, deploy from scratch - III
Lecture 28 - Hyperledger Composer - Application Development
Lecture 29 - Hyperledger Composer - Network Administration

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Lecture 30 - Blockchain Use Cases
Lecture 31 - Blockchain in Financial Service - I (Payments and Secure Trading)
Lecture 32 - Blockchain in Financial Service - II (Compliance and Mortgage)
Lecture 33 - Blockchain in Financial Service - III (Financial Trade)
Lecture 34 - Revolutionizing Global Trade
Lecture 35 - Blockchain in Supply Chain - I
Lecture 36 - Blockchain in Supply Chain - II
Lecture 37 - Blockchain in Other Industries
Lecture 38 - Blockchain in Government - I (Advantages)
Lecture 39 - Blockchain in Government - II (Use Cases)
Lecture 40 - Blockchain in Government - III (Digital Identity)
Lecture 41 - Blockchain in Government - IV (Hyperledger Indy)
Lecture 42 - Blockchain in Government - V (Tax Payments and Land Registry Records)
Lecture 43 - Blockchain Security - I (Overview)
Lecture 44 - Blockchain Security - II (Membership and Access control in Fabric)
Lecture 45 - Blockchain Security - III (Privacy in Fabric)
Lecture 46 - Blockchain Security - III (Fabric SideDB)
Lecture 47 - Research Aspects - I (Consensus Scalability)
Lecture 48 - Research Aspects - II (Bitcoin-NG)
Lecture 49 - Research Aspects - III (Collective Signing)
Lecture 50 - Research Aspects - IV (Byzcoin)
Lecture 51 - Research Aspects - V (Algorand)
Lecture 52 - Research Aspects - VI (Cross Fault Tolerance)
Lecture 53 - Research Aspects - VII (Secured Multi-Party Computation)
Lecture 54 - Blockchain for Science - I (Blockchain for Big Data)
Lecture 55 - Blockchain for Science - II (Blockchain and AI)
Lecture 56 - Comparing Ecosystems - Ethereum
Lecture 57 - Comparing Ecosystems - Ethereum development tools and Quorum
Lecture 58 - Comparing Ecosystems - Corda Part 1
Lecture 59 - Comparing Ecosystems - Corda Part 2
Lecture 60 - Concluding the course

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NPTEL Video Course - Computer Science and Engineering - NOC:Switching Circuits and Logic Design

Subject Co-ordinator - Prof. Indranil Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Octal and Hexadecimal Number Systems
Lecture 3 - Signed and Unsigned Binary Number Representation
Lecture 4 - Binary Addition and Subtraction
Lecture 5 - BCD and Gray Code Representations
Lecture 6 - Error Detection and Correction
Lecture 7 - Logic Gates
Lecture 8 - Logic Families to Implement Gates
Lecture 9 - Emerging Technologies - Part I
Lecture 10 - Emerging Technologies - Part II
Lecture 11 - Switching Algebra
Lecture 12 - Algebraic Manipulation
Lecture 13 - Properties of Switching Functions
Lecture 14 - Obtaining Canonical Representations of Functions
Lecture 15 - Functional Completeness
Lecture 16 - Minimization Using Karnaugh Maps - Part I
Lecture 17 - Minimization Using Karnaugh Maps - Part II
Lecture 18 - Minimization Using Karnaugh Maps - Part III
Lecture 19 - Minimization using Tabular Method - Part I
Lecture 20 - Minimization using Tabular Method - Part II
Lecture 21 - Design of Adders - Part I
Lecture 22 - Design of Adders - Part II
Lecture 23 - Design of Adders - Part III
Lecture 24 - Logic Design - Part I
Lecture 25 - Logic Design - Part II
Lecture 26 - Logic Design - Part III
Lecture 27 - Binary Decision Diagrams - Part I
Lecture 28 - Binary Decision Diagrams - Part II
Lecture 29 - Logic Design using AND-EXOR Network

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Lecture 30 - Threshold Logic and Threshold Gates
Lecture 31 - Latches and Flip-Flops - Part I
Lecture 32 - Latches and Flip-Flops - Part II
Lecture 33 - Latches and Flip-Flops - Part III
Lecture 34 - Clocking and Timing - Part I
Lecture 35 - Clocking and Timing - Part II
Lecture 36 - Synthesis of Synchronous Sequential Circuits - Part I
Lecture 37 - Synthesis of Synchronous Sequential Circuits - Part II
Lecture 38 - Synthesis of Synchronous Sequential Circuits - Part III
Lecture 39 - Synthesis of Synchronous Sequential Circuits - Part IV
Lecture 40 - Minimization of Finite State Machines - Part I
Lecture 41 - Minimization of Finite State Machines - Part II
Lecture 42 - Design of Registers - Part I
Lecture 43 - Design of Registers - Part II
Lecture 44 - Design of Registers - Part III
Lecture 45 - Design of Counters - Part I
Lecture 46 - Design of Counters - Part II
Lecture 47 - Digital-to-Analog Converter - Part I
Lecture 48 - Digital-to-Analog Converter - Part II
Lecture 49 - Analog-to-Digital Converter - Part I
Lecture 50 - Analog-to-Digital Converter - Part II
Lecture 51 - Analog-to-Digital Converter - Part III
Lecture 52 - Asynchronous Sequential Circuits - Part I
Lecture 53 - Asynchronous Sequential Circuits - Part II
Lecture 54 - Algorithmic State Machine (ASM Chart
Lecture 55 - Testing of Digital Circuits
Lecture 56 - Fault Modeling
Lecture 57 - Test Pattern Generation
Lecture 58 - Design for Testability
Lecture 59 - Built-in Self-Test - Part I
Lecture 60 - Built-in Self-Test - Part II

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NPTEL Video Course - Computer Science and Engineering - NOC:Scalable Data Science

Subject Co-ordinator - Prof. Sourangshu Bhattacharya, Prof. Anirban Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Background
Lecture 2 - Probability
Lecture 3 - Linear algebra
Lecture 4 - Optimization
Lecture 5 - Machine Learning
Lecture 6 - Memory-efficient data structures
Lecture 7 - Bloom filters
Lecture 8 - Sketches for distinct count
Lecture 9 - Sketches for distinct count (Continued...)
Lecture 10 - Misra-Gries sketch
Lecture 11 - Frequent Element
Lecture 12 - Frequent Element
Lecture 13 - Near Neighbors
Lecture 14 - Locality Sensitive Hashing
Lecture 15 - Building LSH Tables
Lecture 16 - Approximate near neighbors search
Lecture 17 - Approximate near neighbors search
Lecture 18 - Approximate near neighbors search
Lecture 19 - Randomized Numerical Linear Algebra
Lecture 20 - Randomized Numerical Linear Algebra
Lecture 21 - Randomized Numerical Linear Algebra
Lecture 22 - Randomized Numerical Linear Algebra
Lecture 23 - Randomized Numerical Linear Algebra
Lecture 24 - Randomized Numerical Linear Algebra
Lecture 25 - Randomized Numerical Linear Algebra
Lecture 26 - Map-reduce and Hadoop
Lecture 27 - Hadoop System
Lecture 28 - Hadoop System (Continued...)
Lecture 29 - Hadoop System (Continued...)

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Lecture 30 - Spark
Lecture 31 - Spark (Continued...)
Lecture 32 - Spark (Continued...)
Lecture 33 - Distributed Machine Learning and Optimization
Lecture 34 - SGD+Proof
Lecture 35 - SGD+Proof (Continued...)
Lecture 36 - Distributed Machine Learning and Optimization
Lecture 37 - Distributed Machine Learning and Optimization
Lecture 38 - Clustering
Lecture 39 - Clustering (Continued...)
Lecture 40 - Conclusion

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NPTEL Video Course - Computer Science and Engineering - NOC:Compiler Design

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Introduction (Continued...)
Lecture 7 - Lexical Analysis
Lecture 8 - Lexical Analysis (Continued...)
Lecture 9 - Lexical Analysis (Continued...)
Lecture 10 - Lexical Analysis (Continued...)
Lecture 11 - Lexical Analysis (Continued...)
Lecture 12 - Lexical Analysis (Continued...)
Lecture 13 - Lexical Analysis (Continued...)
Lecture 14 - Lexical Analysis (Continued...)
Lecture 15 - Lexical Analysis (Continued...)
Lecture 16 - Parser
Lecture 17 - Parser (Continued...)
Lecture 18 - Parser (Continued...)
Lecture 19 - Parser (Continued...)
Lecture 20 - Parser (Continued...)
Lecture 21 - Parser (Continued...)
Lecture 22 - Parser (Continued...)
Lecture 23 - Parser (Continued...)
Lecture 24 - Parser (Continued...)
Lecture 25 - Parser (Continued...)
Lecture 26 - Parser (Continued...)
Lecture 27 - Parser (Continued...)
Lecture 28 - Parser (Continued...)
Lecture 29 - Parser (Continued...)

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Lecture 30 - Parser (Continued...)
Lecture 31 - Parser (Continued...)
Lecture 32 - SR Latch and Introduction to Clocked Flip-Flop
Lecture 33 - Edge-Triggered Flip-Flop
Lecture 34 - Representations of Flip-Flops
Lecture 35 - Analysis of Sequential Logic Circuit
Lecture 36 - Conversion of Flip-Flops and Flip-Flop Timing Parameters
Lecture 37 - Register and Shift Register
Lecture 38 - Shift Register
Lecture 39 - Application of Shift Register
Lecture 40 - Linear Feedback Shift Register
Lecture 41 - Serial Addition, Multiplication and Division
Lecture 42 - Type Checking (Continued...)
Lecture 43 - Symbol Table
Lecture 44 - Symbol Table (Continued...)
Lecture 45 - Symbol Table (Continued...)
Lecture 46 - Symbol Table (Continued...) and Runtime Environment
Lecture 47 - Runtime Environment
Lecture 48 - Runtime Environment (Continued...)
Lecture 49 - Runtime Environment (Continued...)
Lecture 50 - Intermediate Code Generation
Lecture 51 - Intermediate Code Generation (Continued...)
Lecture 52 - Intermediate Code Generation (Continued...)
Lecture 53 - Intermediate Code Generation (Continued...)
Lecture 54 - Intermediate Code Generation (Continued...)
Lecture 55 - Intermediate Code Generation (Continued...)
Lecture 56 - Intermediate Code Generation (Continued...)
Lecture 57 - Intermediate Code Generation (Continued...)
Lecture 58 - Intermediate Code Generation (Continued...)
Lecture 59 - Intermediate Code Generation (Continued...)
Lecture 60 - Intermediate Code Generation (Continued...)
Lecture 61 - Intermediate Code Generation (Continued...)

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming in Java

Subject Co-ordinator - Prof. Debasis Samanta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Java Programming Steps
Lecture 3 - Java Tools and Resources
Lecture 4 - Demonstration - I
Lecture 5 - Java Applet Programming
Lecture 6 - Demonstration - II
Lecture 7 - Encapsulation
Lecture 8 - Demonstration - III
Lecture 9 - Java Programming Insights
Lecture 10 - Demonstration - IV
Lecture 11 - Java Static Scope Rule
Lecture 12 - Demonstration - V
Lecture 13 - Inheritance
Lecture 14 - Demonstration - VI
Lecture 15 - Information Hiding
Lecture 16 - Demonstration - VII
Lecture 17 - Packages - I
Lecture 18 - Packages - II
Lecture 19 - Demonstration - VIII
Lecture 20 - Interface - I
Lecture 21 - Interface - II
Lecture 22 - Demonstration - IX
Lecture 23 - Exception Handling - I
Lecture 24 - Exception Handling - II
Lecture 25 - Exception Handling - III
Lecture 26 - Demonstration - X
Lecture 27 - Multithreading - I
Lecture 28 - Multithreading - II
Lecture 29 - Demonstration - XI

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Lecture 30 - I-O Stream - I
Lecture 31 - I-O Stream - II
Lecture 32 - I-O Stream - III
Lecture 33 - Demonstration - XII
Lecture 34 - Applet Programming - I
Lecture 35 - Applet Programming - II
Lecture 36 - Applet Programming - III
Lecture 37 - Demonstration - XIII
Lecture 38 - Demonstration - XIV
Lecture 39 - AWT Programming - I
Lecture 40 - AWT Programming - II
Lecture 41 - Demonstration - XV
Lecture 42 - AWT Programming - III
Lecture 43 - Swing - I
Lecture 44 - Swing - II
Lecture 45 - Demonstration - XVI
Lecture 46 - Demonstration - XVII
Lecture 47 - Demonstration - XVIII
Lecture 48 - Networking with Java
Lecture 49 - Demonstration - XIX
Lecture 50 - JDBC - I
Lecture 51 - JDBC - II
Lecture 52 - JDBC - III
Lecture 53 - Demonstration - XX
Lecture 54 - Demonstration - XXI
Lecture 55 - Demonstration - XXII
Lecture 56 - Case Studies - I
Lecture 57 - Case Studies - II
Lecture 58 - Case Studies - III
Lecture 59 - Case Studies - IV
Lecture 60 - Case Studies - V

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NPTEL Video Course - Computer Science and Engineering - NOC:Discrete Structures

Subject Co-ordinator - Prof. Dipanwita Roychowdhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Propositional Logic
Lecture 2 - Introduction to Propositional Logic (Continued...)
Lecture 3 - Introduction to Propositional Logic (Continued...)
Lecture 4 - Introduction to Propositional Logic (Continued...)
Lecture 5 - Introduction to Propositional Logic (Continued...)
Lecture 6 - Introduction to Propositional Logic (Continued...)
Lecture 7 - Predicate Logic
Lecture 8 - Predicate Logic (Continued...)
Lecture 9 - Predicate Logic (Continued...)
Lecture 10 - Predicate Logic (Continued...)
Lecture 11 - Proof Techniques
Lecture 12 - Proof Techniques (Continued...)
Lecture 13 - Proof Techniques (Continued...)
Lecture 14 - Proof Techniques (Continued...)
Lecture 15 - Proof Techniques (Continued...)
Lecture 16 - Sets and Functions
Lecture 17 - Sets and Functions (Continued...)
Lecture 18 - Sets and Functions (Continued...)
Lecture 19 - Sets and Functions (Continued...)
Lecture 20 - Sets and Functions (Continued...)
Lecture 21 - Relations and their Properties
Lecture 22 - Relations and their Properties (Continued...)
Lecture 23 - Relations and their Properties (Continued...)
Lecture 24 - Relations and their Properties (Continued...)
Lecture 25 - Relations and their Properties (Continued...)
Lecture 26 - Recursion
Lecture 27 - Recursion (Continued...)
Lecture 28 - Recursion (Continued...)
Lecture 29 - Recursion (Continued...)

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Lecture 30 - Recursion (Continued...)
Lecture 31 - Recurrence relations
Lecture 32 - Recurrence relations (Continued...)
Lecture 33 - Recurrence relations (Continued...)
Lecture 34 - Recurrence relations (Continued...)
Lecture 35 - Recurrence relations (Continued...)
Lecture 36 - Counting Techniques and Pigeonhole Principle
Lecture 37 - Counting Techniques and Pigeonhole Principle (Continued...)
Lecture 38 - Counting Techniques and Pigeonhole Principle (Continued...)
Lecture 39 - Counting Techniques and Pigeonhole Principle (Continued...)
Lecture 40 - Counting Techniques and Pigeonhole Principle (Continued...)
Lecture 41 - Combinatorics
Lecture 42 - Combinatorics (Continued...)
Lecture 43 - Combinatorics (Continued...)
Lecture 44 - Combinatorics (Continued...)
Lecture 45 - Combinatorics (Continued...)
Lecture 46 - Algebraic Structures
Lecture 47 - Algebraic Structures (Continued...)
Lecture 48 - Algebraic Structures (Continued...)
Lecture 49 - Algebraic Structures (Continued...)
Lecture 50 - Algebraic Structures (Continued...)
Lecture 51 - Ring and Modular Arithmetic
Lecture 52 - Ring and Modular Arithmetic (Continued...)
Lecture 53 - Ring and Modular Arithmetic (Continued...)
Lecture 54 - Ring and Modular Arithmetic (Continued...)
Lecture 55 - Ring and Modular Arithmetic (Continued...)
Lecture 56 - Finite Field and Applications
Lecture 57 - Finite Field and Applications (Continued...)
Lecture 58 - Finite Field and Applications (Continued...)
Lecture 59 - Finite Field and Applications (Continued...)
Lecture 60 - Finite Field and Applications (Continued...)

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NPTEL Video Course - Computer Science and Engineering - NOC:Embedded System Design with ARM

Subject Co-ordinator - Prof. Indranil Sengupta, Prof. Kamalika Datta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Embedded Systems
Lecture 2 - Design Considerations of Embedded Systems
Lecture 3 - Microprocessors and Microcontrollers
Lecture 4 - Architecture of ARM Microcontroller - Part 1
Lecture 5 - Architecture of ARM Microcontroller - Part 2
Lecture 6 - Architecture of ARM Microcontroller - Part 3
Lecture 7 - ARM Instruction Set - Part 1
Lecture 8 - ARM Instruction Set - Part 2
Lecture 9 - ARM Instruction Set - Part 3
Lecture 10 - About the STM32F401 Nucleo Board
Lecture 11 - PWM and Interrupt on STM32F401
Lecture 12 - Digital to Analog Conversion
Lecture 13 - Analog to Digital Conversion - Part 1
Lecture 14 - Analog to Digital Conversion - Part 2
Lecture 15 - Output Devices, Sensors and Actuators - Part 1
Lecture 16 - Output Devices, Sensors and Actuators - Part 2
Lecture 17 - Output Devices, Sensors and Actuators - Part 3
Lecture 18 - Microcontroller Development Boards
Lecture 19 - Mbed C Programming Environment
Lecture 20 - Interfacing With STM32F401 Board
Lecture 21 - Interfacing With Arduino Uno
Lecture 22 - Interfacing 7-Segment Led And LCD Displays - Part 1
Lecture 23 - Interfacing 7-segment LED and LCD Displays - Part 2
Lecture 24 - Serial Port Terminal Application (Coolterm)
Lecture 25 - Experiment With Temperature Sensor
Lecture 26 - Experiment With Ldr Light Sensor - Part 1
Lecture 27 - Experiment With Ldr Light Sensor - Part 2
Lecture 28 - Experiment With Speaker
Lecture 29 - Experiment With Microphone

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Lecture 30 - Design Of Control System
Lecture 31 - Experiments With Relay
Lecture 32 - Experiments On Speed Control Of Dc Motor
Lecture 33 - Experiment With Multiple Sensors And Relay
Lecture 34 - Introduction To Internet Of Things
Lecture 35 - Gsm And Bluetooth
Lecture 36 - Design Of A Home Automation System
Lecture 37 - Design Of A Simple Alarm System Using Touch Sensor
Lecture 38 - Accelerometer
Lecture 39 - Experiment Using Accelerometer
Lecture 40 - Experiment Using Bluetooth
Lecture 41 - Experiment With Gas Sensor
Lecture 42 - Summarization Of The Course

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NPTEL Video Course - Computer Science and Engineering - NOC:Hardware Security

Subject Co-ordinator - Dr. Debdeep Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Hardware Security - Part 1
Lecture 2 - Introduction to Hardware Security - Part 2
Lecture 3 - Algorithm to Hardware
Lecture 4 - Finite Field Architectures - 1
Lecture 5 - Finite Field Architectures - 1 (Continued...)
Lecture 6 - Hardware Design for Finite Field Inverse
Lecture 7 - Hardware Architecture for Finite Field Inverse
Lecture 8 - Background on Cryptography, Cryptanalysis and Advanced Encryption Standard (AES)
Lecture 9 - Advanced Encryption Standard (AES) andSide Channel Analysis
Lecture 10 - Field Isomorphisms
Lecture 11 - Field Isomorphisms (Continued...)
Lecture 12 - Hardware Implementation of Advanced Encryption
Lecture 13 - Hardware Implementation of Advanced Encryption
Lecture 14 - Hardware Implementation of Advanced Encryption (Continued...)
Lecture 15 - Compact AES-Box
Lecture 16 - Compact AES S-Box - Part II
Lecture 17 - Compact AES S-Box in Normal Basis - Part I
Lecture 18 - Compact AES S-Box in Normal Basis - Part II
Lecture 19 - Hardware for Elliptic Curve Cryptography - Part I
Lecture 20 - Hardware for Elliptic Curve Cryptography - Part II
Lecture 21 - Hardware for Elliptic Curve Cryptography - Part III
Lecture 22 - Hardware for Elliptic Curve Cryptography - Part IV
Lecture 23 - Hardware for Elliptic Curve Cryptography - Part V
Lecture 24 - Introduction to Side Channel Analysis
Lecture 25 - Power Analysis - Part I
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31 - Power Analysis - Part VII
Lecture 32 - Power Analysis - Part VIII
Lecture 33 - Power Analysis - Part IX
Lecture 34 - Power Analysis - Part X
Lecture 35 - Power Analysis - Part XI
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
Lecture 41 - Power Analysis - Part XVII
Lecture 42 - Power Analysis - Part XVIII
Lecture 43 - Power Analysis Countermeasures
Lecture 44 - Power Analysis Countermeasures (Continued...)
Lecture 45 - Power Analysis Countermeasures (Continued...)
Lecture 46 - Fault Analysis of Cryptosystems
Lecture 47 - Improved DFA of AES
Lecture 48 - Multi-Byte and key Scheduling Based Fault Analysis of AES
Lecture 49 - Multi-Byte and key Scheduling Based Fault Analysis of AES (Continued...)
Lecture 50 - Redundaney Based Fault Intensity
Lecture 51 - Reundancy Base Fault Countermeasures and Differential Faut Intensity Attacks (Continued...)
Lecture 52 - Infective Countermeasures for DFA
Lecture 53 - Infective Countermeasures for DFA (Continued...)
Lecture 54 - Infective Countermeasures for DFA (Continued...)
Lecture 55 - Microarchitectural attacks
Lecture 56 - Microarchitectural attacks
Lecture 57 - Microarchitectural attacks
Lecture 58 - Microarchitectural attacks
Lecture 59 - Microarchitectural attacks
Lecture 60 - Microarchitectural attacks

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Industry 4.0 and Industrial Inter

Subject Co-ordinator - Prof. Sudip Misra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Introduction
Lecture 5 - Introduction
Lecture 6 - Industry 4.0
Lecture 7 - Industry 4.0
Lecture 8 - Industry 4.0
Lecture 9 - Industry 4.0
Lecture 10 - Industry 4.0
Lecture 11 - Industry 4.0
Lecture 12 - Industry 4.0
Lecture 13 - Industry 4.0
Lecture 14 - Industry 4.0
Lecture 15 - Industry 4.0
Lecture 16 - Industry 4.0
Lecture 17 - Basics of Industrial IoT
Lecture 18 - Basics of Industrial IoT
Lecture 19 - Basics of IIoT
Lecture 20 - Basics of Industrial IoT
Lecture 21 - Basics of Industrial IoT
Lecture 22 - Business Models and Reference Architecture for IIoT
Lecture 23 - Business Models and Reference Architecture for IIoT
Lecture 24 - Business Models and Reference Architecture for IIoT
Lecture 25 - Business Models and Reference Architecture for IIoT
Lecture 26 - Key Enablers of Industrial IoT
Lecture 27 - Key Enablers of Industrial IoT
Lecture 28 - Key Enablers of Industrial IoT
Lecture 29 - Key Enablers of Industrial IoT

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Lecture 30 - Key Enablers of Industrial IoT
Lecture 31 - Key Enablers of Industrial IoT
Lecture 32 - Key Enablers of Industrial IoT
Lecture 33 - Key Enablers of Industrial IoT
Lecture 34 - Key Enablers of Industrial IoT
Lecture 35 - Key Enablers of Industrial IoT
Lecture 36 - IIoT Analytics and Data Management
Lecture 37 - IIoT Analytics and Data Management
Lecture 38 - IIoT Analytics and Data Management
Lecture 39 - IIoT Analytics and Data Management
Lecture 40 - IIoT Analytics and Data Management
Lecture 41 - Analytics and Data Management
Lecture 42 - IIoT Analytics and Data Management
Lecture 43 - IIoT Analytics and Data Management
Lecture 44 - IIoT Analytics and Data Management
Lecture 45 - Advanced Technologies
Lecture 46 - Advanced Technologies
Lecture 47 - Advanced Technologies
Lecture 48 - Advanced Technologies
Lecture 49 - IIoT Applications
Lecture 50 - IIoT Applications
Lecture 51 - IIoT Applications
Lecture 52 - IIoT Applications
Lecture 53 - IIoT Applications
Lecture 54 - IIoT Applications
Lecture 55 - IIoT Applications
Lecture 56 - IIoT Applications
Lecture 57 - IIoT Applications
Lecture 58 - Case Studies for Industry 4.0 and IIoT
Lecture 59 - Milk Processing and Packaging Industries
Lecture 60 - Manufacturing Industries - Part I
Lecture 61 - Manufacturing Industries - Part II
Lecture 62 - Student Projects - Part I
Lecture 63 - Student Projects - Part II
Lecture 64 - Virtual Reality Lab
Lecture 65 - Steel Technology Lab

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Automata, Languages and Computati

Subject Co-ordinator - Prof. Sourav Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Deterministic Finite Automata (DFA)
Lecture 2 - Input alphabet
Lecture 3 - Extended transition function
Lecture 4 - Language of DFA
Lecture 5 - Building DFA
Lecture 6 - Building DFA (Continued...)
Lecture 7 - NFA (Nondeterministic Finite Automata)
Lecture 8 - Language of a NFA
Lecture 9 - Equivalence of DFAs and NFAs
Lecture 10 - Subset Construction
Lecture 11 - Ã•Âµ-NFA
Lecture 12 - Extended transition function of NFA
Lecture 13 - Language of NFA
Lecture 14 - NFA to NFA
Lecture 15 - NFA to DFA
Lecture 16 - Regular expression
Lecture 17 - Regular expression (Continued...)
Lecture 18 - More on regular expression
Lecture 19 - Equivalence of NFA and regular expression
Lecture 20 - Equivalence of NFA and regular expression (Continued...)
Lecture 21 - DFA to Regular expression
Lecture 22 - DFA to Regular expression (Continued...)
Lecture 23 - Construction of regular expression from a DFA (example)
Lecture 24 - Closure properties of Regular Set
Lecture 25 - Closure properties of Regular Set (Continued...)
Lecture 26 - Substitution
Lecture 27 - Pumping Lemma
Lecture 28 - Application of the pumping lemma
Lecture 29 - More on Pumping lemma

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Lecture 30 - Ardens Theorem
Lecture 31 - Minimization of FA
Lecture 32 - Minimization of FA (Continued...)
Lecture 33 - Two way FA
Lecture 34 - Finite automata with output
Lecture 35 - Equivalence of Moore and Mealy machine
Lecture 36 - Context free grammars (CFG)
Lecture 37 - Context free language (CFL)
Lecture 38 - More example on CFL
Lecture 39 - More on CFG
Lecture 40 - Derivation Tree/Parse Tree
Lecture 41 - Leftmost and Rightmost derivations
Lecture 42 - Ambiguity in CFG
Lecture 43 - Simplification of CFG
Lecture 44 - Algorithms to construct reduced grammar
Lecture 45 - Elimination of Null and Unit productions
Lecture 46 - Chomsky Normal Form (CNF)
Lecture 47 - Greibach Normal Form (GNF)
Lecture 48 - Pushdown Automata (PDA)
Lecture 49 - Language accepted by PDA
Lecture 50 - Example of a language accepted by PDA
Lecture 51 - Deterministic PDA
Lecture 52 - Equivalence of language accepted
Lecture 53 - Equivalence PDA
Lecture 54 - Equivalence PDA and CFL
Lecture 55 - Equivalence PDA and CFL (Continued...)
Lecture 56 - Relationship between regular language and CFL
Lecture 57 - Pumping lemma for CFLs
Lecture 58 - Closer properties of CFLs
Lecture 59 - Turning Machine
Lecture 60 - Language accepted by a Turning machine

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NPTEL Video Course - Computer Science and Engineering - NOC:Operating System Fundamentals

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Introduction (Continued...)
Lecture 7 - Operating System Structures
Lecture 8 - Operating System Structures (Continued...)
Lecture 9 - Operating System Structures (Continued...)
Lecture 10 - Operating System Structures (Continued...)
Lecture 11 - Operating System Structures (Continued...)
Lecture 12 - Processes
Lecture 13 - Processes (Continued...)
Lecture 14 - Processes (Continued...)
Lecture 15 - Processes (Continued...)
Lecture 16 - Processes (Continued...)
Lecture 17 - Processes (Continued...)
Lecture 18 - Processes (Continued...)
Lecture 19 - Threads
Lecture 20 - Threads (Continued...)
Lecture 21 - Threads (Continued...)
Lecture 22 - Threads (Continued...)
Lecture 23 - Threads, Scheduling
Lecture 24 - Scheduling
Lecture 25 - Scheduling (Continued...)
Lecture 26 - Scheduling (Continued...)
Lecture 27 - Scheduling (Continued...)
Lecture 28 - Scheduling (Continued...)
Lecture 29 - Process Synchronization

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Lecture 30 - Process Synchronization (Continued...)
Lecture 31 - Process Synchronization (Continued...)
Lecture 32 - Process Synchronization (Continued...)
Lecture 33 - Process Synchronization (Continued...)
Lecture 34 - Process Synchronization (Continued...)
Lecture 35 - Synchronization Examples
Lecture 36 - Synchronization Examples, Deadlock
Lecture 37 - Deadlock
Lecture 38 - Deadlock (Continued...)
Lecture 39 - Deadlock (Continued...)
Lecture 40 - Deadlock (Continued...)
Lecture 41 - Memory Management
Lecture 42 - Memory Management (Continued...)
Lecture 43 - Memory Management (Continued...)
Lecture 44 - Memory Management (Continued...)
Lecture 45 - Memory Management (Continued...)
Lecture 46 - Memory Management (Continued...)
Lecture 47 - Memory Management (Continued...)
Lecture 48 - Memory Management (Continued...)
Lecture 49 - Virtual Memory
Lecture 50 - Virtual Memory (Continued...)
Lecture 51 - Virtual Memory (Continued...)
Lecture 52 - Virtual Memory (Continued...)
Lecture 53 - Virtual Memory (Continued...)
Lecture 54 - Virtual Memory (Continued...)
Lecture 55 - Virtual Memory (Continued...)
Lecture 56 - Virtual Memory (Continued...)
Lecture 57 - File System and Secondary Storage
Lecture 58 - File System and Secondary Storage (Continued...)
Lecture 59 - File System and Secondary Storage (Continued...)
Lecture 60 - File System and Secondary Storage (Continued...)

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NPTEL Video Course - Computer Science and Engineering - NOC:Deep Learning (Prof. P.K. Biswas)

Subject Co-ordinator - Prof. P.K. Biswas

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Feature Descriptor - I
Lecture 3 - Feature Descriptor - II
Lecture 4 - Bayesian Learning - I
Lecture 5 - Bayesian Learning - II
Lecture 6 - Discriminant Function - I
Lecture 7 - Discriminant Function - II
Lecture 8 - Discriminant Function - III
Lecture 9 - Linear Classifier - I
Lecture 10 - Linear Classifier - II
Lecture 11 - Support Vector Machine - I
Lecture 12 - Support Vector Machine - II
Lecture 13 - Linear Machine
Lecture 14 - Multiclass Support Vector Machine - I
Lecture 15 - Multiclass Support Vector Machine - II
Lecture 16 - Optimization
Lecture 17 - Optimization Techniques in Machine Learning
Lecture 18 - Nonlinear Functions
Lecture 19 - Introduction to Neural Network
Lecture 20 - Neural Network - II
Lecture 21 - Multilayer Perceptron - I
Lecture 22 - Multilayer Perceptron - II
Lecture 23 - Backpropagation Learning
Lecture 24 - Loss Function
Lecture 25 - Backpropagation Learning- Example - I
Lecture 26 - Backpropagation Learning- Example - II
Lecture 27 - Backpropagation Learning- Example - III
Lecture 28 - Autoencoder
Lecture 29 - Autoencoder Vs PCA - I

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Lecture 30 - Autoencoder Vs PCA - II
Lecture 31 - Autoencoder Training
Lecture 32 - Autoencoder Variants - I
Lecture 33 - Autoencoder Variants - II
Lecture 34 - Convolution
Lecture 35 - Cross Correlation
Lecture 36 - CNN Architecture
Lecture 37 - MLP versus CNN, Popular CNN Architecture
Lecture 38 - Popular CNN Architecture
Lecture 39 - Popular CNN Architecture
Lecture 40 - Vanishing and Exploding Gradient
Lecture 41 - GoogleNet
Lecture 42 - ResNet, Optimisers
Lecture 43 - Optimisers
Lecture 44 - Optimisers
Lecture 45 - Optimisers
Lecture 46 - Normalization
Lecture 47 - Batch Normalization - I
Lecture 48 - Batch Normalization - II
Lecture 49 - Layer, Instance, Group Normalization
Lecture 50 - Training Trick, Regularization,Early Stopping
Lecture 51 - Face Recognition
Lecture 52 - Deconvolution Layer
Lecture 53 - Semantic Segmentation - I
Lecture 54 - Semantic Segmentation - II
Lecture 55 - Semantic Segmentation - III
Lecture 56 - Image Denoising
Lecture 57 - Variational Autoencoder - I
Lecture 58 - Variational Autoencoder - II
Lecture 59 - Variational Autoencoder - III
Lecture 60 - Generative Adversarial Network

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Vision

Subject Co-ordinator - Prof. Jayanta Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Image Processing - Part I
Lecture 2 - Fundamentals of Imagr Processing - Part II
Lecture 3 - Image Transform - Part I
Lecture 4 - Image Transform - Part II
Lecture 5 - Projective Geometry - Part I
Lecture 6 - Projective Geometry - Part II
Lecture 7 - Projective Transformation
Lecture 8 - Homography
Lecture 9 - Homography
Lecture 10 - Homography
Lecture 11 - Camera Geometry - Part I
Lecture 12 - Camera Geometry - Part II
Lecture 13 - Camera Geometry - Part III
Lecture 14 - Camera Geometry - Part IV
Lecture 15 - Camera Geometry - Part V
Lecture 16 - Stereo Geometry - Part I
Lecture 17 - Stereo Geometry - Part II
Lecture 18 - Stereo Geometry - Part III
Lecture 19 - Stereo Geometry - Part IV
Lecture 20 - Stereo Geometry - Part V
Lecture 21 - Stereo Geometry - Part VI
Lecture 22 - Stereo Geometry - Part VII
Lecture 23 - Stereo Geometry - Part VIII
Lecture 24 - Feature Detection And Description - Part I
Lecture 25 - Feature Detection And Description - Part II
Lecture 26 - Feature Detection And Description - Part III
Lecture 27 - Feature Detection And Description - Part IV
Lecture 28 - Feature Detection And Description - Part V
Lecture 29 - Feature Matching And Model Fitting- Part I

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Lecture 30 - Feature Matching And Model Fitting- Part II
Lecture 31 - Feature Matching And Model Fitting- Part III
Lecture 32 - Feature Matching And Model Fitting- Part IV
Lecture 33 - Feature Matching And Model Fitting- Part V
Lecture 34 - Color Fundamentals And Processing-Part I
Lecture 35 - Color Fundamentals And Processing-Part II
Lecture 36 - Color Fundamentals And Processing-Part III
Lecture 37 - Color Fundamentals And Processing-Part IV
Lecture 38 - Color Fundamentals And Processing-Part V
Lecture 39 - Color Fundamentals And Processing-Part VI
Lecture 40 - Color Fundamentals And Processing-Part VII
Lecture 41 - Range Image Processing - Part I
Lecture 42 - Range Image Processing - Part II
Lecture 43 - Range Image Processing - Part III
Lecture 44 - Range Image Processing - Part IV
Lecture 45 - Range Image Processing - Part V
Lecture 46 - Clustering and Classification - Part I
Lecture 47 - Clustering and Classification - Part II
Lecture 48 - Clustering and Classification - Part III
Lecture 49 - Clustering and Classification - Part IV
Lecture 50 - Clustering and Classification - Part V
Lecture 51 - Dimensional Reduction And Sparse Representation - Part I
Lecture 52 - Dimensional Reduction And Sparse Representation - Part II
Lecture 53 - Dimensional Reduction And Sparse Representation - Part III
Lecture 54 - Dimensional Reduction And Sparse Representation - Part IV
Lecture 55 - Deep Neural Architecture And Applications - Part I
Lecture 56 - Deep Neural Architecture And Applications - Part II
Lecture 57 - Deep Neural Architecture And Applications - Part III
Lecture 58 - Deep Neural Architecture And Applications - Part IV
Lecture 59 - Deep Neural Architecture And Applications - Part V
Lecture 60 - Deep Neural Architecture And Applications - Part VI

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NPTEL Video Course - Computer Science and Engineering - NOC:Ethical Hacking

Subject Co-ordinator - Prof. Indranil Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ethical Hacking
Lecture 2 - Basic Concepts of Networking - Part I
Lecture 3 - Basic Concepts of Networking - Part II
Lecture 4 - TCP/IP Protocol Stack - Part I
Lecture 5 - TCP/IP Protocol Stack - Part II
Lecture 6 - IP addressing and routing - Part I
Lecture 7 - IP addressing and routing - Part II
Lecture 8 - TCP and UDP - Part I
Lecture 9 - TCP and UDP - Part II
Lecture 10 - IP subnetting
Lecture 11 - Routing protocols - Part I
Lecture 12 - Routing protocols - Part II
Lecture 13 - Routing protocols - Part III
Lecture 14 - IP version 6
Lecture 15 - Routing examples
Lecture 16 - Demonstration - Part I
Lecture 17 - Demonstration - Part II
Lecture 18 - Demonstration - Part III
Lecture 19 - Nessus Installation
Lecture 20 - How to use nessus
Lecture 21 - Metasploit Exploiting System Software - I
Lecture 22 - Metasploit Exploiting System Software - II
Lecture 23 - Metasploit Exploiting System Software and Privilege
Lecture 24 - Metasploit Social Eng Attack
Lecture 25 - MITM (Man in The middle) Attack
Lecture 26 - Basic concepts of cryptography
Lecture 27 - Private-key cryptography - Part I
Lecture 28 - Private-key cryptography - Part II
Lecture 29 - Public-key cryptography - Part I

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Lecture 30 - Public-key cryptography - Part II
Lecture 31 - Cryptographic hash functions - Part I
Lecture 32 - Cryptographic hash functions - Part II
Lecture 33 - Digital signature and certificate
Lecture 34 - Applications - Part I
Lecture 35 - Applications - Part II
Lecture 36 - Steganography
Lecture 37 - Biometrics
Lecture 38 - Network Based Attacks - Part I
Lecture 39 - Network Based Attacks - Part II
Lecture 40 - DNS and Email Security
Lecture 41 - Password cracking
Lecture 42 - Phishing attack
Lecture 43 - Maloeware
Lecture 44 - Wifi hacking
Lecture 45 - Dos and DDos attack
Lecture 46 - Elements of Hardware Security
Lecture 47 - Side Channel Attacks - Part I
Lecture 48 - Side Channel Attacks - Part II
Lecture 49 - Physical Unclonable Function
Lecture 50 - Hardware Trojan
Lecture 51 - Web Application Vulnerability Scanning
Lecture 52 - SQL Injection Authentication Bypass - Part 1
Lecture 53 - SQL Injection Error Based - Part 2
Lecture 54 - SQL Injection Error Based from Web Application - Part 3
Lecture 55 - SQLMAP
Lecture 56 - Cross Site Scripting
Lecture 57 - File Upload Vulnerability
Lecture 58 - The NMAP Tool
Lecture 59 - The NMAP Tool
Lecture 60 - The NMAP Tool
Lecture 61 - Network Analysis using Wireshark
Lecture 62 - Summarization of the Course

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NPTEL Video Course - Computer Science and Engineering - NOC:Software Project Management

Subject Co-ordinator - Prof. Durga Prasad Mohapatra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Introduction - III
Lecture 4 - Project Management Standards
Lecture 5 - Life Cycle Models - I
Lecture 6 - Life Cycle Models - II
Lecture 7 - Life Cycle Models - III
Lecture 8 - Life Cycle Models - IV
Lecture 9 - Life Cycle Models - V
Lecture 10 - Life Cycle Models - VI
Lecture 11 - Project Evaluation and Programme Management
Lecture 12 - Project Evaluation and Programme Management (Continued...)
Lecture 13 - Project Evaluation and Programme Management (Continued...)
Lecture 14 - Project Evaluation and Programme Management (Continued...)
Lecture 15 - Project Evaluation and Programme Management (Continued...)
Lecture 16 - Project Estimation Techniques
Lecture 17 - Project Estimation Techniques (Continued...)
Lecture 18 - Project Estimation Techniques (Continued...)
Lecture 19 - Project Estimation Techniques (Continued...)
Lecture 20 - Project Estimation Techniques (Continued...)
Lecture 21 - Project Estimation Techniques (Continued...)
Lecture 22 - Project Estimation Techniques (Continued...)
Lecture 23 - Project Estimation Techniques (Continued...)
Lecture 24 - Project Estimation Techniques (Continued...)
Lecture 25 - Project Estimation Techniques (Continued...)
Lecture 26 - Project Scheduling
Lecture 27 - Project Scheduling Using PERT/CPM
Lecture 28 - Project Scheduling Using PERT/CPM (Continued...)
Lecture 29 - Computation of Project Characteristics Using PERT/CPM

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Lecture 30 - Computation of Project Characteristics Using PERT/CPM
Lecture 31 - PERT, Project Crashing
Lecture 32 - Team Management
Lecture 33 - Organization and Team Structure
Lecture 34 - Team Structure (Continued...) and Risk Management
Lecture 35 - Risk Management (Continued...) and Introduction to Software Quality
Lecture 36 - Resource Allocation
Lecture 37 - Resource Allocation (Continued...)
Lecture 38 - Resource Allocation (Continued...)
Lecture 39 - Project Monitoring and Control
Lecture 40 - Project Monitoring and Control (Continued...)
Lecture 41 - Project Monitoring and Control (Continued...)
Lecture 42 - Project Monitoring and Control (Continued...)
Lecture 43 - Project Monitoring and Control (Continued...)
Lecture 44 - Project Monitoring and Control (Continued...)
Lecture 45 - Project Monitoring and Control (Continued...)
Lecture 46 - Project Monitoring and Control (Continued...)
Lecture 47 - Project Monitoring and Control (Continued...)
Lecture 48 - Contract Management
Lecture 49 - Contract Management (Continued...)
Lecture 50 - Project Close Out
Lecture 51 - Software Quality Management
Lecture 52 - ISO 9000
Lecture 53 - ISO 9001, SEI CMM
Lecture 54 - SEI CMM (Continued...)
Lecture 55 - SEI CMM (Continued...)
Lecture 56 - Personal Software Process (PSP)
Lecture 57 - Software Reliability - I
Lecture 58 - Software Reliability - II
Lecture 59 - Software Reliability - III
Lecture 60 - Software Testing

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NPTEL Video Course - Computer Science and Engineering - NOC:Spatial Informatics

Subject Co-ordinator - Prof. Soumya Kanti Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Spatial Data Models - 1
Lecture 3 - Spatial Data Models - 2
Lecture 4 - Spatial Data Models - 3
Lecture 5 - Spatial Data Models - 4
Lecture 6 - Spatial Web Services - 1
Lecture 7 - Spatial Web Services - 2
Lecture 8 - Spatial Web Services - 3
Lecture 9 - Spatial Web Services - 4
Lecture 10 - Spatial Web Services - Demo
Lecture 11 - Spatial Database
Lecture 12 - Spatial Query Processing / SQL - 1
Lecture 13 - Spatial Query Processing / SQL - 2
Lecture 14 - Spatial Query Processing / SQL - 3
Lecture 15 - Spatial Query Processing / SQL - 4
Lecture 16 - Spatial Query Demo Tutorial
Lecture 17 - Spatial Indexing - I
Lecture 18 - Spatial Indexing - II
Lecture 19 - Spatial Indexing - III
Lecture 20 - Spatial Indexing - IV
Lecture 21 - Spatial Networks - I
Lecture 22 - Spatial Networks - II
Lecture 23 - Spatial Networks - III
Lecture 24 - Spatial Networks - IV
Lecture 25 - Spatial Networks - V
Lecture 26 - Spatial Analysis - I
Lecture 27 - Spatial Analysis - II
Lecture 28 - Spatial Analysis - III
Lecture 29 - Spatial Analysis - IV

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Lecture 30 - Spatial Analysis - V
Lecture 31 - Remote Sensing and GIS - I
Lecture 32 - Remote Sensing and GIS - II
Lecture 33 - Remote Sensing and GIS - III
Lecture 34 - Remote Sensing and GIS - IIV
Lecture 35 - Remote Sensing and GIS - V
Lecture 36 - SDS / Spatial Cloud / GeoViz - I
Lecture 37 - SDS / Spatial Cloud / GeoViz - II
Lecture 38 - SDS / Spatial Cloud / GeoViz - III
Lecture 39 - SDS / Spatial Cloud / GeoViz - IV
Lecture 40 - SDS / Spatial Cloud / GeoViz - V

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NPTEL Video Course - Computer Science and Engineering - NOC:GPU Architectures and Programming

Subject Co-ordinator - Prof. Soumyajit Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of basic COA w.r.t. performance
Lecture 2 - Review of basic COA w.r.t. performance
Lecture 3 - Review of basic COA w.r.t. performance
Lecture 4 - Review of basic COA w.r.t. performance
Lecture 5 - Intro to GPU architectures
Lecture 6 - Intro to GPU architectures
Lecture 7 - Intro to GPU architectures
Lecture 8 - Intro to GPU architectures
Lecture 9 - Intro to CUDA programming
Lecture 10 - Intro to CUDA programming (Continued...)
Lecture 11 - Intro to CUDA programming (Continued...)
Lecture 12 - Intro to CUDA programming (Continued...)
Lecture 13 - Multi-dimensional mapping of dataspace; Synchronization
Lecture 14 - Multi-dimensional mapping of dataspace; Synchronization (Continued...)
Lecture 15 - Multi-dimensional mapping of dataspace; Synchronization (Continued...)
Lecture 16 - Warp Scheduling and Divergence
Lecture 17 - Warp Scheduling and Divergence (Continued...)
Lecture 18 - Warp Scheduling and Divergence (Continued...)
Lecture 19 - Memory Access Coalescing
Lecture 20 - Memory Access Coalescing (Continued...)
Lecture 21 - Memory Access Coalescing (Continued...)
Lecture 22 - Memory Access Coalescing (Continued...)
Lecture 23 - Memory Access Coalescing (Continued...)
Lecture 24 - Memory Access Coalescing (Continued...)
Lecture 25 - Memory Access Coalescing (Continued...)
Lecture 26 - Memory Access Coalescing (Continued...)
Lecture 27 - Memory Access Coalescing (Continued...)
Lecture 28 - Optimizing Reduction Kernels
Lecture 29 - Optimizing Reduction Kernels (Continued...)

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Lecture 30 - Optimizing Reduction Kernels (Continued...)
Lecture 31 - Optimizing Reduction Kernels (Continued...)
Lecture 32 - Optimizing Reduction Kernels (Continued...)
Lecture 33 - Optimizing Reduction Kernels (Continued...)
Lecture 34 - Optimizing Reduction Kernels (Continued...)
Lecture 35 - Kernel Fusion, Thread and Block Coarsening
Lecture 36 - Kernel Fusion, Thread and Block Coarsening (Continued...)
Lecture 37 - Kernel Fusion, Thread and Block Coarsening (Continued...)
Lecture 38 - Kernel Fusion, Thread and Block Coarsening (Continued...)
Lecture 39 - Kernel Fusion, Thread and Block Coarsening (Continued...)
Lecture 40 - Kernel Fusion, Thread and Block Coarsening (Continued...)
Lecture 41 - OpenCL - Runtime System
Lecture 42 - OpenCL - Runtime System (Continued...)
Lecture 43 - OpenCL - Runtime System (Continued...)
Lecture 44 - OpenCL - Runtime System (Continued...)
Lecture 45 - OpenCL - Runtime System (Continued...)
Lecture 46 - OpenCL - Runtime System (Continued...)
Lecture 47 - OpenCL - Runtime System (Continued...)
Lecture 48 - OpenCL - Heterogeneous Computing
Lecture 49 - OpenCL - Heterogeneous Computing (Continued...)
Lecture 50 - OpenCL - Heterogeneous Computing (Continued...)
Lecture 51 - OpenCL - Heterogeneous Computing (Continued...)
Lecture 52 - OpenCL - Heterogeneous Computing (Continued...)
Lecture 53 - OpenCL - Heterogeneous Computing (Continued...)
Lecture 54 - Efficient Neural Network Training/Inferencing
Lecture 55 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 56 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 57 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 58 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 59 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 60 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 61 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 62 - Efficient Neural Network Training/Inferencing (Continued...)
Lecture 63 - Efficient Neural Network Training/Inferencing (Continued...)

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NPTEL Video Course - Computer Science and Engineering - NOC:Google Cloud Computing Foundation Course

Subject Co-ordinator - Prof. Soumya Kanti Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cloud
Lecture 2 - Cloud Computing
Lecture 3 - Cloud vs Traditional Architecture
Lecture 4 - Iaas, PaaS and SaaS
Lecture 5 - Google Cloud Architecture
Lecture 6 - Cloud Computing Recap Quiz
Lecture 7 - Summary - Cloud Computing
Lecture 8 - Introduction - Start with a Solid Platform
Lecture 9 - The GCP Console
Lecture 10 - Understanding Projects
Lecture 11 - Billing in GCP
Lecture 12 - Install and Configure Cloud SDK
Lecture 13 - Use Cloud Shell
Lecture 14 - GCP APIs
Lecture 15 - Cloud Console Mobile App
Lecture 16 - Recap Quiz - Start with a Solid Foundation
Lecture 17 - Introduction
Lecture 18 - Compute Options in the Cloud
Lecture 19 - Exploring IaaS with Compute Engine
Lecture 20 - Configuring Elastic Apps with Autoscaling
Lecture 21 - Exploring PaaS with App Engine
Lecture 22 - Event Driven Programs with Cloud Functions
Lecture 23 - Containerizing and Orchestrating Apps with GKE
Lecture 24 - Summary
Lecture 25 - Introduction
Lecture 26 - Storage Options in the Cloud
Lecture 27 - Structured and Unstructured Storage in the Cloud
Lecture 28 - Unstructured Storage using Cloud Storage
Lecture 29 - SQL Managed Services

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Lecture 30 - Exploring Cloud SQL
Lecture 31 - Cloud Spanner as a Managed Service
Lecture 32 - NoSQL Managed Services Options
Lecture 33 - Cloud Datastore a NoSQL Document Store
Lecture 34 - Cloud Bigtable as a NoSQL Option
Lecture 35 - Summary
Lecture 36 - Introduction to API
Lecture 37 - The Purpose of APIs
Lecture 38 - Cloud Endpoints
Lecture 39 - Using Apigee
Lecture 40 - Managed Message Services
Lecture 41 - Cloud Pub/Sub
Lecture 42 - Recap Quiz - There's an API for that!
Lecture 43 - Introduction - Cloud Security
Lecture 44 - Introduction to security in the cloud
Lecture 45 - Understanding the shared security model
Lecture 46 - Explore encryption options
Lecture 47 - Understand authentication and authorization
Lecture 48 - Identify best practices for authorization
Lecture 49 - Recap Quiz - Security
Lecture 50 - Summary - Security
Lecture 51 - Introduction
Lecture 52 - Intro to Networking in the Cloud
Lecture 53 - Defining a Virtual Private Cloud
Lecture 54 - Public and Private IP Address Basics
Lecture 55 - Googles Network Architecture
Lecture 56 - Routes and Firewall Rules in the Cloud
Lecture 57 - Multiple VPC Networks
Lecture 58 - Building Hybrid Clouds
Lecture 59 - Different Options for Load Balancing
Lecture 60 - Recap Quiz
Lecture 61 - Summary
Lecture 62 - Introduction - Let Google keep an eye on things
Lecture 63 - Introduction to IaC
Lecture 64 - Cloud Deployment Manager
Lecture 65 - Monitoring and Managing Your Services, Apps, and Infra
Lecture 66 - Stackdriver
Lecture 67 - Recap Quiz - Let Google keep an eye on things
Lecture 68 - Summary - Let Google keep an eye on things

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Lecture 69 - Introduction - You have the data, but what are you doing with it?
Lecture 70 - Intro to Big Data Managed Services in the Cloud
Lecture 71 - Leverage Big Data Operations with Cloud Dataproc
Lecture 72 - Build ETL Pipelines using Cloud Dataflow
Lecture 73 - BigQuery Googles Enterprise Data Warehouse
Lecture 74 - Recap Quiz - You have the data, but what are you doing with it?
Lecture 75 - Summary - You have the data, but what are you doing with it?
Lecture 76 - Introduction
Lecture 77 - Introduction to ML
Lecture 78 - ML and GCP
Lecture 79 - Building Bespoke ML models
Lecture 80 - Cloud AutoML
Lecture 81 - Googles Pre-trained ML APIs
Lecture 82 - Recap Quiz
Lecture 83 - Summary

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NPTEL Video Course - Computer Science and Engineering - NOC:Object Oriented System Development using UML, Jav

Subject Co-ordinator - Prof. Rajib Mall

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic Concepts in UML
Lecture 3 - Introduction to Use case Modelling
Lecture 4 - Factoring Use Cases
Lecture 5 - Use Case Examples
Lecture 6 - Use Case Guidelines
Lecture 7 - Class Diagram
Lecture 8 - Class Relations
Lecture 9 - Binary and Unary Associations
Lecture 10 - Implementation of Association Relation in Java
Lecture 11 - Implementation of Association in General Case
Lecture 12 - Association Class and Ternary Association
Lecture 13 - Qualified Association
Lecture 14 - Aggregation and Composition
Lecture 15 - Dependency Relation
Lecture 16 - Class Diagram Exercises
Lecture 17 - Interfaces, Packages and Abstract Classes
Lecture 18 - Polymorphism
Lecture 19 - State Machine Diagrams
Lecture 20 - State Charts Overview
Lecture 21 - Features of State Machine Model
Lecture 22 - Example of State Machine Modelling
Lecture 23 - Encoding a State Machine - I
Lecture 24 - Encoding a State Machine - II
Lecture 25 - Interaction Diagrams
Lecture 26 - Sequence Diagram - I
Lecture 27 - Sequence Diagram - II
Lecture 28 - Activity Diagram
Lecture 29 - Introduction to OOAD

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Lecture 30 - OOAD - I
Lecture 31 - OOAD - II
Lecture 32 - Example Application of OOAD
Lecture 33 - CRD Cards
Lecture 34 - Open/Closed Principle
Lecture 35 - LSP, ISP Principles
Lecture 36 - DIP Principle
Lecture 37 - Introduction to Design Pattern
Lecture 38 - GRASP Pattern
Lecture 39 - Expert and Creator Pattern
Lecture 40 - Pure Fabrication, Law of Demeter
Lecture 41 - Introduction to GOF Patterns
Lecture 42 - Facade Pattern
Lecture 43 - Observer Pattern - I
Lecture 44 - Observer Pattern - II
Lecture 45 - Singleton Pattern - I
Lecture 46 - Singleton Pattern - II
Lecture 47 - State Pattern - I
Lecture 48 - State Pattern - II
Lecture 49 - Composite Pattern - I
Lecture 50 - Composite Pattern - II
Lecture 51 - Adapter Pattern - I
Lecture 52 - Adapter Pattern - II
Lecture 53 - Bridge Pattern - I
Lecture 54 - Bridge Pattern - II
Lecture 55 - Proxy Pattern - I
Lecture 56 - Proxy Pattern - II
Lecture 57 - Decorator Pattern - I
Lecture 58 - Decorator Pattern - II
Lecture 59 - Decorator Pattern - III
Lecture 60 - Iterator Pattern

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NPTEL Video Course - Computer Science and Engineering - NOC:Data Structure and Algorithms using Java

Subject Co-ordinator - Prof. Debasis Samanta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Course Plan
Lecture 2 - Generic Methods
Lecture 3 - Basics of Generic Class
Lecture 4 - Parameterized Generic Class
Lecture 5 - Bounded Argument Generic Class
Lecture 6 - Basics of the Framework
Lecture 7 - Collection in JCF
Lecture 8 - Set of JCF
Lecture 9 - Map Framework
Lecture 10 - Java Legacy Classes
Lecture 11 - Array Data Structures
Lecture 12 - Programming for Arrays
Lecture 13 - Class ArrayList for Arrays
Lecture 14 - Arrays for Arrays
Lecture 15 - Vector Class for Arrays
Lecture 16 - Linked List Data Structure - Part I
Lecture 17 - Linked List Data Structure - Part II
Lecture 18 - Programming for Linked Lists - Part I
Lecture 19 - Programming for Linked Lists - Part II
Lecture 20 - Linked Lists Using JCF
Lecture 21 - Stack Data Structures
Lecture 22 - Programming for Stack
Lecture 23 - Stack Using JCF
Lecture 24 - Queue Data Structure
Lecture 25 - Programming for Queue
Lecture 26 - Queue Using JCF
Lecture 27 - Understanding Tree Data Structures
Lecture 28 - Operations on Binary Tree Data Structures
Lecture 29 - Binary Search Tree

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Lecture 30 - Programming for Binary Search Tree
Lecture 31 - Height Balanced Binary Search Tree
Lecture 32 - Heap Tree
Lecture 33 - Programming for Heap Tree
Lecture 34 - Huffman Tree
Lecture 35 - Graph Structures
Lecture 36 - Graph Algorithms
Lecture 37 - Map Framework in Java
Lecture 38 - Applications of Map - Part I
Lecture 39 - Applications of Map - Part II
Lecture 40 - Collection Set
Lecture 41 - Operations on Set Collection
Lecture 42 - Introduction to java.io
Lecture 43 - IO with Byte Streams
Lecture 44 - IO with Character Streams
Lecture 45 - File Input-Output
Lecture 46 - Random Access File
Lecture 47 - Linear Searching Algorithms
Lecture 48 - Non-linear Searching Algorithms
Lecture 49 - Programs for Searching
Lecture 50 - Sorting Algorithms - Part I
Lecture 51 - Improved Sorting Algorithms
Lecture 52 - Advanced Sorting Algorithms
Lecture 53 - Programs for Sorting - Part I
Lecture 54 - Programs for Sorting - Part II
Lecture 55 - Sorting Using JCF
Lecture 56 - String Class
Lecture 57 - Applications of String
Lecture 58 - StringBuffer Class
Lecture 59 - Miscellaneous Utilities
Lecture 60 - Java Cursors

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NPTEL Video Course - Computer Science and Engineering - NOC:Real-Time Systems

Subject Co-ordinator - Prof. Rajib Mall

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Characteristics of a real-time embedded system
Lecture 4 - Characteristics of a real-time embedded system
Lecture 5 - Types of real-time tasks
Lecture 6 - Events in a Real-Time System
Lecture 7 - Types of time constraints
Lecture 8 - Basics of Real-Time Task scheduling
Lecture 9 - Clock-driven schedulers
Lecture 10 - Basics of Cyclic schedulers
Lecture 11 - Cyclic Scheduler
Lecture 12 - Frame size constraints
Lecture 13 - Frame size selection: Examples
Lecture 14 - Event-driven scheduling
Lecture 15 - EDF scheduler
Lecture 16 - Variants of EDF and Rate Monotonic Scheduling
Lecture 17 - Rate Monotonic Schedulability Analysis
Lecture 18 - Rate Monotonic Schedulability Analysis
Lecture 19 - Rate Monotonic Scheduling: Miscellaneous issues
Lecture 20 - RMS Generalizations
Lecture 21 - RMS Generalizations
Lecture 22 - Handling aperiodic and sporadic tasks in rate monotonic scheduling
Lecture 23 - Handling aperiodic and sporadic tasks in rate monotonic scheduling
Lecture 24 - Coping up with Insufficient number of priorities
Lecture 25 - Handling task jitter and precedence ordering
Lecture 26 - Resource Sharing Among Real-Time Tasks
Lecture 27 - Basic priority inheritance protocol (PIP)
Lecture 28 - Highest Locker Protocol (HLP)
Lecture 29 - Priority Ceiling Protocol (PCP)

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Lecture 30 - Working of Priority Ceiling Protocol
Lecture 31 - Analysis of Priority Ceiling Protocol
Lecture 32 - Introduction to Multiprocessor and Distributed Systems
Lecture 33 - Static Allocation of Tasks
Lecture 34 - Dynamic Allocation of Tasks
Lecture 35 - Centralized Clock Synchronization in Distributed RT Systems
Lecture 36 - Distributed Clock Synchronization in R-T Systems
Lecture 37 - A Few Basics in Real-Time Operating Systems
Lecture 38 - Time Services
Lecture 39 - Unix as a Real-Time Operating System
Lecture 40 - Unix as a Real-Time Operating System (Continued...)
Lecture 41 - Windows as RTOS
Lecture 42 - POSIX
Lecture 43 - Unix-Based Real-Time Operating Systems
Lecture 44 - A survey of some contemporary Real-Time Operating Systems
Lecture 45 - A survey of some contemporary Real-Time Operating Systems (Continued...)
Lecture 46 - Benchmarking Real-Time Systems
Lecture 47 - Introduction to Real-Time Communication
Lecture 48 - Basics of Real-Time Communication
Lecture 49 - Basics of Networking
Lecture 50 - Basics of Internet
Lecture 51 - Real-Time Communication in a LAN
Lecture 52 - Bounded Access Protocols for LANs
Lecture 53 - Performance Comparison and QoS Framework
Lecture 54 - Routing and Resource Reservation
Lecture 55 - Rate Control
Lecture 56 - QoS Models and Soft Real-Time Communication in a LAN
Lecture 57 - Review of Basic Database Concepts
Lecture 58 - Applications and Issues of Real-Time Database
Lecture 59 - Characteristics of Temporal Data
Lecture 60 - Locking-Based Concurrency Control In Real-Time Databases
Lecture 61 - Concurrency Control In Real-Time Databases and Commercial RT Databases

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NPTEL Video Course - Computer Science and Engineering - NOC:Algorithms for Protein Modelling and Engineering

Subject Co-ordinator - Prof. Pralay Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction on Proteins
Lecture 2 - Introduction on Proteins (Continued...) and Sequence Database
Lecture 3 - Protein Data Bank
Lecture 4 - PDB Parsing
Lecture 5 - Molecular Visualization Tools
Lecture 6 - Representation and Data Structure
Lecture 7 - Digitization of a Molecule
Lecture 8 - Application to Protein Docking, FFT
Lecture 9 - Implementation Details
Lecture 10 - Hashing
Lecture 11 - Geometric Hashing
Lecture 12 - Geometric Hashing (Continued...)
Lecture 13 - Geometric Hashing (Continued...)
Lecture 14 - Molecular Surface
Lecture 15 - Genetic Algorithm (GA) for Surface Comparison
Lecture 16 - Monte Carlo (MC) Method
Lecture 17 - Monte Carlo Method (Continued...) and Random Number
Lecture 18 - Monte Carlo (MC) Method (Continued...)
Lecture 19 - Protein Folding
Lecture 20 - Protein Folding (Continued...) and Protein Design
Lecture 21 - Protein Energy Landscape
Lecture 22 - Protein Energy Landscape (Continued...), Limitation of MC
Lecture 23 - Replica Exchange Monte Carlo (REMC)
Lecture 24 - Ab Initio Protein Folding
Lecture 25 - Structure Alignment Measures
Lecture 26 - Dynamic Programming
Lecture 27 - Dynamic Programming (Continued...), Sequence Alignment
Lecture 28 - Dynamic Programming (Continued...), Position Specific Scoring Matrix (PSSM)
Lecture 29 - Structure Alignment

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Lecture 30 - Structure Alignment (Continued...)
Lecture 31 - Structural Classification of Proteins (SCOP)
Lecture 32 - SCOP (Continued...), Symmetry in Proteins
Lecture 33 - Symmetry in Proteins
Lecture 34 - Discriminating Biological Protein Interfaces from Crystal Artifacts
Lecture 35 - Discriminating Biological Protein Interfaces from Crystal Artifacts (Continued...)
Lecture 36 - Discriminating Biological Protein Interfaces from Crystal Artifacts (Continued...)
Lecture 37 - Discriminating Biological Protein Interfaces from Crystal Artifacts (Continued...)
Lecture 38 - Symmetry-Based Protein Complex Modeling
Lecture 39 - Some Protein Docking Methods
Lecture 40 - Some Protein Docking Methods (Continued...)
Lecture 41 - Computational Protein Design (CPD)
Lecture 42 - Computational Protein Design (CPD) (Continued...)
Lecture 43 - Protein Design Energy Function
Lecture 44 - Protein Design Analysis
Lecture 45 - Application of Protein Design on Drug Design
Lecture 46 - RECM in Protein Design
Lecture 47 - Application of Protein Design on Drug Design
Lecture 48 - Application of Protein Design on Drug Design (Continued...), Protein Modification
Lecture 49 - Protein Modification (Continued...)
Lecture 50 - Protein Modification (Continued...)
Lecture 51 - Assigning Secondary Structure to Protein Sequence
Lecture 52 - Assigning Secondary Structure to Protein Sequence (Continued...)
Lecture 53 - Machine Learning to Predict the Secondary Structure from Amino Acid Sequences
Lecture 54 - Machine Learning to Predict the Secondary Structure from Amino Acid Sequences (Continued...)
Lecture 55 - Post Translational Modification
Lecture 56 - Predicting Protein Phosphorylation Sites
Lecture 57 - Predicting Protein Phosphorylation Sites (Continued...)
Lecture 58 - Summarizing Protein Folding and Protein Docking
Lecture 59 - Summarizing Protein Folding and Protein Docking (Continued...)
Lecture 60 - Summarizing Potein Engineering

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming in Modern C++

Subject Co-ordinator - Prof. Partha Pratim Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline
Lecture 2 - Quick Recap 01: Recap of C/1
Lecture 3 - Quick Recap 02: Recap of C/2
Lecture 4 - Course Overview
Lecture 5 - IO and Loop
Lecture 6 - Arrays and Strings
Lecture 7 - Sorting and Searching
Lecture 8 - Stack and Common Data Structures/Containers
Lecture 9 - Tutorial 1: How to build a C/C++ program?: Part 1: C Preprocessor (CPP)
Lecture 10 - Constants and Inline Functions
Lecture 11 - Reference and Pointer
Lecture 12 - Default Parameters and Function Overloading
Lecture 13 - Operator Overloading
Lecture 14 - Dynamic Memory Management
Lecture 15 - Tutorial 2: How to build a C/C++ program?: Part 2: Build Pipeline
Lecture 16 - Static Members
Lecture 17 - Classes and Objects
Lecture 18 - Access Specifiers
Lecture 19 - Constructors, Destructors and Object Lifetime
Lecture 20 - Copy Constructor and Copy Assignment Operator
Lecture 21 - Const-ness
Lecture 22 - Tutorial 3: How to build a C/C++ program?: Part 3: make Utility
Lecture 23 - Static Members
Lecture 24 - Friend Function and Friend Class
Lecture 25 - Overloading Operator for User-Defined Types: Part 1
Lecture 26 - Overloading Operator for User-Defined Types: Part 2
Lecture 27 - Namespace
Lecture 28 - Tutorial 4: How to build a C/C++ program?: Part 4: Static and Dynamic Library
Lecture 29 - Inheritance: Part 2 (Data Member and Member Function - Override and Overload)

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Lecture 30 - Inheritance: Part 3 (Constructor and Destructor - Object Lifetime)
Lecture 31 - Inheritance: Part 4: Phone Hierarchy
Lecture 32 - Inheritance: Part 5: private and protected Inheritance
Lecture 33 - Tutorial 5: Mixing C and C++ Code: Part 1: Issues and Resolutions
Lecture 34 - Polymorphism: Part 1: Type Casting
Lecture 35 - Polymorphism: Part 2: Static and Dynamic Binding
Lecture 36 - Polymorphism: Part 3: Abstract Base Class
Lecture 37 - Polymorphism: Part 4: Staff Salary Processing using C
Lecture 38 - Polymorphism: Part 5: Staff Salary Processing using C++
Lecture 39 - Tutorial 6: Mixing C and C++ Code: Part 2: Project Example
Lecture 40 - Virtual Function Table
Lecture 41 - Type Casting and Cast Operators: Part 1
Lecture 42 - Type Casting and Cast Operators: Part 2
Lecture 43 - Type Casting and Cast Operators: Part 3
Lecture 44 - Multiple Inheritance
Lecture 45 - Tutorial 7: How to design a UDT like built-in types?: Part 1: Fraction UDT
Lecture 46 - Exceptions (Error handling in C): Part 1
Lecture 47 - Exceptions (Error handling in C++): Part 2
Lecture 48 - Template (Function Template): Part 1
Lecture 49 - Template (Class Template): Part 2
Lecture 50 - Functors: Function Objects
Lecture 51 - Tutorial 8: How to design a UDT like built-in types?: Part 2: Int and Poly UDT
Lecture 52 - Input-Output: File Handling in C
Lecture 53 - Input-Output: Streams in C++
Lecture 54 - C++ Standard Library: Part 1 (Generic Programming)
Lecture 55 - C++ Standard Library: Part 2 (STL)
Lecture 56 - C++ Standard Library: Part 3 (STL)
Lecture 57 - Tutorial 9: How to design a UDT like built-in types?: Part 3: Updates and Mixes of UDTs
Lecture 58 - C++11 and beyond: General Features: Part 1
Lecture 59 - C++11 and beyond: General Features: Part 2
Lecture 60 - C++11 and beyond: General Features: Part 3
Lecture 61 - C++11 and beyond: General Features: Part 4: Rvalue and Move/1
Lecture 62 - C++11 and beyond: General Features: Part 5: Rvalue and Move/2
Lecture 63 - Tutorial 10: How to optimize C++11 programs using Rvalue and Move Semantics?
Lecture 64 - C++11 and beyond: General Features: Part 6: Rvalue and Perfect Forwarding
Lecture 65 - C++11 and beyond: General Features: Part 7: Lambda in C++/1
Lecture 66 - C++11 and beyond: General Features: Part 8: Lambda in C++/2
Lecture 67 - C++11 and beyond: Class Features
Lecture 68 - C++11 and beyond: Non-class Types and Template Features

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Lecture 69 - Tutorial 11: Compatibility of C and C++: Part 1: Significant Features
Lecture 70 - C++11 and beyond: Resource Management by Smart Pointers: Part 1
Lecture 71 - C++11 and beyond: Resource Management by Smart Pointers: Part 2
Lecture 72 - C++11 and beyond: Concurrency: Part 1
Lecture 73 - C++11 and beyond: Concurrency: Part 2
Lecture 74 - Closing Comments
Lecture 75 - Tutorial 12: Compatibility of C and C++: Part 2: Summary

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NPTEL Video Course - Computer Science and Engineering - NOC:Blockchain and its Applications

Subject Co-ordinator - Prof. Sandip Chakraborty, Prof. Shamik Sural

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Model of Decentralization
Lecture 2 - What is Blockchain
Lecture 3 - Basic Cryptographic Primitives - I
Lecture 4 - Basic Cryptographic Primitives - II
Lecture 5 - Basic Cryptographic Primitives - III
Lecture 6 - Basic Cryptographic Primitives - IV
Lecture 7 - Basic Cryptographic Primitives - V
Lecture 8 - Distributed Systems for Decentralization - The Beginningâ
Lecture 9 - The Evolution of Cryptocurrencies
Lecture 10 - Open Consensus and Bitcoin
Lecture 11 - Bitcoin Mining and Beyond
Lecture 12 - Smart Contracts and the Permissioned Models of Blockchainâ
Lecture 13 - Blockchain Elements - I
Lecture 14 - Blockchain Elements - II
Lecture 15 - Blockchain Elements - III
Lecture 16 - Blockchain Elements - IV
Lecture 17 - Blockchain Elements - V
Lecture 18 - Permissionless Model and Open Consensus
Lecture 19 - Nakamoto Consensus (Proof of Work)
Lecture 20 - Limitations of PoW: Forking and Security
Lecture 21 - Beyond PoW
Lecture 22 - Ethereum 1
Lecture 23 - Ethereum 2
Lecture 24 - Ethereum 3
Lecture 25 - Ethereum 4
Lecture 26 - Consensus for Permissioned Models
Lecture 27 - State Machine Replication as Distributed Consensus
Lecture 28 - Paxos
Lecture 29 - Paxos - Safety and Liveness

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Lecture 30 - Byzantine Faults
Lecture 31 - Byzantine Agreement Protocols
Lecture 32 - Safety and Liveness of PBFT
Lecture 33 - Enterprise Blockchains
Lecture 34 - Hyperledger Fabric 1
Lecture 35 - Hyperledger Fabric 2
Lecture 36 - Hyperledger Fabric 3
Lecture 37 - Hyperledger Fabric 4
Lecture 38 - Consensus Scalability
Lecture 39 - Bitcoin-NG
Lecture 40 - Collective Signing (CoSi)
Lecture 41 - ByzCoin
Lecture 42 - Algorand
Lecture 43 - Identity Management - I
Lecture 44 - Identity Management - II
Lecture 45 - Identity Management - III
Lecture 46 - Blockchain Interoperability - I
Lecture 47 - Blockchain Interoperability - II
Lecture 48 - Blockchain Interoperability - III
Lecture 49 - Hyperledger Indy - I
Lecture 50 - Hyperledger Indy - II
Lecture 51 - Hyperledger Aries
Lecture 52 - Blockchain Security - I
Lecture 53 - Blockchain Security - II
Lecture 54 - Blockchain Security - III
Lecture 55 - Use Cases
Lecture 56 - A Potential Use Case From a Critics Perspective
Lecture 57 - Blockchain in Financial Services
Lecture 58 - Public Sector Use Cases
Lecture 59 - Blockchain for Decentralized Marketplace - Part 1
Lecture 60 - Blockchain for Decentralized Marketplace - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Algorithmic Game Theory

Subject Co-ordinator - Prof. Palash Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Assumptions of Game Theory
Lecture 3 - Examples of Games
Lecture 4 - Equilibrium Concepts
Lecture 5 - Nash Equilibrium
Lecture 6 - Indifference Principle
Lecture 7 - Security of Players
Lecture 8 - Minmax Theorem
Lecture 9 - Implications of Minmax Theorem
Lecture 10 - MSNEs of Matrix Games
Lecture 11 - Iterative Eliminations of Dominated Strategies
Lecture 12 - Iterative Eliminations of Dominated Strategies (Continued...)
Lecture 13 - Braess's paradox
Lecture 14 - Yao's Lemma and its applications
Lecture 15 - Support Enumeration Algorithm
Lecture 16 - Succinct game
Lecture 17 - Potential Games
Lecture 18 - Best Response Dynamics
Lecture 19 - Fast Convergence of Best Response Dynamics
Lecture 20 - Computing Ã Âµ-PSNE for Network Congestion Games
Lecture 21 - PSNE for Congestion Games
Lecture 22 - PSNE for Symmetric Congestion Games
Lecture 23 - Functional NP
Lecture 24 - PPAD Class
Lecture 25 - Sperner's Lemma
Lecture 26 - Approximate MSNE Computation
Lecture 27 - Correlated Equilibrium
Lecture 28 - Coarse Correlated Equilibrium
Lecture 29 - External Regret Framework

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Lecture 30 - Multiplicative Weight Algorithm
Lecture 31 - Multiplicative Weight Algorithm (Continued....)
Lecture 32 - Swap Regret and Correlated Equilibrium
Lecture 33 - Swap Regret to External Regret Reduction
Lecture 34 - Braess's paradox and Pigou's Network
Lecture 35 - PoA of Selfish Routing Game
Lecture 36 - PoA of Selfish Load Balancing Game
Lecture 37 - Bayesian Game
Lecture 38 - BNE of First Price Auction
Lecture 39 - Extensive Form Game
Lecture 40 - Mechanism Design Introduction
Lecture 41 - Implementation of Social Choice Functions
Lecture 42 - Revelation Principle
Lecture 43 - Properties of Social Choice Function
Lecture 44 - Gibbard-Satterthwaite Theorem
Lecture 45 - Quasilinear Environment
Lecture 46 - Ex-Post Efficiency
Lecture 47 - VCG Mechanism
Lecture 48 - Example of VCG Mechanism
Lecture 49 - Weighted VCG
Lecture 50 - Affine Maximizer
Lecture 51 - Recap of Topics Discussed so Far
Lecture 52 - Single Parameter Domain
Lecture 53 - DSIC in Single Parameter Domain
Lecture 54 - Mayerson's Lemma
Lecture 55 - Sponsored Search Auction
Lecture 56 - Intermediate Domain
Lecture 57 - Algorithmic Mechanism Design
Lecture 58 - Stable Matching
Lecture 59 - Gale-Shapley Algorithm
Lecture 60 - Properties of Stable Matching

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NPTEL Video Course - Computer Science and Engineering - NOC:Machine Learning for Earth System Sciences

Subject Co-ordinator - Prof. Adway Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics of Spatio-Temporal Modeling
Lecture 3 - Geostatistical Equation for Spatio-Temporal Process
Lecture 4 - Gaussian Process Regression and Inverse Problems
Lecture 5 - Anomaly Event Detection
Lecture 6 - Extreme Events
Lecture 7 - Extreme Value Theory
Lecture 8 - Causality
Lecture 9 - Networks
Lecture 10 - Data Assimilation
Lecture 11 - Challenges and Opportunities for ML in ESS
Lecture 12 - Types of Machine Learning Problems in ESS
Lecture 13 - Convolutional Networks for Spatial Problems
Lecture 14 - Sequential Models for Temporal Problems
Lecture 15 - Probabilistic Models for Earth System Science
Lecture 16 - Identification of Indian Monsoon Predictors
Lecture 17 - Statistical Downscaling of Rainfall with Machine Learning
Lecture 18 - Detection of Anomaly and Extreme Events
Lecture 19 - Identifying Causal Relations from Time-Series - 1
Lecture 20 - Identifying Causal Relations from Time-Series - 2
Lecture 21 - Spatio-Temporal Modelling of Extremes
Lecture 22 - Hierarchical Bayesian Models for Spatio-Temporal Processes
Lecture 23 - Geostatistical modelling for mapping based on in-situ measurements
Lecture 24 - Nowcasting of Extreme Weather Events
Lecture 25 - Discovering Clustered Weather Patterns
Lecture 26 - Interpretable Machine Learning for Earth System Science
Lecture 27 - Object Detection in Satellite Imagery - 1
Lecture 28 - Object Detection in Satellite Imagery - 2
Lecture 29 - Image Fusion from Multiple Sources for Remote Sensing

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Lecture 30 - Image Segmentation for Remote Sensing
Lecture 31 - Satellite Imagery as a Proxy for Geophysical Measurements
Lecture 32 - Precipitation Nowcasting from Remote Sensing
Lecture 33 - Deep Domain Adaptation for Remote Sensing
Lecture 34 - Introduction to Earth System Modelling
Lecture 35 - Stochastic Weather Generator
Lecture 36 - Physics-Inspired Machine Learning for Process Models - 1
Lecture 37 - Physics-Inspired Machine Learning for Process Models - 2
Lecture 38 - Parameterizations for Sub-Grid Processes Using ML
Lecture 39 - Data Assimilation for Earth System Model Correction
Lecture 40 - ML for Climate Change Projection and Course Conclusion

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NPTEL Video Course - Computer Science and Engineering - NOC:Statistical Learning for Reliability Analysis

Subject Co-ordinator - Prof. Monalisa Sarma

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Reliability Engineering
Lecture 2 - Introduction to Statistical Methods in Reliability
Lecture 3 - Concept of Probability and Probability Theory
Lecture 4 - Tutorial on Introduction to RE, SL and Probability Theory - Part I
Lecture 5 - Conditional, Total and Reverse Probability
Lecture 6 - Tutorial on Conditional Probability and Total Probability
Lecture 7 - Introduction to Probability Distributions
Lecture 8 - Introduction to Probability Distributions (Continued...)
Lecture 9 - Discrete Probability Distribution - Part 1
Lecture 10 - Discrete Probability Distribution - Part 2
Lecture 11 - Tutorial on Discrete Probability Distributions
Lecture 12 - Continuous Probability Distributions - Part 1
Lecture 13 - Continuous Probability Distributions - Part 2
Lecture 14 - Tutorial on Continuous Probability Distribution Functions - Part 1
Lecture 15 - Tutorial on Continuous Probability Distribution Functions - Part 2
Lecture 16 - Sampling Distributions - Part 1
Lecture 17 - Sampling Distributions - Part 2
Lecture 18 - Sampling Distributions - Part 3
Lecture 19 - Sampling Distributions - Part 4
Lecture 20 - Sampling Distributions - Part 5
Lecture 21 - Tutorial on Sampling Distributions
Lecture 22 - Statistical Inference - Part 1
Lecture 23 - Statistical Inference - Part 2
Lecture 24 - Statistical Inference - Part 3
Lecture 25 - Tutorial on Statistical Inference
Lecture 26 - Statistical Inference - Part 4
Lecture 27 - Statistical Inference - Part 5
Lecture 28 - Tutorial on Confidence Interval
Lecture 29 - Statistical Inference - Part 6

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Lecture 30 - Statistical Inference - Part 7
Lecture 31 - Statistical Inference - Part 8
Lecture 32 - ANOVA - I
Lecture 33 - ANOVA - II
Lecture 34 - ANOVA - III
Lecture 35 - ANOVA - IV
Lecture 36 - ANOVA - V
Lecture 37 - ANOVA - VI
Lecture 38 - Correlation Analysis - Part I
Lecture 39 - Correlation Analysis - Part II
Lecture 40 - Regression Analysis - Part I
Lecture 41 - Regression Analysis - Part II
Lecture 42 - Regression Analysis - Part III
Lecture 43 - Tutorial on Relation Analysis
Lecture 44 - Auto-Regression Analysis
Lecture 45 - Logistic Regression - Part I
Lecture 46 - Logistic Regression - Part II
Lecture 47 - Logistic Regression - Part III
Lecture 48 - Tutorial on Logistic Regression
Lecture 49 - Introduction
Lecture 50 - Bayesian Classification - Part I
Lecture 51 - Bayesian Classification - Part II
Lecture 52 - k-Nearest Neighbor Classification
Lecture 53 - Tutorial on Classification Techniques
Lecture 54 - Support Vector Machine - Part I
Lecture 55 - Support Vector Machine - Part II
Lecture 56 - Support Vector Machine - Part III
Lecture 57 - Support Vector Machine - Part IV
Lecture 58 - Support Vector Machine - Part V
Lecture 59 - Support Vector Machine - Part VI
Lecture 60 - Tutorial on SVM

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundations of Cyber Physical Systems

Subject Co-ordinator - Prof. Soumyajit Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - CPS: Motivational examples and compute platforms
Lecture 2 - CPS: Motivational examples and compute platforms (Continued...)
Lecture 3 - CPS: Motivational examples and compute platforms (Continued...)
Lecture 4 - CPS: Motivational examples and compute platforms (Continued...)
Lecture 5 - CPS: Motivational examples and compute platforms (Continued...)
Lecture 6 - Real time sensing and communication for CPS
Lecture 7 - Real time sensing and communication for CPS (Continued...)
Lecture 8 - Real time sensing and communication for CPS (Continued...)
Lecture 9 - Real time sensing and communication for CPS (Continued...)
Lecture 10 - Real time task scheduling for CPS
Lecture 11 - Real time task scheduling for CPS (Continued...)
Lecture 12 - Real time task scheduling for CPS (Continued...)
Lecture 13 - Real time task scheduling for CPS (Continued...)
Lecture 14 - Real time task scheduling for CPS (Continued...)
Lecture 15 - Real time task scheduling for CPS (Continued...)
Lecture 16 - Real time task scheduling for CPS (Continued...)
Lecture 17 - Real time task scheduling for CPS (Continued...)
Lecture 18 - Dynamical system modeling, stability, controller design
Lecture 19 - Dynamical system modeling, stability, controller design (Continued...)
Lecture 20 - Dynamical system modeling, stability, controller design (Continued...)
Lecture 21 - Dynamical system modeling, stability, controller design (Continued...)
Lecture 22 - Dynamical system modeling, stability, controller design (Continued...)
Lecture 23 - Dynamical system modeling, stability, controller design (Continued...)
Lecture 24 - Delay-aware Design; Platform effect on Stability/Performance
Lecture 25 - Delay-aware Design; Platform effect on Stability/Performance (Continued...)
Lecture 26 - Delay-aware Design; Platform effect on Stability/Performance (Continued...)
Lecture 27 - Delay-aware Design; Platform effect on Stability/Performance (Continued...) Corrigendum
Lecture 28 - Hybrid Automata based modelling of CPS
Lecture 29 - Hybrid Automata based modelling of CPS (Continued...)

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Lecture 30 - Hybrid Automata based modelling of CPS (Continued...)
Lecture 31 - Hybrid Automata based modelling of CPS (Continued...)
Lecture 32 - Hybrid Automata based modelling of CPS (Continued...)
Lecture 33 - Reachability analysis
Lecture 34 - Reachability analysis (Continued...)
Lecture 35 - Reachability analysis (Continued...)
Lecture 36 - Reachability analysis (Continued...)
Lecture 37 - Lyapunov Stability, Barrier Functions
Lecture 38 - Lyapunov Stability, Barrier Functions (Continued...)
Lecture 39 - Lyapunov Stability, Barrier Functions (Continued...)
Lecture 40 - Lyapunov Stability, Barrier Functions (Continued...)
Lecture 41 - Lyapunov Stability, Barrier Functions (Continued...)
Lecture 42 - Lyapunov Stability, Barrier Functions (Continued...)
Lecture 43 - Quadratic Program based safe Controller Design
Lecture 44 - Quadratic Program based safe Controller Design (Continued...)
Lecture 45 - Quadratic Program based safe Controller Design (Continued...)
Lecture 46 - Quadratic Program based safe Controller Design (Continued...)
Lecture 47 - Neural Network (NN) Based controllers in CPS
Lecture 48 - Neural Network (NN) Based controllers in CPS (Continued...)
Lecture 49 - Neural Network (NN) Based controllers in CPS (Continued...)
Lecture 50 - State Estimation using Kalman Filters (KF)
Lecture 51 - State Estimation using Kalman Filters (KF) (Continued...)
Lecture 52 - Attack Detection and Mitigation in CPS
Lecture 53 - Attack Detection and Mitigation in CPS (Continued...)
Lecture 54 - Attack Detection and Mitigation in CPS (Continued...)
Lecture 55 - Attack Detection and Mitigation in CPS (Continued...)
Lecture 56 - Attack Detection and Mitigation in CPS (Continued...)
Lecture 57 - Attack Detection and Mitigation in CPS (Continued...)
Lecture 58 - Attack Detection and Mitigation in CPS (Continued...)
Lecture 59 - Attack Detection and Mitigation in CPS (Continued...)

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NPTEL Video Course - Computer Science and Engineering - NOC:Selected Topics in Algorithms

Subject Co-ordinator - Prof. Palash Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Maximum Flow
Lecture 2 - Ford - Fulkerson Method
Lecture 3 - Edmond - Karp Algorithm
Lecture 4 - Edmond - Karp Algorithm (Continued...)
Lecture 5 - Flow Decomposition
Lecture 6 - Maximum Bipartite Matching, Fattest Augmenting Path
Lecture 7 - Karger's Algorithm
Lecture 8 - Augmenting Path
Lecture 9 - Edmonds Blossom Algorithm
Lecture 10 - Edmond - Karp Algorithm (Continued...)
Lecture 11 - Introduction to Randomized Algorithm
Lecture 12 - Polynomial Identity Testing
Lecture 13 - Perfect Bipartite Matching, Randomized Quicksort
Lecture 14 - Concentration Inequalities: Markov, Chebyshev, Chernoff
Lecture 15 - Proof of Chernoff Bound
Lecture 16 - Coupon Collector Problem
Lecture 17 - Balls and Bins
Lecture 18 - Balls and Bins (Continued...)
Lecture 19 - Two Point Sampling
Lecture 20 - Randomized Algorithm for 2 SAT
Lecture 21 - Markov Chain, Periodicity, Stationary Distribution
Lecture 22 - Mixing Time, Reversible Markov Chain
Lecture 23 - Metropolis Algorithm, Markov Chain on Independent Sets
Lecture 24 - Random Walk on Cycles
Lecture 25 - Shuffling Cards
Lecture 26 - Monte Carlo Method, Hitting Time, Cover Time
Lecture 27 - DNF Counting
Lecture 28 - DNF Counting (Continued...)
Lecture 29 - Counting Independent Sets of a Graph

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Lecture 30 - Counting Independent Sets of a Graph (Continued...)
Lecture 31 - Introduction of NP, co-NP, and P
Lecture 32 - Turing Reduction, Karp Reduction
Lecture 33 - NP - Completeness of 3SAT
Lecture 34 - NP - Completeness of Independent Set
Lecture 35 - NP - Completeness of vertex cover and clique
Lecture 36 - NP - Completeness of 3-coloring
Lecture 37 - NP - Completeness of Subset sum and Knapsack
Lecture 38 - NP - Completeness of set cover, Weak and Strong NP - completeness
Lecture 39 - Self Reduction
Lecture 40 - Randomized Approximation Algorithm
Lecture 41 - Derandomization
Lecture 42 - Travelling Salesman Problem
Lecture 43 - 2-Factor Approximation Algorithm for Metric TSP
Lecture 44 - 1.5-Factor Approximation Algorithm for Metric TSP
Lecture 45 - Approximation Algorithm for Set Cover
Lecture 46 - FPTAS for Knapsack
Lecture 47 - Introduction to Linear Program
Lecture 48 - Introduction to Linear Program (Continued...,)
Lecture 49 - Dual Fitting
Lecture 50 - Dual Fitting (Continued...)
Lecture 51 - Dual Fitting
Lecture 52 - Set Cover using LP rounding
Lecture 53 - Vertex Cover using reduction to set cover
Lecture 54 - Vertex Cover LP
Lecture 55 - Randomized Rounding
Lecture 56 - Primal Dual Scheme
Lecture 57 - Introduction to Parameterized Algorithm
Lecture 58 - Faster FPT Algorithm for Vertex Cover
Lecture 59 - Introduction to Kernelization
Lecture 60 - Linear Programming Based Kernels

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundations and Applications of Machine Learning

Subject Co-ordinator - Prof. Adway Mitra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - AI/ML à¦ à¦¾à¦°à¦ªà¦¾à¦¶à§ à¦° à¦¨à¦¾à¦¨à¦¾ à¦ à¦¦à¦¾à¦¹à¦°à¦£
Lecture 2 - AI/ML à¦•à¦° à¦ à¦ªà¦ à¦°à¦£
Lecture 3 - Supervised and Unsupervised Learning (à¦¤à¦¤à§•à¦¤à§•à¦¬à¦¾à¦¬à¦§à¦¾à¦¨à§ à¦ à¦¤à¦¤à§•à¦¤à§•à¦-
Lecture 4 - ML Model à¦ Algorithm/à¦²à§ à¦ à¦ à¦¾à¦° 04 : à¦•à¦®à¦•à¦² à¦®à¦¡à§ à¦² à¦ à¦ à§•à¦ à¦¾à¦²à¦ à¦
Lecture 5 - AI/ML problem -à¦•à¦° à¦ à¦ à¦¨ /à¦•à¦ à¦ /à¦•à¦®à¦•à¦² à¦¸à¦®à¦¸à§•à¦ à¦¾ - à¦•à¦° à¦ à¦ à¦¨
Lecture 6 - K-nearest-neighbor classification/regression/K-à¦¨à¦¿à¦ à¦ à¦¬à¦°à§•à¦¤à§ -à¦ªà§•à¦°à¦¤à¦¿à¦¬à§ à
Lecture 7 - à¦¨à§ à¦ªà§•à¦£à§•à¦ à§ à¦° à¦ªà¦°à¦¿à¦®à¦¾à¦ª : Accuracy, Precision, Recall, Confusion
Lecture 8 - Discriminative Feature Selection
Lecture 9 - Decision Tree Algorithm/à¦¸à¦¿à¦¦à§•à¦§à¦¾à¦¨à§•à¦¤à¦²à¦¾à¦¿à¦¤à¦ à¦¾
Lecture 10 - Classifier -à¦•à¦° à¦¸à¦®à¦·à§•à¦ à¦¿ à¦ Random Forests
Lecture 11 - Probability Theory à¦¿à¦«à§ à¦° Î-à¦¦à¦
Lecture 12 - Bayesian à¦•à¦¬à¦ NaÃ¯ve Bayes Classifier
Lecture 13 - Linear Algebra à¦¿à¦«à§ à¦° Î-à¦¦à¦ à¦¾
Lecture 14 - Linear Classifiers à¦•à¦¬à¦ Perceptron Algorithm
Lecture 15 - Multi-class Linear Classifier à¦•à¦¬à¦ Logistic Regression
Lecture 16 - Optimization à¦¿à¦«à§ à¦° Î-à¦¦à¦ à¦¾
Lecture 17 - Linear (à¦¸à¦°à¦²) à¦ Regularized (à¦ªà¦¿à¦°à§ à¦¶à¦¾à¦¿à¦§à¦¿à¦¤) Regression
Lecture 18 - Max-margin Linear Classification/à¦¸à§ à¦¬à¦¾Ð Î° à¦¬Ò•à¦¬à¦§à¦¾à§ à¦¨à¦° Î-Ï à¦£à§ à¦¿à¦¬à¦-à¦¾
Lecture 19 - à¦ à§ Î•Ï•à¦® Ñ¹à¦¾à§ à§•à¦¤Ï´/Basic Neural Networks
Lecture 20 - Neural Network à¦ à¦ à¦¨ à¦ Backpropagation
Lecture 21 - Overfitting and Underfitting
Lecture 22 - Boosting-à¦•à¦° à¦®à¦¾à¦§Ò•à§ à¦® à¦¸à¦®Î Ñ-à¦¬Ð´ à¦ à¦¨à§•à¦®à¦¾à¦¨
Lecture 23 - Data à¦° à¦®à¦¾Ï•à¦¾ (dimensionality) à¦¿à¦¨à§ Ï´à¦£
Lecture 24 - à¦²à§ à¦ à¦ à¦¾à¦° à§¨à§ªà¦ à¦¶à§•à¦°à§ à¦£à§ à¦ à¦¬à¦¬à§ à¦¶à¦¿à¦·à§•à¦ à§ à¦° à¦®à¦¾à¦¨à§ à¦°
Lecture 25 - Supervised Learning à¦ à¦¿à¦-à¦ à¦¾à¦¨
Lecture 26 - Hierarchical Clustering/à¦¸à§•à¦¤à¦°à¦-à¦¿à¦¤à§•à¦¤à¦¿à¦ à¦ à§ à¦·à§•à¦ à§ à¦ à¦°à¦£
Lecture 27 - K-means Clustering/ K-à¦ à§ à¦ à§ à¦·à§•à¦ à§ à¦ à¦°à¦£
Lecture 28 - Evaluation of Clustering/à¦ à§ à¦·à§•à¦ à§ à¦ à¦°à¦£à§ à¦° à¦®à§ à¦²à§•à¦¯à¦¾à§ à¦¨
Lecture 29 - Mean-shift à¦•à¦¬à¦ DB-Scan à¦ à§ à¦·à§•à¦ à§ à¦ à¦°à¦£

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Lecture 30 - Graph-based Clustering/à¦ à§ à¦·à§•à¦ à§ à¦ à¦°à¦£
Lecture 31 - Time-series/à¦¸à¦®à§ à¦ à§•à¦°à¦®à§ à¦° à¦¬à¦¿à¦¶à§•à¦²à§ à¦·à¦£
Lecture 32 - à¦¬à§•à¦¯à¦¤à¦¿à¦ à§•à¦°à¦®à§ à¦ à¦¦à¦¾à¦¹à¦°à¦£ à¦ à¦¿à¦¹à§•à¦¨à¦¿à¦¤à¦ à¦°à¦£
Lecture 33 - Image/à¦ à¦¿à¦¤à§•à¦° à¦¬à¦¿à¦¶à§•à¦²à§ à¦·à¦£
Lecture 34 - Neural Features for Images
Lecture 35 - à¦²à¦¿à¦ à¦¿à¦¤ Data à¦ à¦-à¦¾à¦·à¦¾ à¦¬à¦¿à¦¶à§•à¦²à§ à¦·à¦£
Lecture 36 - Sequential Neural Models and Natural Language Processing
Lecture 37 - à¦¸à§ à¦·à§•à¦ à¦¿à¦®à§ à¦²à¦ /Generative Models, Reinforcement Learning
Lecture 38 - Transfer Learning and Domain Adaptation
Lecture 39 - à¦¨à§ à¦¤à¦¿, à¦¨à¦¿à¦°à¦ªà§ à¦ à§•à¦·à¦¤à¦¾ à¦ à¦¬à§ à¦§à¦ à¦®à§•à¦¯à¦¤à¦¾
Lecture 40 - Machine Learning for Climate Sciences

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NPTEL Video Course - Computer Science and Engineering - NOC:Artificial Intelligence for Economics

Subject Co-ordinator - Prof. Dripto Bakshi, Prof. Adway Mitra, Prof. Palash Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Network Data - Some Stories !!
Lecture 2 - The Stable Matching Algorithm
Lecture 3 - Uncertainty in Financial Markets : Idea of Hedging
Lecture 4 - Uncertainty in Financial Markets : Idea of Hedging (Continued...)
Lecture 5 - Uncertainty in Financial Markets : Idea of Hedging (Continued...)
Lecture 6 - Unconstrained Optimization
Lecture 7 - Constrained Optimization
Lecture 8 - Heuristic Search Techniques
Lecture 9 - Multi-objective Heuristic Search and Game Trees
Lecture 10 - Clustering and Segmentation
Lecture 11 - Decision Tree and Random Forest
Lecture 12 - Linear Regression and Classifiers
Lecture 13 - Uncertainty Modeling
Lecture 14 - Neural Networks
Lecture 15 - Deep Learning for Time Series Forecasting
Lecture 16 - Causality in Time-Series
Lecture 17 - Interventional Causality and Attribution
Lecture 18 - Game Theory
Lecture 19 - Game Theory (Continued...)
Lecture 20 - Game Theory (Continued...) Games with Incomplete Information
Lecture 21 - Game Theory (Continued...) Games with Incomplete Information (Continued...)
Lecture 22 - Game Theory - Sequential Games
Lecture 23 - Game Theory - Rubenstein Bargaining
Lecture 24 - Network Economics
Lecture 25 - Network Economics (Continued...)
Lecture 26 - Introduction to Auction Theory
Lecture 27 - Second Price Auction
Lecture 28 - First Price Auction
Lecture 29 - Overview of Mechanism Design

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Lecture 30 - Groves Mechanism
Lecture 31 - VCG Mechanism
Lecture 32 - Single Parameter Domain and Myerson Lemma
Lecture 33 - Sponsored Search Auction
Lecture 34 - Single Peaked Domain and Median Voting
Lecture 35 - Dimensionality Reduction (Principal Component Analysis) â The Math Prerequisites
Lecture 36 - Dimensionality Reduction (Principal Component Analysis) â The Technique
Lecture 37 - Agent-based Modeling for Economics
Lecture 38 - Computer Vision for Economics
Lecture 39 - Text Mining and NLP for Economics
Lecture 40 - Bias, Fairness, Ethics and Interpretability in AI

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NPTEL Video Course - Computer Science and Engineering - NOC:Approximation Algorithm

Subject Co-ordinator - Prof. Palash Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of NP-completeness and How to Tackle It
Lecture 2 - Deterministic Rounding of Linear Program: An Approximation Algorithm for Weighted
Lecture 3 - Overview of LP Duality and Complementary Slackness
Lecture 4 - Dual Rounding: An Approximation Algorithm for Weighted Set Cover
Lecture 5 - Primal dual method for Weighted Set Cover
Lecture 6 - Greedy algorithm for Weighted Set Cover
Lecture 7 - Dual Fitting Analysis of Greedy Set Cover
Lecture 8 - Randomized Rounding Algorithm for Weighted Set Cover
Lecture 9 - Scheduling Jobs with Deadlines and Release Dates on a Single Machine
Lecture 10 - The k-Center Problem
Lecture 11 - Local Search Algorithm for Scheduling Jobs on Multiple Identical Machines
Lecture 12 - Greedy Algorithm for Scheduling Jobs on Multiple Identical Machines
Lecture 13 - Inapproximability of the Traveling Salesman problem
Lecture 14 - 2-Approximation Algorithm for Metric TSP
Lecture 15 - 1.5-Approximation Algorithm for Metric TSP
Lecture 16 - Edge Coloring
Lecture 17 - Pseudo Polynomial Time Algorithm for Knapsack
Lecture 18 - FPTAS for Knapsack
Lecture 19 - PTAS for Minimizing Makespan for Scheduling Jobs on Constant Number of Machines
Lecture 20 - PTAS for Minimizing Makespan for Scheduling Jobs on Parallel Identical Machines
Lecture 21 - PTAS for Minimizing Makespan for Scheduling Jobs on Parallel Identical Machines (Continued...)
Lecture 22 - An APTAS for Bin Packing
Lecture 23 - An APTAS for Bin Packing (Continued...)
Lecture 24 - 2 Factor Approximation Algorithm for Scheduling Unweighted Jobs on a Single Machine
Lecture 25 - 3 Factor Approximation Algorithm for Scheduling Weighted Jobs on a Single Machine
Lecture 26 - A Polynomial Time Separation Oracle for Scheduling Weighted Jobs on a Single Machine
Lecture 27 - 3 Factor Approximation Algorithm for Prize Collecting Steiner Tree
Lecture 28 - 3 Factor Approximation Algorithm for Prize Collecting Steiner Tree (Continued...)
Lecture 29 - A 4 Factor Approximation Algorithm for Uncapacitated Facility Location Problem

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Lecture 30 - A 4 Factor Approximation Algorithm for Uncapacitated Facility Location Problem (Continued...)
Lecture 31 - A 4 Factor Approximation Algorithm for Uncapacitated Facility Location Problem (Continued...)
Lecture 32 - Randomized 1/2 Factor Approximation Algorithm for MAX-SAT and MAX-CUT
Lecture 33 - Derandomization using Method of Conditional Expectation
Lecture 34 - Flipping Biased Coin for Better Than .5 Approximation Algorithm for Max-SAT
Lecture 35 - Randomized Rounding Based (1-1/e) Factor Approximation Algorithm for Max-SAT
Lecture 36 - Best of Two Solutions for Max-SAT
Lecture 37 - Nonlinear Rounding for Max-SAT
Lecture 38 - Randomized Rounding for Prize Collecting Steiner Tree
Lecture 39 - Randomized Rounding for Prize Collecting Steiner Tree (Continued...)
Lecture 40 - Randomized Rounding for Uncapacitated Facility Location
Lecture 41 - Chernoff Bound
Lecture 42 - Chernoff Bound (Continued...)
Lecture 43 - Integer Multicommodity Flow
Lecture 44 - Primal-dual Algorithm for Minimum Weighted Feedback Vertex Set
Lecture 45 - Primal-dual Algorithm for Minimum Weighted Feedback Vertex Set (Continued...)
Lecture 46 - Primal-dual Algorithm for Minimum Weighted Feedback Vertex Set (Continued...)
Lecture 47 - Primal-dual Algorithm for Steiner Forest
Lecture 48 - Primal-dual Algorithm for Steiner Forest (Continued...)
Lecture 49 - Primal-dual Algorithm for Steiner Forest (Continued...)
Lecture 50 - 2-Approximation Algorithm for Multiway Cut
Lecture 51 - 3/2-Approximation Algorithm for Multiway Cut
Lecture 52 - 3/2-Approximation Algorithm for Multiway Cut (Continued...)
Lecture 53 - Approximation Algorithm for Multicut
Lecture 54 - Approximation Algorithm for Multicut (Continued...)
Lecture 55 - Approximation Algorithm for Multicut (Continued...)
Lecture 56 - Introduction to Semidefinite Program
Lecture 57 - SDP Based Approximation Algorithm for Max Cut
Lecture 58 - SDP Based Approximation Algorithm for Max Cut (Continued...)
Lecture 59 - Inapproximability of Scheduling Jobs on Multiple Non-identical Machines
Lecture 60 - Inapproximability of Edge Disjoint Path

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NPTEL Video Course - Computer Science and Engineering - NOC:Second Level Algorithms

Subject Co-ordinator - Prof. Palash Dey

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Amortized Complexity: What and Why ?
Lecture 2 - Aggregate Method and Its Use in Multi-Stack
Lecture 3 - Use of Aggregate Method in Amortized Analysis of Binary Counter, Accounting Method and its Applic
Lecture 4 - Potential Method and Its Use in the Amortized Analysis of Multi-stack and Binary Counter
Lecture 5 - Dynamic Table
Lecture 6 - Dynamic Table (Continued...)
Lecture 7 - Fibonacci Heap: Creation, Insertion
Lecture 8 - Fibonacci Heap: Extract Min
Lecture 9 - Fibonacci Heap: Pseudocode of Insertion, Extract Min
Lecture 10 - Fibonacci Heap: Decrease Key, Amortized Analysis of Insertion, Extract Min
Lecture 11 - Fibonacci Heap: Amortized Analysis of Decrease Key
Lecture 12 - Fibonacci Heap: Amortized Analysis (Continued...)
Lecture 13 - Fibonacci Heap: Amortized Analysis (Continued...), Introduction to Maximum Flow
Lecture 14 - Maximum Flow: Naive Greedy Approach
Lecture 15 - Maximum Flow: Residual Graph
Lecture 16 - Maximum Flow: Ford Fulkerson Method
Lecture 17 - Integrality of Maximum Flow
Lecture 18 - Maximum Flow, Layered Residual Graph
Lecture 19 - Maximum Flow, Edmond-Karp Algorithm
Lecture 20 - Maximum Flow, Dinic's Algorithm
Lecture 21 - Maximum Flow, Dinic's Algorithm (Continued...)
Lecture 22 - Dry Run of Ford-Fulkerson Method, Edmond-Karp Algorithm, and Dinic's Algorithm
Lecture 23 - Overview of Push Relabel Algorithm
Lecture 24 - Pseudocode and Dry Run of Push Relabel Algorithm
Lecture 25 - Invariants Maintained by Push Relabel Algorithm
Lecture 26 - Proof of Correctness of Push Relabel Algorithm: A Key Lemma
Lecture 27 - Proof of Correctness of Push Relabel Algorithm: Bounding Number of Relabel and Saturating Push O
Lecture 28 - Proof of Correctness of Push Relabel Algorithm: Bounding Number of Non-Saturating Push Operatior
Lecture 29 - Generalization of Maximum Flow

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Lecture 30 - Generalization of Maximum Flow (Continued...) Max Flow Min Cut Theorem
Lecture 31 - Maximum Flow Minimum Cut (Continued...) Maximum Bipartite Matching
Lecture 32 - Maximum Bipartite Matching
Lecture 33 - Hall's Marriage Theorem
Lecture 34 - Flow Path Decomposition
Lecture 35 - Stable Matching
Lecture 36 - Gale Shapley Algorithm
Lecture 37 - Gale Shapley Algorithm (Continued...)
Lecture 38 - Maximum Flow Based Minimum Cut Algorithm
Lecture 39 - Karger's Minimum Cut Algorithm
Lecture 40 - Karger-Stein Algorithm
Lecture 41 - Karger-Stein Algorithm (Continued...)
Lecture 42 - Maximum Cut in General Graph
Lecture 43 - Edmond's Blossom Algorithm
Lecture 44 - Edmond's Blossom Algorithm (Continued...)
Lecture 45 - Edmond's Blossom Algorithm (Continued...)
Lecture 46 - Edmond's Blossom Algorithm (Continued...)
Lecture 47 - Edmond's Blossom Algorithm (Continued...)
Lecture 48 - Edmond's Blossom Algorithm (Continued...), Order Statistics
Lecture 49 - Order Statistics
Lecture 50 - Order Statistics (Continued...)
Lecture 51 - Linear Time Selection
Lecture 52 - Linear Time Selection (Continued...)
Lecture 53 - String Matching: KMP Algorithm
Lecture 54 - String Matching: KMP Algorithm (Continued...)
Lecture 55 - Introduction to NP
Lecture 56 - Self Reduction
Lecture 57 - NP Completeness
Lecture 58 - NP Completeness of 3 SAT
Lecture 59 - NP Completeness of Clique and Independent Set
Lecture 60 - NP Completeness of Vertex Cover and Subset Sum

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NPTEL Video Course - Computer Science and Engineering - NOC:Algorithmic Graph Theory and Data Structures

Subject Co-ordinator - Prof. Sourav Mukhopadhyay

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Analysis of Algorithm
Lecture 3 - Time Complexity
Lecture 4 - Merge Sort
Lecture 5 - Solving the recurrences
Lecture 6 - Solving the recurrences (Continued...)
Lecture 7 - Divide and Conquer Algorithms
Lecture 8 - Fibonacci numbers and Matrix multiplication
Lecture 9 - Quicksort
Lecture 10 - Randomized Quicksort
Lecture 11 - Heapsort
Lecture 12 - Linear time sorting
Lecture 13 - Linear time sorting (Continued...)
Lecture 14 - Order Statistics
Lecture 15 - Order Statistics (Continued...)
Lecture 16 - Hash Function
Lecture 17 - Open Addressing Hashing
Lecture 18 - Universal Hash Functions
Lecture 19 - Perfect Hashing
Lecture 20 - Heap
Lecture 21 - Binary Search Tree
Lecture 22 - Binary Search Tree Sort
Lecture 23 - Randomly build binary search tree
Lecture 24 - Balanced Binary Search Tree
Lecture 25 - Red Black Tree
Lecture 26 - Data-structure augmentation
Lecture 27 - Interval Trees
Lecture 28 - Fixed Universe Successor
Lecture 29 - Van Emde Boas

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Lecture 30 - Computational Geometry
Lecture 31 - Orthogonal Range Tree
Lecture 32 - Amortized Analysis
Lecture 33 - Amortized Analysis (Continued...)
Lecture 34 - Disjoint Set
Lecture 35 - Disjoint Set (Continued...)
Lecture 36 - Dynamic Programming (DP)
Lecture 37 - Introduction to Graphs
Lecture 38 - Minimum Spanning Tree
Lecture 39 - Primâ s Algorithm
Lecture 40 - Kruskal Algorithm
Lecture 41 - Graph Search Algorithm
Lecture 42 - Depth First Search (DFS)
Lecture 43 - Application of DFS
Lecture 44 - Breadth-First Search (BFS)
Lecture 45 - Shortest Path Algorithm
Lecture 46 - Dijkstraâ s Algorithm
Lecture 47 - Bellman-Ford Algorithm
Lecture 48 - Bellman-Ford (Continued...)
Lecture 49 - Application of Bellman-Ford
Lecture 50 - Johnsonâ s Algorithm
Lecture 51 - All Pairs Shortest Paths
Lecture 52 - Floyd-Warshall
Lecture 53 - Flow Network
Lecture 54 - Flow Network (Continued...)
Lecture 55 - Ford-Fulkerson max-flow
Lecture 56 - Maximum Flow, Min Cut Theorem
Lecture 57 - Edmonds-Karp Algorithm
Lecture 58 - Edmonds-Karp Max Flow Algorithm
Lecture 59 - Dynamic Programming - II
Lecture 60 - Computational Complexity

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NPTEL Video Course - Computer Science and Engineering - NOC:Statistical Foundation for Big Data Analysis

Subject Co-ordinator - Prof. Arindam Banerjee

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Big Data : Definition, Examples and Challenges
Lecture 2 - Big Data Analysis vs Big Data Processing : Role of Dimensional Statistics
Lecture 3 - Statistical Framework - 1
Lecture 4 - Statistical Framework - 2
Lecture 5 - Statistical Framework - 3
Lecture 6 - Point Estimation: Unbiased Estimation
Lecture 7 - Point Estimation: Likelihood - 1
Lecture 8 - Point Estimation: Likelihood - 2
Lecture 9 - Method of Moments
Lecture 10 - Point Estimation: Asymptotics
Lecture 11 - Interval Estimation - 1
Lecture 12 - Interval Estimation - 2
Lecture 13 - Basics of Hypothesis Testing - I
Lecture 14 - Basics of Hypothesis Testing - II
Lecture 15 - Basics of Hypothesis Testing - III
Lecture 16 - Bias Variance and Mean Squared Errors
Lecture 17 - Bias Variance and Mean Squared Errors
Lecture 18 - Bias Variance and Mean Squared Errors
Lecture 19 - Bias Variance and Mean Squared Errors
Lecture 20 - Bias Variance and Mean Squared Errors
Lecture 21 - Bias Variance Decomposition
Lecture 22 - Cross Validation and Bias Variance Tradeoff
Lecture 23 - Methods of Cross Validation
Lecture 24 - Regression vs Classification
Lecture 25 - Inference on Logistic Regression
Lecture 26 - Regression: Linear Regression - 1
Lecture 27 - Regression: Linear Regression - 2
Lecture 28 - Regression: Multiple Linear Regression - 1
Lecture 29 - Regression: Multiple Linear Regression - 2

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Lecture 30 - Regression: Multiple Linear Regression - 3
Lecture 31 - Generalities of Multivariate Distribution
Lecture 32 - Bivariate Normal Distribution
Lecture 33 - Multivariate Normal Distribution - 1
Lecture 34 - Multivariate Normal Distribution - 2
Lecture 35 - Multivariate Normal Distribution - 3
Lecture 36 - Supervised Learning vs Unsupervised Learning
Lecture 37 - Heirarchical Clustering
Lecture 38 - K-means clustering
Lecture 39 - Curse of Dimensionality
Lecture 40 - Behaviour of Volume in High Dimension
Lecture 41 - Introduction to Principal Component Analysis
Lecture 42 - Eigenvalues and Eigenvectors
Lecture 43 - Mathematical Formulation of Principal Component Analysis
Lecture 44 - Mathematical Foundation of Principal Component Analysis
Lecture 45 - Population Principal Component Analysis for Normal Distribution
Lecture 46 - Population vs Sample Principal Component Analysis
Lecture 47 - Mathematical Formulation of Sample PCA
Lecture 48 - Sample PCA for Covariance matrix and Correlation Matrix
Lecture 49 - Examples of Sample PCA
Lecture 50 - Inference on Principal Component Analysis
Lecture 51 - Network Data and Random Graph
Lecture 52 - Properties of Random Graph
Lecture 53 - Law of Large Numbers for Random Graph - 1
Lecture 54 - Law of Large Numbers for Random Graph - 2
Lecture 55 - Law of Large Numbers for Random Graph - 3
Lecture 56 - Introduction to Network Medicine
Lecture 57 - Selected Case Study on Network Medicine
Lecture 58 - Social Network Analysis
Lecture 59 - Simple Linear Regression on Social Network Data
Lecture 60 - Conclusion and Course Summary

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NPTEL Video Course - Computer Science and Engineering - Pattern Recognition

Subject Co-ordinator - Prof. Sukhendu Das, Prof. C.A. Murthy

Co-ordinating Institute - IIT - Madras | Indian Statistical Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles of Pattern Recognition I (Introduction and Uses)
Lecture 2 - Principles of Pattern Recognition II (Mathematics)
Lecture 3 - Principles of Pattern Recognition III (Classification and Bayes Decision Rule)
Lecture 4 - Clustering vs. Classification
Lecture 5 - Relevant Basics of Linear Algebra, Vector Spaces
Lecture 6 - Eigen Value and Eigen Vectors
Lecture 7 - Vector Spaces
Lecture 8 - Rank of Matrix and SVD
Lecture 9 - Types of Errors
Lecture 10 - Examples of Bayes Decision Rule
Lecture 11 - Normal Distribution and Parameter Estimation
Lecture 12 - Training Set, Test Set
Lecture 13 - Standardization, Normalization, Clustering and Metric Space
Lecture 14 - Normal Distribution and Decision Boundaries I
Lecture 15 - Normal Distribution and Decision Boundaries II
Lecture 16 - Bayes Theorem
Lecture 17 - Linear Discriminant Function and Perceptron
Lecture 18 - Perceptron Learning and Decision Boundaries
Lecture 19 - Linear and Non-Linear Decision Boundaries
Lecture 20 - K-NN Classifier
Lecture 21 - Principal Component Analysis (PCA)
Lecture 22 - Fisherâ s LDA
Lecture 23 - Gaussian Mixture Model (GMM)
Lecture 24 - Assignments
Lecture 25 - Basics of Clustering, Similarity/Dissimilarity Measures, Clustering Criteria.
Lecture 26 - K-Means Algorithm and Hierarchical Clustering
Lecture 27 - K-Medoids and DBSCAN
Lecture 28 - Feature Selection
Lecture 29 - Feature Selection

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Lecture 30 - Feature Selection
Lecture 31 - Cauchy Schwartz Inequality
Lecture 32 - Feature Selection Criteria Function
Lecture 33 - Feature Selection Criteria Function
Lecture 34 - Principal Components
Lecture 35 - Comparison Between Performance of Classifiers
Lecture 36 - Basics of Statistics, Covariance, and their Properties
Lecture 37 - Data Condensation, Feature Clustering, Data Visualization
Lecture 38 - Probability Density Estimation
Lecture 39 - Visualization and Aggregation
Lecture 40 - Support Vector Machine (SVM)
Lecture 41 - FCM and Soft-Computing Techniques
Lecture 42 - Examples of Uses or Application of Pattern Recognition; And When to do clustering
Lecture 43 - Examples of Real-Life Dataset

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NPTEL Video Course - Computer Science and Engineering - Performance Evaluation of Computer Systems

Subject Co-ordinator - Prof. Krishna Moorthy Sivalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to performance evaluation of computer systems
Lecture 2 - How to avoid common mistakes
Lecture 3 - Selection of techniques and metrics
Lecture 4 - Case study
Lecture 5 - Random Variables and probability distributions
Lecture 6 - Probability distributions - I
Lecture 7 - Probability distributions - II
Lecture 8 - Probability distributions - III
Lecture 9 - Stochastic process
Lecture 10 - Markov Chain
Lecture 11 - Slotted Aloha protocol model and discrete-time birth death process
Lecture 12 - Continuous time Markov chain and queuing theory - I
Lecture 13 - Queuing theory - I (Continued)
Lecture 14 - Queuing theory - II
Lecture 15 - Queuing theory - III
Lecture 16 - Queuing theory - IV
Lecture 17 - Queuing theory - V
Lecture 18 - Queuing theory - VI
Lecture 19 - Queuing networks - I
Lecture 20 - Queuing networks - II
Lecture 21 - Slotted Aloha Markov model
Lecture 22 - Simulations - I
Lecture 23 - Simulations - II
Lecture 24 - Simulations - III
Lecture 25 - Operational laws - I
Lecture 26 - Operational laws - II
Lecture 27 - Open and closed queuing networks
Lecture 28 - Approximate MVA
Lecture 29 - Convolution algorithm - I

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Lecture 30 - Convolution algorithm - II
Lecture 31 - Load-dependent service centers
Lecture 32 - Hierarchical decomposition
Lecture 33 - Balanced Job Bounds
Lecture 34 - Confidence interval for propotions and introduction to experimental design
Lecture 35 - 2k factorial design
Lecture 36 - 2k r factorial design and 2k-p fractional factorial design
Lecture 37 - Programming aspects of discrete-event simulations - I
Lecture 38 - Programming aspects of discrete-event simulations - II
Lecture 39 - Discrete-event simulations - III
Lecture 40 - PetriNets - I
Lecture 41 - PetriNets - II
Lecture 42 - PetriNets - III

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NPTEL Video Course - Computer Science and Engineering - Theory of Automata, Formal Languages and Computation

Subject Co-ordinator - Prof. Kamala Krithivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Grammars and Natural Language Processing
Lecture 2 - Grammars and Languages Generated
Lecture 3 - Grammars and Languages Generated (Continued.)
Lecture 4 - Ambiguity in CFG
Lecture 5 - Simplication of CFG
Lecture 6 - Removal of Unit Productions, Chomsky Normal Form for CFG
Lecture 7 - Greibach Normal Form for CFG
Lecture 8 - Final State Automata
Lecture 9 - Non Deterministic FSA
Lecture 10 - Non Deterministic FSA (Continued.)
Lecture 11 - Non Deterministic FSA with E(Epsilon)- Moves
Lecture 12 - Equivalence Between FSA and Type 3 Grammars
Lecture 13 - Regular Expressions, Regular Expressions to NFSA
Lecture 14 - DFSA to Regular Expressions
Lecture 15 - Problems and Solutions - I
Lecture 16 - Pumping Lemmas for Regular Sets and CFL
Lecture 17 - MYHILL - Nerode Theorem
Lecture 18 - Minimization of DFSA
Lecture 19 - FSA with output Moore and Mealy Machines
Lecture 20 - Pushdown Automata
Lecture 21 - Pushdown Automata, Equivalence Between Acceptance by Empty Store and Acceptance by Final State
Lecture 22 - Pushdown Automata CFG to PDA
Lecture 23 - Pushdown Automata PDA to CFG
Lecture 24 - Problems and Solutions - II
Lecture 25 - Problems and Solutions - III
Lecture 26 - Turing Machines
Lecture 27 - Turing Machines (Continued.)
Lecture 28 - Turing Machine as Acceptor, Techniques for TM Construction
Lecture 29 - Generalized Versions of Turing Machines

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Lecture 30 - Turing Machine as a Generating Device
Lecture 31 - Recursive Sets, Recursively Innumerable Sets, Encoding of TM, Halting Problem
Lecture 32 - Problems and Instances, Universal TM, Decidability
Lecture 33 - RICE'S Theorem, Linear Bounded Automata, Properties of TM
Lecture 34 - POST'S Correspondence Problems
Lecture 35 - POST'S Correspondence Problems (Continued.), Time and Tape Complexity of TM
Lecture 36 - NP - Complete Problems, Cook's Theorem
Lecture 37 - NP - Complete Problems (Continued.)
Lecture 38 - Regulated Rewriting
Lecture 39 - L-Systems
Lecture 40 - Grammar Systems
Lecture 41 - DNA Computing
Lecture 42 - Membrane Computing

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NPTEL Video Course - Computer Science and Engineering - Computer Graphics

Subject Co-ordinator - Prof. Sukhendu Das

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - CRT Display Devices
Lecture 3 - CRT Display Devices (Continued...)
Lecture 4 - CRT Display Devices (Continued...)
Lecture 5 - CRT Display Devices (Continued...)
Lecture 6 - Transformations in 2D
Lecture 7 - Transformations in 2D (Continued...)
Lecture 8 - Three Dimensional Graphics
Lecture 9 - Three Dimensional Graphics (Continued...)
Lecture 10 - Three Dimensional Graphics (Continued...)
Lecture 11 - Projection Transformations And Viewing Pipeline
Lecture 12 - 3D Viewing - Projection Transformations And Viewing Pipeline
Lecture 13 - Scan Converting Lines, Circles And Ellipses
Lecture 14 - Scan Converting Lines, Circles And Ellipses (Continued...)
Lecture 15 - Scan Converting Lines, Circles And Ellipses (Continued...)
Lecture 16 - Scan Converting Lines, Circles And Ellipses (Continued...)
Lecture 17 - Scan Converting Lines, Circles And Ellipses (Continued...)
Lecture 18 - Polyfill- Scan Conversion Of A Polygon
Lecture 19 - Scan Conversion Of A Polygon (Continued...)
Lecture 20 - Clipping - Lines And Polygons
Lecture 21 - Clipping Lines And Polygons
Lecture 22 - Clipping Lines
Lecture 23 - Solid Modelling
Lecture 24 - Solid Modelling
Lecture 25 - Solid Modelling (Continued...)
Lecture 26 - Visible Surface Detection
Lecture 27 - Visible Surface Detection (Continued...)
Lecture 28 - Visible Surface Detection (Continued...)
Lecture 29 - Visible Surface Detection (Continued...)

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Lecture 30 - Visible Surface Detection (Continued...)
Lecture 31 - Visible Surface Detection (Continued...)
Lecture 32 - Visible Surface Detection (Continued...)
Lecture 33 - Illumination And Shading
Lecture 34 - Illumination And Shading (Continued...)
Lecture 35 - Illumination And Shading (Continued...)
Lecture 36 - Curve Representation
Lecture 37 - Curve Representation (Continued...)
Lecture 38 - Curves And Surface Representation
Lecture 39 - Graphics Programming Using Open GL
Lecture 40 - Graphics Programming Using Open GL (Continued...)
Lecture 41 - Advanced Topics
Lecture 42 - Digital Image Processing Image Compression-Jpeg-Enhancements
Lecture 43 - Digital Image Processing (Continued...)

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NPTEL Video Course - Computer Science and Engineering - Computer Organization

Subject Co-ordinator - Prof. S. Raman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Computing
Lecture 2 - Introduction To System
Lecture 3 - Introduction To System
Lecture 4 - Processor Activities
Lecture 5 - Processor As a State Machine
Lecture 6 - Data Path Architecture
Lecture 7 - Data Path Controller
Lecture 8 - State Machine Design
Lecture 9 - Controller Design
Lecture 10 - Controller Design (Contd)
Lecture 11 - Typical Micro Instructions
Lecture 12 - Addressing Modes
Lecture 13 - Problem Exercise
Lecture 14 - Problem Exercise
Lecture 15 - Introduction to memory system
Lecture 16 - CPU - Memory Interaction
Lecture 17 - Cache Organization
Lecture 18 - Cache Organization
Lecture 19 - Virtual Memory
Lecture 20 - Virtual Memory
Lecture 21 - Performance Calculation
Lecture 22 - Segmentation
Lecture 23 - Address Translation and Protection
Lecture 24 - Programmed I/O
Lecture 25 - Interrupt Driven I/O
Lecture 26 - DMA
Lecture 27 - Device Service Routines
Lecture 28 - Evolution Of I/O
Lecture 29 - I/O Devices

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Lecture 30 - I/O Devices - Contd
Lecture 31 - Buses
Lecture 32 - Buses Contd
Lecture 33 - Conclusion

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NPTEL Video Course - Computer Science and Engineering - Database Design

Subject Co-ordinator - Dr. S. Srikanth, Prof. D. Janaki Ram

Co-ordinating Institute - IIT - Madras | IIIT - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Database Management System
Lecture 2 - Conceptual Designs
Lecture 3 - Conceptual Designs
Lecture 4 - Relational Model
Lecture 5 - Relational Model
Lecture 6 - Structured Query Language - I
Lecture 7 - Structured Query Language - II
Lecture 8 - ER Model to Relational Mapping
Lecture 9 - Functional Dependencies and Normal Form
Lecture 10 - ER Model to Relational Model Mapping
Lecture 11 - Storage Structures
Lecture 12 - Indexing Techniques Single Level
Lecture 13 - Indexing Techniques Multi Level
Lecture 14 - Constraints and Triggers
Lecture 15 - Query Processing and Optimization
Lecture 16 - Query Processing and Optimization - II
Lecture 17 - Query Processing and Optimization - III
Lecture 18 - Transaction Processing Concepts
Lecture 19 - Transaction Processing and Database Manager
Lecture 20 - Foundation for Concurrency Control
Lecture 21 - Concurrency Control Part - 1
Lecture 22 - Concurrency Control Part - 2
Lecture 23 - Concurrency Control Part - 3
Lecture 24 - Concurrency Control Part - 4
Lecture 25 - Distributed Transaction Models
Lecture 26 - Basic 2-Phase and 3-phase commit protocol
Lecture 27 - Concurrency Control for Distributed Transaction
Lecture 28 - Introduction to Transaction Recovery
Lecture 29 - Recovery Mechanisms - II

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Lecture 30 - Recovery Mechanisms - III
Lecture 31 - Introduction to Data Warehousing and OLAP
Lecture 32 - Introduction to Data Warehousing and OLAP
Lecture 33 - Case Study
Lecture 34 - Case Study ORACLE and Microsoft Access
Lecture 35 - Data Mining and Knowledge Discovery
Lecture 36 - Data Mining and Knowledge Discovery Part - II
Lecture 37 - Object Oriented Databases
Lecture 38 - Object Oriented Databases - II
Lecture 39 - XML - Introductory Concepts
Lecture 40 - XML - Advanced Concepts
Lecture 41 - XML - Databases
Lecture 42 - Case Study - Part One - Database Design
Lecture 43 - Case Study - Part Two - Database Design

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NPTEL Video Course - Computer Science and Engineering - Discrete Mathematical Structures

Subject Co-ordinator - Prof. Kamala Krithivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Propositional Logic
Lecture 2 - Propositional Logic (Continued)
Lecture 3 - Predicates & Quantifiers
Lecture 4 - Predicates & Quantifiers (Continued)
Lecture 5 - Logical Inference
Lecture 6 - Resolution Principles & Application to PROLOG
Lecture 7 - Methods of Proof
Lecture 8 - Normal Forms
Lecture 9 - Proving Programs Correct (Continued)
Lecture 10 - Sets
Lecture 11 - Induction
Lecture 12 - Set Operations On Strings
Lecture 13 - Relations
Lecture 14 - Graphs
Lecture 15 - Graphs (Continued)
Lecture 16 - Trees
Lecture 17 - Trees And Graphs
Lecture 18 - Special Properties Of Relations
Lecture 19 - Closure Of Relations
Lecture 20 - Closure Properties Of Relations
Lecture 21 - Order Relations
Lecture 22 - Order Relations And Equivalence Relations
Lecture 23 - Equivalence Relations And Partitions
Lecture 24 - Functions
Lecture 25 - Functions (Continued)
Lecture 26 - Functions (Continued)
Lecture 27 - Pigeonhole Principle
Lecture 28 - Permutations And Combinations
Lecture 29 - Permutations And Combinations (Continued)

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Lecture 30 - Generating Functions
Lecture 31 - Generating Functions (Continued)
Lecture 32 - Recurrence Relations
Lecture 33 - Recurrence Relations (Continued)
Lecture 34 - Recurrence Relations (Continued)
Lecture 35 - Algebras
Lecture 36 - Algebras (Continued)
Lecture 37 - Algebras (Continued)
Lecture 38 - Finite State Automaton
Lecture 39 - Finite State Automaton (Continued)
Lecture 40 - Lattices

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NPTEL Video Course - Computer Science and Engineering - Artificial Intelligence (Prof. Deepak Khemani)

Subject Co-ordinator - Prof. Deepak Khemani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Artificial Intelligence
Lecture 2 - Introduction to AI
Lecture 3 - AI Introduction
Lecture 4 - AI Introduction
Lecture 5 - Introduction
Lecture 6 - State Space Search - Introduction
Lecture 7 - Search - DFS and BFS
Lecture 8 - Search DFID
Lecture 9 - Heuristic Search
Lecture 10 - Hill Climbing
Lecture 11 - Solution Space Search, Beam Search
Lecture 12 - TSP Greedy Methods
Lecture 13 - Tabu Search
Lecture 14 - Optimization - I (Simulated Annealing)
Lecture 15 - Optimization - II (Genetic Algorithms)
Lecture 16 - Population based methods for Optimization
Lecture 17 - Population Based Methods II
Lecture 18 - Branch and Bound, Dijkstra's Algorithm
Lecture 19 - A* Algorithm
Lecture 20 - Admissibility of A*
Lecture 21 - A* Monotone Property, Iterative Deeping A*
Lecture 22 - Recursive Best First Search, Sequence Allignment
Lecture 23 - Pruning the Open and Closed lists
Lecture 24 - Problem Decomposition with Goal Trees
Lecture 25 - AO* Algorithm
Lecture 26 - Game Playing
Lecture 27 - Game Playing - Minimax Search
Lecture 28 - Game Playing - AlphaBeta
Lecture 29 - Game Playing - SSS *

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Lecture 30 - Rule Based Systems
Lecture 31 - Inference Engines
Lecture 32 - Rete Algorithm
Lecture 33 - Planning
Lecture 34 - Planning FSSP, BSSP
Lecture 35 - Goal Stack Planning. Sussman's Anomaly
Lecture 36 - Non-linear planning
Lecture 37 - Plan Space Planning
Lecture 38 - GraphPlan
Lecture 39 - Constraint Satisfaction Problems
Lecture 40 - CSP continued
Lecture 41 - Knowledge-based systems
Lecture 42 - Knowledge-based Systems, PL
Lecture 43 - Propositional Logic
Lecture 44 - Resolution Refutation for PL
Lecture 45 - First-order Logic (FOL)
Lecture 46 - Reasoning in FOL
Lecture 47 - Backward chaining
Lecture 48 - Resolution for FOL

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming, Data Structures and Algorithms

Subject Co-ordinator - Prof. Hema A Murthy, Prof. Shankar Balachandran, Dr. N.S. Narayanaswamy

Co-ordinating Institute - IIT - Madras

Lecture 1 - Introduction to Computers and Programming
Lecture 2 - Writing your first program
Lecture 3 - Variables, Operators and Expressions
Lecture 4 - Variable declarations, more operators and precedence
Lecture 5 - Input and Output Statements
Lecture 6 - Conditionals
Lecture 7 - Loops
Lecture 8 - Video Solution to Digital Root Programming Assignment
Lecture 9 - Introduction to arrays
Lecture 10 - Working with 1D arrays
Lecture 11 - Find prime numbers
Lecture 12 - Debugging demo
Lecture 13 - Multi-dimensional arrays
Lecture 14 - Pointers
Lecture 15 - More on pointers
Lecture 16 - Arrays and pointer arithmetic
Lecture 17 - Introduction to Strings
Lecture 18 - More on Strings
Lecture 19 - Video Solution to Print Elements of a Matrix in Spiral Order Programming Assignment
Lecture 20 - Introduction to functions
Lecture 21 - More details on functions
Lecture 22 - Arguments, variables and parameters
Lecture 23 - Pass parameters by reference
Lecture 24 - Recursive functions
Lecture 25 - Running time of a program
Lecture 26 - Computing time complexity
Lecture 27 - Video Solution to Palindrome Checker Programming Assignment
Lecture 28 - Algorithms and Powering
Lecture 29 - Polynomial evaluation and multiplication
Lecture 30 - Linear and Binary Search Analysis
Lecture 31 - Analysis of minimum and maximum in an array
Lecture 32 - Sorting I
Lecture 33 - Sorting II

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Lecture 34 - Finding i-th smallest number
Lecture 35 - Video Solution to Sorting words Programming Assignment
Lecture 36 - Structures
Lecture 37 - More on structures
Lecture 38 - Using structures and pointers to structures
Lecture 39 - Dynamic memory allocation
Lecture 40 - Linked Lists
Lecture 41 - Brief introduction to C++
Lecture 42 - Data Structures
Lecture 43 - Lists
Lecture 44 - Supplementary Lesson
Lecture 45 - Video Solution to Implementing a Hash Table ADT Programming Assignment
Lecture 46 - Stacks
Lecture 47 - Queues
Lecture 48 - Trees
Lecture 49 - Tree traversal
Lecture 50 - Binary Search Trees
Lecture 51 - Heaps
Lecture 52 - Graphs and Representation
Lecture 53 - Supplementary Lesson
Lecture 54 - Video Solution to the Queue in a Hospital Programming Assignment
Lecture 55 - Greedy Algorithms
Lecture 56 - Dynamic Programming
Lecture 57 - Matrix Chain Multiplication
Lecture 58 - Dijkstra's Algorithm
Lecture 59 - Boyer-Moore String Matching Algorithm
Lecture 60 - File I/O
Lecture 61 - Modular Programming

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Information Security I

Subject Co-ordinator - Prof. V. Kamakoti

Co-ordinating Institute - IIT - Madras

Lecture 1 - Module 1 - Part 0 - Introduction to the Course
Lecture 2 - Module 1 - Part 1 - Definition of Information Security
Lecture 3 - Module 1 - Part 2 - Information Security Terminologies
Lecture 4 - Module 1 - Part 3 - Goals of Information Security
Lecture 5 - Module 1 - Part 4 - Implementation Issues of the Goals of Information Security - I
Lecture 6 - Module 1 - Part 5 - Implementation Issues of the Goals of Information Security - II
Lecture 7 - Module 1 - Part 6 - Control Mechanisms for Information Security - I
Lecture 8 - Module 1 - Part 7 - Access Control - Administrative and Technical
Lecture 9 - Module 1 - Part 8 - Passwords - Are they secure? - I
Lecture 10 - Module 1 - Part 9 - Access Control - Administrative and Technical
Lecture 11 - Module 1 - Part 10 - Passwords - Are they secure? - III
Lecture 12 - Module 1 - Part 11 - Multifactor Authentication - Challenges
Lecture 13 - Module 1 - Part 12 - Application Level Control and Information Security Planning
Lecture 14 - Module 1 - Part 13 - Information Security - Policy, Standard and Practice
Lecture 15 - Module 1 - Part 14 - Policies governing Issues, Roles and Responsibilities
Lecture 16 - Module 1 - Part 15 - Managing changes in Information Security Policies
Lecture 17 - Module 1 - Part 16 - Spheres of Information Security
Lecture 18 - Module 2 - Part 1 - Protecting your Personal Computer - I
Lecture 19 - Module 2 - part 2 - Protecting your Personal Computer - II
Lecture 20 - Module 2 - Part 3 - Protecting your Personal Computer - III
Lecture 21 - Module 2 - Part 4 - Cloud Computing (Basic Definitions) - I
Lecture 22 - Module 2 - Part 5 - Cloud Computing (Deployment) - II
Lecture 23 - Module 2 - Part 6 - Cloud Computing (Security Issues) - III
Lecture 24 - Module 2 - Part 7 - Cloud Computing (Trust and Risk) - IV
Lecture 25 - Module 2 - Part 8 - Cloud Computing (Security and Privacy Issues) - V
Lecture 26 - Module 2 - Part 9 - Cloud Computing (Security and Privacy Issues) - VI
Lecture 27 - Module 2 - Part 10 - Cloud Computing (Application and Data level security) - VII
Lecture 28 - Module 2 - Part 11 - Cloud Computing (Summary) - VIII
Lecture 29 - Module 2 - Part 12 - Standard I
Lecture 30 - Module 2 - Part 13 - Standard II
Lecture 31 - Module 2 - Part 14 - Standard III
Lecture 32 - Module 3 - Part 1
Lecture 33 - Module 3 - Part 2

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Lecture 34 - Module 3 - Part 3
Lecture 35 - Module 3 - Part 4
Lecture 36 - Module 3 - Part 5
Lecture 37 - Module 3 - Part 6
Lecture 38 - Module 3 - Part 7
Lecture 39 - Module 3 - Part 8
Lecture 40 - Module 3 - Part 9
Lecture 41 - Module 4 - Part 1
Lecture 42 - module 4 - Part 2
Lecture 43 - Module 4 - Part 3
Lecture 44 - Module 4 - Part 4
Lecture 45 - Module 4 - Part 5
Lecture 46 - Module 4 - Part 6
Lecture 47 - Module 4 - Part 7
Lecture 48 - Module 4 - Part 8
Lecture 49 - Module 4 - Part 9
Lecture 50 - Module 4 - Part 10
Lecture 51 - Module 5 - Part 1
Lecture 52 - Module 5 - Part 2
Lecture 53 - Module 5 - Part 3
Lecture 54 - Module 5 - Part 4
Lecture 55 - Module 5 - Part 5
Lecture 56 - Module 5 - Part 6
Lecture 57 - Module 5 - Part 7
Lecture 58 - Module 6 - Part 1
Lecture 59 - Module 6 - Part 2
Lecture 60 - Module 6 - Part 3
Lecture 61 - Module 6 - Part 4
Lecture 62 - Module 6 - Part 5
Lecture 63 - Module 6 - Part 6
Lecture 64 - Module 6 - Part 7
Lecture 65 - Module 6 - Part 8

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming and Data structures (PDS)

Subject Co-ordinator - Dr. N S. Narayanaswamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Simple C Program for Sorting
Lecture 2 - Review of Structures, Pointers, and Functions
Lecture 3 - Recursion
Lecture 4 - Abstract Data Types-Data + Methods
Lecture 5 - List Data Type
Lecture 6 - Access and update methods
Lecture 7 - Doubly Linked List Data Type
Lecture 8 - Doubly Linked Lists and Arrays
Lecture 9 - ADT Stacks
Lecture 10 - Checking of Balanced Parenthesis
Lecture 11 - Infix and Postfix expressions and Expression evaluation
Lecture 12 - Queue ADT Definition and Implementation
Lecture 13 - Merging using Queue ADT and Queue types
Lecture 14 - Tree ADT and Traversals
Lecture 15 - Binary Tree ADT and traversals
Lecture 16 - Tree Applications
Lecture 17 - Binary Search Trees
Lecture 18 - Heaps

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NPTEL Video Course - Computer Science and Engineering - NOC:Design and Analysis of Algorithms

Subject Co-ordinator - Prof. Madhavan Mukund

Co-ordinating Institute - Chennai Mathematical Institute

Lecture 1 - Course Outline
Lecture 2 - Example
Lecture 3 - Example
Lecture 4 - Example
Lecture 5 - Introduction and motivation
Lecture 6 - Input size, worst case, average case
Lecture 7 - Quantifying efficiency
Lecture 8 - Examples
Lecture 9 - Arrays and lists
Lecture 10 - Searching in an array
Lecture 11 - Selection Sort
Lecture 12 - Insertion sort
Lecture 13 - Merge sort
Lecture 14 - Merge sort - analysis
Lecture 15 - Quicksort
Lecture 16 - Quicksort - analysis
Lecture 17 - Sorting - Concluding remarks
Lecture 18 - Introduction to graphs
Lecture 19 - Representing graphs
Lecture 20 - Breadth first search (BFS)
Lecture 21 - Depth first search (DFS)
Lecture 22 - Applications of BFS and DFS
Lecture 23 - Directed acylic graphs
Lecture 24 - Directed acylic graphs
Lecture 25 - Single source shortest paths
Lecture 26 - Dijkstras algorithm
Lecture 27 - Negative edge weights
Lecture 28 - All pairs shortest paths
Lecture 29 - Minimum Cost Spanning Trees
Lecture 30 - Prims Algorithm
Lecture 31 - Kruskals algorithm
Lecture 32 - Union-Find using arrays
Lecture 33 - Union-Find using pointers

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Lecture 34 - Priority queues
Lecture 35 - Heaps
Lecture 36 - Heaps
Lecture 37 - Counting inversions
Lecture 38 - Closest pair of points
Lecture 39 - Binary Search Trees
Lecture 40 - Balanced search trees
Lecture 41 - Interval scheduling
Lecture 42 - Scheduling with deadlines
Lecture 43 - Huffman codes
Lecture 44 - Introduction to dynamic programming
Lecture 45 - Memoization
Lecture 46 - Grid Paths
Lecture 47 - Common subwords and subsequences
Lecture 48 - Edit distance
Lecture 49 - Matrix multiplication
Lecture 50 - Linear Programming
Lecture 51 - LP modelling
Lecture 52 - LP modelling
Lecture 53 - Network Flows
Lecture 54 - Reductions
Lecture 55 - Checking Algorithms
Lecture 56 - P and NP

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming, Data Structures and Algorithms (Aric

Subject Co-ordinator - Dr. N S. Narayanaswamy, Prof. Shankar Balachandran, Prof. Hema A Murthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computers and Programming
Lecture 2 - Writing your first program
Lecture 3 - Variables, Operators and Expressions
Lecture 4 - Variable declarations, more operators and precedence
Lecture 5 - Input and Output Statements
Lecture 6 - Conditionals
Lecture 7 - Loops
Lecture 8 - Introduction to arrays
Lecture 9 - Working with 1D arrays
Lecture 10 - Find prime numbers
Lecture 11 - Debugging demo
Lecture 12 - Multi-dimensional arrays
Lecture 13 - Pointers
Lecture 14 - More on pointers
Lecture 15 - Arrays and pointer arithmetic
Lecture 16 - Introduction to Strings
Lecture 17 - More on Strings
Lecture 18 - Introduction to functions
Lecture 19 - More details on functions
Lecture 20 - Arguments, variables and parameters
Lecture 21 - Pass parameters by reference
Lecture 22 - Recursive Functions
Lecture 23 - C control structures, functional specification of programs
Lecture 24 - Complexity Analysis using Sum and Product Rule
Lecture 25 - Complexity Analysis of Recursive Functions
Lecture 26 - Algorithms and Powering
Lecture 27 - Polynomial evaluation and multiplication
Lecture 28 - Linear and Binary Search Analysis
Lecture 29 - Analysis of minimum and maximum in an array

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Lecture 30 - Sorting I: Insertion, Merge
Lecture 31 - Sorting II: Counting, Radix
Lecture 32 - Finding i-th smallest number
Lecture 33 - Structures
Lecture 34 - More on Structures
Lecture 35 - Using structures and pointers to structures
Lecture 36 - Dynamic memory allocation
Lecture 37 - Linked List
Lecture 38 - Brief introduction to C++: Classes and objects
Lecture 39 - Abstract Data Types
Lecture 40 - More on ADT
Lecture 41 - Stacks: Last In First Out
Lecture 42 - Queues: First In First
Lecture 43 - Trees
Lecture 44 - Tree Traversal
Lecture 45 - Binary Search
Lecture 46 - Heaps
Lecture 47 - Graphs and Representations
Lecture 48 - Greedy Algorithms
Lecture 49 - Dynamic Programming
Lecture 50 - Matrix Chain Multiplication
Lecture 51 - Hash Tables
Lecture 52 - Graph Algorithms: Dijkstras Algorithm and Prims Algorithm
Lecture 53 - Graph Traversals: BFS,DFS and Articulation Points
Lecture 54 - File I/O
Lecture 55 - Modular Programming

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Architecture

Subject Co-ordinator - Prof.Madhu Mutyam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computer Architecture
Lecture 2 - Quantitative Principles of Computer Design
Lecture 3 - Instruction Set Principles-Part 1
Lecture 4 - Instruction Set Principles-Part 2
Lecture 5 - Instruction Set Principles-Part 3
Lecture 6 - Cache Memory Hierarchy - Part 1
Lecture 7 - Cache Memory Hierarchy - Part 2
Lecture 8 - Cache Memory Hierarchy - Part 3
Lecture 9 - Cache Memory Hierarchy - Part 4
Lecture 10 - Main Memory Design - Part 1
Lecture 11 - Main Memory Design - Part 2
Lecture 12 - Main Memory Design - Part 3
Lecture 13 - Fundamentals of Pipelining - Part 1
Lecture 14 - Fundamentals of Pipelining - Part 2
Lecture 15 - Fundamentals of Pipelining - Part 3
Lecture 16 - Fundamentals of Pipelining - Part 4
Lecture 17 - Fundamentals of Pipelining - Part 5
Lecture 18 - Scalar to Superscalar pipeline
Lecture 19 - Instruction Dependencies
Lecture 20 - Compiler optimizations for Exposing ILP
Lecture 21 - Advanced Branch Prediction Techniques - Part 1
Lecture 22 - Advanced Branch Prediction Techniques - Part 2
Lecture 23 - Superscalar Organization
Lecture 24 - Register Renaming
Lecture 25 - Tomasulo Algorithm
Lecture 26 - Dynamic Execution Core
Lecture 27 - Multi threading
Lecture 28 - Multicore Processor Architecture
Lecture 29 - Cache Coherence

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Lecture 30 - Cache Coherence Protocol Design
Lecture 31 - Synchronization
Lecture 32 - Memory Consistency - Part 1
Lecture 33 - Memory Consistency - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Model Checking

Subject Co-ordinator - Prof. B. Srivathsan

Co-ordinating Institute - Chennai Mathematical Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Module 1 - Modeling code behaviour
Lecture 3 - Module 2 - Modeling hardware circuits
Lecture 4 - Module 3 - Modeling data-dependent programs
Lecture 5 - Module 4 - Modeling concurrent systems
Lecture 6 - Summary
Lecture 7 - Module 1 - Model checking tools
Lecture 8 - Module 2 - Simple models in NuSMV
Lecture 9 - Module 3 - Hardware verification using NuSMV
Lecture 10 - Module 4 - Modeling concurrent systems in NuSMV
Lecture 11 - Summary.
Lecture 12 - Module 1 - A problem in concurrency
Lecture 13 - Module 2 - What is a property?
Lecture 14 - Module 3 - Invariants
Lecture 15 - Module 4 - Safety properties
Lecture 16 - Module 5 - Liveness properties
Lecture 17 - Summary..
Lecture 18 - Module 1 - Road map
Lecture 19 - Module 2 - A gentle introduction to automata
Lecture 20 - Module 3 - Simple properties of finite automata
Lecture 21 - Module 4 - Safety properties described by automata
Lecture 22 - Summary...
Lecture 23 - Module 1 - Specifying properties
Lecture 24 - Module 2 - Omega-regular expressions
Lecture 25 - Module 3 - Bchi automata
Lecture 26 - Module 4 - Simple properties of Bchi automata
Lecture 27 - Summary....
Lecture 28 - Module 1 - Overview
Lecture 29 - Module 2 - Omega-regular expressions to NBA

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Lecture 30 - Module 3 - Checking emptiness of NBA
Lecture 31 - Module 4 - Generalized NBA
Lecture 32 - Summary.....
Lecture 33 - Module 1 - Introduction to LTL
Lecture 34 - Module 2 - Semantics of LTL
Lecture 35 - Module 3 - A puzzle
Lecture 36 - Summary.
Lecture 37 - Module 1 - Automata based LTL model-checking
Lecture 38 - Module 2 - LTL to NBA
Lecture 39 - Module 3 - Automaton construction
Lecture 40 - Summary..
Lecture 41 - Module 1 - Tree view of a transition system
Lecture 42 - Module 2 - CTL*
Lecture 43 - Module 3 - CTL
Lecture 44 - summary...
Lecture 45 - Module 1 - Adequate CTL formulae
Lecture 46 - Module 2 - EX, EU, EG
Lecture 47 - Module 3 - Final algorithm
Lecture 48 - Module 4 - State-space explosion
Lecture 49 - Summary....
Lecture 50 - Module 1 - Introduction to BDDs
Lecture 51 - Module 2 - Ordered BDDs
Lecture 52 - Module 3 - Representing transition systems as OBDDs
Lecture 53 - Summary.....
Lecture 54 - Timed transition systems
Lecture 55 - Concluding remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Functional Programming in Haskell

Subject Co-ordinator - Prof. Madhavan Mukund, Prof. S P Suresh

Co-ordinating Institute - Chennai Mathematical Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functions
Lecture 2 - Types
Lecture 3 - Haskell
Lecture 4 - Running Haskell programs
Lecture 5 - Currying
Lecture 6 - Examples
Lecture 7 - Lists
Lecture 8 - Functions on lists
Lecture 9 - Characters and strings
Lecture 10 - Tuples
Lecture 11 - Computation as rewriting
Lecture 12 - Polymorphism and higher-order functions
Lecture 13 - Map and filter
Lecture 14 - List comprehension
Lecture 15 - Folding through a list
Lecture 16 - Measuring efficiency
Lecture 17 - Sorting
Lecture 18 - Using infinite lists
Lecture 19 - Conditional polymorphism
Lecture 20 - Defining functions in ghci
Lecture 21 - User-defined datatypes
Lecture 22 - Abstract datatypes
Lecture 23 - Modules
Lecture 24 - Recursive data types
Lecture 25 - Binary search trees
Lecture 26 - Balanced search trees
Lecture 27 - Arrays
Lecture 28 - Input/Output

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NPTEL Video Course - Computer Science and Engineering - Virtual Reality

Subject Co-ordinator - Prof. Steven LaVall

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course mechanics
Lecture 2 - Goals and VR definitions
Lecture 3 - Historical perspective
Lecture 4 - Birds-eye view (general)
Lecture 5 - Birds-eye view (general) (Continued...)
Lecture 6 - Birds-eye view (hardware)
Lecture 7 - Birds-eye view (software)
Lecture 8 - Birds-eye view (sensation and perception)
Lecture 9 - Geometric modeling
Lecture 10 - Transforming models
Lecture 11 - Matrix algebra and 2D rotations
Lecture 12 - 3D rotations and yaw, pitch, and roll
Lecture 13 - 3D rotations and yaw, pitch, and roll (Continued...)
Lecture 14 - Axis-angle representations
Lecture 15 - Quaternions
Lecture 16 - Converting and multiplying rotations
Lecture 17 - Converting and multiplying rotations (Continued...)
Lecture 18 - Homogeneous transforms
Lecture 19 - The chain of viewing transforms
Lecture 20 - Eye transforms
Lecture 21 - Eye transforms (Continued...)
Lecture 22 - Canonical view transform
Lecture 23 - Viewport transform
Lecture 24 - Viewport transform (Continued...)
Lecture 25 - Three interpretations of light
Lecture 26 - Refraction
Lecture 27 - Simple lenses
Lecture 28 - Diopters
Lecture 29 - Imaging properties of lenses

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Lecture 30 - Lens aberrations
Lecture 31 - Optical system of eyes
Lecture 32 - Photoreceptors
Lecture 33 - Sufficient resolution for VR
Lecture 34 - Light intensity
Lecture 35 - Eye movements
Lecture 36 - Eye movements (Continued...)
Lecture 37 - Eye movement issues for VR
Lecture 38 - Neuroscience of vision
Lecture 39 - Depth perception
Lecture 40 - Depth perception (Continued...)
Lecture 41 - Motion perception
Lecture 42 - Frame rates and displays
Lecture 43 - Frame rates and displays (Continued...)
Lecture 44 - Overview
Lecture 45 - Orientation tracking
Lecture 46 - Tilt drift correction
Lecture 47 - Yaw drift correction
Lecture 48 - Tracking with a camera
Lecture 49 - Perspective n-point problem
Lecture 50 - Filtering
Lecture 51 - Lighthouse approach
Lecture 52 - Visual Rendering-Overview
Lecture 53 - Visual Rendering-overview (Continued...)
Lecture 54 - Shading models
Lecture 55 - Rasterization
Lecture 56 - Pixel shading
Lecture 57 - VR-specific problems
Lecture 58 - Distortion shading
Lecture 59 - Post-rendering image warp
Lecture 60 - Physics and physiology
Lecture 61 - Auditory perception
Lecture 62 - Auditory localization
Lecture 63 - Rendering
Lecture 64 - Spatialization and display
Lecture 65 - Combining other senses
Lecture 66 - Interfaces -overview
Lecture 67 - Locomotion
Lecture 68 - Manipulation

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Lecture 69 - System control
Lecture 70 - Social interaction
Lecture 71 - Evaluation of VR Systems

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Machine Learning (Sponsored by Ar

Subject Co-ordinator - Dr. Balaraman Ravindran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A brief introduction to machine learning
Lecture 2 - Supervised Learning
Lecture 3 - Unsupervised Learning
Lecture 4 - Reinforcement Learning
Lecture 5 - Probability Basics - 1
Lecture 6 - Probability Basics - 2
Lecture 7 - Linear Algebra - 1
Lecture 8 - Linear Algebra - 2
Lecture 9 - Statistical Decision Theory - Regression
Lecture 10 - Statistical Decision Theory - Classification
Lecture 11 - Bias-Variance
Lecture 12 - Linear Regression
Lecture 13 - Multivariate Regression
Lecture 14 - Subset Selection 1
Lecture 15 - Subset Selection 2
Lecture 16 - Shrinkage Methods
Lecture 17 - Principal Components Regression
Lecture 18 - Partial Least Squares
Lecture 19 - Linear Classification
Lecture 20 - Logistic Regression
Lecture 21 - Linear Discriminant Analysis 1
Lecture 22 - Linear Discriminant Analysis 2
Lecture 23 - Linear Discriminant Analysis 3
Lecture 24 - Optimization
Lecture 25 - Perceptron Learning
Lecture 26 - SVM - Formulation
Lecture 27 - SVM - Interpretation & Analysis
Lecture 28 - SVMs for Linearly Non Separable Data
Lecture 29 - SVM Kernels

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Lecture 30 - SVM - Hinge Loss Formulation
Lecture 31 - Weka Tutorial
Lecture 32 - Early Models
Lecture 33 - Backpropogation - I
Lecture 34 - Backpropogation - II
Lecture 35 - Initialization, Training and Validation
Lecture 36 - Maximum Likelihood Estimate
Lecture 37 - Priors and MAP Estimate
Lecture 38 - Bayesian Parameter Estimation
Lecture 39 - Introduction
Lecture 40 - Regression Trees
Lecture 41 - Stopping Criteria and Pruning
Lecture 42 - Loss Functions for Classification
Lecture 43 - Categorical Attributes
Lecture 44 - Multiway Splits
Lecture 45 - Missing Values, Imputation and Surrogate Splits
Lecture 46 - Instability, Smoothness and Repeated Subtrees
Lecture 47 - Tutorial
Lecture 48 - Evaluation Measures I
Lecture 49 - Bootstrapping and Cross Validation
Lecture 50 - 2 Class Evaluation Measures
Lecture 51 - The ROC Curve
Lecture 52 - Minimum Description Length and Exploratory Analysis
Lecture 53 - Introduction to Hypothesis Testing
Lecture 54 - Basic Concepts
Lecture 55 - Sampling Distributions and the Z Test
Lecture 56 - Student's t-test
Lecture 57 - The Two Sample and Paired Sample t-tests
Lecture 58 - Confidence Intervals
Lecture 59 - Bagging, Committee Machines and Stacking
Lecture 60 - Boosting
Lecture 61 - Gradient Boosting
Lecture 62 - Random Forest
Lecture 63 - Naive Bayes
Lecture 64 - Bayesian Networks
Lecture 65 - Undirected Graphical Models - Introduction
Lecture 66 - Undirected Graphical Models - Potential Functions
Lecture 67 - Hidden Markov Models
Lecture 68 - Variable Elimination

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Lecture 69 - Belief Propagation
Lecture 70 - Partitional Clustering
Lecture 71 - Hierarchical Clustering
Lecture 72 - Threshold Graphs
Lecture 73 - The BIRCH Algorithm
Lecture 74 - The CURE Algorithm
Lecture 75 - Density Based Clustering
Lecture 76 - Gaussian Mixture Models
Lecture 77 - Expectation Maximization
Lecture 78 - Expectation Maximization (Continued...)
Lecture 79 - Spectral Clustering
Lecture 80 - Learning Theory
Lecture 81 - Frequent Itemset Mining
Lecture 82 - The Apriori Property
Lecture 83 - Introduction to Reinforcement Learning
Lecture 84 - RL Framework and TD Learning
Lecture 85 - Solution Methods and Applications
Lecture 86 - Multi-class Classification

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NPTEL Video Course - Computer Science and Engineering - NOC:Artificial Intelligence: Knowledge Representatior

Subject Co-ordinator - Prof. Deepak Khemani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Abductive Inferences and Expectations
Lecture 3 - On Machine Learning
Lecture 4 - A New Test of Intelligence?
Lecture 5 - The World According to Us
Lecture 6 - From Particles to Concepts
Lecture 7 - The Domains for Reasoning
Lecture 8 - Hierarchies in Representation
Lecture 9 - Logic and Representation: A Quick Tour
Lecture 10 - Symbols and Thought
Lecture 11 - From Gears to Symbols
Lecture 12 - Truth, Logic, and Provability
Lecture 13 - A Syntactic Machine
Lecture 14 - Entailment and Proof
Lecture 15 - The Languages of Logic
Lecture 16 - Patterns in Arguments
Lecture 17 - Rules of Inference
Lecture 18 - Propositional Logic
Lecture 19 - Propositional Logic: Syntax
Lecture 20 - Propositional Logic: Semantics
Lecture 21 - Proofs: Natural Deduction
Lecture 22 - The Deduction Theorem
Lecture 23 - Models
Lecture 24 - The Tableau Method
Lecture 25 - First Order Logic
Lecture 26 - First Order Logic: Syntax
Lecture 27 - FOL: Universal Instantiation
Lecture 28 - First Order Logic: Semantics
Lecture 29 - FOL: Truth Assignments

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Lecture 30 - Modified Modus Ponens
Lecture 31 - The Unification Algorithm
Lecture 32 - Skolemization
Lecture 33 - Expert Systems
Lecture 34 - Backward Chaining Systems
Lecture 35 - Deductive Retrieval
Lecture 36 - The Resolution Refutation Method
Lecture 37 - Clause Form in FOL
Lecture 38 - Resolution Refutation in FOL
Lecture 39 - First Order Logic with Equality
Lecture 40 - Who was the surgeon?
Lecture 41 - Consistency vs. Completeness
Lecture 42 - Logic Programming
Lecture 43 - Arithmetic
Lecture 44 - Horn Clauses and Prolog
Lecture 45 - SLD Derivation = Backward Chaining
Lecture 46 - Programming in Logic
Lecture 47 - Prolog: Programming in Logic
Lecture 48 - Prolog: Procedural Interpretation
Lecture 49 - Prolog: Query Evaluation
Lecture 50 - Prolog: Unifying Terms
Lecture 51 - Prolog: Goal Order
Lecture 52 - Prolog: Tabling
Lecture 53 - Prolog: Negation by Failure
Lecture 54 - Prolog: The Cut Operator
Lecture 55 - Rule Based Expert Systems
Lecture 56 - The OPS5 Language
Lecture 57 - Match, Resolve, Execute
Lecture 58 - Conflict Resolution Strategies
Lecture 59 - The Rete Algorithm
Lecture 60 - The Rete Net
Lecture 61 - The Rete Net : Examples
Lecture 62 - Knowledge Representation
Lecture 63 - Synonyms, Antonyms, Hyponyms, Meronyms
Lecture 64 - Binary Relations
Lecture 65 - Describing Family Relations
Lecture 66 - Recursive Descriptions
Lecture 67 - Abstract Entities
Lecture 68 - Reification: Units of Measurement

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Lecture 69 - Semantic Nets and Knowledge Graphs
Lecture 70 - DL: Description Logics
Lecture 71 - Defining New Concepts and Roles
Lecture 72 - The Sentences in DL
Lecture 73 - A Family of Logics
Lecture 74 - DL: Some Examples
Lecture 75 - ALC Tableau
Lecture 76 - Model Checking in ALC
Lecture 77 - ALC Tableau: Examples
Lecture 78 - Language Independent Represntation
Lecture 79 - Conceptual Dependency Theory
Lecture 80 - CD States
Lecture 81 - Inferences in MARGIE
Lecture 82 - CD: Actions
Lecture 83 - English to CD
Lecture 84 - Representing Complex Verbs
Lecture 85 - Semantic Parsing of Language
Lecture 86 - Knowledge Structures
Lecture 87 - Scripts
Lecture 88 - SAM: Script Apploer Mechanism
Lecture 89 - A VIP Visit
Lecture 90 - Invoking Scripts
Lecture 91 - Goals, Plans, and Actions
Lecture 92 - Goal Interactions
Lecture 93 - Explanation Driven Understanding
Lecture 94 - Tussle Over a Bicycle
Lecture 95 - Plan Applier Mechanism (PAM)
Lecture 96 - Requests and Rule Instances
Lecture 97 - Managing Rule Instances
Lecture 98 - Knowledge Structures: Frames
Lecture 99 - Inheritance
Lecture 100 - A Frame System for Travel Planning
Lecture 101 - Inheritance in Taxonomies
Lecture 102 - Default Reasoning
Lecture 103 - Closed World Assumption
Lecture 104 - Circumscription
Lecture 105 - Default Logic
Lecture 106 - Autoepistemic Reasoning
Lecture 107 - The Event Calculus

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Lecture 108 - The Effects of Events
Lecture 109 - Epistemic Logic
Lecture 110 - Kripke Structures: Possible Worlds Semantics
Lecture 111 - The Muddy Children Puzzle
Lecture 112 - The Effects of Epistemic Actions
Lecture 113 - Reasoning with Beliefs

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NPTEL Video Course - Computer Science and Engineering - NOC:Information Security - II

Subject Co-ordinator - Prof. V. Kamakoti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Experimental Setup
Lecture 2 - Need for Secure Systems
Lecture 3 - Ignorance of A is Sin of B
Lecture 4 - Function calls and Stacks
Lecture 5 - Stack Smashing
Lecture 6 - Virtual Machine Based Rootkits
Lecture 7 - Security and Architecture
Lecture 8 - Structured Computer Organization Completed
Lecture 9 - X86 ISA - Part1
Lecture 10 - X86 ISA - Part 2
Lecture 11 - X86 Protected Mode
Lecture 12 - X86 Memory Segmentation
Lecture 13 - Process Isolation using Segmentation
Lecture 14 - Paging and Virtual Memory
Lecture 15 - Task Switching and Interrupt Service
Lecture 16 - Memory Segmentation Deep dive - Part 1
Lecture 17 - Memory Segmentation Deep dive - Part 2
Lecture 18 - Memory Segmentation Deep dive - Part 3
Lecture 19 - Memory Segmentation Deep dive - Part 4
Lecture 20 - Segmentation Recap
Lecture 21 - Lab 1 - Part 1
Lecture 22 - Lab 1 - Part 2
Lecture 23 - Lab 1 - Part 3
Lecture 24 - ISR Recap
Lecture 25 - Lab 2 - Part 1
Lecture 26 - Lab 2 - Part 2
Lecture 27 - Memory Management Recap
Lecture 28 - Lab 3 - Part 1
Lecture 29 - Lab 3 - Part 2

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Lecture 30 - Task Switch recap
Lecture 31 - Lab 4 - Part 1
Lecture 32 - Lab 4 - Part 2
Lecture 33 - Lab 4 - Part 3
Lecture 34 - Lab 4 - Part 4
Lecture 35 - Introduction to Basic Cryptography
Lecture 36 - Public Key Cryptography
Lecture 37 - Freescale ARM iMX6 Processor
Lecture 38 - High Assurance Boot in iMX6
Lecture 39 - Case Study
Lecture 40 - Basics of Networking
Lecture 41 - Network Processor Vs General Purpose Processor
Lecture 42 - Network Processor Architecture

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NPTEL Video Course - Computer Science and Engineering - NOC:Algorithms for Big Data

Subject Co-ordinator - Prof. John Augustine

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic definitions
Lecture 2 - Conditional probability
Lecture 3 - Example problems
Lecture 4 - Karger's mincut algorithm
Lecture 5 - Analysis of Karger's mincut algorithm
Lecture 6 - Random variables
Lecture 7 - Randomized quicksort
Lecture 8 - Problem solving video - The rich get richer
Lecture 9 - Problem solving video - Monty Hall problem
Lecture 10 - Bernoulli, Binomial and Geometric distributions
Lecture 11 - Tail Bounds
Lecture 12 - Application of Chernoff bound
Lecture 13 - Application of Chebyshev's inequality
Lecture 14 - Intro to Big Data Algorithms
Lecture 15 - SAT Problem
Lecture 16 - Classification of States
Lecture 17 - Stationary Distribution of a Markov Chain
Lecture 18 - Celebrities Case Study
Lecture 19 - Random Walks on Undirected Graphs
Lecture 20 - Intro to Streaming, Morris Algorithm
Lecture 21 - Reservoir Sampling
Lecture 22 - Approximate Median
Lecture 23 - Overview
Lecture 24 - Balls, bins, hashing
Lecture 25 - Chain hashing, SUHA, Power of Two choices
Lecture 26 - Bloom filter
Lecture 27 - Pairwise independence
Lecture 28 - Estimating expectation of continuous function
Lecture 29 - Universal hash functions

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Lecture 30 - Perfect hashing
Lecture 31 - Count-min filter for heavy hitters in data streams
Lecture 32 - Problem solving video - Doubly Stochastic Transition Matrix
Lecture 33 - Problem solving video - Random Walks on Linear Structures
Lecture 34 - Problem solving video - Lollipop Graph
Lecture 35 - Problem solving video - Cat And Mouse
Lecture 36 - Estimating frequency moments
Lecture 37 - Property testing framework
Lecture 38 - Testing Connectivity
Lecture 39 - Enforce and Test Introduction
Lecture 40 - Testing if a graph is a biclique
Lecture 41 - Testing bipartiteness
Lecture 42 - Property testing and random walk algorithms
Lecture 43 - Testing if a graph is bipartite (using random walks)
Lecture 44 - Graph streaming algorithms: Introduction
Lecture 45 - Graph streaming algorithms: Matching
Lecture 46 - Graph streaming algorithms: Graph sparsification
Lecture 47 - MapReduce
Lecture 48 - K-Machine Model (aka Pregel Model)

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NPTEL Video Course - Computer Science and Engineering - NOC:Reinforcement Learning

Subject Co-ordinator - Dr. B. Ravindran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Tutorial 1 - Probability Basics 1
Lecture 2 - Tutorial 1 - Probability Basics 2
Lecture 3 - Tutorial 2 - Linear algebra - 1
Lecture 4 - Tutorial 2 - Linear algebra - 2
Lecture 5 - Introduction to RL
Lecture 6 - RL Framework and applications
Lecture 7 - Introduction to Immediate RL
Lecture 8 - Bandit Optimalities
Lecture 9 - Value function based methods
Lecture 10 - UCB 1
Lecture 11 - Concentration Bounds
Lecture 12 - UCB 1 Theorem
Lecture 13 - PAC Bounds
Lecture 14 - Median Elimination
Lecture 15 - Thompson Sampling
Lecture 16 - Policy Search
Lecture 17 - REINFORCE
Lecture 18 - Contextual Bandits
Lecture 19 - Full RL Introduction
Lecture 20 - Returns, Value Functions and MDPs
Lecture 21 - MDP Modelling
Lecture 22 - Bellman Equation
Lecture 23 - Bellman Optimality Equation
Lecture 24 - Cauchy Sequence and Green's Equation
Lecture 25 - Banach Fixed Point Theorem
Lecture 26 - Convergence Proof
Lecture 27 - Lpi Convergence
Lecture 28 - Value Iteration
Lecture 29 - Policy Iteration

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Lecture 30 - Dynamic Programming
Lecture 31 - Monte Carlo
Lecture 32 - Control in Monte Carlo
Lecture 33 - Off Policy MC
Lecture 34 - UCT
Lecture 35 - TD(0)
Lecture 36 - TD(0) Control
Lecture 37 - Q-Learning
Lecture 38 - Afterstate
Lecture 39 - Eligibility Traces
Lecture 40 - Backward View of Eligibility Traces
Lecture 41 - Eligibility Trace Control
Lecture 42 - Thompson Sampling Recap
Lecture 43 - Function Approximation
Lecture 44 - Linear Parameterization
Lecture 45 - State Aggregation Methods
Lecture 46 - Function Approximation and Eligibility Traces
Lecture 47 - LSTD and LSTDQ
Lecture 48 - LSPI and Fitted Q
Lecture 49 - DQN and Fitted Q-Iteration
Lecture 50 - Policy Gradient Approach
Lecture 51 - Actor Critic and REINFORCE
Lecture 52 - REINFORCE (cont'd)
Lecture 53 - Policy Gradient with Function Approximation
Lecture 54 - Hierarchical Reinforcement Learning
Lecture 55 - Types of Optimality
Lecture 56 - Semi Markov Decision Processes
Lecture 57 - Options
Lecture 58 - Learning with Options
Lecture 59 - Hierarchical Abstract Machines
Lecture 60 - MAXQ
Lecture 61 - MAXQ Value Function Decomposition
Lecture 62 - Option Discovery
Lecture 63 - POMDP Introduction
Lecture 64 - Solving POMDP

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Operating Systems

Subject Co-ordinator - Prof. Chester Rebeiro

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro to the Course
Lecture 2 - Introduction to OS
Lecture 3 - PC Hardware
Lecture 4 - From Programs to Processes
Lecture 5 - Sharing the CPU
Lecture 6 - Introduction
Lecture 7 - Virtual Memory
Lecture 8 - MMU Mapping
Lecture 9 - Segmentation
Lecture 10 - Memory Management in xv6
Lecture 11 - PC Booting
Lecture 12 - Week 3 Introduction
Lecture 13 - Create Execute and Exit from Processes
Lecture 14 - System Calls for Process Management
Lecture 15 - Interrupts
Lecture 16 - Interrupt Handling
Lecture 17 - Software Interrupts and System calls
Lecture 18 - CPU Context switching
Lecture 19 - CPU Scheduling
Lecture 20 - Priority Based Scheduling Algorithms
Lecture 21 - Multi-Processor Scheduling
Lecture 22 - Scheduling in Linux
Lecture 23 - Completely Fair Scheduling
Lecture 24 - Inter Process Communication
Lecture 25 - Synchronization
Lecture 26 - Software solutions for critical sections
Lecture 27 - Bakery Algorithm
Lecture 28 - Hardware Locks
Lecture 29 - Mutexes

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Lecture 30 - Semaphores
Lecture 31 - Dining Philosophers Problem
Lecture 32 - Deadlocks
Lecture 33 - Dealing with Deadlocks
Lecture 34 - Threads - Part 1
Lecture 35 - Threads - Part 2
Lecture 36 - Operating system security
Lecture 37 - Information Flow policies
Lecture 38 - Buffer Overflows
Lecture 39 - Preventing Buffer Overflow Attacks

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming, Data Structures and Algorithms in Py

Subject Co-ordinator - Prof. Madhavan Mukund

Co-ordinating Institute - Chennai Mathematical Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1 - Algorithms and programming
Lecture 2 - Lecture 2 - Improving naive gcd
Lecture 3 - Lecture 3 - Euclid's algorithm for gcd
Lecture 4 - Lecture 4 - Downloading and installing Python
Lecture 5 - Lecture 1 - Assignment statement, basic types - int, float, bool
Lecture 6 - Lecture 2 - Strings
Lecture 7 - Lecture 3 - Lists
Lecture 8 - Lecture 4 - Control Flow
Lecture 9 - Lecture 5 - Functions
Lecture 10 - Lecture 6 - Examples
Lecture 11 - Lecture 1 - More about range()
Lecture 12 - Lecture 2 - Manipulating lists
Lecture 13 - Lecture 3 - Breaking out of a loop
Lecture 14 - Lecture 4 - Arrays vs lists, binary search
Lecture 15 - Lecture 5 - Efficiency
Lecture 16 - Lecture 6 - Selection Sort
Lecture 17 - Lecture 7 - Insertion Sort
Lecture 18 - Lecture 8 - Recursion
Lecture 19 - Lecture 1 - Mergesort
Lecture 20 - Lecture 2 - Mergesort, analysis
Lecture 21 - Lecture 3 - Quicksort
Lecture 22 - Lecture 4 - Quicksort analysis
Lecture 23 - Lecture 5 - Tuples and dictionaries
Lecture 24 - Lecture 6 - Function definitions
Lecture 25 - Lecture 7 - List Comprehension
Lecture 26 - Lecture 1 - Exception Handling
Lecture 27 - Lecture 2 - Standard input and output
Lecture 28 - Lecture 3 - Handling files
Lecture 29 - Lecture 4 - String functions

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Lecture 30 - Lecture 5 - Formatting printed output
Lecture 31 - Lecture 6 - pass, del() and None
Lecture 32 - Lecture 1 - Backtracking, N queens
Lecture 33 - Lecture 2 - Global scope, nested functions
Lecture 34 - Lecture 3 - Generating permutations
Lecture 35 - Lecture 4 - Sets, stacks, queues
Lecture 36 - Lecture 5 - Priority queues and heaps
Lecture 37 - Lecture 1 - Abstract datatypes, classes and objects
Lecture 38 - Lecture 2 - Classes and objects in Python
Lecture 39 - Lecture 3 - User defined lists
Lecture 40 - Lecture 4 - Search trees
Lecture 41 - Lecture 1 - Memoization and dynamic programming
Lecture 42 - Lecture 2 - Grid paths
Lecture 43 - Lecture 3 - Longest common subsequence
Lecture 44 - Lecture 4 - Matrix multiplication
Lecture 45 - Lecture 5 - Wrap-up, Python vs other languages

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NPTEL Video Course - Computer Science and Engineering - NOC:Privacy and Security in Online Social Networks

Subject Co-ordinator - Prof. Ponnurangam Kumaraguru

Co-ordinating Institute - IIITD

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro to Course
Lecture 2 - Intro to Course
Lecture 3 - Incidents
Lecture 4 - Tutorial 1 - Part 1 Ubuntu
Lecture 5 - Tutorial 1 - Part 2 Python
Lecture 6 - OSM APIs and tools for data collection
Lecture 7 - Tutorial 2 - Part 1 Facebook API
Lecture 8 - Tutorial 2 - Part 2 Facebook API
Lecture 9 - Trust and Credibility on OSM
Lecture 10 - Misinformation on Social Media
Lecture 11 - Privacy and Social Media
Lecture 12 - Tutorial 3 - Part 1 Twitter API
Lecture 13 - Tutorial 3 - Part 2 MySQL
Lecture 14 - Tutorial 3 - Part 3 MongoDB
Lecture 15 - Privacy and Pictures on Online Social Media
Lecture 16 - Policing and Online Social Media
Lecture 17 - Policing and Online Social Media
Lecture 18 - Policing and Online Social Media
Lecture 19 - eCrime on Online Social Media
Lecture 20 - eCrime on Online Social Media
Lecture 21 - Tutorial 4 - Social Network Analysis
Lecture 22 - Link Farming in Online Social Media
Lecture 23 - Nudges
Lecture 24 - Semantic attacks
Lecture 25 - Tutorial 5 - Analyzing text using Python NLTK
Lecture 26 - Profile Linking on Online Social Media
Lecture 27 - Anonymous Networks
Lecture 28 - Tutorial 6 - Gephi Network Visualization
Lecture 29 - Privacy in Location Based Social Networks - Part 1

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Lecture 30 - Privacy in Location Based Social Networks - Part 2
Lecture 31 - Tutorial 7 - Visualization - Highcharts
Lecture 32 - Beware of What You Share Inferring Home Location in Social Networks
Lecture 33 - On the dynamics of username change behavior on Twitter
Lecture 34 - Boston Marathon Analyzing Fake Content on Twitter

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NPTEL Video Course - Computer Science and Engineering - NOC:Mobile Computing

Subject Co-ordinator - Prof. Pushpendra Singh

Co-ordinating Institute - IIITD

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Java Basics
Lecture 2 - Java
Lecture 3 - Java
Lecture 4 - Java
Lecture 5 - Java
Lecture 6 - Introduction to Android Studio
Lecture 7 - Your First App
Lecture 8 - Deploying your App to a Phone
Lecture 9 - Extending app - Buttons, Toast
Lecture 10 - Android Development Environment
Lecture 11 - User Interface
Lecture 12 - Application Fundamentals
Lecture 13 - Extending the application
Lecture 14 - Activity Lifecycle - I
Lecture 15 - Activity Lifecycle - II
Lecture 16 - Activity LifeCycle - III
Lecture 17 - Adding Icon, Layouts, Handling Rotation - I
Lecture 18 - Adding Icon, Layouts, Handling Rotation - II
Lecture 19 - Debugging
Lecture 20 - Intents - I
Lecture 21 - Intents - II
Lecture 22 - Observer Pattern
Lecture 23 - Fragments - I
Lecture 24 - Fragments - II
Lecture 25 - Fragment Basic Programming Example
Lecture 26 - Fragments - Advanced Example
Lecture 27 - Implicit Intents
Lecture 28 - Saving Data - I
Lecture 29 - Saving Data - II

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Lecture 30 - Security and System Permissions
Lecture 31 - Services
Lecture 32 - Processes and threads
Lecture 33 - Working with Fragments - I
Lecture 34 - Working with Fragments - II
Lecture 35 - Working with Fragments - III
Lecture 36 - RecyclerView, Adapter
Lecture 37 - RecyclerView, Adapter, ViewHolder
Lecture 38 - ViewPager
Lecture 39 - Dialogues

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Modern Application Development

Subject Co-ordinator - Tanmai Gopal, Prof. Gaurav Raina

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Introduction to a web-app
Lecture 3 - Building a web-app
Lecture 4 - Networks
Lecture 5 - Practical - Running your own web-server
Lecture 6 - Protocols
Lecture 7 - Practical - SSH + Network experiments
Lecture 8 - Practical - Building a webapp with nodejs and using git. Introduction to reverse proxies.
Lecture 9 - Practical - Introduciton to server-side javascript and HTML/CSS
Lecture 10 - Introduction to client-side Javascript
Lecture 11 - Practical - APIs and mobile apps use web-servers
Lecture 12 - Introduction to databases
Lecture 13 - Data modelling and constraints
Lecture 14 - Interacting with a DBMS
Lecture 15 - Practical - Deeper exploration of a DBMS (column types and more)
Lecture 16 - Introduction to SQL
Lecture 17 - Understanding database performance
Lecture 18 - Transactions and ACID properties
Lecture 19 - Database security, backup and recovery
Lecture 20 - Analytics and Views
Lecture 21 - Scaling a database
Lecture 22 - Connecting your webapp to your database and SQL Injection
Lecture 23 - SQL and NoSQL systems
Lecture 24 - Authentication with HTTP
Lecture 25 - Understanding security, and some best practices for webapps
Lecture 26 - Introduction to authentication, hashing, curl and sessions
Lecture 27 - Introduction to mobile apps
Lecture 28 - Introduction to Mobile Application Development Part 2
Lecture 29 - Introduction to Android

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Lecture 30 - Getting started with Android Application Development
Lecture 31 - Building Custom UI using XML and Logs
Lecture 32 - Building a Blog App
Lecture 33 - Deploying an app to the Google Play Store
Lecture 34 - Introduction to iOS
Lecture 35 - The API Economy

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NPTEL Video Course - Computer Science and Engineering - NOC:Information Security-3

Subject Co-ordinator - Prof. V. Kamakoti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Operating System Introduction
Lecture 2 - Storage Hierarchy, Exceptions, Interrupts and traps
Lecture 3 - OS Management Services
Lecture 4 - OS Security Issues
Lecture 5 - Process and Threads
Lecture 6 - Process Scheduling
Lecture 7 - Scheduling Algorithm
Lecture 8 - Process Synchronization
Lecture 9 - Memory Management - 1
Lecture 10 - Memory Management - 2
Lecture 11 - File Systems - 1
Lecture 12 - File Systems - 2
Lecture 13 - Unix Filesystem
Lecture 14 - Unix Filesystem (Continued...)
Lecture 15 - Linux
Lecture 16 - Linux
Lecture 17 - Linux
Lecture 18 - Linux
Lecture 19 - Linux
Lecture 20 - Linux
Lecture 21 - Linux
Lecture 22 - Linux
Lecture 23 - Linux
Lecture 24 - Linux
Lecture 25 - Basic Networking Administration
Lecture 26 - Filesystems and Devices
Lecture 27 - Shell Introduction
Lecture 28 - Shell Comments and Variables
Lecture 29 - Shell Variables

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Lecture 30 - Shell Arrays and Arithmetic
Lecture 31 - Shell Condition and Relation
Lecture 32 - Shell Examples
Lecture 33 - Shell Functions
Lecture 34 - Shell File Test
Lecture 35 - Shell Loop Control
Lecture 36 - Shell Script Variations
Lecture 37 - Shell Pattern Matching
Lecture 38 - Shell Case Statements
Lecture 39 - Shell Co-routines
Lecture 40 - Shell Signals and Traps
Lecture 41 - Shell Subshell
Lecture 42 - Shell Declarations
Lecture 43 - Shell Examples 2
Lecture 44 - Shell Review
Lecture 45 - An Introduction
Lecture 46 - Structure of a Network
Lecture 47 - Network Core - Definition
Lecture 48 - Network Access and Physical Media
Lecture 49 - Structure of ISP and Packet Delays
Lecture 50 - Network Protocol Layers
Lecture 51 - Network Devices
Lecture 52 - Network Security - An Introduction
Lecture 53 - Public Key Cryptography
Lecture 54 - Digital Signatures
Lecture 55 - Security in Practise
Lecture 56 - Security in Practise (Continued...)
Lecture 57 - Wireshark
Lecture 58 - Snort
Lecture 59 - Review I
Lecture 60 - Review II

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NPTEL Video Course - Computer Science and Engineering - NOC:AI:Constraint Satisfaction

Subject Co-ordinator - Prof. Deepak Khemani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Constraint Satisfaction Problems
Lecture 2 - CSP Examples: Map colouring, N-Queens, Classroom scheduling
Lecture 3 - CSP Examples: Huffman-Clowes Labelling, Waltz Algorithm, Crosswords
Lecture 4 - Model Based Diagnosis - An application of CSP
Lecture 5 - Constraint Networks - An Introduction
Lecture 6 - Binary Constraint Networks (BCN), Equivalent Networks
Lecture 7 - Projection Networks
Lecture 8 - Constraint Propagation
Lecture 9 - Algorithms AC1 and AC3
Lecture 10 - Can we do better than AC3?
Lecture 11 - Algorithm AC4
Lecture 12 - Generalized AC, Path-Consistency
Lecture 13 - i-Consistency, Algorithm PC1
Lecture 14 - Algorithm PC2, Strong i-Consistency
Lecture 15 - Directional Consistency and Graph Ordering
Lecture 16 - Min-Width and Min-Induced-Width Ordering
Lecture 17 - Directional Arc-Consistency and Tree CSPs
Lecture 18 - Directional Path-Consistency and Directional i-Consistency
Lecture 19 - Backtrack-Free search and Adaptive Consistency
Lecture 20 - Adaptive Consistency: Bucket Elimination
Lecture 21 - Search Methods for Solving CSPs
Lecture 22 - Algorithm Backtracking
Lecture 23 - Look-Ahead Methods in Search
Lecture 24 - Look-Ahead Search: Examples
Lecture 25 - Combining Search with Reasoning: Algorithm DPLL
Lecture 26 - Algorithm Backmarking
Lecture 27 - Dynamic Value Ordering, Dynamic Variable Ordering
Lecture 28 - Look-Back Methods - Definitions
Lecture 29 - GaschnigÂ s Backjumping: The Culprit Variable

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Lecture 30 - GaschnigÂ s Backjumping, Graph-Based Backjumping
Lecture 31 - Graph-Based Backjumping: Internal and Relevant Dead-Ends
Lecture 32 - Conflict-Directed Backjumping: Definitions
Lecture 33 - Algorithm Conflict-Directed Backjumping
Lecture 34 - Combining Look-Ahead and Look-Back: FC-CBJ
Lecture 35 - Learning During Search
Lecture 36 - Model Based Systems
Lecture 37 - Model Based Diagnosis
Lecture 38 - Truth Maintenance Systems
Lecture 39 - Planning as Constraint Satisfaction
Lecture 40 - Planning as Constraint Satisfaction (Continued...)
Lecture 41 - Planning as Satisfiability
Lecture 42 - Wrapping Up and Further Study

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NPTEL Video Course - Computer Science and Engineering - NOC:Computer Organization

Subject Co-ordinator - Prof. V. Kamakoti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction High Speed Circuit - Design Recursive Doubling
Lecture 2 - High Speed Circuit Design - Fast Adder Circuits
Lecture 3 - Lab 1
Lecture 4 - Fast Adder Circuits (Continued...)
Lecture 5 - Fast Multiplier Circuit
Lecture 6 - Fast Multiplier Circuit (Continued...)
Lecture 7 - Programming using X86 ISA - Addressing Modes
Lecture 8 - Programming using X86 ISA - Addressing Modes
Lecture 9 - Floating point - Precision and Accuracy
Lecture 10 - Floating Point - Addition, Subtraction and Multiplication
Lecture 11 - Instruction Set Architecture
Lecture 12 - Instruction Set Architecture (Continued...)
Lecture 13 - Lab 2
Lecture 14 - Lab 2
Lecture 15 - Lab 2
Lecture 16 - Orthogonal ISA, C Constructs Mapping, Addressing Modes
Lecture 17 - Atomic and Predicated Instructions
Lecture 18 - Atomic and Predicated Instructions (Continued...)
Lecture 19 - General Purpose Registers
Lecture 20 - Expanding opcodes
Lecture 21 - Introduction to Pipelining
Lecture 22 - Pipelining
Lecture 23 - Data Hazards
Lecture 24 - Lab 2
Lecture 25 - Dynamic Instruction Scheduling
Lecture 26 - Dynamic Instruction Scheduling (Continued...)
Lecture 27 - Control Hazard, Branch Prediction
Lecture 28 - Process Management
Lecture 29 - Branch prediction

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Lecture 30 - Global Branch Prediction
Lecture 31 - Structural Hazard, Architectural Enhancements
Lecture 32 - Lab 3
Lecture 33 - Locality of Reference, Demand paging
Lecture 34 - Page Replacement Algorithm
Lecture 35 - Multilevel Paging, Translational Lookaside Buffer
Lecture 36 - Multilevel Paging
Lecture 37 - Multilevel Paging - Part 1
Lecture 38 - Page Frame Allocation, Beledy's Anomaly
Lecture 39 - Paging, Cache
Lecture 40 - Cache
Lecture 41 - Cache Organisation
Lecture 42 - Cache - Cache Coherency, Dual Ported Cache
Lecture 43 - Multilevel Caching, Multitasking
Lecture 44 - Cache, Degree of Multiprogramming
Lecture 45 - Shared Memory Architecture
Lecture 46 - Shared Memory Architecture - Part I
Lecture 47 - Virtually Indexed - Virtually Tagged and Physically Tagged Caches
Lecture 48 - Lab 4
Lecture 49 - Shared Memory Architecture, Cache Coherence
Lecture 50 - Concurrent Programming in Hardware - Part I
Lecture 51 - Concurrent Programming in Hardware - Part II
Lecture 52 - Conclusion

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Wireless and Cellular Communicati

Subject Co-ordinator - Prof. David Kovil Pillai

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Cellular Systems - Part 1
Lecture 2 - Overview of Cellular Systems - Part 2
Lecture 3 - Overview of Cellular Systems - Part 3
Lecture 4 - 5G and other Wireless Technologies
Lecture 5 - Basic Cellular Terminology
Lecture 6 - Introduction to Antennas and Propagation Models
Lecture 7 - Link budget, Fading margin, Outage
Lecture 8 - Cellular Concept
Lecture 9 - Cellular system design and analysis
Lecture 10 - Cellular Geometry and System Design
Lecture 11 - Cellular System Capacity, Trunking
Lecture 12 - Handoff and Mobility
Lecture 13 - Handoff Part 2, Classification of Signal Variation
Lecture 14 - Shadowing, Outage, Multipath
Lecture 15 - Rayleigh Fading and Statistical Characterization
Lecture 16 - Properties of Rayleigh Distribution
Lecture 17 - BER in Fading, Narrowband vs Wideband Channels
Lecture 18 - Characterization of Multipath Fading Channels
Lecture 19 - Choice of Modulation
Lecture 20 - Coherent versus Differential Detection
Lecture 21 - Review of Lecture 1-19
Lecture 22 - Coherent vs Differential Detection - Part II and BER in Fading
Lecture 23 - BER in Fading - Part II, Ricean Fading
Lecture 24 - Ricean and Nakagami Fading, Moment Generating Function (MGF)
Lecture 25 - MGF Part II, WSSUS Model
Lecture 26 - WSSUS Part II, Coherence Time, Doppler Spectrum
Lecture 27 - Doppler, Temporal Characteristics of Fading Channels
Lecture 28 - WSSUS-Characterization of Time Dispersive Fading Channels
Lecture 29 - WSSUS-Classification of Fading Channels

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Lecture 30 - Practical Channel Models (ITU, COST), Computer generation of Rayleigh fading
Lecture 31 - Rayleigh Fading simulation - Clark and Gans Method, Jakesâ Method
Lecture 32 - Jakesâ Method properties
Lecture 33 - Introduction to Diversity, Antenna selection diversity
Lecture 34 - Statistical Characterization of Antenna Diversity, Optimal Diversity Combining
Lecture 35 - BER in fading, Equal Gain Combining
Lecture 36 - Array Gain, Diversity Gain, Alamouti Scheme
Lecture 37 - Alamouti Scheme - Part II, Channel Capacity
Lecture 38 - Capacity of fading Channels, Capacity with Outage
Lecture 39 - Channel State Information, Optimum Power Allocation
Lecture 40
Lecture 41
Lecture 42
Lecture 43
Lecture 44
Lecture 45
Lecture 46 - (Missing)
Lecture 47 - (Missing)
Lecture 48 - Rake Receiver for multipath channels
Lecture 49 - Multiuser environment
Lecture 50 - CDMA system Capacity
Lecture 51 - CDMA Multiuser Detectors - Part 1
Lecture 52 - CDMA Multiuser Detectors - Part 2
Lecture 53
Lecture 54
Lecture 55
Lecture 56

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NPTEL Video Course - Computer Science and Engineering - NOC:Distributed Systems

Subject Co-ordinator - Dr. Rajiv Misra

Co-ordinating Institute - IIT - Patna

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Distributed Systems
Lecture 2 - Basic Algorithms in Message Passing System
Lecture 3 - Leader Election in Rings
Lecture 4 - Distributed Models of Computation, Causality and Logical Time
Lecture 5 - Size of Vector Clock, Matrix Clocks, Virtual Time and Physical Clock Synchronization
Lecture 6 - Global State and Snapshot Recording Algorithms
Lecture 7 - Distributed Mutual Exclusion and Non-Token based Approaches
Lecture 8 - Quorum Based Distributed Mutual Exclusion Approaches
Lecture 9 - Token Based Distributed Mutual Exclusion Approaches
Lecture 10 - Consensus and Agreement Algorithms
Lecture 11 - Checkpointing and Rollback Recovery
Lecture 12 - Deadlock Detection in Distributed Systems
Lecture 13 - Distributed Shared Memory
Lecture 14 - Distributed Minimum Spanning Tree
Lecture 15 - Termination Detection in Distributed System
Lecture 16 - Message Ordering and Group Communication
Lecture 17 - Self-Stabilization
Lecture 18 - Case Study 1 - Distributed Randomized Algorithms
Lecture 19 - Case Study 2 - Peer-to-Peer Computing and Structured Overlay Network
Lecture 20 - Case Study 3 - The Google File System (GFS)
Lecture 21 - Case Study 4 - MapReduce
Lecture 22 - Case Study 5 - HDFS
Lecture 23 - Case Study 6 - Spark
Lecture 24 - Case Study 7 - Distributed Algorithms for Sensor Networks
Lecture 25 - Case Study 8 - Authentication in Distributed Systems
Lecture 26 - Case Study 9 - Bitcoin
Lecture 27 - Case Study 10 - BlockChain Technology

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NPTEL Video Course - Computer Science and Engineering - NOC:Social Networks

Subject Co-ordinator - Prof. Sudarshan Iyengar

Co-ordinating Institute - IIT - Ropar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Answer to the puzzle
Lecture 3 - Introduction to Python - 1
Lecture 4 - Introduction to Python - 2
Lecture 5 - Introduction to Networkx - 1
Lecture 6 - Introduction to Networkx - 2
Lecture 7 - Social Networks
Lecture 8 - Google Page Rank
Lecture 9 - Searching in a Network
Lecture 10 - Link Prediction
Lecture 11 - The Contagions
Lecture 12 - Importance of Acquaintances
Lecture 13 - Marketing on Social Networks
Lecture 14 - Introduction to Datasets
Lecture 15 - Ingredients Network
Lecture 16 - Synonymy Network
Lecture 17 - Web Graph
Lecture 18 - Social Network Datasets
Lecture 19 - Datasets
Lecture 20 - Datasets
Lecture 21 - Datasets
Lecture 22 - Datasets
Lecture 23 - Introduction
Lecture 24 - Advanced Material
Lecture 25 - Programming Illustration
Lecture 26 - Summary to Datasets
Lecture 27 - Introduction
Lecture 28 - Granovetter's Strength of weak ties
Lecture 29 - Triads, clustering coefficient and neighborhood overlap

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Lecture 30 - Structure of weak ties, bridges, and local bridges
Lecture 31 - Validation of Granovetter's experiment using cell phone data
Lecture 32 - Embededness
Lecture 33 - Structural Holes
Lecture 34 - Social Capital
Lecture 35 - Finding Communities in a graph (Brute Force Method)
Lecture 36 - Community Detection Using Girvan Newman Algorithm
Lecture 37 - Visualising Communities using Gephi
Lecture 38 - Tie Strength, Social Media and Passive Engagement
Lecture 39 - Betweenness Measures and Graph Partitioning
Lecture 40 - Strong and Weak Relationship - Summary
Lecture 41 - Introduction to Homophily - Should you watch your company ?
Lecture 42 - Selection and Social Influence
Lecture 43 - Interplay between Selection and Social Influence
Lecture 44 - Homophily - Definition and measurement
Lecture 45 - Foci Closure and Membership Closure
Lecture 46 - Introduction to Fatman Evolutionary model
Lecture 47 - Fatman Evolutionary Model - The Base Code (Adding people)
Lecture 48 - Fatman Evolutionary Model - The Base Code (Adding Social Foci)
Lecture 49 - Fatman Evolutionary Model - Implementing Homophily
Lecture 50 - Quantifying the Effect of Triadic Closure
Lecture 51 - Fatman Evolutionary Model - Implementing Closures
Lecture 52 - Fatman Evolutionary Model - Implementing Social Influence
Lecture 53 - Fatman Evolutionary Model - Storing and analyzing longitudnal data
Lecture 54 - Spatial Segregation
Lecture 55 - Spatial Segregation
Lecture 56 - Spatial Segregation
Lecture 57 - Schelling Model Implementation - 1 (Introduction)
Lecture 58 - Schelling Model Implementation - 2 (Base Code)
Lecture 59 - Schelling Model Implementation - 3 (Visualization and Getting a list of boundary and internal no
Lecture 60 - Schelling Model Implementation - 4 (Getting a list of unsatisfied nodes)
Lecture 61 - Schelling Model Implementation - 5 (Shifting the unsatisfied nodes and visualizing the final gra
Lecture 62 - Chapter - 5 Positive and Negative Relationships (Introduction)
Lecture 63 - Structural Balance
Lecture 64 - Enemy'S Enemy is a Friend
Lecture 65 - Characterizing the Structure of Balanced Networks
Lecture 66 - Balance Theorem
Lecture 67 - Proof of Balance Theorem
Lecture 68 - Introduction to positive and negative edges

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Lecture 69 - Outline of implemantation
Lecture 70 - Creating graph, displaying it and counting unstable triangles
Lecture 71 - Moving a network from an unstable to stable state
Lecture 72 - Forming two coalitions
Lecture 73 - Forming two coalitions (Continued...)
Lecture 74 - Visualizing coalitions and the evolution
Lecture 75 - The Web Graph
Lecture 76 - Collecting the Web Graph
Lecture 77 - Equal Coin Distribution
Lecture 78 - Random Coin Dropping
Lecture 79 - Google Page Ranking Using Web Graph
Lecture 80 - Implementing PageRank Using Points Distribution Method - 1
Lecture 81 - Implementing PageRank Using Points Distribution Method - 2
Lecture 82 - Implementing PageRank Using Points Distribution Method - 3
Lecture 83 - Implementing PageRank Using Points Distribution Method - 4
Lecture 84 - Implementing PageRank Using Random Walk Method - 1
Lecture 85 - Implementing PageRank Using Random Walk Method - 2
Lecture 86 - DegreeRank versus PageRank
Lecture 87 - We Follow
Lecture 88 - Why do we Follow?
Lecture 89 - Diffusion in Networks
Lecture 90 - Modeling Diffusion
Lecture 91 - Modeling Diffusion (Continued...)
Lecture 92 - Impact of Commmunities on Diffusion
Lecture 93 - Cascade and Clusters
Lecture 94 - Knowledge, Thresholds and the Collective Action
Lecture 95 - An Introduction to the Programming Screencast (Coding 4 major ideas)
Lecture 96 - The Base Code
Lecture 97 - Coding the First Big Idea - Increasing the Payoff
Lecture 98 - Coding the Second Big Idea - Key People
Lecture 99 - Coding the Third Big Idea - Impact of Communities on Cascades
Lecture 100 - Coding the Fourth Big Idea - Cascades and Clusters
Lecture 101 - Introduction to Hubs and Authorities (A Story)
Lecture 102 - Principle of Repeated Improvement (A story)
Lecture 103 - Principle of Repeated Improvement (An example)
Lecture 104 - Hubs and Authorities
Lecture 105 - PageRank Revisited - An example
Lecture 106 - PageRank Revisited - Convergence in the Example
Lecture 107 - PageRank Revisited - Conservation and Convergence

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Lecture 108 - PageRank, conservation and convergence - Another example
Lecture 109 - Matrix Multiplication (Pre-requisite 1)
Lecture 110 - Convergence in Repeated Matrix Multiplication (Pre-requisite 1)
Lecture 111 - Addition of Two Vectors (Pre-requisite 2)
Lecture 112 - Convergence in Repeated Matrix Multiplication- The Details
Lecture 113 - PageRank as a Matrix Operation
Lecture 114 - PageRank Explained
Lecture 115 - Introduction to Powerlaw
Lecture 116 - Why do Normal Distributions Appear?
Lecture 117 - Power Law emerges in WWW graphs
Lecture 118 - Detecting the Presence of Powerlaw
Lecture 119 - Rich Get Richer Phenomenon
Lecture 120 - Summary So Far
Lecture 121 - Implementing Rich-getting-richer Phenomenon (Barabasi-Albert Model) - 1
Lecture 122 - Implementing Rich-getting-richer Phenomenon (Barabasi-Albert Model) - 2
Lecture 123 - Implementing a Random Graph (Erdos-Renyi Model) - 1
Lecture 124 - Implementing a Random Graph (Erdos-Renyi Model) - 2
Lecture 125 - Forced Versus Random Removal of Nodes (Attack Survivability)
Lecture 126 - Rich Get Richer - A Possible Reason
Lecture 127 - Rich Get Richer - The Long Tail
Lecture 128 - Epidemics- An Introduction
Lecture 129 - Introduction to epidemics (Continued...)
Lecture 130 - Simple Branching Process for Modeling Epidemics
Lecture 131 - Simple Branching Process for Modeling Epidemics (Continued...)
Lecture 132 - Basic Reproductive Number
Lecture 133 - Modeling epidemics on complex networks
Lecture 134 - SIR and SIS spreading models
Lecture 135 - Comparison between SIR and SIS spreading models
Lecture 136 - Basic Reproductive Number Revisited for Complex Networks
Lecture 137 - Percolation model
Lecture 138 - Analysis of basic reproductive number in branching model (The problem statement)
Lecture 139 - Analyzing basic reproductive number - 2
Lecture 140 - Analyzing basic reproductive number - 3
Lecture 141 - Analyzing basic reproductive number - 4
Lecture 142 - Analyzing basic reproductive number - 5
Lecture 143 - Small World Effect - An Introduction
Lecture 144 - Milgram's Experiment
Lecture 145 - The Reason
Lecture 146 - The Generative Model

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Lecture 147 - Decentralized Search - I
Lecture 148 - Decentralized Search - II
Lecture 149 - Decentralized Search - III
Lecture 150 - Programming illustration- Small world networks
Lecture 151 - Base code
Lecture 152 - Making homophily based edges
Lecture 153 - Adding weak ties
Lecture 154 - Plotting change in diameter
Lecture 155 - Programming illustration- Myopic Search
Lecture 156 - Myopic Search
Lecture 157 - Myopic Search comparision to optimal search
Lecture 158 - Time Taken by Myopic Search
Lecture 159 - PseudoCores
Lecture 160 - How to be Viral
Lecture 161 - Who are the right key nodes?
Lecture 162 - finding the right key nodes (the core)
Lecture 163 - Coding K-Shell Decomposition
Lecture 164 - Coding cascading Model
Lecture 165 - Coding the importance of core nodes in cascading
Lecture 166 - Pseudo core

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NPTEL Video Course - Computer Science and Engineering - NOC:An Introduction to Probability in Computing

Subject Co-ordinator - Prof. John Augustine

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Probability - A box of chocolates
Lecture 2 - Introduction to Probability - Axiomatic Approach to Probability Theory
Lecture 3 - Introduction to Probability - Verifying Matrix Multipilication (Statement,Algorithm and Independe
Lecture 4 - Introduction to Probability - Verifying Matrix Multipilication (Correctness and Law of Total Prob
Lecture 5 - Introduction to Probability - How Strong is your Network?
Lecture 6 - Introduction to Probability - How to Understand the World? Play with it!
Lecture 7 - Tutorial 1
Lecture 8 - Tutorial 2
Lecture 9 - Discrete Random Variables - Basic Definitions
Lecture 10 - Discrete Random Variables - Linearity of Expectation and Jensens Inequality
Lecture 11 - Discrete Random Variables - Conditional Expectation I
Lecture 12 - Discrete Random Variables - Conditional Expectation II
Lecture 13 - Discrete Random Variables - Geometric Random Variables and Collecting Coupons
Lecture 14 - Discrete Random Variables - Randomized Selection
Lecture 15 - Tail Bounds I - Markov's Inequality
Lecture 16 - Tail Bounds I - The Second Moment,Variance and Chebyshev's Inequality
Lecture 17 - Tail Bounds I - Median via Sampling
Lecture 18 - Tail Bounds I - Median via Sampling - Analysis
Lecture 19 - Tail Bounds I - Moment Generating Functions and Chernoff Bounds
Lecture 20 - Tail Bounds I - Parameter Estimation
Lecture 21 - Tail Bounds I - Control Group Selection
Lecture 22 - Applications of Tail Bounds - Routing in Sparse Networks
Lecture 23 - Applications of Tail Bounds - Analysis of Valiant's Rounting
Lecture 24 - Applications of Tail Bounds - Random Graphs
Lecture 25 - Live Session 2
Lecture 26 - Live Session

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Human Computer Interaction

Subject Co-ordinator - Prof. Ponnurangam Kumaraguru

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Human Computer Interaction
Lecture 2 - What is HCI? Commonalities and Differences in Interfaces
Lecture 3 - Door handle, Elevators, Contextual Inquiry, Affinity Diagrams
Lecture 4 - Lab Session Contextual Inquiry
Lecture 5 - Lab Session Affinity Diagram
Lecture 6 - Tutorial on Photoshop
Lecture 7 - Tutorial on UI Designing using Photoshop
Lecture 8 - Institutional Review Board, Ethics committee, IRB documents / application, consent form
Lecture 9 - Tutorial on Proto.io
Lecture 10 - Tutorial on Lookback
Lecture 11 - How to understand user needs? Surveys, Questionnaire
Lecture 12 - How to understand user needs? Surveys, Questionnaire - Continues
Lecture 13 - Prototyping
Lecture 14 - User-Centered Design
Lecture 15 - Lab Session
Lecture 16 - Design Patterns
Lecture 17 - Lab Session
Lecture 18 - Usable security
Lecture 19 - Lab Session
Lecture 20 - Continuity of Usable Security
Lecture 21 - Visual Design
Lecture 22 - Visual Design - 2
Lecture 23 - Crypto price Tracker App
Lecture 24 - Interacto
Lecture 25 - Tech Hinder
Lecture 26 - busKARO
Lecture 27 - MayMayMe
Lecture 28 - noWhinge

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NPTEL Video Course - Computer Science and Engineering - NOC:Information Security-IV

Subject Co-ordinator - Prof.M J Shankar Raman, Prof. V. Kamakoti, Prof.Vasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - WISE Gen and The IT Revolution - 1
Lecture 2 - WISE Gen and The IT Revolution - 1 (Continued...)
Lecture 3 - WISE GEN - Next Step
Lecture 4 - Network Security
Lecture 5 - Symmetric Key Cryptography and Digital Signatures
Lecture 6 - Basic Network Security Components
Lecture 7 - Internet Security Threats
Lecture 8 - History of Kali Linux
Lecture 9 - Penetration Testing with Kali Linux
Lecture 10 - Network Security and Forensics Introduction - I
Lecture 11 - Network Security and Forensics Introduction - II
Lecture 12 - Penetration Testing
Lecture 13 - Penetration testing steps in Kali Linux
Lecture 14 - Kali Linux Installation
Lecture 15 - Reconnaissance - Part I
Lecture 16 - Reconnaissance - Part II
Lecture 17 - Serverside Attacks
Lecture 18 - Serverside Attacks
Lecture 19 - Serverside Attacks
Lecture 20 - Serverside Attacks
Lecture 21 - Serverside Attacks
Lecture 22 - Serverside Attacks
Lecture 23 - Client Side Attacks - Tools in Kali Linux - 1
Lecture 24 - Client Side Attacks - Tools in Kali Linux - 2
Lecture 25 - Client Side Attacks - Tools in Kali Linux - 3
Lecture 26 - Client Side Attacks - Tools in Kali Linux - 4
Lecture 27 - Authentication Based Attacks - Tools in Kali Linux - 1
Lecture 28 - Authentication Based Attacks - Tools in Kali Linux - 2
Lecture 29 - Authentication Based Attacks - Tools in Kali Linux - 3

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Lecture 30 - Authentication Based Attacks - Tools in Kali Linux - 4
Lecture 31 - Authentication Based Attacks - Tools in Kali Linux - 5
Lecture 32 - Web Attacks - Tools in Kali Linux - 1
Lecture 33 - Web Attacks - Tools in Kali Linux - 2
Lecture 34 - Penetration Testing Attacks - Defensive Countermeasures
Lecture 35 - Technical Fundamentals for Evidence Acquisition - 1
Lecture 36 - Technical Fundamentals for Evidence Acquisition - 2
Lecture 37 - Packet Capture Tools and Methods
Lecture 38 - Wireshark Introduction
Lecture 39 - Packet Analysis
Lecture 40 - Flow Analysis
Lecture 41 - Case study 1
Lecture 42 - Case study 1 (Continued...)
Lecture 43 - Wireless Forensics - Technology
Lecture 44 - Wireless Network Security Framework
Lecture 45 - Wireless Access Points - Security issues
Lecture 46 - Case Study 2 - Use of tools
Lecture 47 - Network Security Devices - IDS
Lecture 48 - IDS Evidence Acquistion and SNORT
Lecture 49 - SNORT Rules
Lecture 50 - SNORT Installation
Lecture 51 - SNORT Configuration and Demonstration
Lecture 52 - Evidence collection in Switches and Routers
Lecture 53 - Evidence collection in Routers and Firewalls
Lecture 54 - IPTables rules and tool usage
Lecture 55 - Logs, Rules and Automated Tools
Lecture 56 - Re-cap of All Topics
Lecture 57 - Introduction to Meltdown Attack
Lecture 58 - Introduction to Meltdown - Address Space Basics
Lecture 59 - Meltdown Attack - Out of Order Execution
Lecture 60 - Meltdown Attack - Recovering from Exception

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NPTEL Video Course - Computer Science and Engineering - NOC:Data Science for Engineers

Subject Co-ordinator - Prof. Shankar Narasimhan, Prof. Ragunathan Rengasamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Data science for engineers Course philosophy and expectation
Lecture 2 - Introduction to R
Lecture 3 - Introduction to R (Continued...)
Lecture 4 - Variables and datatypes in R
Lecture 5 - Data frames
Lecture 6 - Recasting and joining of dataframes
Lecture 7 - Arithmetic,Logical and Matrix operations in R
Lecture 8 - Advanced programming in R
Lecture 9 - Advanced Programming in R
Lecture 10 - Control structures
Lecture 11 - Data visualization in R Basic graphics
Lecture 12 - Linear Algebra for Data science
Lecture 13 - Solving Linear Equations
Lecture 14 - Solving Linear Equations (Continued...)
Lecture 15 - Linear Algebra - Distance,Hyperplanes and Halfspaces,Eigenvalues,Eigenvectors
Lecture 16 - Linear Algebra - Distance,Hyperplanes and Halfspaces,Eigenvalues,Eigenvectors (Continued... 1)
Lecture 17 - Linear Algebra - Distance,Hyperplanes and Halfspaces,Eigenvalues,Eigenvectors (Continued... 2)
Lecture 18 - Linear Algebra - Distance,Hyperplanes and Halfspaces,Eigenvalues,Eigenvectors (Continued... 3)
Lecture 19 - Statistical Modelling
Lecture 20 - Random Variables and Probability Mass/Density Functions
Lecture 21 - Sample Statistics
Lecture 22 - Hypotheses Testing
Lecture 23 - Optimization for Data Science
Lecture 24 - Unconstrained Multivariate Optimization
Lecture 25 - Unconstrained Multivariate Optimization (Continued...)
Lecture 26 - Gradient (Steepest) Descent (OR) Learning Rule
Lecture 27 - Multivariate Optimization With Equality Constraints
Lecture 28 - Multivariate Optimization With Inequality Constraints
Lecture 29 - Introduction to Data Science

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Lecture 30 - Solving Data Analysis Problems - A Guided Thought Process
Lecture 31 - Module
Lecture 32 - Linear Regression
Lecture 33 - Model Assessment
Lecture 34 - Diagnostics to Improve Linear Model Fit
Lecture 35 - Simple Linear Regression Model Building
Lecture 36 - Simple Linear Regression Model Assessment
Lecture 37 - Simple Linear Regression Model Assessment (Continued...)
Lecture 38 - Muliple Linear Regression
Lecture 39 - Cross Validation
Lecture 40 - Multiple Linear Regression Modelling Building and Selection
Lecture 41 - Classification
Lecture 42 - Logisitic Regression
Lecture 43 - Logisitic Regression (Continued...)
Lecture 44 - Performance Measures
Lecture 45 - Logisitic Regression Implementation in R
Lecture 46 - K-Nearest Neighbors (kNN)
Lecture 47 - K-Nearest Neighbors implementation in R
Lecture 48 - K-means Clustering
Lecture 49 - K-means implementation in R
Lecture 50 - Data Science for engineers - Summary

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NPTEL Video Course - Computer Science and Engineering - NOC:The Joy of Computing using Python

Subject Co-ordinator - Prof. Sudarshan Iyengar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Programming
Lecture 2 - Why Programming ?
Lecture 3 - Programming for Everybody
Lecture 4 - Any Prerequisites ?
Lecture 5 - Where to start?
Lecture 6 - Why do we have so many languages?
Lecture 7 - How to go about programming?
Lecture 8 - Why to learn programming?
Lecture 9 - What is programming?
Lecture 10 - How to give instructions ?
Lecture 11 - Introduction To Scratch
Lecture 12 - Introduction To Loops
Lecture 13 - More About Loops
Lecture 14 - Solution To Looping Problem
Lecture 15 - Scratch
Lecture 16 - Scratch
Lecture 17 - Scratch
Lecture 18 - More On Scratch
Lecture 19 - Introduction to Anaconda
Lecture 20 - Installation of Anaconda
Lecture 21 - Introduction to Spyder IDE
Lecture 22 - Printing statements in Python
Lecture 23 - Understanding Variables in Python
Lecture 24 - Executing a sequence of instructions in the Console
Lecture 25 - Writing your First Program
Lecture 26 - Taking inputs from the user
Lecture 27 - Discount Calculation
Lecture 28 - Motivation to if condition
Lecture 29 - A reminder on how to deal with numbers

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Lecture 30 - Understanding if condition's working
Lecture 31 - Realizing the importance of syntax and indentation
Lecture 32 - Introductions to loops
Lecture 33 - Loops
Lecture 34 - Loops
Lecture 35 - Loops
Lecture 36 - Introducction to While Loop
Lecture 37 - Lists Part 1
Lecture 38 - Lists Part 2
Lecture 39 - Lists Part 3
Lecture 40 - Lists Part 4
Lecture 41 - Loops and Conditionals
Lecture 42 - Loops and Conditionals
Lecture 43 - Crowd Computing - Just estimate 01
Lecture 44 - Crowd Computing - Just estimate 02
Lecture 45 - Crowd Computing - Just estimate 03
Lecture 46 - Crowd Computing - Just estimate 04
Lecture 47 - Crowd Computing - Just estimate 05
Lecture 48 - Crowd Computing - Just estimate 06
Lecture 49 - Permutations - Jumbled Words 01
Lecture 50 - Permutations - Jumbled Words 02
Lecture 51 - Permutations - Jumbled Words 03
Lecture 52 - Theory of Evolution 01
Lecture 53 - Theory of Evolution 02
Lecture 54 - Theory of Evolution 03
Lecture 55 - Theory of Evolution 04
Lecture 56 - Practice is the key
Lecture 57 - Magic Square Hit and Trial 01
Lecture 58 - Magic Square Hit and Trial 02
Lecture 59 - Magic Square Hit and Trial 03
Lecture 60 - Magic Square Hit and Trial 04
Lecture 61 - Magic Square Hit and Trial 05
Lecture 62 - Let's program and play
Lecture 63 - Dobble Game - Spot the similarity 01
Lecture 64 - Dobble Game - Spot the similarity 02
Lecture 65 - Dobble Game - Spot the similarity 03
Lecture 66 - Dobble Game - Spot the similarity 04
Lecture 67 - What is your date of birth?
Lecture 68 - Birthday Paradox - Find your twin 01

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Lecture 69 - Birthday Paradox - Find your twin 02
Lecture 70 - Birthday Paradox - Find your twin 03
Lecture 71 - Birthday Paradox - Find your twin 04
Lecture 72 - Birthday Paradox - Find your twin 05
Lecture 73 - What's your favourite movie?
Lecture 74 - Guess the Movie Name 01
Lecture 75 - Guess the Movie Name 02
Lecture 76 - Guess the Movie Name 03
Lecture 77 - Guess the Movie Name 04
Lecture 78 - Guess the Movie Name 05
Lecture 79 - Guess the Movie Name 06
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Lecture 99 - Substitution Cipher -The science of secrecy 01
Lecture 100 - Substitution Cipher -The science of secrecy 02
Lecture 101 - Substitution Cipher -The science of secrecy 03
Lecture 102 - Tic Tac Toe - Down the memory Lane
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Lecture 104 - Tic Tac Toe - Down the memory Lane 02
Lecture 105 - Tic Tac Toe - Down the memory Lane 03
Lecture 106 - Tic Tac Toe - Down the memory Lane 04
Lecture 107 - Tic Tac Toe - Down the memory Lane 05

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Lecture 108 - Recursion
Lecture 109 - Recursion 01
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Lecture 116 - Snakes and Ladders - Not on the Board - Part 01
Lecture 117 - Snakes and Ladders - Not on the Board - Part 02
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Lecture 123 - Spiral Traversing - Let's Animate - Part 01
Lecture 124 - Spiral Traversing - Let's Animate - Part 02
Lecture 125 - Spiral Traversing - Let's Animate - Part 03
Lecture 126 - Spiral Traversing - Let's Animate - Part 04
Lecture 127 - Spiral Traversing - Let's Animate - Part 05
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Lecture 138 - Lottery Simulation - Profit or Loss - Part 02
Lecture 139 - Lottery Simulation - Profit or Loss - Part 03
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Lecture 141 - Lottery Simulation - Profit or Loss - Part 05
Lecture 142 - Lottery Simulation - Profit or Loss - Part 06
Lecture 143 - Image Processing - Enhance your images
Lecture 144 - Image Processing - Enhance your images - Part 01
Lecture 145 - Image Processing - Enhance your images - Part 02
Lecture 146 - Image Processing - Enhance your images - Part 03

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Lecture 158 - Natural Language Processing - Author Stylometry - Part 01
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Lecture 160 - Natural Language Processing - Author Stylometry - Part 03
Lecture 161 - Natural Language Processing - Author Stylometry - Part 04
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Lecture 164 - Natural Language Processing - Author Stylometry - Part 07
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Lecture 172 - Six Degrees of Separation
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Lecture 175 - Area Calculation - Don't Measure - Part 01
Lecture 176 - Area Calculation - Don't Measure - Part 02
Lecture 177 - Area Calculation - Don't Measure - Part 03
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NPTEL Video Course - Computer Science and Engineering - NOC:Discrete Mathematics

Subject Co-ordinator - Prof. Sudarshan Iyengar

Co-ordinating Institute - IIT - Madras

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NPTEL Video Course - Computer Science and Engineering - NOC:Deep Learning

Subject Co-ordinator - Prof.Mitesh Khapra

Co-ordinating Institute - IIT - Madras

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Lecture 2 - From Spring to Winter of AI
Lecture 3 - The Deep Revival
Lecture 4 - From Cats to Convolutional Neural Networks
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Lecture 7 - Beating humans at their own games (literally)
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Lecture 86 - The convolution operation
Lecture 87 - Relation between input size, output size and filter size
Lecture 88 - Convolutional Neural Networks
Lecture 89 - Convolutional Neural Networks (Continued...)
Lecture 90 - CNNs (success stories on ImageNet)
Lecture 91 - CNNs (success stories on ImageNet) (Continued...)
Lecture 92 - Image Classification continued (GoogLeNet and ResNet)
Lecture 93 - Visualizing patches which maximally activate a neuron
Lecture 94 - Visualizing filters of a CNN
Lecture 95 - Occlusion experiments
Lecture 96 - Finding influence of input pixels using backpropagation
Lecture 97 - Guided Backpropagation
Lecture 98 - Optimization over images
Lecture 99 - Create images from embeddings
Lecture 100 - Deep Dream
Lecture 101 - Deep Art
Lecture 102 - Fooling Deep Convolutional Neural Networks
Lecture 103 - Sequence Learning Problems
Lecture 104 - Recurrent Neural Networks
Lecture 105 - Backpropagation through time
Lecture 106 - The problem of Exploding and Vanishing Gradients
Lecture 107 - Some Gory Details

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Lecture 108 - Selective Read, Selective Write, Selective Forget - The Whiteboard Analogy
Lecture 109 - Long Short Term Memory (LSTM) and Gated Recurrent Units (GRUs)
Lecture 110 - How LSTMs avoid the problem of vanishing gradients
Lecture 111 - How LSTMs avoid the problem of vanishing gradients (Continued...)
Lecture 112 - Introduction to Encoder Decoder Models
Lecture 113 - Applications of Encoder Decoder models
Lecture 114 - Attention Mechanism
Lecture 115 - Attention Mechanism (Continued...)
Lecture 116 - Attention over images
Lecture 117 - Hierarchical Attention

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundations to Computer Systems Design

Subject Co-ordinator - Prof. V. Kamakoti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - CMOS Transistors and Gates
Lecture 3 - Basic Gates
Lecture 4 - Building Gates Using Simulator
Lecture 5 - Hierarchical Design and Verification
Lecture 6 - Building Blocks of a Digital Computer
Lecture 7 - Binary Number Systems
Lecture 8 - Signed Number Systems
Lecture 9 - Twos Complement Number System
Lecture 10 - Binary Adder Circuits
Lecture 11 - Building the ALU of HACK
Lecture 12 - HACK ALU Functionality
Lecture 13 - Tips for Project P1
Lecture 14 - Sequential Logic Design
Lecture 15 - Latches and Flipflops
Lecture 16 - The Memory Hierarchy
Lecture 17 - Design of Program Counter
Lecture 18 - Introduction to Computer Organization
Lecture 19 - Memory Mapped I/O
Lecture 20 - Tips for Projects P2 and P3
Lecture 21 - Tips for Project 4
Lecture 22 - Tips for Project 4
Lecture 23 - Introduction to Computer Architecture
Lecture 24 - The HACK Microarchitecture
Lecture 25 - The HACK CPU - A Deep Dive - Part 1
Lecture 26 - The HACK CPU - A Deep Dive - Part 2
Lecture 27 - The Data Memory
Lecture 28 - The HACK Computer
Lecture 29 - The Assembler Construction

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Lecture 30 - Understanding the Working of Assembler
Lecture 31 - Assembler
Lecture 32 - Assembler
Lecture 33 - Assembler
Lecture 34 - Project 6
Lecture 35 - Virtual Machines - What and Why?
Lecture 36 - The VM Instruction Set Architecture
Lecture 37 - The execution of a VM Program
Lecture 38 - How powerful is the VM?
Lecture 39 - Project 7
Lecture 40 - Project 7
Lecture 41 - Deep Understanding of VM ISA using VM Emulator
Lecture 42 - Virtual Machine II - Program flow commands and Introduction to Function Calls
Lecture 43 - Implementation of Function Call
Lecture 44 - Working of the Virtual Machine
Lecture 45 - Project 8
Lecture 46 - Handling Static Variables
Lecture 47 - Project 8
Lecture 48 - Introduction to The JACK Programming Language
Lecture 49 - Project 9
Lecture 50 - Understanding Syntax of JACK using Examples
Lecture 51 - Project 9
Lecture 52 - The JACK Syntax - Language Specification
Lecture 53 - Application Development using JACK
Lecture 54 - JACK Compiler
Lecture 55 - Project 10
Lecture 56 - The JACK Grammar
Lecture 57 - Compiler for JACK
Lecture 58 - The Token Analyzer
Lecture 59 - Testing the Correctness
Lecture 60 - The Jack Compiler - Back-end Introduction
Lecture 61 - The Jack Compiler - Handling Variables
Lecture 62 - The Jack Compiler - Handling Expressions
Lecture 63 - The Jack Compiler - Handling Flow of Control
Lecture 64 - The Jack Compiler - Handling Objects
Lecture 65 - The Jack Compiler - Handling Arrays
Lecture 66 - The Jack Compiler Backend
Lecture 67 - The Jack Compiler Backend
Lecture 68 - The Jack Compiler Backend

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Lecture 69 - The Jack Compiler Backend
Lecture 70 - The Jack Compiler Backend
Lecture 71 - The Jack Compiler Backend
Lecture 72 - Jack Compiler
Lecture 73 - Jack Compiler
Lecture 74 - Jack Compiler
Lecture 75 - Understand the Operating System - Compiler Interactions
Lecture 76 - Project 12 - One sample journey from Jack to Hack
Lecture 77 - Concluding Remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Machine Learning for Engineering and Science Appl

Subject Co-ordinator - Prof. Ganapathy, Prof. Balaji Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course History of Artificial Intelligence
Lecture 2 - Overview of Machine Learning
Lecture 3 - Why Linear Algebra ? Scalars, Vectors, Tensors
Lecture 4 - Basic Operations
Lecture 5 - Norms
Lecture 6 - Linear Combinations Span Linear Independence
Lecture 7 - Matrix Operations Special Matrices Matrix Decompositions
Lecture 8 - Introduction to Probability Theory Discrete and Continuous Random Variables
Lecture 9 - Conditional, Joint, Marginal Probabilities Sum Rule and Product Rule Bayes' Theorem
Lecture 10 - Bayes' Theorem - Simple Examples
Lecture 11 - Independence Conditional Independence Chain Rule Of Probability
Lecture 12 - Expectation
Lecture 13 - Variance Covariance
Lecture 14 - Some Relations for Expectation and Covariance (Slightly Advanced)
Lecture 15 - Machine Representation of Numbers, Overflow, Underflow, Condition Number
Lecture 16 - Derivatives,Gradient,Hessian,Jacobian,Taylor Series
Lecture 17 - Matrix Calculus (Slightly Advanced)
Lecture 18 - Optimization 1 Unconstrained Optimization
Lecture 19 - Introduction to Constrained Optimization
Lecture 20 - Introduction to Numerical Optimization Gradient Descent - 1
Lecture 21 - Gradient Descent 2 Proof of Steepest Descent Numerical Gradient Calculation Stopping Criteria
Lecture 22 - Introduction to Packages
Lecture 23 - The Learning Paradigm
Lecture 24 - A Linear Regression Example
Lecture 25 - Linear Regression Least Squares Gradient Descent
Lecture 26 - Coding Linear Regression
Lecture 27 - Generalized Function for Linear Regression
Lecture 28 - Goodness of Fit
Lecture 29 - Bias-Variance Trade Off

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Lecture 30 - Gradient Descent Algorithms
Lecture 31 - Introduction to Week 5 (Deep Learning)
Lecture 32 - Logistic Regression
Lecture 33 - Binary Entropy cost function
Lecture 34 - OR Gate Via Classification
Lecture 35 - NOR, AND, NAND Gates
Lecture 36 - XOR Gate
Lecture 37 - Differentiating the sigmoid
Lecture 38 - Gradient of logistic regression
Lecture 39 - Code for Logistic Regression
Lecture 40 - Multinomial Classification - Introduction
Lecture 41 - Multinomial Classification - One Hot Vector
Lecture 42 - Multinomial Classification - Softmax
Lecture 43 - Schematic of multinomial logistic regression
Lecture 44 - Biological neuron
Lecture 45 - Structure of an Artificial Neuron
Lecture 46 - Feedforward Neural Network
Lecture 47 - Introduction to back prop
Lecture 48 - Summary of Week 05
Lecture 49 - Introduction to Convolution Neural Networks (CNN)
Lecture 50 - Types of convolution
Lecture 51 - CNN Architecture Part 1 (LeNet and Alex Net)
Lecture 52 - CNN Architecture Part 2 (VGG Net)
Lecture 53 - CNN Architecture Part 3 (GoogleNet)
Lecture 54 - CNN Architecture Part 4 (ResNet)
Lecture 55 - CNN Architecture Part 5 (DenseNet)
Lecture 56 - Train Network for Image Classification
Lecture 57 - Semantic Segmentation
Lecture 58 - Hyperparameter optimization
Lecture 59 - Transfer Learning
Lecture 60 - Segmentation of Brain Tumors from MRI using Deep Learning
Lecture 61 - Activation Functions
Lecture 62 - Learning Rate decay, Weight initialization
Lecture 63 - Data Normalization
Lecture 64 - Batch Norm
Lecture 65 - Introduction to RNNs
Lecture 66 - Example - Sequence Classification
Lecture 67 - Training RNNs - Loss and BPTT
Lecture 68 - Vanishing Gradients and TBPTT

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Lecture 69 - RNN Architectures
Lecture 70 - LSTM
Lecture 71 - Why LSTM Works
Lecture 72 - Deep RNNs and Bi- RNNs
Lecture 73 - Summary of RNNs
Lecture 74 - Introduction.
Lecture 75 - Knn
Lecture 76 - Binary decision trees
Lecture 77 - Binary regression trees
Lecture 78 - Bagging
Lecture 79 - Random Forest
Lecture 80 - Boosting
Lecture 81 - Gradient boosting
Lecture 82 - Unsupervised learning and Kmeans
Lecture 83 - Agglomerative clustering
Lecture 84 - Probability Distributions- Gaussian, Bernoulli
Lecture 85 - Covariance Matrix of Gaussian Distribution
Lecture 86 - Central Limit Theorem
Lecture 87 - NaÃ Â¨ve Bayes
Lecture 88 - MLE Intro
Lecture 89 - PCA - Part 1
Lecture 90 - PCA - Part 2
Lecture 91 - Support Vector Machines
Lecture 92 - MLE, MAP and Bayesian Regression
Lecture 93 - Introduction to Generative model
Lecture 94 - Generative Adversarial Networks (GAN)
Lecture 95 - Variational Auto-encoders (VAE)
Lecture 96 - Applications
Lecture 97 - Applications
Lecture 98 - Introduction to Week 12
Lecture 99 - Application 1 description - Fin Heat Transfer
Lecture 100 - Application 1 solution
Lecture 101 - Application 2 description - Computational Fluid Dynamics
Lecture 102 - Application 2 solution
Lecture 103 - Application 3 description - Topology Optimization
Lecture 104 - Application 3 solution
Lecture 105 - Application 4 Solution of PDE/ODE using Neural Networks
Lecture 106 - Summary and road ahead

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NPTEL Video Course - Computer Science and Engineering - NOC:Information Security 5 - Secure Systems Engineeri

Subject Co-ordinator - Prof. Chester Rebeiro

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Secure Systems Engineering
Lecture 2 - Program Binaries
Lecture 3 - Buffer Overflows in the Stack
Lecture 4 - Buffer Overflows
Lecture 5 - Gdb - Demo
Lecture 6 - Skip instruction - Demo
Lecture 7 - Buffer Overflow - Demo
Lecture 8 - Buffer Overflow (create a shell) - Demo
Lecture 9 - Preventing buffer overflows with canaries and W^X
Lecture 10 - Return-to-libc attack
Lecture 11 - ROP Attacks
Lecture 12 - Demonstration of Canaries, W^X, and ASLR to prevent Buffer Overflow Attacks
Lecture 13 - Demonstration of a Return-to-Libc Attack
Lecture 14 - Demonstration of a Return Oriented Programming (ROP) Attack
Lecture 15 - ASLR - Part 1
Lecture 16 - ASLR - Part 2
Lecture 17 - Buffer overreads
Lecture 18 - Demonstration of Load Time Relocation
Lecture 19 - Demonstration of Position Independent Code
Lecture 20 - PLT Demonstration
Lecture 21 - Format string vulnerabilities
Lecture 22 - Integer Vulnerabilities
Lecture 23 - Heap
Lecture 24 - Heap exploits
Lecture 25 - Demo of Integer Vulnerabilites - I
Lecture 26 - Demo of Integer Vulnerabilites - II
Lecture 27 - Demo of Format String Vulnerabilities
Lecture 28 - Access Control
Lecture 29 - Access control in linux

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Lecture 30 - Mandatory access Control
Lecture 31 - Confinement in Applications
Lecture 32 - Software fault isolation
Lecture 33 - Trusted Execution Environments
Lecture 34 - ARM Trustzone
Lecture 35 - SGX - Part 1
Lecture 36 - SGX - Part 2
Lecture 37 - PUF - Part 1
Lecture 38 - PUF - Part 2
Lecture 39 - PUF - Part 3
Lecture 40 - Covert Channels
Lecture 41 - Flush+Reload Attacks
Lecture 42 - Prime+Probe
Lecture 43 - Meltdown
Lecture 44 - Spectre Variant - 1
Lecture 45 - Spectre variant - 2
Lecture 46 - rowhammer
Lecture 47 - Heap demo - 1
Lecture 48 - Heap demo - 2
Lecture 49 - Heap demo - 3
Lecture 50 - PowerAnalysisAttacks
Lecture 51 - Hardware Trojans
Lecture 52 - FANCI
Lecture 53 - Detecting Hardware Trojans in ICs
Lecture 54 - Protecting against Hardware Trojans
Lecture 55 - Side Channel Analysis
Lecture 56 - Fault Attacks on AES
Lecture 57 - Demo
Lecture 58 - Demo
Lecture 59 - Demo

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NPTEL Video Course - Computer Science and Engineering - NOC:Multimodal Interaction

Subject Co-ordinator - Dr. Stefan Hillmann, Prof. Dr. Sebastian Moller

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Medium vs. Modality
Lecture 3 - Multimedia and Multimodality
Lecture 4 - Modality Relations
Lecture 5 - Characteristics of Multimodal Systems
Lecture 6 - Introduction
Lecture 7 - Speech Production
Lecture 8 - Hearing - Ear
Lecture 9 - Hearing - Perception
Lecture 10 - Introduction
Lecture 11 - The Human Eye
Lecture 12 - Gestlat Perception
Lecture 13 - Resolution and Sensitivity
Lecture 14 - Depth Perception
Lecture 15 - Reading
Lecture 16 - Introduction
Lecture 17 - Haptics
Lecture 18 - Smell
Lecture 19 - Taste
Lecture 20 - Memory
Lecture 21 - Motorsystem
Lecture 22 - Introduction
Lecture 23 - Processing Multiple Signals
Lecture 24 - Multimodal Dual-Tasks
Lecture 25 - Effects of Discongurent Signals
Lecture 26 - Relevance
Lecture 27 - Introduction 1
Lecture 28 - Introduction 2
Lecture 29 - Gesture to Space

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Lecture 30 - Turn Taking
Lecture 31 - Conclusion
Lecture 32 - Introduction
Lecture 33 - Overview
Lecture 34 - Automatic Speech Recognition
Lecture 35 - Emotion Recognition
Lecture 36 - Text Recognition
Lecture 37 - Introduction1
Lecture 38 - Icons
Lecture 39 - Text Generation
Lecture 40 - Text to Speech
Lecture 41 - Speech Generation
Lecture 42 - Introduction .
Lecture 43 - Multimodal Interactive Systems Development
Lecture 44 - Introduction . .
Lecture 45 - Virtual Reality
Lecture 46 - Introduction to Audio for Virtual Reality
Lecture 47 - Spatial Hearing
Lecture 48 - Dummy Heads
Lecture 49 - Individuality of HRTFs
Lecture 50 - Sterophony
Lecture 51 - Crosstalk Cancelation
Lecture 52 - Ambisonics
Lecture 53 - Sound Field Synthesis
Lecture 54 - Challenges with Projection-based Systems
Lecture 55 - Capturing of Sound Scenes
Lecture 56 - Closing Remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Deep Learning - Part 2

Subject Co-ordinator - Prof.Mitesh Khapra

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Recap of Probability Theory
Lecture 2 - Why are we interested in Joint Distributions
Lecture 3 - How do we represent a joint distribution
Lecture 4 - Can we represent the joint distribution more compactly
Lecture 5 - Can we use a graph to represent a joint distribution
Lecture 6 - Different types of reasoning encoded in a Bayesian Network
Lecture 7 - Independencies encoded by a Bayesian Network (Case 1
Lecture 8 - Independencies encoded by a Bayesian Network (Case 2
Lecture 9 - Independencies encoded by a Bayesian Network (Case 3
Lecture 10 - Bayesian Networks
Lecture 11 - I-Maps
Lecture 12 - Markov Networks
Lecture 13 - Factors in Markov Network
Lecture 14 - Local Independencies in a Markov Network
Lecture 15 - Joint Distributions
Lecture 16 - The concept of a latent variable
Lecture 17 - Restricted Boltzmann Machines
Lecture 18 - RBMs as Stochastic Neural Networks
Lecture 19 - Unsupervised Learning with RBMs
Lecture 20 - Computing the gradient of the log likelihood
Lecture 21 - Motivation for Sampling
Lecture 22 - Motivation for Sampling - Part 2
Lecture 23 - Markov Chains
Lecture 24 - Why de we care about Markov Chains ?
Lecture 25 - Setting up a Markov Chain for RBMs
Lecture 26 - Training RBMs Using Gibbs Sampling
Lecture 27 - Training RBMS Using Contrastive Divergence
Lecture 28 - Revisiting Autoencoders
Lecture 29 - Variational Autoencoders

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Lecture 30 - Variational Autoencoders
Lecture 31 - Neural Autoregressive Density Estimator
Lecture 32 - Masked Autoencoder Density Estimator (MADE)
Lecture 33 - Generative Adversarial Networks - The Intuition
Lecture 34 - Generative Adversarial Networks - Architecture
Lecture 35 - Generative Adversarial Networks - The Math Behind it
Lecture 36 - Generative Adversarial Networks - Some Cool Stuff and Applications
Lecture 37 - Bringing it all together (the deep generative summary)

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NPTEL Video Course - Computer Science and Engineering - NOC:Machine Learning

Subject Co-ordinator - Prof. Henrik Bostrom, Prof. Fredrik Kilander, Prof. Carl Gustaf Jansson

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Machine Learning Course
Lecture 2 - Foundation of Artificial Intelligence and Machine Learning
Lecture 3 - Intelligent Autonomous Systems and Artificial Intelligence
Lecture 4 - Applications of Machine Learning
Lecture 5 - Tutorial for week 1
Lecture 6 - Characterization of Learning Problems
Lecture 7 - Objects, Categories and Features
Lecture 8 - Feature related issues
Lecture 9 - Scenarios for Concept Learning
Lecture 10 - Tutorial for week 2
Lecture 11 - Forms of Representation
Lecture 12 - Decision Trees
Lecture 13 - Bayes (ian) Belief Networks
Lecture 14 - Artificial Neural Networks
Lecture 15 - Genetic algorithm
Lecture 16 - Logic Programming
Lecture 17 - Tutorial for week 3
Lecture 18 - Inductive Learning based on Symbolic Representations and Weak Theories
Lecture 19 - Generalization as Search - Part 1
Lecture 20 - Generalization as Search - Part 2
Lecture 21 - Decision Tree Learning Algorithms - Part 1
Lecture 22 - Decision Tree Learning Algorithms - Part 2
Lecture 23 - Instance Based Learning - Part 1
Lecture 24 - Instance Based Learning - Part 2
Lecture 25 - Cluster Analysis
Lecture 26 - Tutorial for week 4
Lecture 27 - Machine Learning enabled by Prior Theories
Lecture 28 - Explanation Based Learning
Lecture 29 - Inductive Logic Programming

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Lecture 30 - Reinforcement Learning - Part 1 Introduction
Lecture 31 - Reinforcement Learning - Part 2 Learning Algorithms
Lecture 32 - Reinforcement Learning - Part 3 Q-Learning
Lecture 33 - Case - Based Reasoning
Lecture 34 - Tutorial for week 5
Lecture 35 - Fundamentals of Artificial Neural Networks - Part 1
Lecture 36 - Fundamentals of Artificial Neural Networks - Part 2
Lecture 37 - Perceptrons
Lecture 38 - Model of Neuron in an ANN
Lecture 39 - Learning in a Feed Forward Multiple Layer ANN - Backpropagation
Lecture 40 - Recurrent Neural Networks
Lecture 41 - Hebbian Learning and Associative Memory
Lecture 42 - Hopfield Networks and Boltzman Machines - Part 1
Lecture 43 - Hopfield Networks and Boltzman Machines - Part 2
Lecture 44 - Convolutional Neural Networks - Part 1
Lecture 45 - Convolutional Neural Networks - Part 2
Lecture 46 - DeepLearning
Lecture 47 - Tutorial for week 6
Lecture 48 - Tools and Resources
Lecture 49 - Interdisciplinary Inspiration
Lecture 50 - Preparation for Exam and Example of Applications

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NPTEL Video Course - Computer Science and Engineering - NOC:C Programming and Assembly Language

Subject Co-ordinator - Prof. Janakiraman Viraraghavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22

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NPTEL Video Course - Computer Science and Engineering - NOC:Applied Natural Language Processing

Subject Co-ordinator - Prof. Ramaseshan R

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Operations on a Corpus
Lecture 3 - Probability and NLP
Lecture 4 - Vector Space models
Lecture 5 - Sequence Learning
Lecture 6 - Machine Translation
Lecture 7 - Preprocessing
Lecture 8 - Statistical Properties of Words - Part 1
Lecture 9 - Statistical Properties of Words - Part 2
Lecture 10 - Statistical Properties of Words - Part 3
Lecture 11 - Vector Space Models for NLP
Lecture 12 - Document Similarity - Demo, Inverted index, Exercise
Lecture 13 - Vector Representation of words
Lecture 14 - Contextual understanding of text
Lecture 15 - Co-occurence matrix, n-grams
Lecture 16 - Collocations, Dense word Vectors
Lecture 17 - SVD, Dimensionality reduction, Demo
Lecture 18 - Query Processing
Lecture 19 - Topic Modeling
Lecture 20 - Examples for word prediction
Lecture 21 - Introduction to Probability in the context of NLP
Lecture 22 - Joint and conditional probabilities, independence with examples
Lecture 23 - The definition of probabilistic language model
Lecture 24 - Chain rule and Markov assumption
Lecture 25 - Generative Models
Lecture 26 - Bigram and Trigram Language models - peeking indide the model building
Lecture 27 - Out of vocabulary words and curse of dimensionality
Lecture 28 - Exercise
Lecture 29 - Naive-Bayes, classification

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Lecture 30 - Machine learning, perceptron, linearly separable
Lecture 31 - Linear Models for Claassification
Lecture 32 - Biological Neural Network
Lecture 33 - Perceptron
Lecture 34 - Perceptron Learning
Lecture 35 - Logical XOR
Lecture 36 - Activation Functions
Lecture 37 - Gradient Descent
Lecture 38 - Feedforward and Backpropagation Neural Network
Lecture 39 - Why Word2Vec?
Lecture 40 - What are CBOW and Skip-Gram Models?
Lecture 41 - One word learning architecture
Lecture 42 - Forward pass for Word2Vec
Lecture 43 - Matrix Operations Explained
Lecture 44 - CBOW and Skip Gram Models
Lecture 45 - Building Skip-gram model using Python
Lecture 46 - Reduction of complexity - sub-sampling, negative sampling
Lecture 47 - Binay tree, Hierarchical softmax
Lecture 48 - Mapping the output layer to Softmax
Lecture 49 - Updating the weights using hierarchical softmax
Lecture 50 - Discussion on the results obtained from word2vec
Lecture 51 - Recap and Introduction
Lecture 52 - ANN as a LM and its limitations
Lecture 53 - Sequence Learning and its applications
Lecture 54 - Introuduction to Recurrent Neural Network
Lecture 55 - Unrolled RNN
Lecture 56 - RNN - Based Language Model
Lecture 57 - BPTT - Forward Pass
Lecture 58 - BPTT - Derivatives for W,V and U
Lecture 59 - BPTT - Exploding and vanishing gradient
Lecture 60 - LSTM
Lecture 61 - Truncated BPTT
Lecture 62 - GRU
Lecture 63 - Introduction and Historical Approaches to Machine Translation
Lecture 64 - What is SMT?
Lecture 65 - Noisy Channel Model, Bayes Rule, Language Model
Lecture 66 - Translation Model, Alignment Variables
Lecture 67 - Alignments again!
Lecture 68 - IBM Model 1

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Lecture 69 - IBM Model 2
Lecture 70 - Introduction to Phrase-based translation
Lecture 71 - Symmetrization of alignments
Lecture 72 - Extraction of Phrases
Lecture 73 - Learning/estimating the phrase probabilities using another Symmetrization example
Lecture 74 - Introduction to evaluation of Machine Translation
Lecture 75 - BLEU - A short Discussion of the seminal paper
Lecture 76 - BLEU Demo using NLTK and other Metrics
Lecture 77 - Encoder-Decoder model for Neural Machine Translation
Lecture 78 - RNN Based Machine Translation
Lecture 79 - Recap and Connecting Bloom Taxonomy with Machine Learning
Lecture 80 - Introduction to Attention based Translation
Lecture 81 - Research Paper discussion on Neural machine translation by jointly learning to align and transla
Lecture 82 - Typical NMT architecture architecture and models for multi-language translation
Lecture 83 - Beam Search, Stochatic Gradient Descend, Mini Batch, Batch
Lecture 84 - Beam Search, Stochatic Gradient Descend, Mini Batch, Batch
Lecture 85 - Introduction to Conversation Modeling
Lecture 86 - A few examples in Conversation Modeling
Lecture 87 - Some ideas to Implement IR-based Conversation Modeling
Lecture 88 - Discussion of some ideas in Question Answering
Lecture 89 - Hyperspace Analogue to Language - HAL
Lecture 90 - Correlated Occurence Analogue to Lexical Semantic - COALS
Lecture 91 - Global Vectors - Glove
Lecture 92 - Evaluation of Word vectors

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NPTEL Video Course - Computer Science and Engineering - NOC:Python for Data Science

Subject Co-ordinator - Prof. Ragunathan Rengasamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Python for Data Science
Lecture 2 - Introduction to Python
Lecture 3 - Introduction to Spyder - Part 1
Lecture 4 - Introduction to Spyder - Part 2
Lecture 5 - Variables and Datatypes
Lecture 6 - Operators
Lecture 7 - Jupyter setup
Lecture 8 - Sequence data - Part 1
Lecture 9 - Sequence data - Part 2
Lecture 10 - Sequence data - Part 3
Lecture 11 - Sequence data - Part 4
Lecture 12 - Numpy
Lecture 13 - Reading data
Lecture 14 - Pandas Dataframes - I
Lecture 15 - Pandas Dataframes - II
Lecture 16 - Pandas Dataframes - III
Lecture 17 - Control structures and Functions
Lecture 18 - Exploratory data analysis
Lecture 19 - Data Visualization - Part I
Lecture 20 - Data Visualization - Part II
Lecture 21 - Dealing with missing data
Lecture 22 - Introduction to Classification Case Study
Lecture 23 - Case Study on Classification - Part I
Lecture 24 - Case Study on Classification - Part II
Lecture 25 - Introduction to Regression Case Study
Lecture 26 - Case Study on Regression - Part I
Lecture 27 - Case Study on Regression - Part II
Lecture 28 - Case Study on Regression - Part III
Lecture 29 - Module : Predictive Modelling

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Lecture 30 - Linear Regression
Lecture 31 - Model Assessment
Lecture 32 - Diagnostics to Improve Linear Model Fit
Lecture 33 - Cross Validation
Lecture 34 - Classification
Lecture 35 - Logistic Regression
Lecture 36 - K-Nearest Neighbors (kNN)
Lecture 37 - K-means Clustering
Lecture 38 - Logistic Regression (Continued...)
Lecture 39 - Decision Trees
Lecture 40 - Multiple Linear Regression

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NPTEL Video Course - Computer Science and Engineering - NOC:Practical Machine Learning with Tensorflow

Subject Co-ordinator - Dr. B. Ravindran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Tensorflow
Lecture 2 - Machine Learning Refresher
Lecture 3 - Steps in Machine Learning Process
Lecture 4 - Loss Functions in Machine Learning
Lecture 5 - Gradient Descent
Lecture 6 - Gradient Descent Variations
Lecture 7 - Model Selection and Evaluation
Lecture 8 - Machine Learning Visualization
Lecture 9 - Deep Learning Refresher
Lecture 10 - Introduction to Tensors
Lecture 11 - Mathematical Foundations of Deep Learning (Continued...)
Lecture 12 - Building Data Pipelines for Tensorflow - Part 1
Lecture 13 - Building Data Pipelines for Tensorflow - Part 2
Lecture 14 - Building Data Pipelines for Tensorflow - Part 3
Lecture 15 - Text Processing with Tensorflow
Lecture 16 - Classify Images
Lecture 17 - Regression
Lecture 18 - Classify Structured Data
Lecture 19 - Text Classification
Lecture 20 - Underfitting and Overfitting
Lecture 21 - Save and Restore Models
Lecture 22 - CNNs - Part 1
Lecture 23 - CNNs - Part 2
Lecture 24 - Transfer learning with pretrained CNNs
Lecture 25 - Transfer learning with TF hub
Lecture 26 - Image classification and visualization
Lecture 27 - Estimator API
Lecture 28 - Logistic Regression
Lecture 29 - Boosted Trees

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Lecture 30 - Introduction to word embeddings
Lecture 31 - Recurrent Neural Networks - Part 1
Lecture 32 - Recurrent Neural Networks - Part 2
Lecture 33 - Time Series Forecasting with RNNs
Lecture 34 - Text Generation with RNNs
Lecture 35 - TensorFlow Customization
Lecture 36 - Customizing tf.keras - Part 1
Lecture 37 - Customizing tf.keras - Part 2
Lecture 38 - TensorFlow Distributed Training

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Database Systems

Subject Co-ordinator - Prof. P.Sreenivasa Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Database Architecture
Lecture 3 - RDBMS Architecture
Lecture 4 - Introduction to ER Model
Lecture 5 - Entities and Relationships
Lecture 6 - Modelling Weak Entities and Design Choices
Lecture 7 - Relational Data Model and Notion of Keys
Lecture 8 - Introduction to Relational Algebra
Lecture 9 - Operators in Relational Model
Lecture 10 - Uses of Renaming, Join and Division in Relation Algebra
Lecture 11 - Example Queries in Relation Model and Outer Join Operation
Lecture 12 - Convert ER-Model to a Relational Model
Lecture 13 - Introduction to tuple relational calculus
Lecture 14 - Example TRC queries
Lecture 15 - Data definition using SQL
Lecture 16 - Basic SQL query block and subqueries
Lecture 17 - Correlated subqueries
Lecture 18 - Aggregate functions
Lecture 19 - Views
Lecture 20 - Programmatic access of SQL
Lecture 21 - Normal forms - Introduction
Lecture 22 - Deriving new functional dependencies
Lecture 23 - Proving soundness and completeness of Armstrong's Axioms
Lecture 24 - Normal forms - 2 NF, 3NF, BCNF
Lecture 25 - Properties of decompositions
Lecture 26 - Normal forms - 4NF, 5NF
Lecture 27 - Introduction to file orgranization
Lecture 28 - File orgranization methods
Lecture 29 - Dynamic File orgranization using Hashing

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Lecture 30 - Index structures
Lecture 31 - B+ trees on Disks
Lecture 32 - Performance and Reliability of Multiple Disks
Lecture 33 - Relational Query Evaluation
Lecture 34 - Join operator processing algorithms
Lecture 35 - Query optimization
Lecture 36 - ACID properties and operations in transactions
Lecture 37 - Schdeules
Lecture 38 - Concurrency control using Locks
Lecture 39 - Recovery using undo logging method
Lecture 40 - Recovery using Redo and Undo-Redo logging methods
Lecture 41 - Recoverable schdeules and transaction isolation levels

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundations of Cryptography

Subject Co-ordinator - Prof. Ashish Choudhury

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Symmetric-key Encryption
Lecture 3 - Historical Ciphers and their Cryptanalysis
Lecture 4 - Perfect Security
Lecture 5 - Limitations of Perfect Security
Lecture 6 - Introduction to Computational Security
Lecture 7 - Semantic Security
Lecture 8 - Pseudo-random Generators (PRGs)
Lecture 9 - Operations on Pseudorandom Generators
Lecture 10 - Stream Ciphers
Lecture 11 - Provably-secure Instantiation of PRG
Lecture 12 - Practical Instantiations of PRG
Lecture 13 - CPA-security
Lecture 14 - Pseudo-random Functions (PRFs)
Lecture 15 - CPA-secure Encryption from PRF
Lecture 16 - Modes of Operations of Block Ciphers - Part I
Lecture 17 - Modes of Operations of Block Ciphers - Part II
Lecture 18 - Theoretical Constructions of Block Ciphers
Lecture 19 - Practical Constructions of Block Ciphers - Part I
Lecture 20 - Practical Constructions of Block Ciphers - Part II
Lecture 21 - From Passive to Active Adversary
Lecture 22 - Message Integrity and Authentication
Lecture 23 - Message Authentication for Long Messages - Part I
Lecture 24 - Message Authentication for Long Messages - Part II
Lecture 25 - Information-theoretic MACs - Part I
Lecture 26 - Information-theoretic MACs - Part II
Lecture 27 - Cryptographic Hash Functions - Part I
Lecture 28 - Cryptographic Hash Functions - Part II
Lecture 29 - Message Authentication Using Hash Functions

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Lecture 30 - Generic Attacks on Hash Functions and Additional Applications of Hash Functions
Lecture 31 - Random Oracle Model - Part I
Lecture 32 - Random Oracle Model - Part II
Lecture 33 - Authenticated Encryption
Lecture 34 - Composing CPA-secure Cipher with a Secure MAC - Part I
Lecture 35 - Composing CPA-secure Cipher with a Secure MAC - Part II
Lecture 36 - Key-Exchange Protocols - Part I
Lecture 37 - Key-Exchange Protocols - Part II
Lecture 38 - Cyclic groups
Lecture 39 - Cryptographic Hardness Assumptions in the Cyclic Groups
Lecture 40 - Candidate Cyclic Groups for Cryptographic Purposes - Part I
Lecture 41 - Candidate Cyclic Groups for Cryptographic Purposes - Part II
Lecture 42 - Cryptographic Applications of the Discrete Log Assumption
Lecture 43 - Public-key Encryption
Lecture 44 - El Gamal Public-key Encryption Scheme
Lecture 45 - RSA Assumption
Lecture 46 - RSA Public-key Cryptosystem
Lecture 47 - Hybrid Public-key Cryptosystem
Lecture 48 - CCA-Secure Public-key Ciphers
Lecture 49 - CCA-Secure Public-key Ciphers Based on Diffie-Hellman Problems
Lecture 50 - CCA-Secure Public-key Ciphers Based on RSA Assumption
Lecture 51 - Digital Signatures
Lecture 52 - RSA Signatures
Lecture 53 - Identification Schemes
Lecture 54 - Schnorr Signature Scheme and TLS/SSL
Lecture 55 - Number Theory
Lecture 56 - Secret Sharing
Lecture 57 - Zero-Knowledge Protocols - Part I
Lecture 58 - Zero-Knowledge Protocols - Part II
Lecture 59 - Good Bye for Now

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NPTEL Video Course - Computer Science and Engineering - NOC:Modern Application Development

Subject Co-ordinator - Prof. Madhavan Mukund, Prof. Abhijat Vichare, Prof. Aamod Sane

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Modern Application Development - Part 1
Lecture 2 - Introduction to Modern Application Development - Part 2
Lecture 3 - Introduction to Modern Application Development - Part 3
Lecture 4 - Introduction to Modern Application Development - Part 4
Lecture 5 - Introduction to Modern Application Development - Part 5
Lecture 6 - Command Line - Part 1
Lecture 7 - Command Line - Part 2
Lecture 8 - Command Line - Practice Questions - Part 1
Lecture 9 - Command Line - Practice Questions - Part 2
Lecture 10 - Comparing CLI, GUI, and Web Interfaces
Lecture 11 - Producing HTML+CSS output - Part 1
Lecture 12 - Producing HTML+CSS output - Part 2
Lecture 13 - Introduction to Input in HTML
Lecture 14 - Session 2 - Part 1
Lecture 15 - Session 2 - Part 2
Lecture 16 - Session 2 - Part 3
Lecture 17 - Session 1 - Part 1 - Introduction to HTML and CSS
Lecture 18 - Session 1 - Part 2
Lecture 19 - Week6 - Session 1
Lecture 20 - Week6 - Session 2
Lecture 21 - Introduction to JDBC
Lecture 22 - Week 7 Session 1 - Part 1
Lecture 23 - Week 7 Session 1 - Part 2
Lecture 24 - Week 8 Session 1
Lecture 25 - Week 8 Session 2
Lecture 26 - Week 8 Session 3
Lecture 27 - Week 9 Session 1
Lecture 28 - Week 9 Session 3
Lecture 29 - Week 10 Part 1

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Lecture 30 - Week 10 Part 2
Lecture 31 - Week 10 Part 3

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NPTEL Video Course - Computer Science and Engineering - NOC:Deep Learning for Computer Vision

Subject Co-ordinator - Prof. Vineeth N Balasubramanian

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - History
Lecture 3 - Image Formation
Lecture 4 - Image Representation
Lecture 5 - Linear Filtering
Lecture 6 - Image in Frequency Domain
Lecture 7 - Image Sampling
Lecture 8 - Edge Detection
Lecture 9 - From Edges to Blobs and Corners
Lecture 10 - Scale Space, Image Pyramids and Filter Banks
Lecture 11 - Feature Detectors
Lecture 12 - Image Segmentation
Lecture 13 - Other Feature Spaces
Lecture 14 - Human Visual System
Lecture 15 - Feature Matching
Lecture 16 - Hough Transform
Lecture 17 - From Points to Images
Lecture 18 - Image Descriptor Matching
Lecture 19 - Pyramid Matching
Lecture 20 - From Traditional Vision to Deep Learning
Lecture 21 - Neural Networks
Lecture 22 - Neural Networks
Lecture 23 - Feedforward Neural Networks and Backpropagation - Part 1
Lecture 24 - Feedforward Neural Networks and Backpropagation - Part 2
Lecture 25 - Gradient Descent and Variants - Part 1
Lecture 26 - Gradient Descent and Variants - Part 2
Lecture 27 - Regularization in Neural Networks - Part 1
Lecture 28 - Regularization in Neural Networks - Part 2
Lecture 29 - Improving Training of Neural Networks - Part 1

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Lecture 30 - Improving Training of Neural Networks - Part 2
Lecture 31 - Convolutional Neural Networks
Lecture 32 - Convolutional Neural Networks
Lecture 33 - Backpropagation in CNNs
Lecture 34 - Evolution of CNN Architectures for Image Classification - Part 1
Lecture 35 - Evolution of CNN Architectures for Image Classification - Part 2
Lecture 36 - Recent CNN Architectures
Lecture 37 - Finetuning in CNNs
Lecture 38 - Explaining CNNs
Lecture 39 - Explaining CNNs
Lecture 40 - Explaining CNNs
Lecture 41 - Explaining CNNs
Lecture 42 - Explaining CNNs
Lecture 43 - Going Beyond Explaining CNNs
Lecture 44 - CNNs for Object Detection-I - Part 1
Lecture 45 - CNNs for Object Detection-I - Part 2
Lecture 46 - CNNs for Object Detection-II
Lecture 47 - CNNs for Segmentation
Lecture 48 - CNNs for Human Understanding
Lecture 49 - CNNs for Human Understanding
Lecture 50 - CNNs for Human Understanding
Lecture 51 - CNNs for Other Image Tasks
Lecture 52 - Recurrent Neural Networks
Lecture 53 - Backpropagation in RNNs
Lecture 54 - LSTMs and GRUs
Lecture 55 - Video Understanding using CNNs and RNNs
Lecture 56 - Attention in Vision Models
Lecture 57 - Vision and Language
Lecture 58 - Beyond Captioning
Lecture 59 - Other Attention Models
Lecture 60 - Self-Attention and Transformers
Lecture 61 - Deep Generative Models
Lecture 62 - Generative Adversarial Networks - Part 1
Lecture 63 - Generative Adversarial Networks - Part 2
Lecture 64 - Variational Autoencoders
Lecture 65 - Combining VAEs and GANs
Lecture 66 - Beyond VAEs and GANs
Lecture 67 - Beyond VAEs and GANs
Lecture 68 - GAN Improvements

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Lecture 69 - Deep Generative Models across Multiple Domains
Lecture 70 - VAEs and DIsentanglement
Lecture 71 - Deep Generative Models
Lecture 72 - Deep Generative Models
Lecture 73 - Few-shot and Zero-shot Learning - Part 1
Lecture 74 - Few-shot and Zero-shot Learning - Part 2
Lecture 75 - Self-Supervised Learning
Lecture 76 - Adversarial Robustness
Lecture 77 - Pruning and Model Compression
Lecture 78 - Neural Architecture Search
Lecture 79 - Course Conclusion

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NPTEL Video Course - Computer Science and Engineering - NOC:Artificial Intelligence Search Methods For Proble

Subject Co-ordinator - Prof. Deepak Khemani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prologue
Lecture 2 - The Winograd Schema Challenge
Lecture 3 - Introduction (2013 version)
Lecture 4 - Can Machines Think?
Lecture 5 - The Turing Test
Lecture 6 - Language and Thought
Lecture 7 - The Willing Suspension of Disbelief
Lecture 8 - Machines with Wheels and Gears
Lecture 9 - The Notion of Mind in Philosophy
Lecture 10 - Reasoning = Computation
Lecture 11 - Concepts and Categories
Lecture 12 - How did AI get its name?
Lecture 13 - The Chess Saga
Lecture 14 - A Brief History of AI
Lecture 15 - The Worlds in our Minds
Lecture 16 - Epiphemona in Computers
Lecture 17 - State Space Search
Lecture 18 - Domain Independent Algorithms
Lecture 19 - Deterministic Search
Lecture 20 - DFS and BFS
Lecture 21 - Comparing DFS and BFS
Lecture 22 - Depth First Iterative Deepening
Lecture 23 - Heuristic Search
Lecture 24 - Heuristic Functions and the Search Landscape
Lecture 25 - Solution Space Search
Lecture 26 - The Traveling Salesman Problem
Lecture 27 - Escaping Local Optima
Lecture 28 - Stochastic Local Search
Lecture 29 - Genetic Algorithms

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Lecture 30 - Genetic Algorithms and SAT
Lecture 31 - Genetic Algorithms for the TSP
Lecture 32 - Emergent Systems
Lecture 33 - Ant Colony Optimization
Lecture 34 - Finding Optimal Paths
Lecture 35 - Branch and Bound
Lecture 36 - Algorithm A*
Lecture 37 - A*
Lecture 38 - Is A* Admissible?
Lecture 39 - Admissibility of A*
Lecture 40 - Higher, Faster ...
Lecture 41 - B&B - A* - wA* - Best First
Lecture 42 - A*
Lecture 43 - The Monotone Condition
Lecture 44 - DNA Sequence Alignment
Lecture 45 - Divide and Conquer Frontier Search.
Lecture 46 - Smart Memory Graph Search
Lecture 47 - Variations on A*
Lecture 48 - Breadth First Heuristic Search
Lecture 49 - Beam Stack Search
Lecture 50 - Game Theory
Lecture 51 - Popular Recreational Games
Lecture 52 - Board Games and Game Trees
Lecture 53 - The Evaluation Function in Board Games
Lecture 54 - Algorithm Minimax and Alpha-Beta Pruning
Lecture 55 - A Cluster of Strategies
Lecture 56 - SSS*
Lecture 57 - SSS*
Lecture 58 - Automated Domain Independent Planning
Lecture 59 - The Blocks World Domain
Lecture 60 - State Space Planning
Lecture 61 - Goal Stack Planning (GSP)
Lecture 62 - GSP
Lecture 63 - Plan Space Planning (PSP)
Lecture 64 - PSP
Lecture 65 - Multi-Armed Robots
Lecture 66 - Means-Ends Analysis
Lecture 67 - The Planning Graph
Lecture 68 - Algorithm Graphplan

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Lecture 69 - Problem Decomposition.
Lecture 70 - Algorithm AO*
Lecture 71 - AO*
Lecture 72 - Rule Based Expert Systems
Lecture 73 - The Inference Engine
Lecture 74 - The OPS5 Language
Lecture 75 - Conflict Resolution
Lecture 76 - Business Rule Management Systems
Lecture 77 - The Rete Net
Lecture 78 - Rete Algorithm
Lecture 79 - Rete Algorithm
Lecture 80 - Reasoning in Logic
Lecture 81 - Rules of Inference
Lecture 82 - Forward Reasoning
Lecture 83 - First Order Logic
Lecture 84 - Implicit Quantifier Notation
Lecture 85 - Backward Reasoning
Lecture 86 - Depth First Search on Goal Trees
Lecture 87 - Incompleteness...
Lecture 88 - Constraint Satisfaction Problems
Lecture 89 - Binary Constraint Networks
Lecture 90 - Interpreting Line Drawings
Lecture 91 - Model Based Diagnosis
Lecture 92 - Solving CSPs
Lecture 93 - Arc Consistency
Lecture 94 - Propagation = Reasoning
Lecture 95 - Lookahead Search

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NPTEL Video Course - Computer Science and Engineering - NOC:Computational Complexity

Subject Co-ordinator - Prof. Subrahmanyam Kalyanasundaram

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computational Complexity
Lecture 2 - The Class P
Lecture 3 - The Class NP
Lecture 4 - The Class NP - Alternate Definition
Lecture 5 - Polynomial Time Reductions
Lecture 6 - NP - Completeness
Lecture 7 - Cook Levin Theorem - Part 1
Lecture 8 - Cook Levin Theorem - Part 2
Lecture 9 - More NP Complete Problems
Lecture 10 - Polynomial Hierarchy - Part 1
Lecture 11 - Polynomial Hierarchy - Part 2
Lecture 12 - Polynomial Hierarchy - Part 3
Lecture 13 - Time Hierarchy Theorem
Lecture 14 - Introduction to Space Complexity
Lecture 15 - NL-Completeness
Lecture 16 - Savitch's Theorem
Lecture 17 - NL = co-NL - Part 1
Lecture 18 - NL = co-NL - Part 2
Lecture 19 - PSPACE Completeness
Lecture 20 - Games and PSPACE Completeness
Lecture 21 - Space Hierarchy Theorem
Lecture 22 - Ladner's Theorem
Lecture 23 - Oracle Turing Machines
Lecture 24 - Polynomial Hierarchy Using Oracles
Lecture 25 - Baker-Gill-Solovay Theorem - Part 1
Lecture 26 - Baker-Gill-Solovay Theorem - Part 2
Lecture 27 - Randomized Complexity Classes - Part 1
Lecture 28 - Randomized Complexity Classes - Part 2
Lecture 29 - Randomized Complexity Classes - Part 3

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Lecture 30 - Randomized Complexity Classes - Part 4
Lecture 31 - Comparison Between Randomized Complexity Classes
Lecture 32 - BPP is in Polynomial Hierarchy
Lecture 33 - Circuit Complexity - Part 1
Lecture 34 - Circuit Complexity - Part 2
Lecture 35 - Formal Definition of Circuits
Lecture 36 - Hierarchy Theorem for Circuit Size
Lecture 37 - Complexity Class : P/Poly
Lecture 38 - Karp-Lipton Theorem
Lecture 39 - Turing Machines That Take Advice
Lecture 40 - Classes NC and AC
Lecture 41 - Parity Not in AC0 - Part 1
Lecture 42 - Parity Not in AC0 - Part 2
Lecture 43 - Adleman's Theorem
Lecture 44 - Polynomial Identity Testing and Bipartite Perfect Matching in RNC
Lecture 45 - Search Bipartite Perfect Matching is in RNC - Part 1
Lecture 46 - Search Bipartite Perfect Matching is in RNC - Part 2
Lecture 47 - Promise Problems and Valiant-Vazirani Theorem
Lecture 48 - Valiant Vazirani Theorem Continued
Lecture 49 - #P and the Complexity of Counting
Lecture 50 - Permanent is #P-Complete - Part 1
Lecture 51 - Permanent is #P-Complete - Part 2
Lecture 52 - Toda's Theorem - Part 1
Lecture 53 - Toda's Theorem - Part 2
Lecture 54 - Introduction to Communication Complexity - Part 1
Lecture 55 - Introduction to Communication Complexity - Part 2
Lecture 56 - Lower Bound Techniques
Lecture 57 - Communication Complexity of Relations
Lecture 58 - Monotone Depth Lower Bound for Matching
Lecture 59 - Interactive Proofs
Lecture 60 - #3SAT is in IP
Lecture 61 - Public Coin Interactive Proofs and AM/MA
Lecture 62 - Simulating Private Coins using Public Coins
Lecture 63 - Summary and Concluding Remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Parameterized Algorithms

Subject Co-ordinator - Prof. Neeldhara Misra

Co-ordinating Institute - IIT Gandhinagar, IMSC

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Invitation to FPT
Lecture 2 - Formalizing FPT
Lecture 3 - Kernelization: High Degree Rule
Lecture 4 - Kernelization: d-Hitting Set
Lecture 5 - Kernelization: Crown Reduciton
Lecture 6 - Kernelization: Nemhauser-Trotter and Expansion Lemma
Lecture 7 - Introduction to Branching
Lecture 8 - Analyzing Recurrences
Lecture 9 - High-Degree Branching for FVS
Lecture 10 - Vertex Cover above LP
Lecture 11 - Applications of Vertex Cover above Matching
Lecture 12 - Iterative Compression I: Setting Up the Method
Lecture 13 - Iterative Compression II: Vertex Cover and Tournament Feedback Vertex Set
Lecture 14 - Iterative Compression III: Feedback Vertex Set and 3-Hitting Set
Lecture 15 - Iterative Compression IV: Odd Cycle Transversal
Lecture 16 - Introduction to Randomized Algorithms via a Simple Randomized FPT Algorithm for FVS
Lecture 17 - Color Coding for Longest Path
Lecture 18 - Chromatic Coding for Feedback Arc Set on Tournaments
Lecture 19 - Random Separation and Subgraph Isomorphism
Lecture 20 - Derandomization
Lecture 21 - Divide and Conquer and Separator
Lecture 22 - Towards Defining Treewidth
Lecture 23 - Treewidth and Constructing Treedecomposition of Few Graph Classes
Lecture 24 - Structural Properties of Treedecomposition and Win-Win
Lecture 25 - Nice Tree Decomposition and Algorithm for Max Weight Independent Set
Lecture 26 - Dynamic Programming Algorithm over graphs of Bounded Treewidth
Lecture 27 - FPT Appproximation Algorithm for Computing Tree Decomposition - Part 1
Lecture 28 - FPT Appproximation Algorithm for Computing Tree Decomposition - Part 2
Lecture 29 - FPT Appproximation Algorithm for Computing Tree Decomposition and Applications - Part 1

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Lecture 30 - FPT Appproximation Algorithm for Computing Tree Decomposition and Applications - Part 2
Lecture 31 - Dynamic Programming Over Subsets for Set Cover
Lecture 32 - Dynamic Programming Over Subsets for Steiner Tree
Lecture 33 - ILP for Envy-Free Allocations and Lobbying
Lecture 34 - ILP for Imbalance Parameterized by Vertex Cover
Lecture 35 - Important Cuts: Basic
Lecture 36 - Important Cuts: Enumeration and Bounds
Lecture 37 - FPT Algorithm for Multiway Cut
Lecture 38 - FPT Algorithm for Directed Feedback Edge Set
Lecture 39 - Algebraic Techniques: Inclusion Exclusion (Coloring)
Lecture 40 - Algebraic Techniques: Inclusion Exclusion (Hamiltonian Path)
Lecture 41 - Algebraic Techniques: Matrix Multiplication
Lecture 42 - Algebraic Techniques: Polynomial Method
Lecture 43 - Matroids: Representative Sets
Lecture 44 - Matroids: Representative Sets - Computation and Combinatorics
Lecture 45 - Matroids: Representative Sets - Applications (Paths and Kernels)
Lecture 46 - Matroids: Representative Sets - Applications (Directed Long Cycle)
Lecture 47 - Reductions - An Introduction
Lecture 48 - Reductions - Problems as Hard as Clique I (Clique on Regular Graphs)
Lecture 49 - Reductions - Problems as Hard as Clique (PVC, MCC, MIS)
Lecture 50 - Reductions - Problems as Hard as Clique (Dominating Set, Set Cover)

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NPTEL Video Course - Computer Science and Engineering - NOC:Getting Started with Competitive Programming

Subject Co-ordinator - Prof. Neeldhara Misra

Co-ordinating Institute - IIT - Gandhinagar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Welcome and Initial Setup
Lecture 1 - Reversort
Lecture 2 - Engineering Reversort
Lecture 3 - Number Game
Lecture 4 - Will It Stop?
Lecture 5 - Trouble Sort
Lecture 6 - The Meeting Place Cannot Be Changed
Lecture 7 - Magic Ship
Lecture 8 - Simple Skewness
Lecture 9 - Pancake Flipping
Lecture 10 - Islands War
Lecture 11 - Stable Marriage - I
Lecture 12 - Stable Marriage - II
Lecture 13 - When Greedy Does Not Work - Coin Change
Lecture 14 - When Greedy Does Not Work - Guarding a Museum
Lecture 15 - When Greedy Does Not Work - Traveling Salesman
Lecture 16 - DSU - Definition and Motivation
Lecture 17 - DSU via Union by Rank and Path Compression
Lecture 18 - DSU - Implementation
Lecture 19 - Destroying Array - I (Problem Statement and Solution)
Lecture 20 - Destroying Array - II (Implementation)
Lecture 21 - War-I (Problem Statement)
Lecture 22 - War-II (Solution)
Lecture 23 - War-III (Implementation)
Lecture 24 - Graph Foundations
Lecture 25 - BFS and DFS
Lecture 26 - Mahmoud and Ehab and the bipartiteness
Lecture 27 - Cover It!
Lecture 28 - Diamond Inheritance

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Lecture 29 - SSSP - Overview BFS Revisited
Lecture 30 - SSSP and Dijkstra's Algorithm
Lecture 31 - Sending Email
Lecture 32 - SSSP and Modified Dijkstra
Lecture 33 - SSSP with Negative Cycles - Bellman-Ford
Lecture 34 - Wormholes
Lecture 35 - APSP and Floyd-Warshall
Lecture 36 - Page Hopping
Lecture 37 - Introduction to MSTs
Lecture 38 - Prim's Algorithm
Lecture 39 - Kruskal's Algorithm
Lecture 40 - Cherries Mesh
Lecture 41 - Heirarchy
Lecture 42 - Island Hopping
Lecture 43 - Introduction to MaxFlow
Lecture 44 - Ford-Fulkerson for MaxFlow
Lecture 45 - Implementing Edmonds-Karp
Lecture 46 - Maximum Matching via MaxFlow
Lecture 47 - Sport Elimination via MaxFlow
Lecture 48 - Maxflow-Mincut Duality
Lecture 49 - Police Chase
Lecture 50 - Sam I AM and Vertex Covers
Lecture 51 - Top-Down Dynamic Programming with Frog 1 - Part A
Lecture 52 - Top-Down Dynamic Programming with Frog 1 - Part B
Lecture 53 - Bottom-Up Dynamic Programming with Dice Combinations

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Quantum Computing: Quantum Algori

Subject Co-ordinator - Prof. Prabha Mandayam

Co-ordinating Institute - IBM and IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quantum Computing Roadmap
Lecture 2 - Quantum Mission in India
Lecture 3 - A Brief Introduction to Applications of Quantum
Lecture 4 - Quantum Computing Basics
Lecture 5 - Postulates of Quantum Mechanics - Part 1
Lecture 6 - Postulates of Quantum Mechanics - Part 2
Lecture 7 - Quantum Measurements
Lecture 8 - Quantum Gates and Circuits - Part 1
Lecture 9 - Quantum Gates and Circuits - Part 2
Lecture 10 - Programming using IBM Quantum Experience and Circuit Composer
Lecture 11 - Quantum Computing Concepts: Entanglement and Interferenceâ - Part 1
Lecture 12 - Quantum Computing Concepts: Entanglement and Interferenceâ - Part 2
Lecture 13 - Programming using Qiskit - Part 1
Lecture 14 - Programming using Qiskit - Part 2
Lecture 15 - Quantum Algorithms: Deutsch Jozsa Algorithm
Lecture 16 - Quantum Algorithms: Bernstein Vazirani Algorithm
Lecture 17 - Quantum Algorithms: Grover's Search
Lecture 18 - Grover's algorithm Programming
Lecture 19 - NISQ-era quantum algorithms
Lecture 20 - Variational Quantum Algorithms
Lecture 21 - Variational Quantum Eigensolver
Lecture 22 - Quantum Generative Adversarial Networks (QGANs)
Lecture 23 - Fixing quantum errors with quantum tricks: A brief introduction to QEC - Part 1
Lecture 24 - Fixing quantum errors with quantum tricks: A brief introduction to QEC - Part 2
Lecture 25 - Fixing quantum errors with quantum tricks: A brief introduction to QEC - Part 3

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NPTEL Video Course - Computer Science and Engineering - NOC:Systems and Usable Security

Subject Co-ordinator - Prof. Neminath Hubballi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computer Security - Part 1
Lecture 2 - Introduction to Computer Security - Part 2
Lecture 3 - Malcious Software - Part 1
Lecture 4 - Malcious Software - Part 2
Lecture 5 - Social Engineering and Phishing Attacks - Part 1
Lecture 6 - Social Engineering and Phishing Attacks - Part 2
Lecture 7 - Operating System Security - Part 1
Lecture 8 - Operating System Security - Part 2
Lecture 9 - Operating System Security - Part 3
Lecture 10 - Operating System Security - Part 4
Lecture 11 - Email Security - Part 1
Lecture 12 - Email Security - Part 2
Lecture 13 - Transport Layer Security - Part 1
Lecture 14 - Transport Layer Security - Part 2
Lecture 15 - IP Security - Part 1
Lecture 16 - IP Security - Part 2
Lecture 17 - Security and Usability Overview
Lecture 18 - User Privacy and Usability

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NPTEL Video Course - Computer Science and Engineering - NOC:Online Privacy

Subject Co-ordinator - Prof. Ponnurangam Kumaraguru

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Online Privacy
Lecture 2 - Privacy concepts and studies
Lecture 3 - Fair Information Practices
Lecture 4 - Right to Privacy Contextual Integrity
Lecture 5 - Privacy Policy - Part I
Lecture 6 - Privacy Policy - Part II
Lecture 7 - Privacy-based technologies and decision making
Lecture 8 - Social Media Privacy
Lecture 9 - Identity resolution
Lecture 10 - Privacy Nudges
Lecture 11 - Cookies
Lecture 12 - Ethics about studying Online Privacy
Lecture 13 - Anonymization techniques and Differential Privacy
Lecture 14 - Conducting (user, lab, online) studies
Lecture 15 - Research paper reading
Lecture 16 - Voter and Browser Privacy Leaks, Profiling form PII - Part I
Lecture 17 - Voter and Browser Privacy Leaks, Profiling form PII - Part II
Lecture 18 - Online Privacy Tools (Hands-on) - Part I
Lecture 19 - Online Privacy Tools (Hands-on) - Part II
Lecture 20 - Mobile numbers, home location, Location-based social networks
Lecture 21 - Location-based social networks
Lecture 22 - Privacy laws and regulations - Part I
Lecture 23 - Privacy laws and regulations - Part II
Lecture 24 - Privacy standards
Lecture 25 - Look back

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Machine Learning (Tamil)

Subject Co-ordinator - Prof. Arun Rajkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Paradigms of Machine Learning
Lecture 2 - Few more examples
Lecture 3 - Types of Learning
Lecture 4 - Types of supervised learning
Lecture 5 - Mathematical tools
Lecture 6 - Three Fundamental spaces
Lecture 7 - Conditional Probability
Lecture 8 - Bayes Theorem
Lecture 9 - Continuous Probability
Lecture 10 - Introduction to vectors
Lecture 11 - Span of vectors
Lecture 12 - Linear Independence
Lecture 13 - Basis of vector space
Lecture 14 - Orthogonality and Projection
Lecture 15 - Introduction to Regression
Lecture 16 - Linear regression
Lecture 17 - Geometrical Interpretation
Lecture 18 - Visual Guide to Orthogonal Projection
Lecture 19 - Iterative solution: Gradient descent
Lecture 20 - Gradient Descent
Lecture 21 - Choosing Step size
Lecture 22 - Taylor Series
Lecture 23 - Stochastic Gradient Descent and basis functions
Lecture 24 - Regularization Techniques
Lecture 25 - Binary Classification
Lecture 26 - K-Nearest Neighbour Classification
Lecture 27 - Distance metric and Cross-Validation
Lecture 28 - Computational efficiency of KNN
Lecture 29 - Introduction to Decision Trees

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Lecture 30 - Level splitting
Lecture 31 - Measure of Impurity
Lecture 32 - Entropy and Information Gain
Lecture 33 - Generative vs Discriminative models
Lecture 34 - Naive Bayes classifier
Lecture 35 - Conditional Independence
Lecture 36 - Classifying the test point and summary
Lecture 37 - Discriminative models
Lecture 38 - Logistic Regression
Lecture 39 - Summary and big picture
Lecture 40 - Maximum likelihood estimation
Lecture 41 - Linear separability
Lecture 42 - Perceptron and its learning algorithm
Lecture 43 - Perceptron : A thing of past
Lecture 44 - Support Vector Machine
Lecture 45 - Optimizing weights
Lecture 46 - Handling Outliers
Lecture 47 - Dual Formulation
Lecture 48 - Kernel formulation
Lecture 49 - Introduction to Ensemble methods
Lecture 50 - Bagging
Lecture 51 - Bootstrapping
Lecture 52 - Limitations of bagging
Lecture 53 - Introduction to boosting
Lecture 54 - Ada boost
Lecture 55 - Unsupervised learning
Lecture 56 - K-means Clustering
Lecture 57 - LLyod's Algorithms
Lecture 58 - Convergence and Initialization
Lecture 59 - Representation Learning
Lecture 60 - Orthogonal Projection
Lecture 61 - Covariance Matrix and Eigen direction
Lecture 62 - PCA and mean centering

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NPTEL Video Course - Computer Science and Engineering - Compiler Design (Prof. Rupesh Nasre)

Subject Co-ordinator - Prof. Rupesh Nasre

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1, Programming languages and compilers
Lecture 2 - Introduction - Part 2, Language translators
Lecture 3 - Introduction - Part 3, Phases of a compiler
Lecture 4 - Introduction - Part 4, Static vs Dynamic contexts,Parameter passing
Lecture 5 - Lexing - Part 1, Terminology, Regex, flex tool- Part 1
Lecture 6 - Lexing - Part 2, Lexical errors, Input buffering
Lecture 7 - flex tool- Part 2
Lecture 8 - Lexing - Part 3, Lookahead, KMP string matching
Lecture 9 - Lexing - Part 4, Regex to DFA conversion - Part 1
Lecture 10 - Lexing - Part 5, Regex to DFA conversion - Part 2, Prasing - Part 1
Lecture 11 - Parsing - Part 2, CFG, Parse tree, Precedence, Ambiguity
Lecture 12 - flex tool - Part 3
Lecture 13 - Parsing - Part 3, Sentinel forms, Error recovery, if-else ambiguity
Lecture 14 - Parsing - Part 4, Left recursion, Recursive descent parsing
Lecture 15 - Parsing - Part 5, First and Follow, Predicitive parsing table
Lecture 16 - Parsing - Part 6, Predictive parsing table, LL(1) grammars
Lecture 17 - Discussions and doubts clarification - Part 1
Lecture 18 - Parsing - Part 6, Bottom-up, Shift-reduce parsing, SLR parsing
Lecture 19 - Parsing - Part 6, LR(0) automaton, SLR parsing using automaton
Lecture 20 - Parsing - Part 7, SLR(1) parsing table, SLR(1) parsing algorithm
Lecture 21 - Parsing - Part 8, Viable prefixes, LR(1) parsing, LR(1) automaton
Lecture 22 - Parsing - Part 9, LALR parsing, SDT- Part 1, attributes
Lecture 23 - Syntax Directed Translation - Part 2, S- and L-attributed SDD
Lecture 24 - Syntax Directed Translation - Part 3, L-attributed SDD, Applications
Lecture 25 - Syntax Directed Translation - Part 4, Actions within productions
Lecture 26 - Discussions and doubts clarification - Part 2
Lecture 27 - Quiz-1 discussion, SDT - Part 5, Code generation for while loop
Lecture 28 - Intermdiate Code Generation - Part 1, Syntax trees and DAGs
Lecture 29 - Intermdiate Code Generation - Part 2, Three-address code

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Lecture 30 - Discussions and doubts clarification Part 3
Lecture 31 - Intermdiate Code Generation - Part 3, Static single assignment
Lecture 32 - Intermdiate Code Generation - Part 4, IR for type expressions
Lecture 33 - Intermdiate Code Generation - Part 4, IR for array expressions
Lecture 34 - Intermdiate Code Generation - Part 4, IR for boolean expressions
Lecture 35 - Intermdiate Code Generation - Part 4, IR for break, continue, switch
Lecture 36 - Code Generator - Part 1, Introduction, IR and target code
Lecture 37 - Code Generator - Part 2, Instruction selection, ordering
Lecture 38 - Code Generator - Part 2, Basic blocks and CFG
Lecture 39 - x86 assembly code
Lecture 40 - Code optimizer - Part 1, Local optimizations within a basic block
Lecture 41 - Code optimizer - Part 2, Array references, Peephole optimization
Lecture 42 - Discussions and doubts clarification - Part 4
Lecture 43 - Code optimizer - Part 3, Register allocation, Liveness
Lecture 44 - Code optimizer - Part 4, Register allocation as graph coloring
Lecture 45 - Discussions and doubts clarification - Part 5
Lecture 46 - Code optimizer - Part 5, Data flow analysis, Reaching definitions
Lecture 47 - Discussions and doubts clarification - Part 6
Lecture 48 - Code optimizer - Part 6, DFA for reaching definitions,Live variables

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NPTEL Video Course - Computer Science and Engineering - NOC:Applied Accelerated Artificial Intelligence

Subject Co-ordinator - Prof. Satyadhyan Chickerur, Prof. Bharatkumar Sharma, Prof. Adesuyi Tosin, Prof. Satya

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to AI Systems Hardware - Part 1
Lecture 2 - Introduction to AI Systems Hardware - Part 2
Lecture 3 - Introduction to AI Accelerators, GPUs
Lecture 4 - Introduction to Operating Systems, Virtualization, Cloud - Part 1
Lecture 5 - Introduction to Operating Systems, Virtualization, Cloud - Part 2
Lecture 6 - Introduction to Containers and IDE Dockers - Part 1
Lecture 7 - Introduction to Containers and IDE Dockers - Part 2
Lecture 8 - Scheduling and Resource Management - Part 1
Lecture 9 - Scheduling and Resource Management - Part 2
Lecture 10 - DeepOps: Deep Dive into Kubernetes with deployment of various AI based Services - Part 1
Lecture 11 - DeepOps: Deep Dive into Kubernetes with deployment of various AI based Services - Part 2
Lecture 12 - DeepOps: Deep Dive into Kubernetes with deployment of various AI based Services Session II - Par
Lecture 13 - DeepOps: Deep Dive into Kubernetes with deployment of various AI based Services Session II - Par
Lecture 14 - Design principles for Building High Performance Clusters - Part 1
Lecture 15 - Design principles for Building High Performance Clusters - Part 2
Lecture 16 - Design principles for Building High Performance Clusters - Part 3
Lecture 17 - Design principles for Building High Performance Clusters - Part 4
Lecture 18 - Introduction to Pytorch - Part 1
Lecture 19 - Introduction to Pytorch - Part 2
Lecture 20 - Introduction to Pytorch - Part 3
Lecture 21 - Introduction to Pytorch - Part 4
Lecture 22 - Profiling with DLProf Pytorch Catalyst - Part 1
Lecture 23 - Profiling with DLProf Pytorch Catalyst - Part 2
Lecture 24 - Introduction to TensorFlow - Part 1
Lecture 25 - Introduction to TensorFlow - Part 2
Lecture 26 - Accelerated TensorFlow - Part 1
Lecture 27 - Accelerated TensorFlow - Part 2
Lecture 28 - Accelerated TensorFlow - XLA Approach - Part 1
Lecture 29 - Accelerated TensorFlow - XLA Approach - Part 2

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Lecture 30 - Optimizing Deep learning Training: Automatic Mixed Precision - Part 1
Lecture 31 - Optimizing Deep learning Training: Automatic Mixed Precision - Part 2
Lecture 32 - Optimizing Deep learning Training: Transfer Learning - Part 1
Lecture 33 - Optimizing Deep learning Training: Transfer Learning - Part 2
Lecture 34 - Fundamentals of Distributed AI Computing Session 1 - Part 1
Lecture 35 - Fundamentals of Distributed AI Computing Session 1 - Part 2
Lecture 36 - Fundamentals of Distributed AI Computing Session 2 - Part 1
Lecture 37 - Fundamentals of Distributed AI Computing Session 2 - Part 2
Lecture 38 - Distributed Deep Learning using Tensorflow and Horovod
Lecture 39 - Challenges with Distributed Deep Learning Training Convergence
Lecture 40 - Fundamentals of Accelerating Deployment - Part 1
Lecture 41 - Fundamentals of Accelerating Deployment - Part 2
Lecture 42 - Accelerating neural network inference in PyTorch and TensorFlow - Part 1
Lecture 43 - Accelerating neural network inference in PyTorch and TensorFlow - Part 2
Lecture 44 - Accelerated Data Analytics - Part 1
Lecture 45 - Accelerated Data Analytics - Part 2
Lecture 46 - Accelerated Data Analytics - Part 3
Lecture 47 - Accelerated Data Analytics - Part 4
Lecture 48 - Accelerated Machine Learning
Lecture 49 - Scale Out with DASK
Lecture 50 - Web visualizations to GPU accelerated crossfiltering - Part 1
Lecture 51 - Web visualizations to GPU accelerated crossfiltering - Part 2
Lecture 52 - Accelerated ETL Pipeline with SPARK - Part 1
Lecture 53 - Accelerated ETL Pipeline with SPARK - Part 2
Lecture 54 - Applied AI: Smart City (Intelligent Video Analytics) Session 1 - Part 1
Lecture 55 - Applied AI: Smart City (Intelligent Video Analytics) Session 1 - Part 2
Lecture 56 - Applied AI: Smart City (Intelligent Video Analytics) Session 2 Deepstream - Part 1
Lecture 57 - Applied AI: Smart City (Intelligent Video Analytics) Session 2 Deepstream - Part 2
Lecture 58 - Applied AI: Health care Session I - Part 1
Lecture 59 - Applied AI: Health care Session I - Part 2
Lecture 60 - Applied AI: Health care Session II - Part 1
Lecture 61 - Applied AI: Health care Session II - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Social Network Analysis

Subject Co-ordinator - Prof. Tanmoy Chakraborty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Chapter 1 Lectuer 1
Lecture 2 - Chapter 1 Lectuer 2
Lecture 3 - Chapter 1 Lectuer 3
Lecture 4 - Tutorial 1: Introduction to Python/Colab
Lecture 5 - Tutorial 2: Introduction to NetworkX - Part I
Lecture 6 - Chapter 2 Lectuer 1
Lecture 7 - Chapter 2 Lectuer 2
Lecture 8 - Chapter 2 Lectuer 3
Lecture 9 - Chapter 2 Lectuer 4
Lecture 10 - Chapter 2 Lectuer 5
Lecture 11 - Chapter 2 Lectuer 6
Lecture 12 - Tutorial 3: Introduction to NetworkX - Part II
Lecture 13 - Chapter 3 Lectuer 1
Lecture 14 - Chapter 3 Lectuer 2
Lecture 15 - Chapter 3 Lectuer 3
Lecture 16 - Chapter 3 Lectuer 4
Lecture 17 - Chapter 3 Lectuer 5
Lecture 18 - Chapter 3 Lectuer 6
Lecture 19 - Chapter 3 Lectuer 7
Lecture 20 - Chapter 4 Lectuer 1
Lecture 21 - Chapter 4 Lectuer 2
Lecture 22 - Chapter 4 Lectuer 3
Lecture 23 - Chapter 4 Lectuer 4
Lecture 24 - Chapter 4 Lectuer 5
Lecture 25 - Chapter 4 Lectuer 6
Lecture 26 - Tutorial 4
Lecture 27 - Chapter 5 Lectuer 1
Lecture 28 - Chapter 5 Lectuer 2
Lecture 29 - Chapter 5 Lectuer 3

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Lecture 30 - Chapter 5 Lectuer 4
Lecture 31 - Chapter 5 Lectuer 5
Lecture 32 - Chapter 5 Lectuer 6
Lecture 33 - Chapter 5 Lectuer 7
Lecture 34 - Chapter 5 Lectuer 8
Lecture 35 - Chapter 5 Lectuer 9
Lecture 36 - Chapter 5 Lectuer 10
Lecture 37 - Chapter 6 Lectuer 1
Lecture 38 - Chapter 6 Lectuer 2
Lecture 39 - Chapter 6 Lectuer 3
Lecture 40 - Chapter 6 Lectuer 4
Lecture 41 - Chapter 6 Lectuer 5
Lecture 42 - Chapter 7 Lectuer 1
Lecture 43 - Chapter 7 Lectuer 2
Lecture 44 - Chapter 7 Lectuer 3
Lecture 45 - Chapter 7 Lectuer 4
Lecture 46 - Chapter 7 Lectuer 5
Lecture 47 - Chapter 7 Lectuer 6
Lecture 48 - Chapter 7 Lectuer 7
Lecture 49 - Chapter 7 Lectuer 8
Lecture 50 - chapter 8 Lectuer 1
Lecture 51 - chapter 8 Lectuer 2
Lecture 52 - Chapter 8 Lectuer 3
Lecture 53 - Chapter 8 Lectuer 4
Lecture 54 - Chapter 8 Lectuer 5
Lecture 55 - Chapter 8 Lectuer 6
Lecture 56 - Chapter 9 Lectuer 1
Lecture 57 - Chapter 9 Lectuer 2
Lecture 58 - Chapter 9 Lectuer 3
Lecture 59 - Chapter 9 Lectuer 4
Lecture 60 - Chapter 9 Lectuer 5
Lecture 61 - Chapter 9 Lectuer 6
Lecture 62 - Chapter 9 Lectuer 7
Lecture 63 - Chapter 9 Lectuer 8
Lecture 64 - Chapter 9 Lectuer 9
Lecture 65 - Chapter 9 Lectuer 10
Lecture 66 - Chapter 9 Lectuer 11
Lecture 67 - Tutorial 5
Lecture 68 - Chapter 10 Lectuer 1

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Lecture 69 - Chapter 10 Lectuer 2
Lecture 70 - Chapter 10 Lectuer 3
Lecture 71 - Chapter 10 Lectuer 4
Lecture 72 - Chapter 10 Lectuer 5
Lecture 73 - Conclusion - Panel discussion
Lecture 74 - Conclusion

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NPTEL Video Course - Computer Science and Engineering - NOC:Quantum Algorithms and Cryptography

Subject Co-ordinator - Prof. Shweta Agrawal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quantum Algorithms and Cryptography
Lecture 2 - Basics of Quantum Information - Part 1
Lecture 3 - Basics of Quantum Information - Part 2
Lecture 4 - Computation and No-Cloning - Part 1
Lecture 5 - Computation and No-Cloning - Part 2
Lecture 6 - Computation and No-Cloning - Part 3
Lecture 7 - Going beyond classical - Part 1
Lecture 8 - Going beyond classical - Part 2
Lecture 9 - Going beyond classical - Part 3
Lecture 10 - Going beyond classical- Deutsch and Deutsch-Jozsa - Part 1
Lecture 11 - Going beyond classical- Deutsch and Deutsch-Jozsa - Part 2
Lecture 12 - Simon's and Bernstein's Vazirani Algorithm - Part 1
Lecture 13 - Simon's and Bernstein's Vazirani Algorithm - Part 2
Lecture 14 - Introduction to Cryptography - Part 1
Lecture 15 - Introduction to Cryptography - Part 2
Lecture 16 - Introduction to Cryptography - Part 3
Lecture 17 - Building Cryptography - Part 1
Lecture 18 - Building Cryptography - Part 2
Lecture 19 - Building Cryptography - Part 3
Lecture 20 - Building Cryptography - Part 4
Lecture 21 - Building Cryptography - Part 5
Lecture 22 - Building Public Key Encryption - Part 1
Lecture 23 - Building Public Key Encryption - Part 2
Lecture 24 - RSA Encryption - Part 1
Lecture 25 - RSA Encryption - Part 2
Lecture 26 - Finishing RSA, Fourier Transform - Part 1
Lecture 27 - Finishing RSA, Fourier Transform - Part 2
Lecture 28 - Finishing RSA, Fourier Transform - Part 3
Lecture 29 - Grover's Algorithm - Part 1

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Lecture 30 - Grover's Algorithm - Part 2
Lecture 31 - Grover's Algorithm - Part 3
Lecture 32 - Simon's Algorithm over Z_n - Part 1
Lecture 33 - Simon's Algorithm over Z_n - Part 2
Lecture 34 - Simon's Algorithm over Z_n - Part 3
Lecture 35 - Simon's Algorithm over Z_n - Part 4
Lecture 36 - Simon's Algorithm over Z_n - Part 5
Lecture 37 - Simon's Algorithm over Z_n - Part 6
Lecture 38 - Shor's Algorithm - Part 1
Lecture 39 - Shor's Algorithm - Part 2
Lecture 40 - Hidden Subgroup Problem - Part 1
Lecture 41 - Hidden Subgroup Problem - Part 2
Lecture 42 - Introduction to Lattices - Part 1
Lecture 43 - Introduction to Lattices - Part 2
Lecture 44 - Public Key Encryption from LWE - Part 1
Lecture 45 - Public Key Encryption from LWE - Part 2
Lecture 46 - Public Key Encryption from LWE - Part 3
Lecture 47 - Fully Homomorphic Encryption - Part 1
Lecture 48 - Fully Homomorphic Encryption - Part 2
Lecture 49 - Fully Homomorphic Encryption - Part 3
Lecture 50 - Quantum Cryptography - Part 1
Lecture 51 - Quantum Cryptography - Part 2
Lecture 52 - Quantum Cryptography - Part 3
Lecture 53 - Quantum Cryptography - Part 4
Lecture 54 - Quantum Cryptography - Part 5
Lecture 55 - Quantum PKE and FHE - Part 1
Lecture 56 - Quantum PKE and FHE - Part 2
Lecture 57 - Quantum PKE and FHE - Part 3
Lecture 58 - Quantum PKE and FHE - Part 4
Lecture 59 - Quantum PKE and FHE - Part 5

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NPTEL Video Course - Computer Science and Engineering - NOC:Theory of Computation (2023)

Subject Co-ordinator - Prof. Subrahmanyam Kalyanasundaram

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to The Theory of Computation
Lecture 2 - Notations and Terminology in Theory of Computation
Lecture 3 - An Introduction to Finite Automata and Regular Languages - Part 1
Lecture 4 - An Introduction to Finite Automata and Regular Languages - Part 2
Lecture 5 - Significance of Regular Languages and Regular Operations
Lecture 6 - Closure Properties of Regular Languages Under Union, Concatenation and Kleene Star Operation - Pa
Lecture 7 - Closure Properties of Regular Languages Under Union, Concatenation and Kleene Star Operation - Pa
Lecture 8 - An Introduction to Non-Deterministic Finite Automata (NFA)
Lecture 9 - Formal Definitions and Examples of Non-Deterministic Finite Automata (NFA)
Lecture 10 - Equivalence of NFA and DFA
Lecture 11 - Closure of Regular Languages Under Regular Operations (Using NFA)
Lecture 12 - Regular Expressions - Part 1
Lecture 13 - Regular Expressions - Part 2
Lecture 14 - Proving Equivalence of Regular Expression and DFA Through a GNFA
Lecture 15 - Pumping Lemma for Regular Languages - Part 1
Lecture 16 - Pumping Lemma for Regular Languages - Part 2
Lecture 17 - Distinguishability of Strings and Myhill-Nerode Theorem
Lecture 18 - Proving the Myhill-Nerode Theorem
Lecture 19 - An Introduction to Context-Free Languages - Part 1
Lecture 20 - An Introduction to Context-Free Languages - Part 2
Lecture 21 - Chomsky Normal Form
Lecture 22 - CYK Algorithm - Part 1
Lecture 23 - CYK Algorithm - Part 2 (Example)
Lecture 24 - Closure Properties of Context Free Languages
Lecture 25 - An Introduction to Push Down Automata
Lecture 26 - Normalizations in PDA and Intersection of Regular Language and CFL
Lecture 27 - Equivalence of Context Free Grammars and Push Down Automata - Part 1
Lecture 28 - Equivalence of Context Free Grammars and Push Down Automata - Part 2
Lecture 29 - Equivalence of Context Free Grammars and Push Down Automata - Part 3

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Lecture 30 - Pumping Lemma for Context Free Languages
Lecture 31 - Examples of Pumping Lemma Usage for Context Free Languages
Lecture 32 - Formal Definition of a Turing Machine
Lecture 33 - Turing Recognizable and Decidable Languages and TM Examples
Lecture 34 - Multitape Turing Machine
Lecture 35 - Non-Deterministic Turing Machines
Lecture 36 - Equivalence of Deterministic and Nondeterministic TM
Lecture 37 - Church-Turing Thesis
Lecture 38 - Decidable Problems Concerning Regular Languages
Lecture 39 - Decidable Problems Concerning Context Free Languages
Lecture 40 - Countability of Sets
Lecture 41 - Proof of Existence of Undecidable Languages
Lecture 42 - Halting Problem
Lecture 43 - Co-Turing Recognizability
Lecture 44 - An Introduction to Mapping Reducibility
Lecture 45 - Examples of Proving Undecidability Using Reductions
Lecture 46 - Rice Theorem
Lecture 47 - Computation Histories
Lecture 48 - The Post Correspondence Problem
Lecture 49 - Checking Ambiguity in CFG is Undecidable
Lecture 50 - Time Complexity - Part 1
Lecture 51 - Time Complexity - Part 2
Lecture 52 - Non-Deterministic Polynomial Time - Part 1
Lecture 53 - Non-Deterministic Polynomial Time - Part 2
Lecture 54 - Verifiability and NP
Lecture 55 - Polynomial Time Reductions - Part 1
Lecture 56 - Polynomial Time Reductions - Part 2
Lecture 57 - NP-Completeness
Lecture 58 - Cook-Levin Theorem
Lecture 59 - Cook-Levin Theorem - Proof and Implications
Lecture 60 - CLIQUE and VERTEX-COVER is NP-Complete
Lecture 61 - HAM-PATH is NP-Complete
Lecture 62 - SUBSET-SUM is NP-Complete
Lecture 63 - Knapsack Problem
Lecture 64 - Integer Linear Program is NP-Complete
Lecture 65 - Space Complexity and its Complexity Classes
Lecture 66 - Logspace Reductions and NL-Completeness
Lecture 67 - Savitch's theorem
Lecture 68 - Results in Space Complexity

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Lecture 69 - Summary and Concluding Remarks

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NPTEL Video Course - Computer Science and Engineering - NOC:Advanced Computer Networks

Subject Co-ordinator - Prof. Neminath Hubballi, Prof. Sameer Kulkarni

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to High Performance Switching and Routing - Part 1
Lecture 2 - An Introduction to High Performance Switching and Routing - Part 2
Lecture 3 - IP Table Lookup - Part 1
Lecture 4 - IP Table Lookup - Part 2
Lecture 5 - IP Table Lookup: Trie Based Data Structures - Part 1
Lecture 6 - IP Table Lookup: Trie Based Data Structures - Part 2
Lecture 7 - IP Table Lookup: Optimized Trie based Data Structures - Part 1
Lecture 8 - IP Table Lookup: Optimized Trie based Data Structures - Part 2
Lecture 9 - Packet Classification - Part 1
Lecture 10 - Packet Classification - Part 2
Lecture 11 - Packet Classification - Part 3
Lecture 12 - Packet Classification Implementation - Part 1
Lecture 13 - Packet Classification Implementation - Part 2
Lecture 14 - Traffic Management - Part 1
Lecture 15 - Traffic Management - Part 2
Lecture 16 - Traffic Management - Part 3
Lecture 17 - Traffic Management - Part 4
Lecture 18 - Traffic Management - Part 5
Lecture 19 - Traffic Management - Part 6
Lecture 20 - Traffic Management - Part 7
Lecture 21 - Packet Switching Fabric Design - Part 1
Lecture 22 - Packet Switching Fabric Design - Part 2
Lecture 23 - Introduction to Network Softwarization
Lecture 24 - Internet Impasse and Nework Ossification
Lecture 25 - Network Ossification
Lecture 26 - Network Virtualization - Part 1
Lecture 27 - Network Virtualization - Part 2
Lecture 28 - Road to SDN
Lecture 29 - Active Networks

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Lecture 30 - Data and Control Plane Separation
Lecture 31 - Control Plane Abstractions
Lecture 32 - Software Defined Networking - I
Lecture 33 - Software Defined Networking - II
Lecture 34 - Software Defined Networking - III
Lecture 35 - OpenFlow
Lecture 36 - SND Prospects and Challenges
Lecture 37 - Introduction to Network Function Virtualization - I
Lecture 38 - Introduction to Network Function Virtualization - II
Lecture 39 - Network Function Virtualization - Concepts, Framework and Architecture - I
Lecture 40 - Network Function Virtualization - Concepts, Framework and Architecture - II
Lecture 41 - Network Function Virtualization - Road ahead and Key challenges
Lecture 42 - High Performance Network Packet Processing
Lecture 43 - Summary and Comparision of NFV and SDN
Lecture 44 - Programmable Networks - Data Plane Programmability - Overview I
Lecture 45 - Programmable Networks - Data Plane Programmability - Overview II
Lecture 46 - Reconfigurable Match Action Tables
Lecture 47 - P4 Programming
Lecture 48 - Data Center Networking - Introduction - Part 1
Lecture 49 - Data Center Networking - Introduction - Part 2
Lecture 50 - Data Center Networking - Characteristics and Challenges
Lecture 51 - Data Center Networking - Topologies and Architecture - Part 1
Lecture 52 - Data Center Networking - Topologies and Architecture - Part 2
Lecture 53 - Data Center Networking - Protocol Innovations - Part 1
Lecture 54 - Data Center Networking - Protocol Innovations - Part 2
Lecture 55 - Network Telemetry
Lecture 56 - Serverless Computing - Part 1
Lecture 57 - Serverless Computing - Part 2
Lecture 58 - SmartNICs and In-band Network Telemetry, Future of Network Softwarization, SDN 3.0
Lecture 59 - QUIC
Lecture 60 - Green and Sustainable Data Centers
Lecture 61 - Content Distribution in IP Networks - Part 1
Lecture 62 - Content Distribution in IP Networks - Part 2
Lecture 63 - Information Centric Networking - Part 1
Lecture 64 - Information Centric Networking - Part 2
Lecture 65 - Information Centric Networking - Part 3
Lecture 66 - Named Data Networking - Part 1
Lecture 67 - Named Data Networking - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Affective Computing

Subject Co-ordinator - Prof. Jainendra Shukla, Prof. Abhinav Dhal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Affective computing
Lecture 2 - Fundamentals of Affective computing Applications
Lecture 3 - Emotion Psychology
Lecture 4 - Emotion Theory
Lecture 5 - Brain and Asymmetry
Lecture 6 - Emotional Design
Lecture 7 - Affect Elicitation
Lecture 8 - Experimental Methodology
Lecture 9 - Tutorial
Lecture 10 - Introduction to Facial Expression Recognition
Lecture 11 - Facial Feature Extraction
Lecture 12 - Group Level Emotion
Lecture 13 - Applications of Facial Expression Recognition
Lecture 14 - Tutorial
Lecture 15 - Tutorial
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20 - Tutorial
Lecture 21 - Emotions in Physiological Signals
Lecture 22 - Tutorial
Lecture 23 - Emotions via Skin Conductance
Lecture 24 - Emotions Via EEG
Lecture 25 - Multimodal Affect Recognition
Lecture 26 - Multimodal Analysis
Lecture 27 - MM Tutorial
Lecture 28 - Tutorial
Lecture 29

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Lecture 30
Lecture 31
Lecture 32 - Emotionally Intelligent Machines - Part 1
Lecture 33 - Emotionally Intelligent Machines - Part 2
Lecture 34 - Case Study
Lecture 35
Lecture 36
Lecture 37 - Ethics in Affective Computing - 1
Lecture 38 - Ethics in Affective Computing - 2
Lecture 39 - Course Finale

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NPTEL Video Course - Computer Science and Engineering - NOC:Optimisation for Machine Learning: Theory and Imp

Subject Co-ordinator - Prof. Pravesh Biyani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Linear Algebra: Linear Independence
Lecture 2 - Linear Algebra: Rank of a matrix
Lecture 3 - Linear Algebra - Subspaces of a matrix - 1
Lecture 4 - Linear Algebra - Subspaces of a matrix - 2
Lecture 5 - Linear Algebra - Null space
Lecture 6 - Linear Algebra - Eigen Vectors/Values of a matrix - 1
Lecture 7 - Linear Algebra - Eigen Vectors/Values of a matrix - 2
Lecture 8 - Programming Eigen Decomposition using Python
Lecture 9 - Singular Value Decomposition - 1
Lecture 10 - Singular Value Decomposition - 2
Lecture 11 - Principal Component Analysis - 1
Lecture 12 - Principal Component Analysis - 2
Lecture 13 - Principal Component Analysis - 3
Lecture 14 - Principal Component Analysis - Coding
Lecture 15 - Machine Learning - Overview
Lecture 16 - Optimisation Problems
Lecture 17 - Gradient of a Vector Valued Function - 1
Lecture 18 - Gradient of a Vector Valued Function - 2
Lecture 19 - Neural Netowrks - Overview
Lecture 20 - Neural Netowrks - Backpropagation
Lecture 21 - Optimisation - Introduction to optimisation problems
Lecture 22 - Optimisation - Relaxation and approximate convergence
Lecture 23 - Optimisation - First Order Optimality Condition
Lecture 24 - Optimisation - Second Order Optimality Condition
Lecture 25 - Proof of Second Order Optimality Condition, Gradient Methods
Lecture 26 - Gradient Descent - 2
Lecture 27 - Variants of Gradient Descent - 1
Lecture 28 - Variants of Gradient Descent - 2
Lecture 29 - Variants of Gradient Descent - 3

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Lecture 30 - Convex Sets
Lecture 31 - Convex Functions
Lecture 32 - Duality and Lagrangian - Part 1
Lecture 33 - Duality and Lagrangian - Part 2
Lecture 34 - Duality and Lagrangian - Part 3
Lecture 35 - Coding: Introduction to Pytorch
Lecture 36 - Guest Lectuer: Support Vector Machine

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NPTEL Video Course - Computer Science and Engineering - ACM India - RBCDSAI Summer School on DS-AI-ML

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to AI/ML/DS
Lecture 2 - Introduction to Probability; Introduction to machine learning - Part 1
Lecture 3 - Introduction to Probability; Introduction to machine learning - Part 2
Lecture 4 - Introduction to Probability; Introduction to machine learning - Part 3
Lecture 5 - Introduction to Probability; Introduction to machine learning - Part 4
Lecture 6 - Python for AI/ML/DS - Part 1
Lecture 7 - Python for AI/ML/DS - Part 2
Lecture 8 - Descriptive statistics and Inferential statistics - Part 1
Lecture 9 - Descriptive statistics and Inferential statistics - Part 2
Lecture 10 - Descriptive statistics and Inferential statistics - Part 3
Lecture 11 - Descriptive statistics and Inferential statistics - Part 4
Lecture 12 - Descriptive statistics and Inferential statistics - Part 5
Lecture 13 - Distribution, Data visualization, Plotting libraries - Part 1
Lecture 14 - Distribution, Data visualization, Plotting libraries - Part 2
Lecture 15 - Distribution, Data visualization, Plotting libraries - Part 3
Lecture 16 - Linear Algebra for Data science
Lecture 17 - Identification of linear relationship among attributes
Lecture 18 - Solving Linear Equations - 1
Lecture 19 - Solving Linear Equations - 2
Lecture 20 - Linear Algebra - Distance, Hyperplanes and Halfspaces, Eigenvalues, Eigenvectors - Part 1
Lecture 21 - Linear Algebra - Distance, Hyperplanes and Halfspaces, Eigenvalues, Eigenvectors - Part 2
Lecture 22 - Linear Algebra - Part 1
Lecture 23 - Linear Algebra - Part 2
Lecture 24 - Linear Algebra - Part 3
Lecture 25 - Regression Models, Models Selection and Evaluation - Part 1
Lecture 26 - Regression Models, Models Selection and Evaluation - Part 2
Lecture 27 - Regression Models, Models Selection and Evaluation - Part 3
Lecture 28 - Regression Models, Models Selection and Evaluation - Part 4
Lecture 29 - Regression - Part 1

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Lecture 30 - Regression - Part 2
Lecture 31 - Regression - Part 3
Lecture 32 - Classification Naive Bayes, Logistic Regression, K-NN - Part 1
Lecture 33 - Classification Naive Bayes, Logistic Regression, K-NN - Part 2
Lecture 34 - Classification Naive Bayes, Logistic Regression, K-NN - Part 3
Lecture 35 - Classification Naive Bayes, Logistic Regression, K-NN - Part 4
Lecture 36 - Classification - Part 1
Lecture 37 - Classification - Part 2
Lecture 38 - Classification - Part 3
Lecture 39 - Linear Models for Classification - Part 1
Lecture 40 - Linear Models for Classification - Part 2
Lecture 41 - Kernel Machines
Lecture 42 - Solving Langrange Dual in SVM
Lecture 43 - Classification and SVM - Part 1
Lecture 44 - Classification and SVM - Part 2
Lecture 45 - Tree - Based methods, Boosting bagging - Part 1
Lecture 46 - Tree - Based methods, Boosting bagging - Part 2
Lecture 47 - Tree - Based methods, Boosting bagging - Part 3
Lecture 48 - Tree - Based methods, Boosting bagging - Part 4
Lecture 49 - Tree-based approaches for regression and classification - Part 1
Lecture 50 - Tree-based approaches for regression and classification - Part 2
Lecture 51 - Supervised Learning Using K Nearest Neighbors - Part 1
Lecture 52 - Supervised Learning Using K Nearest Neighbors - Part 2
Lecture 53 - Supervised Learning Using K Nearest Neighbors - Part 3
Lecture 54 - Supervised Learning Using K Nearest Neighbors - Part 4
Lecture 55 - Clustering methods - Part 1
Lecture 56 - Clustering methods - Part 2
Lecture 57 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks -
Lecture 58 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks -
Lecture 59 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks -
Lecture 60 - Induction to Neural Networks, Perceptrons, Multilayer Perceptrons, Feedforward Neural Networks -
Lecture 61 - Neural Networks and Feedforward NN - Part 1
Lecture 62 - Neural Networks and Feedforward NN - Part 2
Lecture 63 - Neural Networks and Feedforward NN - Part 3
Lecture 64 - Backpropagation (Intuition)
Lecture 65 - Backpropagation: Computing Cradients w.r.t the Output Units
Lecture 66 - Learning Parameters: Gradient Descent
Lecture 67 - Contours
Lecture 68 - Nesterov Accelerated Gradient Descent

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Lecture 69 - Stochastic and Mini-Batch Gradient Descent
Lecture 70 - Tips for Adjusting learning Rate and Momentum
Lecture 71 - Line Search
Lecture 72 - The convolution operation
Lecture 73 - Convolutional Neural Networks
Lecture 74 - CNN and DL models - Part 1
Lecture 75 - CNN and DL models - Part 2
Lecture 76 - CNN and DL models - Part 3
Lecture 77 - CNN and DL models - Part 4
Lecture 78 - AI/ML/DS Industry Use Cases - Part 1
Lecture 79 - AI/ML/DS Industry Use Cases - Part 2
Lecture 80 - AI/ML - Case Studies in Industry - Part 1
Lecture 81 - AI/ML - Case Studies in Industry - Part 2
Lecture 82 - Q and A on career in research a woman faculty representative from PSGTech and RBCDSAI

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NPTEL Video Course - Computer Science and Engineering - NOC:Machine Learning (ML) in Hindi

Subject Co-ordinator - Prof. Anubha Gupta

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Machine Learning
Lecture 2 - Linear Algebra: Review (Vector Spaces)
Lecture 3 - Linear Algebra: Review (Matrices)
Lecture 4 - Probability Theory: Review (Basics of Probability)
Lecture 5 - Probability Theory: Review (Random Variables)
Lecture 6 - Linear Regression
Lecture 7 - Linear Regression
Lecture 8 - Tutorial: Linear Regression
Lecture 9 - Linear Regression
Lecture 10 - Linear Kernel Regression
Lecture 11 - k-Nearest Neighbour (k-NN) Regression
Lecture 12 - Tutorial: k-NN Regression
Lecture 13 - Tutorial: Kernel Regression
Lecture 14 - Logistic Regression: Classification Evaluation Metrics
Lecture 15 - Logistic Regression
Lecture 16 - Logistic Regression: Examples
Lecture 17 - Tutorial: Logistic Regression
Lecture 18 - Neural Networks
Lecture 19 - Neural Networks
Lecture 20 - Neural Networks: Examples
Lecture 21 - Tutorial: Neural Networks
Lecture 22 - Practical Machine Learning - Part 1
Lecture 23 - Practical Machine Learning - Part 2
Lecture 24 - Practical Machine Learning - Part 3
Lecture 25 - Practical Machine Learning - Part 4
Lecture 26 - Support Vector Machines (SVM)
Lecture 27 - Tutorial: Support Vector Machines (SVM)
Lecture 28 - Kernel Support Vector Machines (k-SVM)
Lecture 29 - NaÃ¯ve Bayes Classification

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Lecture 30 - Decision Trees - Part 1
Lecture 31 - Decision Trees - Part 2
Lecture 32 - Tutorial: Naive Bayes Classification
Lecture 33 - Tutorial: Decision Trees
Lecture 34 - k-NN Classifier
Lecture 35 - Ensemble Learning
Lecture 36 - Random Forests
Lecture 37 - Bagging (Bootstrap AGGregatING)
Lecture 38 - Tutorial: Random Forests
Lecture 39 - Tutorial: k-NN Classifier and Bootstrap AGGregatING (Bagging)
Lecture 40 - Boosting
Lecture 41 - Clustering
Lecture 42 - k-means Clustering
Lecture 43 - Tutorial: Boosting
Lecture 44 - Spectral Clustering
Lecture 45 - Mixture of Models (Gaussian Mixture Models-GMM)
Lecture 46 - Dimensionality Reduction: Principal Component Analysis (PCA) and kernel PCA
Lecture 47 - Tutorial: k-means and Spectral Clustering
Lecture 48 - Tutorial: Principal Component Analysis (PCA) and Gaussian Mixture Models (GMM)
Lecture 49 - Introduction to Deep Learning (DL)
Lecture 50 - Convolutional Neural Networks (CNN) - Part A
Lecture 51 - Convolutional Neural Networks (CNN) - Part B
Lecture 52 - Autoencoders
Lecture 53 - Applications of ML in Healthcare Problems - Part 1
Lecture 54 - Applications of ML in Healthcare Problems - Part 2
Lecture 55 - Tutorial: CNN and Autoencoder

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NPTEL Video Course - Computer Science and Engineering - NOC:Cyber Security and Privacy

Subject Co-ordinator - Prof. Saji K Mathew

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Introduction - Part 3
Lecture 4 - Foundations - Part 1
Lecture 5 - Foundations - Part 2
Lecture 6 - Foundations - Part 3
Lecture 7 - Security management, GRC - Part 1
Lecture 8 - Security management, GRC - Part 2
Lecture 9 - Security management, GRC - Part 3
Lecture 10 - Contingency planning - Part 1
Lecture 11 - Contingency Planning - Part 2
Lecture 12 - Contingency Planning - Part 3
Lecture 13 - Cybersecurity policy - Part 1
Lecture 14 - Cybersecurity policy - Part 2
Lecture 15 - Cybersecurity policy - Part 3
Lecture 16 - Risk Management - Part 1
Lecture 17 - Risk Management - Part 2
Lecture 18 - Risk Management - Part 3
Lecture 19 - Cybersecurity: Industry perspective - Part 1
Lecture 20 - Cybersecurity: Industry perspective - Part 2
Lecture 21 - Cybersecurity: Industry perspective - Part 3
Lecture 22 - Cyber security technologies - Part 1
Lecture 23 - Cyber security technologies - Part 2
Lecture 24 - Cyber security technologies - Part 3
Lecture 25 - Foundations of privacy - Part 1
Lecture 26 - Foundations of privacy - Part 2
Lecture 27 - Foundations of privacy - Part 3
Lecture 28 - Privacy regulation - Part 1
Lecture 29 - Privacy regulation - Part 2

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Lecture 30 - Privacy regulation - Part 3
Lecture 31 - Privacy regulation in Europe - Part 1
Lecture 32 - Privacy regulation in Europe - Part 2
Lecture 33 - Privacy regulation in Europe - Part 3
Lecture 34 - Privacy: The Indian Way - Part 1
Lecture 35 - Privacy: The Indian Way - Part 2
Lecture 36 - Privacy: The Indian Way - Part 3
Lecture 37 - Information privacy: Economics and strategy - Part 1
Lecture 38 - Information privacy: Economics and strategy - Part 2
Lecture 39 - Information privacy: Economics and strategy - Part 3
Lecture 40 - Privacy: Strategy and safety - Part 1
Lecture 41 - Privacy: Strategy and safety - Part 2
Lecture 42 - Privacy: Strategy and safety - Part 3

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NPTEL Video Course - Computer Science and Engineering - NOC:Business Intelligence and Analytics

Subject Co-ordinator - Prof. Saji K Mathew

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Business Intelligence and Analytics
Lecture 2 - Patterns in Data
Lecture 3 - Vocabulary of Business Analytics
Lecture 4 - Course Overview
Lecture 5 - Case: Bizocity Scoring at AT&T
Lecture 6 - Business Intelligence Architecture
Lecture 7 - Data Management
Lecture 8 - Online Transaction Processing
Lecture 9 - Introduction To SQL
Lecture 10 - Normalisation
Lecture 11 - Shopsense Case in MySQL Workbench
Lecture 12 - Online Analytical Processing
Lecture 13 - Descriptive Data Analytics
Lecture 14 - Churn Analysis
Lecture 15 - Customer Lifetime Value
Lecture 16 - NPV-CLV Spreadsheet Analysis
Lecture 17 - Analytics Process
Lecture 18 - Introduction to Statistical Learning and Data Pre-Processing
Lecture 19 - Data Mining Process
Lecture 20 - Overview of Data Mining Techniques
Lecture 21 - Analytics Process Case
Lecture 22 - Introduction to Classification
Lecture 23 - Scoring Models
Lecture 24 - Classifier Performance
Lecture 25 - Decision Trees
Lecture 26 - Attribute Selection
Lecture 27 - Growing a Decision Tree
Lecture 28 - Decision Tree Application - Part 1
Lecture 29 - Decision Tree Application - Part 2

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Lecture 30 - Classification Demo - 1
Lecture 31 - Classification Demo - 2
Lecture 32 - Cluster Analysis
Lecture 33 - Clustering Techniques - Part 1
Lecture 34 - Clustering Techniques - Part 2
Lecture 35 - K-Means Clustering
Lecture 36 - Implementation in Python: Clustering for segmentation and profiling
Lecture 37 - RFM Analysis
Lecture 38 - Trendhub Case on RFM
Lecture 39 - RFM and Clustering
Lecture 40 - Artificial Neural Network
Lecture 41 - ANN Training
Lecture 42 - ANN for Financial Time Series Modelling
Lecture 43 - Implementation in Python: ANN
Lecture 44 - Introduction Text Mining
Lecture 45 - Text Mining Process
Lecture 46 - Text mining Using R - The Case of a Movie Discussion Forum

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NPTEL Video Course - Computer Science and Engineering - NOC:Responsible and Safe AI Systems

Subject Co-ordinator - Prof. Ponnurangam Kumaraguru, Prof. Balaraman Ravindran, Prof. Arun Rajkumar

Co-ordinating Institute - IIITH and IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - AI Capabilities - Part 1
Lecture 3 - AI Capabilities - Part 2
Lecture 4 - AI Risk - Part 1
Lecture 5 - AI Risk - Part 2
Lecture 6 - AI Risk - Part 3
Lecture 7 - AI Risk Part 4"Risks associated with AI, getting harmful outputs from AI, biases
Lecture 8 - Robustness - Part 1
Lecture 9 - Robustness - Part 2
Lecture 10 - Robustness Hands-On
Lecture 11 - RLHF
Lecture 12 - AI Alignment
Lecture 13 - Transformers - Part 1
Lecture 14 - Transformers - Part 2
Lecture 15 - Hugging face
Lecture 16 - Unlearning
Lecture 17 - Approximate unlearning
Lecture 18 - Evaluation of Unlearning and Graph Unlearning - Part 1
Lecture 19 - Evaluation of Unlearning and Graph Unlearning - Part 2
Lecture 20 - Representation Engineering - Hands on
Lecture 21 - Introduction to ML - Part 1
Lecture 22 - Introduction to ML - Part 2
Lecture 23 - Basics of Neural Networks and PyTorch - Part 1
Lecture 24 - Basics of Neural Networks and PyTorch - Part 2
Lecture 25 - PyTorch - Basic Workflow
Lecture 26 - PyTorch - Classification
Lecture 27 - Bias - I
Lecture 28 - Bias - II
Lecture 29 - Source of Bias

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Lecture 30 - Bias - Handson
Lecture 31 - Bias - III
Lecture 32 - Bias - IV
Lecture 33 - Bias in VLM's
Lecture 34 - Bias Handson - Part 1
Lecture 35 - Bias Handson - Part 2
Lecture 36 - Data Privacy
Lecture 37 - Differential Privacy
Lecture 38 - Approximate Differential Privacy
Lecture 39 - Exponential Mechanism
Lecture 40 - Fairness in Machine Learning
Lecture 41 - Interpretability - I
Lecture 42 - Interpretability - II
Lecture 43 - Interpretability Hands-on - Part 1
Lecture 44 - Interpretability Hands-on - Part 2
Lecture 45 - AI Policies, Regulations, AGI - Part 1
Lecture 46 - AI Policies, Regulations, AGI - Part 2
Lecture 47 - AI Policies, Regulations, AGI - Part 3
Lecture 48 - AI Policies, AGI with Prof. David Krueger - Part 1
Lecture 49 - AI Policies, AGI with Prof. David Krueger - Part 2
Lecture 50 - Finetuning and Jailbreaking: Hands-on
Lecture 51 - AI Governance
Lecture 52 - Research Overview: SaGE- Quantifying moral consistency in LLMs
Lecture 53 - Research Overview: Higher Order Structures for Graph Explanations
Lecture 54 - Research Overview: Representation Surgery
Lecture 55 - Summary - Part 1
Lecture 56 - Summary - Part 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Human Computer Interaction (Hindi and English)

Subject Co-ordinator - Prof. Rajiv Ratn Shah

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Human-Computer Interaction (HCI) - Part 1
Lecture 2 - Introduction to Human-Computer Interaction (HCI) - Part 2
Lecture 3 - Good Design Vs Bad Design
Lecture 4 - HCI Project
Lecture 5 - Design - Part 1
Lecture 6 - Design - Part 2
Lecture 7 - Inclusivity, Accessibility and Design Principles
Lecture 8 - Canva
Lecture 9 - Interaction - Part 1
Lecture 10 - Interaction - Part 2
Lecture 11 - Interaction Design Process
Lecture 12 - Prototyping with Figma
Lecture 13 - User Perspective - Part 1
Lecture 14 - User Perspective - Part 2
Lecture 15 - User Perspective
Lecture 16 - Miro
Lecture 17 - Mental/conceptual model
Lecture 18 - Interface - Part 1
Lecture 19 - Interface - Part 2
Lecture 20 - Cognitive Aspects in Human-Computer Interaction
Lecture 21 - Introduction to Behance
Lecture 22 - Data Requirement, Gathering, and Analysis
Lecture 23 - Data Gathering and Analysis
Lecture 24 - Panel Discussion: Ethics, Techniques, and Analysis in Data Gathering
Lecture 25 - IRB Overview
Lecture 26 - Prototyping and Smart UI - Part 1
Lecture 27 - Prototyping and Smart UI - Part 2
Lecture 28 - Hands-on Prototyping Techniques
Lecture 29 - Prototyping for Human-Computer Interaction

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Lecture 30 - Evaluation
Lecture 31 - Evaluation Techniques
Lecture 32 - Illustrator
Lecture 33 - Iterative design and evaluation
Lecture 34 - IoT and HCI
Lecture 35 - IoT and HCI
Lecture 36 - HCI and AI
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Lecture 41 - HCI and AI in Conversational Systems
Lecture 42 - Human Centered AI for Autism Diagnosis
Lecture 43 - Conversational AI: Human-Centric Interaction through HCI and NLP
Lecture 44 - WAYV: Braille Assistive Gloves

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NPTEL Video Course - Computer Science and Engineering - NOC:Large Applications Practicum

Subject Co-ordinator - Prof. Varun Dutt

Co-ordinating Institute - IIT - Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Makefiles: Build Automation - 1
Lecture 2 - Introduction to Makefiles: Build Automation - 2
Lecture 3 - Introduction to GIT: Version Control Simplified
Lecture 4 - Master GIT Workflow: Track and Commit
Lecture 5 - Master GIT: Track and Undo Changes
Lecture 6 - Master GIT: Fetch, Push and Tagging
Lecture 7 - Master GIT: Aliases, Branching and Commits
Lecture 8 - Master GIT: Merging, Conflict Resolution and Branch Management
Lecture 9 - Introduction to Code Documentation with Natural Docs
Lecture 10 - Mastering Code Documentation: Classes, Scope and Formatting
Lecture 11 - Advanced Documentation: Linking, Extra Topics and Abbreviated Syntax
Lecture 12 - Introduction to Software Testing: Verification, Validation and Testing Methods
Lecture 13 - JUnit for Java: Writing and Running Unit Tests in Eclipse
Lecture 14 - Code Coverage Analysis with EclEmma in Eclipse
Lecture 15 - Lexical Analysis with Flex: Tokenizing Input for Parsing
Lecture 16 - Introduction to Parsing with Bison: Building a Simple Expression Parser
Lecture 17 - Flex and Bison Integration: Creating a Complete Expression Parser
Lecture 18 - Introduction to UML: Use Case and Class Diagrams
Lecture 19 - UML Class Diagrams: Associations, Aggregation and Composition
Lecture 20 - Sequence Diagrams and UML Tools in Software Design
Lecture 21 - UML Editing and Code Generation with Umbrello
Lecture 22 - Introduction to Software Reverse Engineering: Disassemblers and Debuggers
Lecture 23 - Reverse Engineering Java and .NET Applications: Decompilers in Action

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NPTEL Video Course - Computer Science and Engineering - NOC:Mobile Virtual Reality and Artificial Intelligenc

Subject Co-ordinator - Prof. Varun Dutt

Co-ordinating Institute - IIT - Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Virtual Reality
Lecture 2 - Virtual Reality today and its applications
Lecture 3 - Unity 3D Setup
Lecture 4 - Getting Familiar with Unity Editor
Lecture 5 - Making a Cube in Unity 3D
Lecture 6 - Materials in Unity 3D
Lecture 7 - Lights in Unity 3D
Lecture 8 - Particle Systems in Unity 3D
Lecture 9 - Applying Physics in Unity 3D
Lecture 10 - Unity Assets Store
Lecture 11 - Introduction to Unity Editor Activity
Lecture 12 - Programming in C# - Variables
Lecture 13 - Programming in C# - Methods
Lecture 14 - Programming in C# - if-blocks
Lecture 15 - Programming in C# - Loops
Lecture 16 - Programming in C# - Activity
Lecture 17 - User Interaction - Inputs, Keypress, Player movements, Cycling cameras
Lecture 18 - User Interaction - Activity
Lecture 19 - Prefabs in Unity 3D - Adding Menus
Lecture 20 - Prefabs in Unity 3D - Prefabs
Lecture 21 - Prefabs in Unity 3D - Explosion Effects
Lecture 22 - Prefabs in Unity 3D - Activity
Lecture 23 - Introduction to Deep Reinforcement Learning
Lecture 24 - Q-Learning Theory
Lecture 25 - Setup Q-Learning with Taxi Tutorial
Lecture 26 - Deep Reinforcement Learning - Activity
Lecture 27 - Introduction to Unity ML Agents
Lecture 28 - Introduction to Proximal Policy Optimization
Lecture 29 - PPO setup in Unity and its Configuration

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Lecture 30 - Imitation Learning
Lecture 31 - Basics of Cardboard VR Game in Unity
Lecture 32 - Google VR (GVR) SDK for Unity
Lecture 33 - Google Cardboard VR - Activity
Lecture 34 - Whack a Mole
Lecture 35 - Blender and Activity
Lecture 36 - Closing Lectuer

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Algebraic Graph Theory

Subject Co-ordinator - Prof. Ranveer Singh

Co-ordinating Institute - IIT - Indore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Warm-up with graphs
Lecture 2 - Incidence matrix, cofactors of the Laplacian matrix (towards Matrix-Tree Theorem)
Lecture 3 - Determinant of submatrices of incidence matrices and characterization of spanning trees
Lecture 4 - Cauchy-Binet theorem and the proof of matrix-tree theorem
Lecture 5 - Rank of incidence matrix and the number of connected components
Lecture 6 - Rank and acyclic graphs, 0-1 incidence matrix and characterization of bipartite graph
Lecture 7 - Introduction of the eigenvalues and eigenvector
Lecture 8 - Adjacency matrix and number of walks; powers of a symmetric matrix
Lecture 9 - The spectral theorem
Lecture 10 - Rayleigh quotient and the eigenvalues
Lecture 11 - A bound on the diameter of a graph using the number of distinct eigenvalues
Lecture 12 - The rank of a symmetric matrix equals the number of nonzero eigenvalues
Lecture 13 - Perron-Frobenius theorem for nonnegative symmetric matrices
Lecture 14 - The consequences of the Perron-Frobenius theorem (the properties of the largest eigenvalue and t
Lecture 15 - Eigenvalues of a graph and its subgraph; a relation between the largest eigenvalue and the degre
Lecture 16 - Cauchy interlace theorem
Lecture 17 - Bipartite graphs and their eigenvalues
Lecture 18 - Positive semi-definite matrices and the eigenvalues of their partitioned form
Lecture 19 - The eigenvalues of a symmetric matrix in partitioned form
Lecture 20 - Bounds on chromatic number, clique number, and independence number
Lecture 21 - Introduction to lazy random walk, walk matrix
Lecture 22 - Convergence of lazy random walk
Lecture 23 - Rate of convergence of lazy random walk
Lecture 24 - Regular graphs, spectral properties, bound on size of independent set
Lecture 25 - Strongly regular graphs, their eigenvalues, and characterization
Lecture 26 - The friendship theorem
Lecture 27 - Introduction to cospectral graphs
Lecture 28 - Godsil McKay switching to generate cospectral graphs
Lecture 29 - Cartesian product and their eigenvalues, Shrikhande graph

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Lecture 30 - Graph determined by the spectrum
Lecture 31 - Sensitivity, block sensitivity and hypercube graph
Lecture 32 - Proof of sensitivity conjecture
Lecture 33 - Introduction to expander graphs
Lecture 34 - A lower bound on Cheeger constant, and expander mixing lemma
Lecture 35 - Introduction to Ramanujan graphs
Lecture 36 - 2-Lift and Zig-zag product for construction of expander and Ramanujan graphs
Lecture 37 - Introduction of algebraic connectivity and Fiedler vector
Lecture 38 - Upper bound on algebraic connectivity
Lecture 39 - Some more bounds on algebraic connectivity
Lecture 40 - Relation between algebraic connectivity of graph and its induced subgraph
Lecture 41 - Introduction to Balanced Signed Graphs
Lecture 42 - Sign Switching in Signed Graphs
Lecture 43 - Laplacian of Signed Graphs, Frustration number and Frustration index
Lecture 44 - Determinant, Permanent in terms of graph structure

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundations of Virtual Reality

Subject Co-ordinator - Prof. M.Manivannan, Prof. Anna LaValle, Prof. Steven LaValle

Co-ordinating Institute - IIT Madras and University of Oulu

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - VR Definition, History - Part 1
Lecture 2 - VR Definition, History - Part 2
Lecture 3 - VR Definition, History - Part 3
Lecture 4 - Bird's Eye View - Hardware - Part 1
Lecture 5 - Bird's Eye View - Hardware - Part 2
Lecture 6 - Bird's Eye View - Hardware - Part 3
Lecture 7 - Bird's Eye View - Software and Human Perception - Part 1
Lecture 8 - Bird's Eye View - Software and Human Perception - Part 2
Lecture 9 - Bird's Eye View - Software and Human Perception - Part 3
Lecture 10 - Bird's Eye View - Software and Human Perception - Part 4
Lecture 11 - Geometry of Virtual Worlds - Part 1
Lecture 12 - Geometry of Virtual Worlds - Part 2
Lecture 13 - Geometry of Virtual Worlds - Part 3
Lecture 14 - Geometry of Virtual Worlds - Part 4
Lecture 15 - Canonical Rotations, Quaternions - Part 1
Lecture 16 - Canonical Rotations, Quaternions - Part 2
Lecture 17 - Canonical Rotations, Quaternions - Part 3
Lecture 18 - Canonical Rotations, Quaternions - Part 4
Lecture 19 - Homogeneous Transformations, Examples - Part 1
Lecture 20 - Homogeneous Transformations, Examples - Part 2
Lecture 21 - Homogeneous Transformations, Examples - Part 3
Lecture 22 - Homogeneous Transformations, Examples - Part 4
Lecture 23 - Light, Optics, and the Human Eye - Part 1
Lecture 24 - Light, Optics, and the Human Eye - Part 2
Lecture 25 - Light, Optics, and the Human Eye - Part 3
Lecture 26 - Light, Optics, and the Human Eye - Part 4
Lecture 27 - Light, Optics, and the Human Eye - Part 5
Lecture 28 - Light, Optics, and the Human Eye - Part 6
Lecture 29 - Light, Optics, and the Human Eye - Part 7

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Lecture 30 - Light, Optics, and the Human Eye - Part 8
Lecture 31 - The Human Eye - Physiology and Neuroscience - Part 1
Lecture 32 - The Human Eye - Physiology and Neuroscience - Part 2
Lecture 33 - The Human Eye - Physiology and Neuroscience - Part 3
Lecture 34 - The Human Eye - Physiology and Neuroscience - Part 4
Lecture 35 - Physiology of Human Vision, VR Screen Resolution - Part 1
Lecture 36 - Physiology of Human Vision, VR Screen Resolution - Part 2
Lecture 37 - Physiology of Human Vision, VR Screen Resolution - Part 3
Lecture 38 - Physiology of Human Vision, VR Screen Resolution - Part 4
Lecture 39 - Eye Motions and Neurophysiology of Human Vision, Human Perception of Motion - Part 1
Lecture 40 - Eye Motions and Neurophysiology of Human Vision, Human Perception of Motion - Part 2
Lecture 41 - Eye Motions and Neurophysiology of Human Vision, Human Perception of Motion - Part 3
Lecture 42 - Eye Motions and Neurophysiology of Human Vision, Human Perception of Motion - Part 4
Lecture 43 - Human Perception of Motion, Frames per Second - Part 1
Lecture 44 - Human Perception of Motion, Frames per Second - Part 2
Lecture 45 - Human Perception of Motion, Frames per Second - Part 3
Lecture 46 - Human Perception of Motion, Frames per Second - Part 4
Lecture 47 - Depth, Perception, Panoromas - Part 1
Lecture 48 - Depth, Perception, Panoromas - Part 2
Lecture 49 - Depth, Perception, Panoromas - Part 3
Lecture 50 - Depth, Perception, Panoromas - Part 4
Lecture 51 - Modelling - Part 1
Lecture 52 - Modelling - Part 2
Lecture 53 - Modelling - Part 3
Lecture 54 - Modelling - Part 4
Lecture 55 - Vestibular systems - Part 1
Lecture 56 - Vestibular systems - Part 2
Lecture 57 - Vestibular systems - Part 3
Lecture 58 - Vestibular systems - Part 4
Lecture 59 - Tracking Systems - Part 1
Lecture 60 - Tracking Systems - Part 2
Lecture 61 - Tracking Systems - Part 3
Lecture 62 - Tracking Systems - Part 4
Lecture 63 - Rendering Pipeline - Part 1
Lecture 64 - Rendering Pipeline - Part 2
Lecture 65 - Rendering Pipeline - Part 3
Lecture 66 - Rendering Pipeline - Part 4
Lecture 67 - Rendering Pipeline - Part 5
Lecture 68 - Rendering Pipeline - Part 6

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Lecture 69 - 3D Computer Graphics: Rendering Pipeline - Part 1
Lecture 70 - 3D Computer Graphics: Rendering Pipeline - Part 2
Lecture 71 - 3D Computer Graphics: Rendering Pipeline - Part 3
Lecture 72 - Spatial Audio Rendering Pipeline - Part 1
Lecture 73 - Spatial Audio Rendering Pipeline - Part 2
Lecture 74 - Spatial Audio Rendering Pipeline - Part 3
Lecture 75 - Spatial Audio Rendering Pipeline - Part 4
Lecture 76 - Spatial Audio Rendering Pipeline - Part 5
Lecture 77 - Spatial Audio Rendering Pipeline - Part 6
Lecture 78 - Haptics Rendering Pipeline - Part 1
Lecture 79 - Haptics Rendering Pipeline - Part 2
Lecture 80 - Haptics Rendering Pipeline - Part 3

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NPTEL Video Course - Computer Science and Engineering - NOC:Human Computer Interaction (In Hindi)

Subject Co-ordinator - Prof. Rajiv Ratn Shah

Co-ordinating Institute - IIIT Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Human-Computer Interaction (HCI) - Part 1
Lecture 2 - Introduction to Human-Computer Interaction (HCI) - Part 2
Lecture 3 - Introduction to Human-Computer Interaction (HCI) - Part 3
Lecture 4 - Introduction to Human-Computer Interaction (HCI) - Part 4
Lecture 5 - Good Design Vs Bad Design
Lecture 6 - HCI Project
Lecture 7 - Design - Part 1
Lecture 8 - Design - Part 2
Lecture 9 - Inclusivity, Accessibility and Design Principles
Lecture 10 - Canva
Lecture 11 - Interaction - Part 1
Lecture 12 - Interaction - Part 2
Lecture 13 - Interaction Design Process
Lecture 14 - Prototyping with Figma
Lecture 15 - User Perspective - Part 1
Lecture 16 - User Perspective - Part 2
Lecture 17 - User Perspective
Lecture 18 - Miro
Lecture 19 - Personas, Mental model
Lecture 20 - Interface - 1
Lecture 21 - Interface - 2
Lecture 22 - Cognitive Aspects in Human-Computer Interaction
Lecture 23 - Introduction to Behance
Lecture 24 - Data Requirement, Gathering, and Analysis
Lecture 25 - Data Gathering and Analysis
Lecture 26 - Panel Discussion: Ethics, Techniques, and Analysis in Data Gathering
Lecture 27 - Prototyping and Smart UI
Lecture 28 - Hands-on Prototyping Techniques
Lecture 29 - Prototyping for Human-Computer Interaction

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Lecture 30 - Evaluation
Lecture 31 - Evaluation Techniques
Lecture 32 - Illustrator
Lecture 33 - Iterative design and Evaluation
Lecture 34 - IoT and HCI - Part 1
Lecture 35 - IoT and HCI - Part 2
Lecture 36 - HCI and AI
Lecture 37 - LLM and HCI Tutorial
Lecture 38 - AI-Powered Tools for Content Generation and Analysis: Kyron
Lecture 39 - AI-Powered Tools for Content Generation and Analysis: Firefly, Audino
Lecture 40 - Privacy, Security, and HCI
Lecture 41 - HCI and AI in Conversational Systems - Part 1
Lecture 42 - HCI and AI in Conversational Systems - Part 2
Lecture 43 - Human Centered AI for Autism Diagnosis
Lecture 44 - Conversational AI: Human-Centric Interaction through HCI and NLP
Lecture 45 - WAYV: Braille Assistive Gloves

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NPTEL Video Course - Computer Science and Engineering - Automated Program Verification

Subject Co-ordinator - Prof. Kartik Nagar

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Propositional Logic (PL)
Lecture 3 - Satisfiability and Validity in Propositional Logic
Lecture 4 - Davis-Putnam-Logemann-Loveland Algorithm (DPLL) - Part A
Lecture 5 - Davis-Putnam-Logemann-Loveland Algorithm (DPLL) - Part B
Lecture 6 - Encoding Problems in Propositional Logic
Lecture 7 - First-Order Logic (FOL)
Lecture 8 - Satisfiability and Validity in First-Order Logic - Part A
Lecture 9 - Satisfiability and Validity in First-Order Logic - Part B
Lecture 10 - Satisfiability Modulo Theories (SMT)
Lecture 11 - Theory of Equality (T_=) - Part A
Lecture 12 - Theory of Equality (T_=) - Part B
Lecture 13 - Theory of Numbers
Lecture 14 - Theory of Arrays
Lecture 15 - Combination of Theories
Lecture 16 - Compactness of FOL
Lecture 17 - Application of SMT: Bounded Model Checking
Lecture 18 - Z3 Tool
Lecture 19 - Introduction to Program Verification
Lecture 20 - Formal Definition of Program Verification
Lecture 21 - Different Forms of Program Specifications
Lecture 22 - Towards Automated Verification
Lecture 23 - Strongest Post Condition - Part A : Primitive Statements
Lecture 24 - Strongest Post Condition - Part B : Primitive Statements
Lecture 25 - Strongest Post Condition - Part C : Compound Statements
Lecture 26 - Strongest Post-Condition - Part D : Putting it all together
Lecture 27 - Soundness and Completeness of Strongest Post-Condition
Lecture 28 - Weakest Pre-condition - Part A : Primitive Statements
Lecture 29 - Weakest Pre-condition - Part B : Primitive Statements

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Lecture 30 - Weakest Pre-condition - Part C : Compound Statements
Lecture 31 - Weakest Pre-condition - Part D : Putting it all together
Lecture 32 - Hoare Logic - Part A : Introduction
Lecture 33 - Hoare Logic - Part B : Inference Rules for Compound Statements
Lecture 34 - Hoare Logic - Part C : Loop Invariants
Lecture 35 - Hoare Logic - Part D : Putting it all together
Lecture 36 - Crafting Inductive Loop Invariants
Lecture 37 - Verification Condition Generation - Part A
Lecture 38 - Verification Condition Generation - Part B
Lecture 39 - Handling functions
Lecture 40 - Handling Pointers
Lecture 41 - Introduction to Abstract Interpretation
Lecture 42 - Forward Propagate Algorithm
Lecture 43 - Overview of Abstract Interpretation
Lecture 44 - Soundness of Abstract Interpretation
Lecture 45 - Lattice Theory Basics - Part A
Lecture 46 - Lattice Theory Basics - Part B
Lecture 47 - Fixpoints
Lecture 48 - Chains
Lecture 49 - Galois Connection
Lecture 50 - Concrete and Abstract Join Over Path
Lecture 51 - Defining Soundness of Abstract Interpretation
Lecture 52 - Proof of Soundness of Abstract Interpretation
Lecture 53 - Introduction to Kildall's Algorithm
Lecture 54 - Properties of Kildall's Algorithm
Lecture 55 - Kildall's Algorithm with Monotonic Transfer Functions
Lecture 56 - Kildall's Algorithm with Distributive Transfer Functions
Lecture 57 - Proof of Soundness of Kildall's Algorithm
Lecture 58 - Proof of Termination of Kildall's Algorithm
Lecture 59 - Constant Abstract Domain
Lecture 60 - Interval Abstract Domain: Introduction
Lecture 61 - Interval Abstract Domain: Widening and Narrowing
Lecture 62 - Relational Domains and Inter-Procedural Abstract Interpretation
Lecture 63 - Concrete and Symbolic Model Checking
Lecture 64 - Abstract Model Checking
Lecture 65 - Abstract Model Cheking with Cartesian Predicate Abstraction
Lecture 66 - Abstraction Refinement using Interpolation
Lecture 67 - CEGAR
Lecture 68 - Summary

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NPTEL Video Course - Computer Science and Engineering - NOC:Artificial Intelligence (AI) for Management

Subject Co-ordinator - Prof. Saji K Mathew

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - AI in Business: Milestones, Applications, and Organizational Challenges - 1
Lecture 2 - AI in Business: Milestones, Applications, and Organizational Challenges - 2
Lecture 3 - AI in Business: Milestones, Applications, and Organizational Challenges - 3
Lecture 4 - Case of AI Development: OpenAI and Industry Adoption
Lecture 5 - Case of AI for Social Impact : e-Paarvai in Healthcare
Lecture 6 - Machine Learning (ML) Fundamentals: Modeling and Testing
Lecture 7 - Artificial neural networks - 1
Lecture 8 - Artificial neural networks - 2
Lecture 9 - ANN for Stock Market Application
Lecture 10 - Digital Business Strategy: Enterprise systems to Ecosystems - 1
Lecture 11 - Digital Business Strategy: Enterprise systems to Ecosystems - 2
Lecture 12 - AI-Driven Business Models and Platforms
Lecture 13 - AI-Driven Business Models and Global Platform Strategy: The Bytedance Case
Lecture 14 - Industry Lectuer - Strategies for future of work in management
Lecture 15 - Business Value of AI: Strategic, Capability, and Value-Creation Perspectives
Lecture 16 - Business Value of AI: A Case in Point
Lecture 17 - Vibe Coding
Lecture 18 - Vibe Coding Demo
Lecture 19 - Business Value of AI: Measuring What Matters - Part 1
Lecture 20 - Business Value of AI: Measuring What Matters - Part 2
Lecture 21 - Algorithmic Decision Making - 1
Lecture 22 - Algorithmic Decision Making - 2
Lecture 23 - Machine Bias: Root Cause, Examples, and Cognitive Biases in Data
Lecture 24 - AI for Decision-Making: Interpretability and Explainability
Lecture 25 - Interpretability, Explainability, and the Black Box Problem in AI
Lecture 26 - Introduction to RNN and LSTM - 1
Lecture 27 - Introduction to RNN and LSTM - 2
Lecture 28 - Advances in ANN - 1
Lecture 29 - Advances in ANN - 2

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Lecture 30 - AI Risk: Sources
Lecture 31 - AI Risk and Bias: Sources, Examples, and Control Mechanisms
Lecture 32 - The Dark Side of AI: Manifested Risks and the Alignment Problem
Lecture 33 - Case: AI for VA
Lecture 34 - Prompt Engineering
Lecture 35 - Responsible AI: An Introduction
Lecture 36 - Case - Responsible AI: Silenced No More!
Lecture 37 - AI and Fairness
Lecture 38 - Responsible AI: Principles, Governance and Regulation - Part 1
Lecture 39 - Responsible AI: Principles, Governance and Regulation - Part 2
Lecture 40 - Building AI Systems Responsibly

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NPTEL Video Course - Computer Science and Engineering - NOC:Predictive Modelling with Applications: Supervise

Subject Co-ordinator - Prof. Sayantee Jana

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Predictive Modelling
Lecture 2 - Correlation coefficient
Lecture 3 - Principal Components Analysis - 1
Lecture 4 - Principal Components Analysis - 2
Lecture 5 - Principal Components Analysis - 3
Lecture 6 - Factor Analysis - 1
Lecture 7 - Factor Analysis - 2
Lecture 8 - Factor Analysis applications with R
Lecture 9 - Introduction to Cluster Analysis
Lecture 10 - Agglomerative Hierarchical clustering 1
Lecture 11 - Hierarchical clustering
Lecture 12 - Hierarchical clustering using R examples
Lecture 13 - k-means clustering
Lecture 14 - Simple linear regression - 1
Lecture 15 - Simple linear regression - 2
Lecture 16 - Multiple linear regression - 1
Lecture 17 - Multiple linear regression - 2
Lecture 18 - Multiple linear Regression - 3
Lecture 19 - Outliers - 1
Lecture 20 - Outliers - 2
Lecture 21 - Outliers Detection
Lecture 22 - Regression Modelling with Categorical predictors using R
Lecture 23 - Modelling Non-linear and Interaction effects in Regression using R
Lecture 24 - Autocorrelation - 1
Lecture 25 - Autocorrelation - 2
Lecture 26 - Tests for Normality - 1
Lecture 27 - Tests for Normality - 2
Lecture 28 - Multicollinearity in Regression - 1
Lecture 29 - Multicollinearity in Regression - 2

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Lecture 30 - Multicollinearity in Regression - 3
Lecture 31 - Heteroscedasticity - 1
Lecture 32 - Heteroscedasticity - 2
Lecture 33 - Heteroscedasticity - 3
Lecture 34 - Variable Selection and Model Evaluation
Lecture 35 - Case study
Lecture 36 - Odds Ratio
Lecture 37 - Logistic Regression - 1
Lecture 38 - Logistic Regression - 2
Lecture 39 - Regression Disconituity Design

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Information Retrieval

Subject Co-ordinator - Prof. Dwaipayan Roy

Co-ordinating Institute - IISER Kolkata

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Introduction to Information Retrieval
Lecture 3 - Text Processing: Term Selection
Lecture 4 - Text Processing: Term Filtering and Linguistic Processing
Lecture 5 - Indexing
Lecture 6 - Inverted Index
Lecture 7 - Making of the Inverted Index
Lecture 8 - Storing Inverted Index
Lecture 9 - Inverted Index Summary
Lecture 10 - Statistical Properties of Text - Zipf's Law
Lecture 11 - Statistical Properties of Text - Heap's Law
Lecture 12 - Index Compression
Lecture 13 - Getting started with PyLucene
Lecture 14 - Installing Docker and PyLucene
Lecture 15 - Understanding Different Fields in PyLucene - 1
Lecture 16 - Understanding Different Fields in PyLucene - 2
Lecture 17 - Reading a Small Toy Dataset for Indexing using PyLucene
Lecture 18 - Different Analyzers in PyLucene
Lecture 19 - Indexing using PyLucene - Setting the Parameters
Lecture 20 - Indexing using PyLucene - 2
Lecture 21 - Non-English Text Analysis using PyLucene
Lecture 22 - Exploring Luke: The Lucene Index Viewer
Lecture 23 - Experimenting with Different Options in Indexing
Lecture 24 - PyLucene Practice Programs - 1
Lecture 25 - PyLucene Practice Programs - 2
Lecture 26 - Query Processing
Lecture 27 - Introduction to Ranked Retrieval
Lecture 28 - Introduction to Term Weightings for Retrieval - TF
Lecture 29 - Introduction to Term Weightings for Retrieval - IDF

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Lecture 30 - Vector Space Model - 1
Lecture 31 - Vector Space Model - 2
Lecture 32 - Vector Space Model - 3
Lecture 33 - Vector Space Model - Problem Solving - 1
Lecture 34 - Vector Space Model - Problem Solving - 2
Lecture 35 - Probabilistic Model - Introduction
Lecture 36 - Binary Independence Model (BIM)
Lecture 37 - Best Match Model, BM1, BM11, BM15, BM25
Lecture 38 - Dissecting BM25, BM25 vs VSM, BM25 for long queries, BM25F, BM25+
Lecture 39 - BM25, After 30 years
Lecture 40 - Introduction to Language Model for Information Retrieval
Lecture 41 - Introducing Unigram Language Model
Lecture 42 - Estimating Document Language Model
Lecture 43 - Zero Frequency Problem and introduction to Smoothing
Lecture 44 - Jelinek-Mercer and Dirichlet Smoothed Language Model
Lecture 45 - Comparing Smoothing with IDF and Summary of LM based Retrieval
Lecture 46 - Using Divergence Measures for Document Scoring
Lecture 47 - PyLucene for Retrieval
Lecture 48 - PyLucene - Varius Query Classes 1 - TermQuery
Lecture 49 - PyLucene - Varius Query Classes 2 - PhraseQuery, TermRangeQuery, Numerical Range Query, PrefixQu
Lecture 50 - PyLucene - Varius Query Classes 3 - BooleanQuery, WildcardQuery, FuzzyQuery, MatchAllDocsQuery
Lecture 51 - Evaluating Information Retrieval Systems 1 - Set Based Evaluation Metrics
Lecture 52 - Evaluating Information Retrieval Systems 2 - Precision@K, R-Prec, Incorporating Ranking in Preci
Lecture 53 - Evaluating Information Retrieval Systems 3 - AP, MAP, GMAP, MRR
Lecture 54 - Evaluating Information Retrieval Systems 4 - Graded relevance, nDCG
Lecture 55 - Evaluating Information Retrieval Systems 5 - Hypothesis Testing, Role of Evaluation Forums, Kapp
Lecture 56 - Indexing in Benchmark Dataset - Indexing TREC-like Benchmark Datasets
Lecture 57 - Retrieval in Benchmark Dataset - Retrieval in TREC-like Benchmark Datasets, and Evaluation using
Lecture 58 - Comparing Retrieval Models - Hypothesis Testing in Information Retrieval
Lecture 59 - Relevance Feedback 1 - An Introduction
Lecture 60 - Relevance Feedback 2 - Rocchio's Algorithm
Lecture 61 - Relevance Feedback 3 - Incorporating Pseudo Feedback using Relevance based Language Model, RM3
Lecture 62 - Web Search And Crawler
Lecture 63 - PageRank Algorithm
Lecture 64 - PageRank - Random Surfer's Algorithm
Lecture 65 - HITS Algorithm: Hubs and Authorities
Lecture 66 - Search Engine Optimization
Lecture 67 - Learning to Rank for Information Retrieval
Lecture 68 - Latent Semantic Indexing

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Lecture 69 - Introduction to Embeddings for Information Retrieval
Lecture 70 - From Embeddings to Transformers
Lecture 71 - Large Language Models for Information Retrieval

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NPTEL Video Course - Computer Science and Engineering - NOC:Data Mining for Decision Making

Subject Co-ordinator - Prof. Varun Dutt

Co-ordinating Institute - IIT Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Data Mining Explained: Decision Lists and Association Rules Made Simple
Lecture 2 - How to Install WEKA: Step-by-Step Guide for Beginners
Lecture 3 - Getting Started with WEKA: A Complete Beginnerâ s Overview
Lecture 4 - Basics of Bayesian Classification: Understanding Probabilistic Learning
Lecture 5 - A Deep Dive into Bayesian Classification: Concepts and Intuition building
Lecture 6 - Implementing Bayesian Classification Using WEKA
Lecture 7 - Bayesian Classification with Numeric Data: Theory and Examples
Lecture 8 - Decision Trees Explained: From Roots to Leaves
Lecture 9 - Building Decision Trees in WEKA: Hands-On Tutorial
Lecture 10 - Neural Networks Fundamentals: How Artificial Brains Learn
Lecture 11 - Neural Networks Explained: Architecture and Learning
Lecture 12 - Implementing Neural Networks in WEKA
Lecture 13 - Clustering Basics: Grouping Data Without Labels
Lecture 14 - Clustering Algorithms in WEKA: Practical Demonstration
Lecture 15 - Clustering Techniques Explained: Beyond the Basics
Lecture 16 - Principal Component Analysis (PCA): Dimensionality Reduction Explained
Lecture 17 - Applying PCA in WEKA: Step-by-Step Walkthrough
Lecture 18 - Linear Regression Explained: Modeling Relationships in Data
Lecture 19 - Linear Regression Using WEKA: Practical Implementation
Lecture 20 - Logistic Regression Basics: Classification Made Easy
Lecture 21 - Logistic Regression in WEKA: Hands-On Classification
Lecture 22 - Instance-Based Learning Explained: Learning from Examples
Lecture 23 - Instance-Based Learning in WEKA: KNN and Beyond
Lecture 24 - Market Basket Analysis Explained: Discovering Hidden Patterns
Lecture 25 - Market Basket Analysis Using WEKA
Lecture 26 - Linear Discriminant Analysis (LDA): Classification Intuition
Lecture 27 - Linear Discriminant Analysis Explained in Depth
Lecture 28 - Implementing LDA in WEKA
Lecture 29 - Model Evaluation Metrics Explained: Accuracy, Precision and More

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Lecture 30 - Support Vector Machines Explained: Maximum Margin Learning
Lecture 31 - Support Vector Machines Deep Dive: Kernels and Optimization
Lecture 32 - Advanced SVM Concepts: Kernels, Margins and Hyperparameters
Lecture 33 - Support Vector Machines in WEKA: Practical Tutorial

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction To Haskell Programming (2026)

Subject Co-ordinator - Prof. S. P Suresh

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functions and types - 1
Lecture 2 - Functions and types - 2
Lecture 3 - Functions and types - 3
Lecture 4 - Haskell demo
Lecture 5 - Recursive functions - 1
Lecture 6 - Recursive functions - 2
Lecture 7 - Lists - 1
Lecture 8 - Lists - 2
Lecture 9 - Lists demo
Lecture 10 - Built-in functions on lists, list notations - 1
Lecture 11 - Built-in functions on lists, list notations - 2
Lecture 12 - Char, String, tuples, etc
Lecture 13 - Haskell demo
Lecture 14 - Higher-order functions
Lecture 15 - Folds
Lecture 16 - More folds
Lecture 17 - Higher-order functions: demo
Lecture 18 - Polymorphism and type classes
Lecture 19 - User-defined data types
Lecture 20 - Demo session: user-defined types
Lecture 21 - Demo session: problem solving
Lecture 22 - Recursive data types - 1
Lecture 23 - Recursive data types - 2
Lecture 24 - Computation as rewriting
Lecture 25 - Input/output : basics - 1
Lecture 26 - Input/output : basics - 2
Lecture 27 - Input/output : loops - 1
Lecture 28 - Input/output : loops - 2
Lecture 29 - Measuring efficiency

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Lecture 30 - Sorting
Lecture 31 - Merge sort
Lecture 32 - Quick sort
Lecture 33 - Exploring graphs - connectedness
Lecture 34 - Exploring graphs - eight queens problem
Lecture 35 - Abstract data types - Stacks
Lecture 36 - Abstract data types - Queues
Lecture 37 - Binary trees - 1
Lecture 38 - Binary trees - 2
Lecture 39 - Binary search trees - 1
Lecture 40 - Binary search trees - 2
Lecture 41 - AVL trees - 1
Lecture 42 - AVL trees - 2
Lecture 43 - Leftist heaps - 1
Lecture 44 - Leftist heaps - 2
Lecture 45 - Immutable arrays using Data.Array
Lecture 46 - Dynamic programming in Haskell
Lecture 47 - Solving Sudoku - An example of a full-fledged program development

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Cryptology

Subject Co-ordinator - Dr. Sugata Gangopadhyay

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Caeser cipher
Lecture 2 - Modular arithmetic, shift cipher
Lecture 3 - Affine Cipher, Vigenere Cipher
Lecture 4 - Prefect secrecy, Application of Shift Cipher
Lecture 5 - Problem Discussion on Affine cipher and Perfect Secrecy
Lecture 6 - Product Cipher, Block Cipher, Modes of Operation for Block Cipher
Lecture 7 - Substitution Permutation network, Fiestel Cipher
Lecture 8 - S-Box Theory
Lecture 9 - Cryptanalysis and its Variants, Linear Attack
Lecture 10 - Problem Discussion
Lecture 11 - Public Key Cryptology Introduction RSA Cryptosystem
Lecture 12 - Complexity analysis of Euclidian Algorithm and RSA Cryptosystem square and multiply algorithm
Lecture 13 - Primality testing
Lecture 14 - Efficien Computation of Jacobi Symbol Primality Testing
Lecture 15 - Problem Discussion on Jacobi Symbol Calculation and RSA Cryptosystem
Lecture 16 - Cryptographic hash function
Lecture 17 - Random Oracle model, Security of hash functions
Lecture 18 - Randomized Algorithm and its application on Preimage resistance and collision resistance
Lecture 19 - Iterated Hash Functions
Lecture 20 - Problem Discussionn

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NPTEL Video Course - Computer Science and Engineering - NOC:Data Analytics with Python

Subject Co-ordinator - Prof. A. Ramesh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to data analytics
Lecture 2 - Python Fundamentals - I
Lecture 3 - Python Fundamentals - II
Lecture 4 - Central Tendency and Dispersion - I
Lecture 5 - Central Tendency and Dispersion - II
Lecture 6 - Introduction to Probability - I
Lecture 7 - Introduction to Probability - II
Lecture 8 - Probability Distributions - I
Lecture 9 - Probability Distributions - II
Lecture 10 - Probability Distributions - III
Lecture 11 - Python Demo for Distributions
Lecture 12 - Sampling and Sampling Distribution
Lecture 13 - Distribution of Sample Means, population, and variance
Lecture 14 - Confidence interval estimation
Lecture 15 - Confidence interval estimation
Lecture 16 - Hypothesis Testing - I
Lecture 17 - Hypothesis Testing - II
Lecture 18 - Hypothesis Testing - III
Lecture 19 - Errors in Hypothesis Testing
Lecture 20 - Hypothesis Testing
Lecture 21 - Hypothesis Testing
Lecture 22 - Hypothesis Testing
Lecture 23 - ANOVA - I
Lecture 24 - ANOVA - II
Lecture 25 - Post Hoc Analysis (Tukeyâ s test)
Lecture 26 - Randomize block design (RBD)
Lecture 27 - Two Way ANOVA
Lecture 28 - Linear Regression - I
Lecture 29 - Linear Regression - II

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Lecture 30 - Linear Regression - III
Lecture 31 - Estimation, Prediction of Regression Model Residual Analysis - I
Lecture 32 - Estimation, Prediction of Regression Model Residual Analysis - II
Lecture 33 - Multiple Regression Model - I
Lecture 34 - Multiple Regression Model - II
Lecture 35 - Categorical variable regression
Lecture 36 - Maximum Likelihood Estimation - I
Lecture 37 - Maximum Likelihood Estimation - II
Lecture 38 - Logistic Regression - I
Lecture 39 - Logistic Regression - II
Lecture 40 - Linear Regression Model Vs Logistic Regression Model
Lecture 41 - Confusion matrix and ROC - I
Lecture 42 - Confusion Matrix and ROC - II
Lecture 43 - Performance of Logistic Model - III
Lecture 44 - Regression Analysis Model Building - I
Lecture 45 - Regression Analysis Model Building (Interaction) - II
Lecture 46 - Chi - Square Test of Independence - I
Lecture 47 - Chi-Square Test of Independence - II
Lecture 48 - Chi-Square Goodness of Fit Test
Lecture 49 - Cluster analysis
Lecture 50 - Clustering analysis - Part II
Lecture 51 - Clustering analysis - Part III
Lecture 52 - Cluster analysis - Part IV
Lecture 53 - Cluster analysis - Part V
Lecture 54 - K- Means Clustering
Lecture 55 - Hierarchical method of clustering - I
Lecture 56 - Hierarchical method of clustering - II
Lecture 57 - Classification and Regression Trees (CART) - I
Lecture 58 - Measures of attribute selection
Lecture 59 - Attribute selection Measures in (CART) - II
Lecture 60 - Classification and Regression Trees (CART) - III

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NPTEL Video Course - Computer Science and Engineering - NOC:Fundamentals of Object Oriented Programming

Subject Co-ordinator - Prof. Balasubramanian Raman

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Object-Oriented Programming
Lecture 2 - Introduction to Classes and Objects in C++
Lecture 3 - Introduction to Member Data and Member Functions in C++
Lecture 4 - Introduction to Classes and Objects in Java
Lecture 5 - Introduction to Paradigms of OOP
Lecture 6 - Classes and Objects in C++
Lecture 7 - Classes and Objects in Java and Solved problems
Lecture 8 - Constructors in C++ - Default and Parameterized
Lecture 9 - Constructors in C++ - Copy Constructor
Lecture 10 - Constructors in Java - Default and Parameterized
Lecture 11 - Access Specifiers in C++
Lecture 12 - Inheritance - Single Inheritance
Lecture 13 - Inheritance - Multilevel Inheritance
Lecture 14 - Inheritance - Multiple, Hierarchial, and Hybrid
Lecture 15 - Inheritance and Introduction to Friend Function
Lecture 16 - Polymorphism
Lecture 17 - Overloading - Operator and Constructor
Lecture 18 - this keyword in C++
Lecture 19 - Method Overloading
Lecture 20 - Method Overriding
Lecture 21 - Encapsulation - I
Lecture 22 - Encapsulation - II
Lecture 23 - Data Abstraction
Lecture 24 - Virtual Functions in C++ and Abstract Class
Lecture 25 - Interface in Java
Lecture 26 - Exception Handling in C++
Lecture 27 - Exception Handling - Solved Problems
Lecture 28 - Multiple Catch and Nested try Statements
Lecture 29 - 'throws' keyword in Java

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Lecture 30 - 'finally' keyword in Java
Lecture 31 - Basics of File Handling
Lecture 32 - File Handling - Solved Problems
Lecture 33 - File Handling - Append and other Mathematical Operations
Lecture 34 - File Handling - Character, Line, and CSV File Reading
Lecture 35 - Serialization and Deserialization
Lecture 36 - Introduction to Templates and Generics
Lecture 37 - Template Class in C++
Lecture 38 - Generics in Java
Lecture 39 - Generics in Java (Continued...)
Lecture 40 - Generics in Python
Lecture 41 - Introduction to Standard Template Library
Lecture 42 - Associative Containers
Lecture 43 - Unordered Containers, Iterators
Lecture 44 - STL Algorithms
Lecture 45 - Case Studies - Library Management System, Real-Time Stock Tracker
Lecture 46 - Design Patterns
Lecture 47 - Singleton and Factory Pattern
Lecture 48 - Factory Pattern in Java
Lecture 49 - Observer Pattern
Lecture 50 - Structural Patterns
Lecture 51 - Advanced Topics - Multithreading and Concurrency
Lecture 52 - Deadlocks - Causes and Prevention
Lecture 53 - Introduction to Network Programming
Lecture 54 - Communication over HTTP and Related Protocols
Lecture 55 - GUI Development
Lecture 56 - Case Study - Mathematical Computation Framework C++
Lecture 57 - Case Study - Hotel reservation System C++
Lecture 58 - Case Study - Online Shopping Cart Java
Lecture 59 - Case Study - Employee Payroll System Java
Lecture 60 - Case Study - Image Classification Tool Python

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Lambda Calculus

Subject Co-ordinator - Prof. Rajdeep Niyogi

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Foundations of Lambda Calculus
Lecture 2 - Syntax of Lambda Calculus
Lecture 3 - Free Variable, Scope, and Reduction
Lecture 4 - Normal Forms
Lecture 5 - Encoding if-then-else and Recursion
Lecture 6 - Combinators and Recursive Functions
Lecture 7 - Church numerals and design of some functions
Lecture 8 - Encoding Boolean Operations and Standard Combinators
Lecture 9 - Data Structures in Lambda Calculus
Lecture 10 - Haskell: A Brief Introduction
Lecture 11 - Type and Type Systems
Lecture 12 - Typed Lambda Calculus
Lecture 13 - A Formal Type Assignment System
Lecture 14 - The structure of a term, a TAð• deduction, and a type
Lecture 15 - Restricted Lambda Terms and Type Safe
Lecture 16 - Term Unification
Lecture 17 - Principal Type Algorithm
Lecture 18 - Curry-Howard Correspondence - I
Lecture 19 - Curry-Howard Correspondence - II
Lecture 20 - Strong Polymorphic Types

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NPTEL Video Course - Computer Science and Engineering - Combinatorics

Subject Co-ordinator - Dr. L. Sunil Chandran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Pigeon hole principle - (Part 1)
Lecture 2 - Pigeon hole principle - (Part 2)
Lecture 3 - Pigeon hole principle - (Part 3)
Lecture 4 - Pigeon hole principle - (Part 4)
Lecture 5 - Elementary concepts and basic counting principles
Lecture 6 - Elementary concepts; Binomial theorem; Bijective proofs - Part (1)
Lecture 7 - Bijective proofs â Part (2)
Lecture 8 - Bijective proofs - Part (3); Properties of binomial coefficients; Combinatorial identities - Part
Lecture 9 - Combinatorial identities - Part (2); Permutations of multisets â Part (1)
Lecture 10 - Permutations of multisets â Part (2)
Lecture 11 - Multinomial Theorem, Combinations of Multisets â Part (1)
Lecture 12 - Combinations of Multisets - Part (2)
Lecture 13 - Combinations of Multisets â Part (3), Bounds for binomial coefficients
Lecture 14 - Sterlingâ s Formula, Generalization of Binomial coefficients - Part (1)
Lecture 15 - Generalization of Binomial coefficients - Part (2)
Lecture 16 - Generalization of Binomial coefficients - Part (3); Double counting - Part (1)
Lecture 17 - Double counting - Part (2)
Lecture 18 - Hallâ s Theorem for regular bipartite graphs; Inclusion exclusion principle - Part (1)
Lecture 19 - Inclusion exclusion principle - Part (2)
Lecture 20 - Inclusion exclusion principle - Part (3)
Lecture 21 - Inclusion exclusion principle - Part (4)
Lecture 22 - Inclusion exclusion principle - Part (5)
Lecture 23 - Recurrence Relations - Part (1)
Lecture 24 - Recurrence Relations - Part (2)
Lecture 25 - Recurrence Relations - Part (3)
Lecture 26 - Recurrence Relations - Part (4)
Lecture 27 - Recurrence Relations - Part (5)
Lecture 28 - Generating functions - Part (1)
Lecture 29 - Generating functions - Part (2)

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Lecture 30 - Solving recurrence relations using generating functions - Part (1)
Lecture 31 - Solving recurrence relations using generating functions - Part (2)
Lecture 32 - Exponential generating functions - Part (1)
Lecture 33 - Exponential generating functions - Part (2), Partition Number - Part (1)
Lecture 34 - Partition Number - Part (2)
Lecture 35 - Partition Number - Part (3)
Lecture 36 - Partition Number - Part (4); Catalan Numbers - Part (1)
Lecture 37 - Catalans Numbers - Part (2)
Lecture 38 - Catalan Numbers - Part (3), Sterling numbers of the 2nd kind
Lecture 39 - Difference Sequences
Lecture 40 - Sterling Numbers
Lecture 41 - Summary

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NPTEL Video Course - Computer Science and Engineering - Compiler Design (Prof. Y.N. Srikanth)

Subject Co-ordinator - Prof. Y.N. Srikanth

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview of a Compiler - Part 1
Lecture 2 - An Overview of a Compiler - Part 2 and Run-Time Environments - Part 1
Lecture 3 - An Overview of a Compiler - Part 2 and Run-Time Environments - Part 1
Lecture 4 - Run-Time Environments - Part 2
Lecture 5 - Run-Time Environments - Part 3 and Local Optimizations - Part 1
Lecture 6 - Run-Time Environments - Part 3 and Local Optimizations - Part 1
Lecture 7 - Local Optimizations - Part 2 and Code Generation - Part 1
Lecture 8 - Local Optimizations - Part 2 and Code Generation - Part 1
Lecture 9 - Code Generation - Part 1
Lecture 10 - Code Generation - Part 2
Lecture 11 - Code Generation - Part 3 and Global Register Allocation - Part 1
Lecture 12 - Code Generation - Part 3 and Global Register Allocation - Part 1
Lecture 13 - Global Register Allocation - Part 2
Lecture 14 - Global Register Allocation - Part 3 and Implementing Object-Oriented Languages - Part 1
Lecture 15 - Global Register Allocation - Part 3 and Implementing Object-Oriented Languages - Part 1
Lecture 16 - Implementing Object-Oriented Languages - Part 2 and Introduction to Machine-Independent Optimiza
Lecture 17 - Implementing Object-Oriented Languages - Part 2 and Introduction to Machine-Independent Optimiza
Lecture 18 - Introduction to Machine-Independent Optimizations - Part 2 and Data-Flow Analysis - Part 1
Lecture 19 - Introduction to Machine-Independent Optimizations - Part 2 and Data-Flow Analysis - Part 1
Lecture 20 - Data-Flow Analysis - Part 2
Lecture 21 - Data-Flow Analysis - Part 3 and Control-Flow Analysis - Part 1
Lecture 22 - Data-Flow Analysis - Part 3 and Control-Flow Analysis - Part 1
Lecture 23 - Control-Flow Analysis - Part 2
Lecture 24 - Machine-Independent Optimizations - Part 1
Lecture 25 - Machine-Independent Optimizations - Part 2
Lecture 26 - Machine-Independent Optimizations - Part 3 and Data-Flow Analysis
Lecture 27 - Machine-Independent Optimizations - Part 3 and Data-Flow Analysis
Lecture 28 - Data-Flow Analysis
Lecture 29 - Data-Flow Analysis

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Lecture 30 - Partial Redundancy Elimination - Part 2
Lecture 31 - The Static Single Assignment Form
Lecture 32 - The Static Single Assignment Form
Lecture 33 - The Static Single Assignment Form
Lecture 34 - Automatic Parallelization - Part 1
Lecture 35 - Automatic Parallelization - Part 2
Lecture 36 - Automatic Parallelization - Part 3
Lecture 37 - Automatic Parallelization - Part 4
Lecture 38 - Instruction Scheduling - Part 1
Lecture 39 - Instruction Scheduling - Part 2
Lecture 40 - Instruction Scheduling - Part 3
Lecture 41 - Software Pipelining
Lecture 42 - Energy-Aware Software Systems - Part 1
Lecture 43 - Energy-Aware Software Systems - Part 2
Lecture 44 - Energy-Aware Software Systems - Part 3
Lecture 45 - Energy-Aware Software Systems - Part 4
Lecture 46 - Just-In-Time Compilation and Optimizations for .NET CLR
Lecture 47 - Garbage Collection
Lecture 48 - Interprocedural Data-Flow Analysis
Lecture 49 - Worst Case Execution Time - Part 1
Lecture 50 - Worst Case Execution Time - Part 2

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NPTEL Video Course - Computer Science and Engineering - Graph Theory

Subject Co-ordinator - Dr. L. Sunil Chandran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Matchings
Lecture 3 - More on Hallâ s theorem and some applications
Lecture 4 - Tutteâ s theorem on existence of a perfect matching
Lecture 5 - More on Tutteâ s theorem
Lecture 6 - More on Matchings
Lecture 7 - Dominating set, path cover
Lecture 8 - Gallai â Millgram theorem, Dilworthâ s theorem
Lecture 9 - Connectivity
Lecture 10 - Mengerâ s theorem
Lecture 11 - More on connectivity
Lecture 12 - Minors, topological minors and more on k- linkedness
Lecture 13 - Vertex coloring
Lecture 14 - More on vertex coloring
Lecture 15 - Edge coloring
Lecture 16 - Proof of Vizingâ s theorem, Introduction to planarity
Lecture 17 - 5- coloring planar graphs, Kuratowskyâ s theorem
Lecture 18 - Proof of Kuratowskyâ s theorem, List coloring
Lecture 19 - List chromatic index
Lecture 20 - Adjacency polynomial of a graph and combinatorial Nullstellensatz
Lecture 21 - Chromatic polynomial, k - critical graphs
Lecture 22 - Gallai-Roy theorem, Acyclic coloring, Hadwigerâ s conjecture
Lecture 23 - Perfect graphs
Lecture 24 - Interval graphs, chordal graphs
Lecture 25 - Proof of weak perfect graph theorem (WPGT)
Lecture 26 - Second proof of WPGT, Some non-perfect graph classes
Lecture 27 - More special classes of graphs
Lecture 28 - Boxicity,Sphericity, Hamiltonian circuits
Lecture 29 - More on Hamiltonicity

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Lecture 30 - Chvatalâ s theorem, toughness, Hamiltonicity and 4-color conjecture
Lecture 31 - Network flows
Lecture 32 - More on network flows
Lecture 33 - Circulations and tensions
Lecture 34 - More on circulations and tensions, flow number and Tutteâ s flow conjectures
Lecture 35 - Random graphs and probabilistic method
Lecture 36 - Probabilistic method
Lecture 37 - Probabilistic method
Lecture 38 - Probabilistic method
Lecture 39 - Graph minors and Hadwigerâ s conjecture
Lecture 40 - More on graph minors, tree decompositions

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NPTEL Video Course - Computer Science and Engineering - High Performance Computing

Subject Co-ordinator - Prof. Mathew Jacob

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Programs and Data
Lecture 2 - Data Representation
Lecture 3 - Registers and Memory
Lecture 4 - Instructions, Addressing Modes
Lecture 5 - A RISC Instruction Set
Lecture 6 - A RISC Instruction Set (Continued...)
Lecture 7 - Function Call and Return
Lecture 8 - Function Call and Return (Continued...)
Lecture 9 - Instruction Execution
Lecture 10 - Instruction Execution (Continued...)
Lecture 11 - Software organization
Lecture 12 - System Calls
Lecture 13 - Virtual memory
Lecture 14 - Virtual memory (Continued...)
Lecture 15 - Virtual Memory (Continued...)
Lecture 16 - Process
Lecture 17 - Process scheduling
Lecture 18 - Process lifetime
Lecture 19 - Interprocess communication
Lecture 20 - Concurrent programming
Lecture 21 - Pipelining
Lecture 22 - Pipeline hazards
Lecture 23 - Pipeline hazards (Continued...)
Lecture 24 - Pipeline hazards (Continued...)
Lecture 25 - Cache memory
Lecture 26 - Memory hierarchy
Lecture 27 - Cache operation
Lecture 28 - Cache operation (Continued)
Lecture 29 - Cache aware programming

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Lecture 30 - Cache aware programming (Continued...)
Lecture 31 - More on cache
Lecture 32 - Measuring time
Lecture 33 - Program Profiling
Lecture 34 - Secondary storage
Lecture 35 - Files and disks
Lecture 36 - Directories
Lecture 37 - Protection and Performance
Lecture 38 - Parallel architecture
Lecture 39 - Cache coherence
Lecture 40 - MPI programming
Lecture 41 - MPI programming (Continued...)

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NPTEL Video Course - Computer Science and Engineering - Numerical Optimization

Subject Co-ordinator - Dr. Shirish K. Shevade

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mathematical Background
Lecture 3 - Mathematical Background (Continued...)
Lecture 4 - One Dimensional Optimization - Optimality Conditions
Lecture 5 - One Dimensional Optimization (Continued...)
Lecture 6 - Convex Sets
Lecture 7 - Convex Sets (Continued...)
Lecture 8 - Convex Functions
Lecture 9 - Convex Functions (Continued...)
Lecture 10 - Multi Dimensional Optimization - Optimality Conditions, Conceptual Algorithm
Lecture 11 - Line Search Techniques
Lecture 12 - Global Convergence Theorem
Lecture 13 - Steepest Descent Method
Lecture 14 - Classical Newton Method
Lecture 15 - Trust Region and Quasi-Newton Methods
Lecture 16 - Quasi-Newton Methods - Rank One Correction, DFP Method
Lecture 17 - i) Quasi-Newton Methods - Broyden Family ii) Coordinate Descent Method
Lecture 18 - Conjugate Directions
Lecture 19 - Conjugate Gradient Method
Lecture 20 - Constrained Optimization - Local and Global Solutions, Conceptual Algorithm
Lecture 21 - Feasible and Descent Directions
Lecture 22 - First Order KKT Conditions
Lecture 23 - Constraint Qualifications
Lecture 24 - Convex Programming Problem
Lecture 25 - Second Order KKT Conditions
Lecture 26 - Second Order KKT Conditions (Continued...)
Lecture 27 - Weak and Strong Duality
Lecture 28 - Geometric Interpretation
Lecture 29 - Lagrangian Saddle Point and Wolfe Dual

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Lecture 30 - Linear Programming Problem
Lecture 31 - Geometric Solution
Lecture 32 - Basic Feasible Solution
Lecture 33 - Optimality Conditions and Simplex Tableau
Lecture 34 - Simplex Algorithm and Two-Phase Method
Lecture 35 - Duality in Linear Programming
Lecture 36 - Interior Point Methods - Affine Scaling Method
Lecture 37 - Karmarkar's Method
Lecture 38 - Lagrange Methods, Active Set Method
Lecture 39 - Active Set Method (Continued...)
Lecture 40 - Barrier and Penalty Methods, Augmented Lagrangian Method and Cutting Plane Method
Lecture 41 - Summary

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NPTEL Video Course - Computer Science and Engineering - Storage Systems

Subject Co-ordinator - Dr. K. Gopinath

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Storage, Processing, Networking
Lecture 3 - Naming and Storing
Lecture 4 - Storage Filesystems
Lecture 5 - Access Architecture, Hard Disks
Lecture 6 - SCSI
Lecture 7 - Fibre Channel Protocol (FCP)
Lecture 8 - FCP, 10Gb Ethernet, iSCSI, TCP
Lecture 9 - NFS, NFSv2
Lecture 10 - NFSv2, NFSv3, NFSv4, CIFS
Lecture 11 - USB Storage
Lecture 12 - Tiering
Lecture 13 - Mobile/Personal/Organizational - type Storage
Lecture 14 - Parallel/Cloud/Web-scale Storage
Lecture 15 - Long-term Storage
Lecture 16 - Storage interfaces
Lecture 17 - User-Memory-CPU interactions
Lecture 18 - Spinlock, Concurrency
Lecture 19 - Block Layer design
Lecture 20 - FAT, TFAT, F2FS, LFS, FTL
Lecture 21 - Data Structures
Lecture 22 - Abstractions
Lecture 23 - Link & Write Operations
Lecture 24 - ZFS
Lecture 25 - RAID in Filesystems
Lecture 26 - RAID-Z, NetApp RAID4, Flash Filesystems
Lecture 27 - Reliability
Lecture 28 - Performance
Lecture 29 - Security

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Lecture 30 - CAP Theorem
Lecture 31 - POSIX/NFS/S3/Zookeeper, ACID Vs. BASE
Lecture 32 - Consistency & Commit problems
Lecture 33 - Paxos
Lecture 34 - Group Communication problem
Lecture 35 - Message Ordering
Lecture 36 - Ordering Models
Lecture 37 - Orderings in Filesystems
Lecture 38 - Semantics of highly scalable filesystems
Lecture 39 - GFS
Lecture 40 - GFS Model
Lecture 41 - GFS functions and operations
Lecture 42 - GFS problems, BigTable
Lecture 43 - Lessons to learn

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NPTEL Video Course - Computer Science and Engineering - System Analysis and Design

Subject Co-ordinator - Prof. V. Rajaraman

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture - 1
Lecture - 2
Lecture - 3
Lecture - 4
Lecture - 5
Lecture - 6
Lecture - 7
Lecture - 8
Lecture - 9
Lecture - 10
Lecture - 11
Lecture - 12
Lecture - 13
Lecture - 14
Lecture - 15
Lecture - 16
Lecture - 17
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Lecture - 28
Lecture - 29

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Lecture - 30
Lecture - 31
Lecture - 32
Lecture - 33
Lecture - 34
Lecture - 35
Lecture - 36
Lecture - 37
Lecture - 38
Lecture - 39
Lecture - 40

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NPTEL Video Course - Computer Science and Engineering - Principles of Compiler Design

Subject Co-ordinator - Prof. Y.N. Srikanth

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview of a Compiler
Lecture 2 - Lexical Analysis - Part 1
Lecture 3 - Lexical Analysis - Part 2
Lecture 4 - Lexical Analysis - Part 3
Lecture 5 - Syntax Analysis
Lecture 6 - Syntax Analysis
Lecture 7 - Syntax Analysis
Lecture 8 - Syntax Analysis
Lecture 9 - Syntax Analysis
Lecture 10 - Syntax Analysis
Lecture 11 - Syntax Analysis
Lecture 12 - Semantic Analysis with Attribute Grammars Part - 1
Lecture 13 - Semantic Analysis with Attribute Grammars Part - 2
Lecture 14 - Semantic Analysis with Attribute Grammars Part - 3
Lecture 15 - Semantic Analysis with Attribute Grammars Part - 4
Lecture 16 - Semantic Analysis with Attribute Grammars Part - 5
Lecture 17 - Intermediate code generation Part - 1
Lecture 18 - Intermediate code generation Part - 2
Lecture 19 - Intermediate code generation Part - 3
Lecture 20 - Intermediate code generation Part - 4 (first half of lecture)
Lecture 21 - Run-time environments - 1 (second half of lecture)
Lecture 22 - Run-time environments - 2
Lecture 23 - Run-time environments - 3
Lecture 24 - Run-time environments - 4 (first half of lecture)
Lecture 25 - Control-Flow Graph and Local Optimizations - Part 1 (second half of lecture)
Lecture 26 - Control-Flow Graph and Local Optimizations - Part 2 (first half of lecture)
Lecture 27 - Machine code generation - 1 (second half of lecture)
Lecture 28 - Machine code generation - 2
Lecture 29 - Machine code generation - 3

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Lecture 30 - Machine code generation - 4 (first half of lecture), Implementing object-oriented languages 1 (s
Lecture 31 - Implementing object-oriented languages 2 (first half of lecture)
Lecture 32 - Global register allocation - 1 (second half of lecture)
Lecture 33 - Global register allocation - 2
Lecture 34 - Global register allocation - 3
Lecture 35 - Introduction to Machine-Independent Optimizations - 1
Lecture 36 - Introduction to Machine-Independent Optimizations - 2
Lecture 37 - Introduction to Machine-Independent Optimizations - 3
Lecture 38 - Introduction to Machine-Independent Optimizations - 4
Lecture 39 - Introduction to Machine-Independent Optimizations - 5
Lecture 40 - Introduction to Machine-Independent Optimizations - 6
Lecture 41 - Introduction to Machine-Independent Optimizations - 7 (first half of lecture)
Lecture 42 - Instruction Scheduling and Software Pipelining - 1 (second half of lecture)
Lecture 43 - Instruction Scheduling and Software Pipelining - 2
Lecture 44 - Instruction Scheduling and Software Pipelining - 3 (first part of lecture)
Lecture 45 - Automatic parallelization - 1 (second half of lecture)
Lecture 46 - Automatic parallelization - 2

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NPTEL Video Course - Computer Science and Engineering - NOC:Discrete Mathematics (IIITB)

Subject Co-ordinator - Prof. Ashish Choudhury

Co-ordinating Institute - IIIT - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mathematical Logic
Lecture 2 - Logical Equivalence
Lecture 3 - SAT Problem
Lecture 4 - Rules of Inference
Lecture 5 - Resolution
Lecture 6 - Tutorial 1 - Part I
Lecture 7 - Tutorial 1 - Part II
Lecture 8 - Predicate Logic
Lecture 9 - Rules of Inferences in Predicate Logic
Lecture 10 - Proof Strategies - I
Lecture 11 - Proof Strategies - II
Lecture 12 - Induction
Lecture 13 - Tutorial 2 - Part I
Lecture 14 - Tutorial 2 - Part II
Lecture 15 - Sets
Lecture 16 - Relations
Lecture 17 - Operations on Relations
Lecture 18 - Transitive Closure of Relations
Lecture 19 - Warshallâ s Algorithm for Computing Transitive Closure
Lecture 20 - Tutorial - 3
Lecture 21 - Equivalence Relation
Lecture 22 - Equivalence Relations and Partitions
Lecture 23 - Partial Ordering
Lecture 24 - Functions
Lecture 25 - Tutorial 4 - Part I
Lecture 26 - Tutorial 4 - Part II
Lecture 27 - Countable and Uncountable Sets
Lecture 28 - Examples of Countably Infinite Sets
Lecture 29 - Cantorâ s Diagonalization Argument

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Lecture 30 - Uncomputable Functions
Lecture 31 - Tutorial - 5
Lecture 32 - Basic Rules of Counting
Lecture 33 - Permutation and Combination
Lecture 34 - Counting Using Recurrence Equations
Lecture 35 - Solving Linear Homogeneous Recurrence Equations - Part I
Lecture 36 - Solving Linear Homogeneous Recurrence Equations - Part II
Lecture 37 - Tutorial 6 - Part I
Lecture 38 - Tutorial 6 - Part II
Lecture 39 - Solving Linear Non-Homogeneous Recurrence Equations
Lecture 40 - Catalan Numbers
Lecture 41 - Catalan Numbers - Derivation of Closed Form Formula
Lecture 42 - Counting Using Principle of Inclusion-Exclusion
Lecture 43 - Tutorial - 7
Lecture 44 - Graph Theory Basics
Lecture 45 - Matching
Lecture 46 - Proof of Hallâ s Marriage Theorem
Lecture 47 - Various Operations on Graphs
Lecture 48 - Vertex and Edge Connectivity
Lecture 49 - Tutorial - 8
Lecture 50 - Euler Path and Euler Circuit
Lecture 51 - Hamiltonian Circuit
Lecture 52 - Vertex and Edge Coloring
Lecture 53 - Tutorial 9 - Part I
Lecture 54 - Tutorial 9 - Part II
Lecture 55 - Modular Arithmetic
Lecture 56 - Prime Numbers and GCD
Lecture 57 - Properties of GCD and BÃ©zoutâ s Theorem
Lecture 58 - Linear Congruence Equations and Chinese Remainder Theorem
Lecture 59 - Uniqueness Proof of the CRT
Lecture 60 - Fermatâ s Little Theorem, Primality Testing and Carmichael Numbers
Lecture 61 - Group Theory
Lecture 62 - Cyclic Groups
Lecture 63 - Subgroups
Lecture 64 - Discrete Logarithm and Cryptographic Applications
Lecture 65 - More Applications of Groups
Lecture 66 - Rings, Fields and Polynomials
Lecture 67 - Polynomials Over Fields and Properties
Lecture 68 - Finite Fields and Properties - I

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Lecture 69 - Finite Fields and Properties - II
Lecture 70 - Primitive Element of a Finite Field
Lecture 71 - Applications of Finite Fields
Lecture 72 - Goodbye and Farewell

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NPTEL Video Course - Computer Science and Engineering - NOC:Secure Computation: Part I

Subject Co-ordinator - Prof. Ashish Choudhury

Co-ordinating Institute - IIITB

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Secure MPC
Lecture 2 - Real-World Examples of Secure MPC
Lecture 3 - Various Dimensions to Study Secure MPC
Lecture 4 - Recap of Basic Concepts from Abstract Algebra
Lecture 5 - Recap of Basic Concepts from Abstract Algebra (Continued...)
Lecture 6 - Recap of Basic Concepts from Cryptography
Lecture 7 - Secret sharing
Lecture 8 - Additive Secret Sharing
Lecture 9 - Inefficient Threshold Secret Sharing
Lecture 10 - Polynomials Over Fields
Lecture 11 - Shamir Secret-Sharing
Lecture 12 - Linear secret-sharing
Lecture 13 - Linear Secret Sharing (Continued...)
Lecture 14 - General Secret Sharing
Lecture 15 - Perfectly-Secure Message Transmission
Lecture 16 - A Toy MPC Protocol
Lecture 17 - A Toy MPC Protocol (Continued...)
Lecture 18 - A Toy MPC Protocol (Continued...)
Lecture 19 - The BGW MPC Protocol
Lecture 20 - The BGW MPC Protocol for Linear Functions
Lecture 21 - The BGW MPC Protocol for Linear Functions: Security Analysis
Lecture 22 - The BGW MPC Protocol: The Case of Non-Linear Gates
Lecture 23 - The Degree-Reduction Problem
Lecture 24 - The Gennaro-Rabin-Rabin (GRR) Degree-Reduction Method
Lecture 25 - Analysis of the GRR, Degree-Reduction Method
Lecture 26 - Shared Circuit-Evaluation via GRR Degree-Reduction Method
Lecture 27 - Shared Circuit-Evaluation in the Pre-processing Model
Lecture 28 - Optimality of Corruption Bound for Perfectly-Secure MPC
Lecture 29 - Perfectly-Secure MPC Tolerating General (Non-Threshold) Adversaries

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Lecture 30 - Perfectly-Secure MPC Tolerating General (Non-Threshold) Adversaries with Q^((2)) Condition
Lecture 31 - Perfectly-Secure MPC for Small Number of Parties
Lecture 32 - Perfectly-Secure 3PC (Continued...)
Lecture 33 - More Efficient Perfectly-Secure 3PC
Lecture 34 - More Efficient Perfectly-Secure 3PC (Continued...)
Lecture 35 - Towards Cryptographically-Secure MPC
Lecture 36 - GMW MPC protocol
Lecture 37 - Oblivious Transfer (OT)
Lecture 38 - RSA Assumption and RSA Hard-Core Predicate
Lecture 39 - Bit OT Based on RSA Assumption and Hard-Core Predicate
Lecture 40 - Discrete Logarithm and DDH Assumption
Lecture 41 - OT Based on the DDH Assumption
Lecture 42 - Pre-Processing Phase for the GMW Protocol
Lecture 43 - Pre-Processing Phase for the GMW Protocol: The n-Party Case
Lecture 44 - Pre-Processing Phase for the GMW Protocol (Continued...)
Lecture 45 - Pre-Processing of OT
Lecture 46 - OT Extension
Lecture 47 - Analysis of IKNP OT Extension
Lecture 48 - Yaoâ s Protocol for Secure 2PC
Lecture 49 - Yaoâ s Garbling Scheme
Lecture 50 - Yaoâ s Protocol for Secure 2PC
Lecture 51 - Optimizations for Yaoâ s Garbling
Lecture 52 - Interpreting Yaoâ s Secure 2PC Protocol as a Secret-Sharing Based Protocol
Lecture 53 - Mixed Protocols for Secure 2PC
Lecture 54 - The Arithmetic, Boolean and Yao Sharing for Secure 2PC
Lecture 55 - The ABY Conversions
Lecture 56 - The ABY Conversions (Continued...)
Lecture 57 - The ABY Conversions (Continued...)
Lecture 58 - ABY Computations : Example
Lecture 59 - Goodbye and Farewell

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NPTEL Video Course - Computer Science and Engineering - NOC:Secure Computation - Part II

Subject Co-ordinator - Prof. Ashish Choudhury

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Secure Multi-Party Computation (MPC)?
Lecture 2 - Reliable Broadcast and Byzantine Agreement
Lecture 3 - EIG Protocol for Perfectly-Secure Byzantine Agreement
Lecture 4 - EIG Protocol for Perfectly-Secure Byzantine Agreement: Illustration
Lecture 5 - EIG Protocol for Perfectly-Secure Byzantine Agreement: Analysis - Part I
Lecture 6 - EIG Protocol for Perfectly-Secure Byzantine Agreement: Analysis - Part II
Lecture 7 - Efficient Protocols for Perfectly-Secure Byzantine Agreement - Part I
Lecture 8 - Efficient Protocols for Perfectly-Secure Byzantine Agreement - Part II
Lecture 9 - Domain Extension for Perfectly-Secure Byzantine Agreement
Lecture 10 - Cryptographically/Statistically-Secure Reliable Broadcast
Lecture 11 - Dolev-Strong Reliable Broadcast Protocol: Analysis
Lecture 12 - Randomized Protocol for Byzantine Agreement - Part I
Lecture 13 - Randomized Protocol for Byzantine Agreement - Part II
Lecture 14 - Randomized Protocol for Byzantine Agreement - Part III
Lecture 15 - Lower Bound for Number of Parties for Byzantine Agreement - Part I
Lecture 16 - Lower Bound for Number of Parties for Byzantine Agreement - Part II
Lecture 17 - Lower Bound for Number of Parties for Byzantine Agreement - Part III
Lecture 18 - Recap of Basic Concepts from Abstract Algebra
Lecture 19 - Reed-Solomon Error-Correcting Codes
Lecture 20 - Perfectly-Secure Message Transmission
Lecture 21 - Properties of Polynomials Over a Field - I
Lecture 22 - Properties of Polynomials Over a Field - II
Lecture 23 - One Round PSMT Protocol
Lecture 24 - Multi-Round PSMT Protocol - I
Lecture 25 - Multi-Round PSMT Protocol - II
Lecture 26 - Domain Extension for Perfectly-Secure Broadcast Based on RS Error-Correcting Codes - I
Lecture 27 - Domain Extension for Perfectly-Secure Broadcast Based on RS Error-Correcting Codes - II
Lecture 28 - Domain Extension for Perfectly-Secure Broadcast Based on RS Error-Correcting Codes - III
Lecture 29 - (n,t) - Star Structure

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Lecture 30 - Domain Extension for Perfectly-Secure Broadcast Based on RS Error-Correcting Codes - IV
Lecture 31 - The BGW MPC Protocol for Passive Corruptions: Recap
Lecture 32 - The BGW MPC Protocol for Byzantine Corruptions: Challenges
Lecture 33 - Perfectly-Secure VSS: Necessary Condition
Lecture 34 - Bivariate Polynomials Over Finite Fields - I
Lecture 35 - Bivariate Polynomials Over Finite Fields - II
Lecture 36 - Bivariate Polynomials Over Finite Fields - III
Lecture 37 - Bivariate Polynomials Over Finite Fields - IV
Lecture 38 - Perfectly-Secure VSS with n greater than 3t - Part I
Lecture 39 - Perfectly-Secure VSS with n greater than 3t - Part II
Lecture 40 - Perfectly-Secure VSS with n greater than 3t - Part III
Lecture 41 - Perfectly-Secure VSS with n greater than 3t - A Round-Reducing Technique
Lecture 42 - Perfectly-Secure VSS with n greater than 4t - Part I
Lecture 43 - Perfectly-Secure VSS with n greater than 4t - Part II
Lecture 44 - The BGW MPC Protocol for Linear Functions
Lecture 45 - The BGW MPC Protocol for Linear Functions: Security Analysis
Lecture 46 - The BGW MPC Protocol: The Case of Non-Linear Gates
Lecture 47 - The Degree-Reduction Problem
Lecture 48 - Generating Random Multiplication-Triples - I
Lecture 49 - Generating Random Multiplication-Triples - II
Lecture 50 - Generating Random Multiplication-Triples - III
Lecture 51 - Perfectly-Secure Protocol for Verifying Multiplicative Relationship
Lecture 52 - Perfectly-Secure Verifiable Triple-Sharing Protocol
Lecture 53 - Perfectly-Secure Triple-Extraction Protocol
Lecture 54 - Towards Secure MPC with an Honest Majority
Lecture 55 - ICP from Information-Theoretic MAC - I
Lecture 56 - ICP from Information-Theoretic MAC - II
Lecture 57 - Ingredients for Statistically-Secure MPC
Lecture 58 - Statistically-Secure VSS
Lecture 59 - Cyclic Groups and Discrete Logarithm
Lecture 60 - Pedersen Commitment Scheme
Lecture 61 - Cryptographically-secure VSS and MPC
Lecture 62 - Goodbye and Farewell

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NPTEL Video Course - Computer Science and Engineering - NOC:Introduction to Graph Algorithms

Subject Co-ordinator - Prof. C. Pandu Rangan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Principles of Algorithms - Part 1
Lecture 2 - Principles of Algorithms - Part 2
Lecture 3 - Shortest Path Algorithms
Lecture 4 - Undirected Graph
Lecture 5 - Algorithms for finding Shortest Path - Part 1
Lecture 6 - Algorithms for finding Shortest Path - Part 2
Lecture 7 - Single source shortest path problem
Lecture 8 - Properties of shortest path distances - Part 1
Lecture 9 - Properties of shortest path distances - Part 2
Lecture 10 - Belman Equation - Part 1
Lecture 11 - Belman Equation - Part 2
Lecture 12 - Belman Equation - Part 3
Lecture 13 - Belman Equation - Part 4
Lecture 14 - Bellman Ford - Part 1
Lecture 15 - Bellman Ford - Part 2
Lecture 16 - Dijkstra Algorithm - Part 1
Lecture 17 - Dijkstra Algorithm - Part 2
Lecture 18 - Dijkstra Algorithm - Part 3
Lecture 19 - All Pair Shortest - Path 1
Lecture 20 - All Pair Shortest - Path 2
Lecture 21 - All Pair Shortest - Path 3 and 4
Lecture 22 - All Pair Shortest - Path 5
Lecture 23 - Prims Algorithm - Part 1
Lecture 24 - Prims Algorithm - Part 2
Lecture 25 - Kruskal's Algorithm - Part 1
Lecture 26 - Kruskal's Algorithm - Part 2
Lecture 27 - Kruskal's Algorithm - Part 3
Lecture 28 - DFS
Lecture 29 - DFS

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Lecture 30 - Algorithm for Cut Vertex
Lecture 31 - Iterative DFS
Lecture 32 - DFS in Directed Graph
Lecture 33 - Strong Connected Components - Part 1
Lecture 34 - Strong Connected Components - Part 2
Lecture 35 - Strong Connected Components - Part 3
Lecture 36 - Strong Connected Components - Part 4
Lecture 37 - BFS

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NPTEL Video Course - Computer Science and Engineering - NOC:Linear Algebra Through Geometry

Subject Co-ordinator - Prof. Ashok Rao, Prof. M Krishna Kumar, Prof. Arulalan M R

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Linear Algebra and Matrices
Lecture 2 - Geometry of System of linear equations - Straight lines andplanes, Matrix Definitions
Lecture 3 - Some Interpretations to solutions of system of linear equations
Lecture 4 - Matrix Operations, Homogeneous system of equations
Lecture 5 - Matrix Operations, Homogeneous system of equations
Lecture 6 - Elementary Row Operations
Lecture 7 - Elementary Row operations - How do they work?
Lecture 8 - Determinant and Inverse of a matrix
Lecture 9 - Interpreting the inverse of a matrix
Lecture 10 - Cramer's rule
Lecture 11 - Points and Vectors in 2D
Lecture 12 - Vector Length and properties
Lecture 13 - Combining Vectors
Lecture 14 - Linearly Independent and Dependent vectors, Dot Product of vectors
Lecture 15 - Angle between two vectors, Orthogonal projections
Lecture 16 - Lines and Parametric Equations of lines, Linear Maps
Lecture 17 - Rotation, Shear and Projection transformations
Lecture 18 - Determinant of 2x2 matrix as Area of Parallelogram,Determinant of linear transformations
Lecture 19 - System of 2 linear equations in 2 unknowns from vector perspective
Lecture 20 - Eigenvalues and eigenvectors
Lecture 21 - Vectors in 3D, Linear combination of vectors in 3D
Lecture 22 - Projectionvector on another vector, line passing through origin, plane passing through origin
Lecture 23 - Area of a parallelogram in 3D, Cross product
Lecture 24 - Interpreting the cross-product, Properties of cross-product
Lecture 25 - Volume of a parallelepiped, Lines in 3D, Intersection of line and plane
Lecture 26 - Linear Maps in 3D - Scaling and Reflection
Lecture 27 - Linear Maps in 3D - Reflection about a plane, Shear
Lecture 28 - Rotation in 3D
Lecture 29 - Determinant and its properties

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Lecture 30 - eigenvalues and eigenvectors in 3D
Lecture 31 - Linear systems in 3D and geometric perspective
Lecture 32 - Homogeneous system in 3D
Lecture 33 - LU Decomposition
Lecture 34 - Least Squares Solution, Gram-Schmidt Orthogonalization, QRDecomposition
Lecture 35 - Orthogonal Matrix, Linear Independence, eigenvalues and eigenvectors in 3D
Lecture 36 - Vector Space and Properties
Lecture 37 - Examples of vector spaces - Polynomial space, planes and lines through origin
Lecture 38 - Vector Subspaces and their geometry
Lecture 39 - Combining vectors in a vector space, Linear Independence
Lecture 40 - Span, Basis, Dimension of a vector space, Fourier Expansion
Lecture 41 - Homogeneous system of linear equations and null space of a matrix
Lecture 42 - Column Space of A
Lecture 43 - Subspaces associated matrix A transpose, Nullity, Rank
Lecture 44 - Orthogonal Complement of a subspace
Lecture 45 - Orientation of the four fundamental subspaces of a matrix A
Lecture 46 - System of linear equations with no solution - Inconsistent systems
Lecture 47 - Least squares solution, Pseudoinverse of A
Lecture 48 - Projection and Projection Matrices
Lecture 49 - Pseudoinverse of special matrices
Lecture 50 - Eigendecomposition
Lecture 51 - Eigensubspace and dimension
Lecture 52 - Real Symmetric matrix and properties
Lecture 53 - Eigenvalues and eigenvectors of real symmetric matrices
Lecture 54 - Effect of a real symmetric matrix - Geometric Interpretation
Lecture 55 - Spectral Theorem, Quadratic Forms
Lecture 56 - Singular Value Decomposition
Lecture 57 - Relationship between SVD and Eigen Decomposition
Lecture 58 - An Interpretation of SVD
Lecture 59 - Fourier Series and Transform through Linear Algebra
Lecture 60 - Practical Applications of Linear Algebra - 1
Lecture 61 - Practical Applications of Linear Algebra - 2
Lecture 62 - Summary and Credits

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NPTEL Video Course - Computer Science and Engineering - NOC:Algorithms in Computational Biology and Sequence

Subject Co-ordinator - Prof. Chirag Jain

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course overview
Lecture 2 - Molecular biology and high-throughput sequencing
Lecture 3 - Data structures/Algorithms Warmup
Lecture 4 - Bitvector rank operations
Lecture 5 - Demo for constructing rank data structure
Lecture 6 - Z-algorithm
Lecture 7 - Suffix Arrays
Lecture 8 - Suffix array construction using prefix doubling
Lecture 9 - Demo for constructing suffix array
Lecture 10 - Suffix Tree
Lecture 11 - Building Suffix Trees
Lecture 12 - Building Suffix Trees (Continued...)
Lecture 13 - Applications of suffix trees
Lecture 14 - Burrows Wheeler Indexes
Lecture 15 - Burrows Wheeler Indexes (Continued...)
Lecture 16 - How is BWT useful for indexing genomes ?
Lecture 17 - Sequence Alignment and Edit Distance
Lecture 18 - Global and semi-global alignment
Lecture 19 - Local alignment
Lecture 20 - Scoring gaps in alignments
Lecture 21 - Alignment significance statitstics
Lecture 22 - Alignment demonstration
Lecture 23 - Heuristics for genome-scale alignment
Lecture 24 - Maximal unique matches
Lecture 25 - Co-linear chaining
Lecture 26 - Incorporating gaps into the chaining algorithm
Lecture 27 - IGV Demonstration
Lecture 28 - Genome assembly
Lecture 29 - Shortest common superstring

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Lecture 30 - Greedy algorithm for genome assembly
Lecture 31 - Genome assembly using de Bruijn graphs
Lecture 32 - Multiplex de Bruijn graphs and Overlap graphs
Lecture 33 - Assembly Demonstration
Lecture 34 - Introduction to phylogeny trees
Lecture 35 - Distance based tree reconstruction
Lecture 36 - Character based tree reconstruction
Lecture 37 - Phylogenetic trees Demo
Lecture 38 - Hidden Markov Models
Lecture 39 - Hidden Markov Models (Continued...)
Lecture 40 - ProtGPT2 Demo
Lecture 41 - Pangenome Graphs
Lecture 42 - Pangenome Demo
Lecture 43 - Multiple Sequence Alignment
Lecture 44 - Multiple Sequence Alignment Demo
Lecture 45 - Sequence alignment to pangenome graphs
Lecture 46 - Genomic Large Language Models
Lecture 47 - Course Summary

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NPTEL Video Course - Computer Science and Engineering - NOC:Stochastic Approximation: Theory and Applications

Subject Co-ordinator - Prof. Gugan Chandrashekhar Mallika Thoppe

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Stochastic Approximation
Lecture 2 - Estimating the Mean of a Random Variable
Lecture 3 - Estimating change rates of webpages
Lecture 4 - An Introduction to Reinforcement Learning
Lecture 5 - Policy Evaluation in Reinforcement Learning
Lecture 6 - Probability Spaces - A Measure Theoretic Perspective
Lecture 7 - Random Variables as Measurable Maps
Lecture 8 - Expectation of Random Variable as Lebesgue Integration
Lecture 9 - Conditional Expectation: A Formal Introduction
Lecture 10 - Properties of Conditional Expectation
Lecture 11 - Martingales: Definition and Examples
Lecture 12 - Doobâ s Uncrossing Lemma
Lecture 13 - Doobâ s Forward Convergence Theorem for Supermartingales
Lecture 14 - L^2 Martingales
Lecture 15 - Revisiting the Martingale Convergence Theorem via Stopped Processes
Lecture 16 - Existence and Uniqueness of Solutions to Ordinary Differential Equations
Lecture 17 - Continuity of ODE Solutions with Respect to Initial Conditions
Lecture 18 - Asymptotic Behaviour of Solutions to ODEs
Lecture 19 - Stability of ODEs and Lyapunov Methods
Lecture 20 - Foundations of Stochastic Approximation - Assumptions and Key Definitions
Lecture 21 - Almost Sure Convergence of Stochastic Approximation Iterates
Lecture 22 - Concluding the Convergence Proof: Internal Chain Transitivity, Connectedness, and Invariance
Lecture 23 - How Stochastic Approximation Iterates Track an ODE: The Key Lemma
Lecture 24 - Proof of the Key Lemma - Part I
Lecture 25 - Proof of the Key Lemma - Part II
Lecture 26 - Extensions, Variants, and Applications of Stochastic Approximation
Lecture 27 - Convergence Rate for Linear Stochastic Approximation - Part 1
Lecture 28 - Convergence Rate for Linear Stochastic Approximation - Part 2
Lecture 29 - Lower Bounds and the Minimax Risk in Estimation

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Lecture 30 - Stability Requirements in Stochastic Approximation
Lecture 31 - Almost Sure Boundedness of Iterates: Theorem and Example
Lecture 32 - Distributed Estimation of the Mean of a Random Vector
Lecture 33 - Robust Distributed Learning under Adversaries
Lecture 34 - Motivation for Stochastic Recursive Inclusion in Distributed Mean Estimation
Lecture 35 - Well-Posedness of Differential Inclusions
Lecture 36 - Convergence of Distributed Robust Mean Estimation Iterates through the Lens of Differential Incl
Lecture 37 - Almost Sure Convergence via Robbins-Siegmund Theorem - Part 1
Lecture 38 - Almost Sure Convergence via Robbins-Siegmund Theorem - Part 2
Lecture 39 - Introduction to Reinforcement Learning and Value Function Approximation
Lecture 40 - Temporal Difference Algorithm Through the Lens of Stochastic Approximation
Lecture 41 - How Good Is the TD Solution? Fixed Point Analysis in Linear Approximation
Lecture 42 - Almost Sure Convergence Analysis of Temporal Difference Learning via the ODE Method
Lecture 43 - Best Policy Algorithm for Q-Value Functions: A Stochastic Approximation Formulation
Lecture 44 - Asymptotic Analysis of Q-Learning Algorithm
Lecture 45 - Asymptotic Behaviour of the Q-Learning Limit ODE - A Switching Systems Perspective
Lecture 46 - Concluding the Asymptotic Analysis of Q-Learning
Lecture 47 - Q-Learning with Linear Function Approximation - A Unified Switching Systems Perspective
Lecture 48 - Q-Learning with Linear Function Approximation under epsilon - Greedy Exploration
Lecture 49 - Analysis of Limiting Dynamics in Q-Learning with Function Approximation
Lecture 50 - Review of Probability Theory and Fundamental Inequalities
Lecture 51 - Review of Stochastic Approximation Concepts

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NPTEL Video Course - Computer Science and Engineering - NOC:Mathematical Foundations for Machine Learning

Subject Co-ordinator - Prof. Ashok Rao, Prof. Arulalan Rajan

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why this course ?
Lecture 2 - Fields and Their Properties - Algebraic Tools for ML
Lecture 3 - Fields, Vector Spaces
Lecture 4 - Vector Spaces and Subspaces
Lecture 5 - Combining Vectors and Linear Independence
Lecture 6 - Basis and Dimension
Lecture 7 - Linear Transformation - Intuition
Lecture 8 - Subspaces associated with Linear Transformations
Lecture 9 - Matrix representation of Linear Transformation
Lecture 10 - Examples of Linear Transformation
Lecture 11 - Eigenvalues and Eigenvectors
Lecture 12 - Multiplicity of Eigen Values
Lecture 13 - Diagonalization of Matrix
Lecture 14 - Diagonalizability, Invariant subspaces
Lecture 15 - Dot Product on Vector Space
Lecture 16 - Orthogonality on Vector Space
Lecture 17 - Orthonormal Basis
Lecture 18 - Orthogonal Projections
Lecture 19 - Construction of Orthogonal Basis
Lecture 20 - Approximating a vector in any given subspace
Lecture 21 - Real Symmetric Matrices
Lecture 22 - Least Square Fitting and Pseudo Inverse - 1
Lecture 23 - Least Square Fitting and Pseudo Inverse - 2
Lecture 24 - Principal Component Analysis (PCA)
Lecture 25 - Singular Value Decomposition (SVD)
Lecture 26 - Singular Value Decomposition (SVD) Interpretation
Lecture 27 - Support Vector Machine (SVM)
Lecture 28 - Consolidating Week 1 to Week 4
Lecture 29 - Introduction to Probability - 1

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Lecture 30 - Introduction to Probability - 2
Lecture 31 - Mutually Exclusive Events, Independent Events and Conditional Probability
Lecture 32 - Total Probability Theorem and Bayes' Theorem
Lecture 33 - Probability - A Measure Theoretic Insight
Lecture 34 - Random Experiment and Random Variables
Lecture 35 - Discrete Random Variables and Probability Mass Function (PMF)
Lecture 36 - Types of Discrete Random Variables and Their Probability Distributions
Lecture 37 - Continuous Random Variables
Lecture 38 - Expected Value of Random Variable
Lecture 39 - Moments and Variance
Lecture 40 - Joint Distributions and Marginals
Lecture 41 - Joint Moments of Random Variables
Lecture 42 - Independence and Correlation
Lecture 43 - Correlation and Covariance
Lecture 44 - Joint Moments of Continuous random Variables and Conditioning of Random Variables
Lecture 45 - Markov Inequality
Lecture 46 - Chebychev Inequality
Lecture 47 - Central Limit Theorem
Lecture 48 - Sample Geometry
Lecture 49 - Covariance Matrix and its properties
Lecture 50 - Functions, Derivatives, Infinite Series
Lecture 51 - Differentiation Rules
Lecture 52 - Multivariate functions
Lecture 53 - Gradient and Directional Derivatives
Lecture 54 - Rules for Partial Derivatives, Jacobian and Hessian
Lecture 55 - Matrix derivatives
Lecture 56 - Optimization Overview
Lecture 57 - Constrained Optimization, Optimal solutions, Saddle point
Lecture 58 - Constrained optimization, Lagrange Multiplier
Lecture 59 - Revisiting Least squares, Principal Component Analysis
Lecture 60 - Minimizing the Cost Function: Gradent Descent Algorithm
Lecture 61 - Variants of the Gradient Descent Algorithm
Lecture 62 - Neural Networks, Perceptron
Lecture 63 - Multilayer Layer Perceptron
Lecture 64 - Back Propogation Algorithm
Lecture 65 - Data and Patterns
Lecture 66 - Classification and a simple binary classifier
Lecture 67 - Classification, Clustering Techniques
Lecture 68 - Linear Regression : Line of best fit

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Lecture 69 - Logistic Regression
Lecture 70 - Course Summary, Credits and Acknowledgments

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NPTEL Video Course - Computer Science and Engineering - NOC:Programming with Generative AI

Subject Co-ordinator - Prof. Viraj Kumar

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What do Programmers Do ?
Lecture 2 - What is (and isn't) an algorithm ?
Lecture 3 - Algorithms for prime numbers
Lecture 4 - Key Programming Trends
Lecture 5 - Test Your Understanding
Lecture 6 - How effective is GenAI at coding ?
Lecture 7 - Refuting an Algorithm
Lecture 8 - Why is GenAI so effective at coding ?
Lecture 9 - Assumptions in AI-generated code
Lecture 10 - Test Your Understanding
Lecture 11 - Summary
Lecture 12 - Python resources
Lecture 13 - The REPL
Lecture 14 - Basic Arithmetic Operators
Lecture 15 - Test Your Understanding
Lecture 16 - Complex Expressions
Lecture 17 - Limits to arithmetic computation
Lecture 18 - Investigation sys.float_info
Lecture 19 - Binary digits (bits)
Lecture 20 - Naming Things
Lecture 21 - Introducing 'our friend'
Lecture 22 - Test Our Friend's Understanding
Lecture 23 - Limits to float computation
Lecture 24 - Python Objects
Lecture 25 - Textual data
Lecture 26 - Strings
Lecture 27 - Summary
Lecture 28 - Evaluating a complex expression
Lecture 29 - Assignment statements in Python

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Lecture 30 - Assignment statements and a common misconception
Lecture 31 - Clarifying the misconception
Lecture 32 - Another misconception with assignments
Lecture 33 - A final misconception with assignments
Lecture 34 - Introduction to PythonTutor
Lecture 35 - Swapping two variables (incorrect)
Lecture 36 - Swapping two variables (correct)
Lecture 37 - Good, Poor, and Illegal Variable names
Lecture 38 - Summary
Lecture 39 - Representing complex programs abstractly as functions
Lecture 40 - Properties of mathematical functions
Lecture 41 - Other built-in functions
Lecture 42 - The input function
Lecture 43 - Celcius to Fahrenheit (buggy)
Lecture 44 - Reviewing our friend's critique of buggy code
Lecture 45 - Debugging the code
Lecture 46 - Nested function calls
Lecture 47 - AI-generated program - 1
Lecture 48 - AI-generated program - 1
Lecture 49 - Another example: Patient Data (buggy)
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Lecture 51 - Fixing ChatGPT assumptions
Lecture 52 - Using GitHub Copilot to debug
Lecture 53 - Further model assumptions
Lecture 54 - Fixing GitHub Copilot assumptions
Lecture 55 - ChatGPT vs GitHub Copilot
Lecture 56 - Summary
Lecture 57 - Poorly designed and well designed functions
Lecture 58 - Principles of good function design
Lecture 59 - Improvement - 1
Lecture 60 - Improvement - 2
Lecture 61 - Example of a poorly designed function
Lecture 62 - Improvement - 2 (Continued...)
Lecture 63 - Improvement - 3
Lecture 64 - Simple conditional statements
Lecture 65 - Critiquing AI-generated code
Lecture 66 - Complex conditional statements
Lecture 67 - Introduction to Refute problems
Lecture 68 - Summary

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Lecture 69 - Example 1 (is_multiple)
Lecture 70 - Visualizing Example 1
Lecture 71 - Visualizing a function call
Lecture 72 - The error in Example 1
Lecture 73 - Fixing the code
Lecture 74 - Key Observations
Lecture 75 - Example 2 (modified is_multiple)
Lecture 76 - Fixing the error, Simplification 1
Lecture 77 - Elements of a Refute Problem
Lecture 78 - Refuting the median function
Lecture 79 - Simplification 2
Lecture 80 - Feedback for Refute Problems
Lecture 81 - Attempting to refute
Lecture 82 - Refuting the num_days function
Lecture 83 - Critique our friend's function
Lecture 84 - Boolean/logical operators
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Lecture 86 - Identifying an unexpected behaviour
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Lecture 88 - Short-circuiting
Lecture 89 - Inequivalence due to short-circuiting
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Lecture 92 - Calling a helper function
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Lecture 94 - Definition of a leap year
Lecture 95 - Refuting our friend's code
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Lecture 97 - Infinite recursion
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Lecture 99 - Using the default visualization
Lecture 100 - A non-recursive solution
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Lecture 104 - Clarifying the task
Lecture 105 - Our friend's recursive function
Lecture 106 - Tracing our friend's code
Lecture 107 - Refuting our friend's code

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Lecture 108 - Clarifying questions: num_vowels
Lecture 109 - Strings in Python
Lecture 110 - Testing our understanding
Lecture 111 - Testing out understanding further
Lecture 112 - String operations and methods
Lecture 113 - Testing your understanding
Lecture 114 - Our friend's code: num_vowels
Lecture 115 - Refuting our friend's code
Lecture 116 - Immutable objects
Lecture 117 - Summary
Lecture 118 - Modifying existing code
Lecture 119 - Poor code readability
Lecture 120 - Improving code readability
Lecture 121 - Asking clarifying questions
Lecture 122 - Clarifying the code's expected behaviour
Lecture 123 - Lists are mutable
Lecture 124 - Step 1: Suggested modification
Lecture 125 - Exceptions
Lecture 126 - Tuples
Lecture 127 - Sequence unpacking
Lecture 128 - Summary
Lecture 129 - A mystery (recursive) function
Lecture 130 - Visualizing the mystery function
Lecture 131 - A better (iterative) solution
Lecture 132 - Visualizing a for-loop
Lecture 133 - Pattern 1: Iterate until 'success'
Lecture 134 - Examples of Pattern 1
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Lecture 137 - Refuting the buggy function
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Lecture 139 - The is_prime function
Lecture 140 - Visualizing prime_product
Lecture 141 - Another version of prime_product
Lecture 142 - Visualizing the new version
Lecture 143 - An example of Pattern 2
Lecture 144 - Another example of Pattern 2
Lecture 145 - Visualizing appending to a list
Lecture 146 - Our friend's suggestion

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Lecture 147 - List comprehension
Lecture 148 - A buggy function using Pattern 2
Lecture 149 - Refuting the buggy function
Lecture 150 - An interesting takeaway
Lecture 151 - Summary
Lecture 152 - A recursive mystery function
Lecture 153 - Iterative version
Lecture 154 - Replacing while with for : Example 1
Lecture 155 - Replacing while with for : Example 2
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Lecture 157 - Implementing binary search
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Lecture 160 - A correct implementation of num_unique
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Lecture 163 - Pattern 3: All pairs
Lecture 164 - Example (Pattern 3): max_profit
Lecture 165 - Refuting the buggy function
Lecture 166 - Representing tabular data
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Lecture 168 - Example: substring_count
Lecture 169 - Clarifying the task
Lecture 170 - Reviewing ChatGPT's solution
Lecture 171 - Test Driven Development
Lecture 172 - Writing doctests for is_prime
Lecture 173 - Summary
Lecture 174 - Clarifying the task: count_between
Lecture 175 - Understanding the interpretation of 'between'
Lecture 176 - Are ChatGPT suggestions 'good' ?
Lecture 177 - Generating the code after clarifying (using ChatGPT)
Lecture 178 - Additional ChatGPT inputs
Lecture 179 - Revised code after additional clarifications
Lecture 180 - Learning a new programming language
Lecture 181 - Python vs C: Similarities and differences
Lecture 182 - Python: Example 1
Lecture 183 - Translating Example 1 to C
Lecture 184 - Key syntactic differences: Python vs C
Lecture 185 - Visualizing Python and C code

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Lecture 186 - C programming style
Lecture 187 - Python: Example 2
Lecture 188 - Example 2, Attempt 2
Lecture 189 - Semantics of integer division
Lecture 190 - Example 2, Attempt 3
Lecture 191 - Summary
Lecture 192 - Example 1 (is_upper)
Lecture 193 - Visualizing the incorrect is_upper function
Lecture 194 - Correcting the error
Lecture 195 - Basics of strings in C
Lecture 196 - Strings in C (char [])
Lecture 197 - Strings in C (char *)
Lecture 198 - Mutable and immutable strings
Lecture 199 - Example 2 (to_ind_lower)
Lecture 200 - Visualizing the modified to_ind_lower function
Lecture 201 - Our friend's translation
Lecture 202 - Visualizing our friend's translation
Lecture 203 - Preventing accidental mutation
Lecture 204 - Copying a string (Attempt 1)
Lecture 205 - Copying a string (Attempt 2)
Lecture 206 - Fixing one error, revealing another
Lecture 207 - Allocating memory on the heap
Lecture 208 - Visualizing the revised version (with malloc)
Lecture 209 - Summary
Lecture 210 - Algorithm-centric improvements (to_ind_lower)
Lecture 211 - Data-centric improvements (to_ind_lower)
Lecture 212 - Processing textual data: C or Python
Lecture 213 - Understanding (simplified) Python lists
Lecture 214 - A simple implementation of Python lists - Part 1
Lecture 215 - A simple implementation of Python lists - Part 2
Lecture 216 - A simple implementation of Python lists - Part 3
Lecture 217 - A simple implementation of Python lists - Part 4
Lecture 218 - Testing the list implementation
Lecture 219 - Summary

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NPTEL Video Course - Computer Science and Engineering - NOC:Artificial Intelligence: Concepts and Techniques

Subject Co-ordinator - Prof. V. Susheela Devi

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course overview and Introduction
Lecture 2 - History and Applications of AI
Lecture 3 - Agents and Environment
Lecture 4 - General Problem Solving
Lecture 5 - Introduction to Search Strategies
Lecture 6 - Uninformed Search Strategies - I
Lecture 7 - Uninformed Search Strategies - II
Lecture 8 - Informed Search Strategies - I
Lecture 9 - Informed Search Strategies - II
Lecture 10 - Adversarial or Game-Playing Search
Lecture 11 - Game-Playing Search
Lecture 12 - Introduction to Genetic Algorithms
Lecture 13 - GA Operators
Lecture 14 - Genetic Programming
Lecture 15 - Knowledge-Base Agents
Lecture 16 - Proposotional Logic
Lecture 17 - Predicate Logic - 1
Lecture 18 - Predicate Logic - 2
Lecture 19 - Inference in Predicate Logic
Lecture 20 - Inference in First Order Logic
Lecture 21 - Introduction to Expert Systems
Lecture 22 - Applications of Expert Systems
Lecture 23 - Introduction to Planning
Lecture 24 - Planning Graph
Lecture 25 - Planning and Scheduling
Lecture 26 - Knowledge Representation
Lecture 27 - Non Monotonic Reasoning
Lecture 28 - Representation Schemes - 1
Lecture 29 - Representation Schemes - 2

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Lecture 30 - Uncertanity in Knowledge Representation
Lecture 31 - Bayesian Network
Lecture 32 - Dynamic belief networks (DBN)
Lecture 33 - Utility Theory
Lecture 34 - Decision Theory - 1
Lecture 35 - Decision Theory - 2
Lecture 36 - Introduction to Learning
Lecture 37 - Learning Algorithms
Lecture 38 - Learning Algorithms
Lecture 39 - Ensemble Learning
Lecture 40 - Introduction to Neural Networks
Lecture 41 - Multilayer Perceptron Neural network
Lecture 42 - Hypothesis Learning
Lecture 43 - Practical Session - 1
Lecture 44 - Practical Session - 2
Lecture 45 - Introduction to deep learning
Lecture 46 - Datasets for DL
Lecture 47 - CNN and introduction to RNN
Lecture 48 - RNN and LSTMs
Lecture 49 - Practical Session - 3
Lecture 50 - Practical Session - 4
Lecture 51 - Practical Session - 5
Lecture 52 - Generative AI
Lecture 53 - Fuzzy Sets and Systems
Lecture 54 - Fuzzification and Defuzzification methods
Lecture 55 - Natural Language Processing
Lecture 56 - Ethics in AI
Lecture 57 - Swarm Intelligence
Lecture 58 - Multi agent systems

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NPTEL Video Course - Computer Science and Engineering - NOC:Foundations of Deep Learning: Concepts and Applic

Subject Co-ordinator - Prof. Sriram Ganapathy, Prof. Ashwini Kodipalli, Prof. Baishali Garai

Co-ordinating Institute - IISc Bangalore, R.V. University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Machine Learning and Deep Learning
Lecture 2 - Single Layer Perceptron
Lecture 3 - Hands-on on Single Layer Perceptron
Lecture 4 - Multi-Layer Perceptron
Lecture 5 - Activation and Loss Functions
Lecture 6 - Gradient descent algorithm
Lecture 7 - Backpropagation in Neural Network
Lecture 8 - Varients of Gradient descent and Momentum based techniques
Lecture 9 - Regularization techniques in Neural Networks
Lecture 10 - Hands-on on MLP for classification problem
Lecture 11 - Fundamentals of Image representation and Image preprocessing and Data augmentation
Lecture 12 - Introduction to Convolutional Neural Networks, Inspiration behind CNN, Key Components of CNN
Lecture 13 - Convolution for RGB, Pooling Layer and Flatten Layer
Lecture 14 - Batch Normalization
Lecture 15 - Hands-on session on building simple CNN model
Lecture 16 - Architecture and Implementation of AlexNet
Lecture 17 - VGGNet (VGG16 and VGG19) and GoogleNet
Lecture 18 - Introduction to ResNet (ResNet 34 and ResNet50)
Lecture 19 - Introduction to Transfer Learning
Lecture 20 - Hands-on on standard CNN architectures and transfer learning
Lecture 21 - Hands-on on building and deep CNN ensemble model
Lecture 22 - Need for XAI, PCI, Occlusion method
Lecture 23 - SHAP and LIME
Lecture 24 - Guided backpropagation
Lecture 25 - Grad-CAM and Class Activation Maps (CAMs)
Lecture 26 - Hands-on implemenation of XAI methods
Lecture 27 - Image segmentation
Lecture 28 - U-Net with Attention and Evaluation Metric for Segmentation
Lecture 29 - Object detection

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Lecture 30 - YOLO v1 for object detection
Lecture 31 - Hands-on implemenation of Unet
Lecture 32 - Creating yaml file for the custom dataset
Lecture 33 - Hands-on implemenation of YOLO
Lecture 34 - Introduction to Recurrent Neural Networks
Lecture 35 - Numerical Example for RNN
Lecture 36 - Vanishing and exploding gradients in NN
Lecture 37 - Backpropagation through time (BTT)
Lecture 38 - Hands-on implementation of RNN model and its variants
Lecture 39 - Introduction to LSTM
Lecture 40 - Gated Recurrent Unit
Lecture 41 - LSTM-Encoder Decoder Structure
Lecture 42 - LSTM with attention
Lecture 43 - Hands-on implementation of LSTM
Lecture 44 - Introduction to NLP
Lecture 45 - Text Preprocessing and Text Representations
Lecture 46 - Discrete and Distributed Word Representation
Lecture 47 - Word Embeddings in NLP
Lecture 48 - Hands-on implementation of RNN in NLP application
Lecture 49 - Introduction to Autoencoders
Lecture 50 - Types of Autoencoders
Lecture 51 - VAE Architecture - Encoder part
Lecture 52 - VAE Architecture - Decoder part
Lecture 53 - Reparameterization Trick
Lecture 54 - Hands-on implemenation of Autoencoders
Lecture 55 - Foundations of Language Modeling and Transformers
Lecture 56 - Transformer Architectures and Attention Mechanisms
Lecture 57 - In-context learning and Self-Supervised Learning in LLMs
Lecture 58 - Large Language Models: Tokenization, Generation, and Sampling
Lecture 59 - Pre-training and Instruction Tuning of Large Language Models
Lecture 60 - Reinforcement Learning for Aligning Large Language Models
Lecture 61 - Reasoning, Retrieval, and Efficiency in Post-trained LLMs
Lecture 62 - Evaluation, Benchmarking, and Impact of Foundation Models
Lecture 63 - LLMs demo - TA
Lecture 64 - Diffusion Models for Generative Modelling
Lecture 65 - GANs and Diffusion models demo - TA

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NPTEL Video Course - Computer Science and Engineering - NOC:Mathematical Foundations of Machine Learning

Subject Co-ordinator - Prof. Prathosh A P

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Function Approximation
Lecture 2 - Recap of Probability Theory - 1, Part 1
Lecture 3 - Recap of Probability Theory - 1, Part 2
Lecture 4 - Recap of Probability Theory - 1, Part 3
Lecture 5 - Recap of Probability Theory - Part 2
Lecture 6 - Understanding a Chest X-Ray as Sample from Distribution
Lecture 7 - IID Assumption
Lecture 8 - Distribution Estimation
Lecture 9 - Density Function
Lecture 10 - Challenge With ML
Lecture 11 - Tutorial 1 : Introduction to Python Basics
Lecture 12 - Tutorial 2 : Simple Problem solving in Probability Theory
Lecture 13 - Entropy
Lecture 14 - Kullback-Leibler (KL) Divergence
Lecture 15 - Minimization of KL Divergence
Lecture 16 - Example of ML Estimate
Lecture 17 - Risk Minimization Framework
Lecture 18 - Bayes Classifier
Lecture 19 - Tutorial 3 : Risk Minimization Framework
Lecture 20 - MLE for Gaussian Distribution
Lecture 21 - MLE for Generalized Discrete Random Variable
Lecture 22 - Density Estimation for Mixed Distribution
Lecture 23 - Latent Variable Models
Lecture 24 - MLE for Latent Variable Models
Lecture 25 - Expectation Maximization Algorithm
Lecture 26 - Tutorial 4 : Minmax Classifier
Lecture 27 - Tutorial 5 : Neyman Pearson Classifier
Lecture 28 - Tutorial 6 : Example of NP Classifier, ROC Curve
Lecture 29 - Tutorial 7A : MLE for Gaussian Distribution

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Lecture 30 - Tutorial 7B : MLE for Generalized Discrete Distribution
Lecture 31 - Convergence of EM
Lecture 32 - EM for GMMs
Lecture 33 - MAP Estimate
Lecture 34 - Parzen Window
Lecture 35 - Nearest Neighbor Classifier
Lecture 36 - Tutorial 8 : Computation of EM for GMMs
Lecture 37 - Tutorial 9 : MAP Estimate
Lecture 38 - Ordinary Least Squares (OLS)
Lecture 39 - Generalized Least Squares (GLS)
Lecture 40 - Linear Models for Classification
Lecture 41 - Bias - Variance Decomposition and Analysis
Lecture 42 - Bias and Variance in Practice
Lecture 43 - Tutorial 10 Part A : Numerical Example on Bayes Classifier
Lecture 44 - Tutorial 10 Part B : Numerical Example on MLE and MAP Estimate
Lecture 45 - Regularization
Lecture 46 - Regularized ERM and MAP Estimate
Lecture 47 - Stochastic Gradient Descent as a Regularizer
Lecture 48 - Max-Margin Classifier and SVM
Lecture 49 - SVM Formulation
Lecture 50 - Dual Function in SVM
Lecture 51 - SVM for Non-Linear Seperable Case
Lecture 52 - SVM with Kernel Function
Lecture 53 - Neural Networks and Universal Approximation Theorem
Lecture 54 - ERM on Neural Networks and Error Backpropagation
Lecture 55 - Local Receptive Field and Parameter Sharing
Lecture 56 - Convolutional Neural Networks (CNNs) as Regularized MLP
Lecture 57 - Recurrent Neural Networks (RNNs)
Lecture 58 - Back Prapogation in RNNs and Vanishing Gradients Problem
Lecture 59 - LSTMs and GRUs
Lecture 60 - Tutorial 11 : Pytorch - Tensors and Data Loaders
Lecture 61 - Tutorial 12 : Pytorch - Building MLP and Auto Grad
Lecture 62 - Tutorial 13 : Pytorch - Training the Model
Lecture 63 - Attention - Part 1
Lecture 64 - Attention - Part 2
Lecture 65 - Multi-Head Attention and Transformer Architecture
Lecture 66 - Positional Embeddings
Lecture 67 - Transfer Learning and Knowledge Distilation
Lecture 68 - SGD, RMS Prop, ADAM : Optimizers

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Lecture 69 - Tutorial 14 Part 1 : CNNs
Lecture 70 - Tutorial 14 Part 2 : Transfer Learning using CNNs
Lecture 71 - Tutorial 15 Part 1 : RNNs, LSTMs and GRUs
Lecture 72 - Tutorial 15 Part 2 : Deep RNNs, LSTMs and GRUs
Lecture 73 - Decision Trees and Impurity Measures
Lecture 74 - Regression Trees
Lecture 75 - Ensemble Methods, Bagging and Boosting
Lecture 76 - Gradient Boosting Algorithm
Lecture 77 - Ada-Boosting
Lecture 78 - Cross Validation
Lecture 79 - Un-Supervised Learning
Lecture 80 - K-Means Clustering
Lecture 81 - PCA - Principal Component Analysis
Lecture 82 - NCE - Noise Contrastive Estimation
Lecture 83 - NCE, Info-NCE, SimCLR, JEPA
Lecture 84 - Introduction to Generative Models
Lecture 85 - GAN - Generative Adversarial Networks
Lecture 86 - Variational Auto Encoders : VAEs
Lecture 87 - Introduction to Large Language Models : LLMs
Lecture 88 - Introduction to Reinforcement Learning : RL

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NPTEL Video Course - Economics - NOC:Microfoundations of Macroeconomics

Subject Co-ordinator - Prof. Wasim Ahmad

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - One Period Model - I
Lecture 2 - One Period Model - II
Lecture 3 - One Period Model - III
Lecture 4 - One Period Model - IV
Lecture 5 - One Period Model - V
Lecture 6 - Two Period Model - I
Lecture 7 - Two Period Model - II
Lecture 8 - Two Period Model - III
Lecture 9 - Two Period Model - IV
Lecture 10 - Two Period Model - V
Lecture 11 - Two Period Model - VI
Lecture 12 - Ricardian Equivalence - I
Lecture 13 - Ricardian Equivalence - II
Lecture 14 - Credit Market Imperfection - I
Lecture 15 - Credit Market Imperfection - II
Lecture 16 - Search and Unemployment - I
Lecture 17 - Search and Unemployment - II
Lecture 18 - Search and Unemployment - III
Lecture 19 - Schools of Macroeconomic Thought
Lecture 20 - Rational Expectations and Economic Policy I
Lecture 21 - Sticky Prices - I
Lecture 22 - Sticky Prices - II
Lecture 23 - Sticky Prices - III
Lecture 24 - Flexible Prices - I
Lecture 25 - Flexible Prices - II
Lecture 26 - Keynesian Coordination Failure Model
Lecture 27 - New Keynesian Sticky Prices - I
Lecture 28 - New Keynesian Sticky Prices - II
Lecture 29 - New Keynesian Sticky Prices - III

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Lecture 30 - New Keynesian Sticky Prices - IV
Lecture 31 - Monetary Policy - I
Lecture 32 - Monetary Policy - II
Lecture 33 - Monetary Policy - III
Lecture 34 - Monetary Policy - IV
Lecture 35 - Monetary Policy - V
Lecture 36 - Monetary Policy - VI
Lecture 37 - Financial Crisis and Economy - I
Lecture 38 - Financial Crisis and Economy - II
Lecture 39 - Open Economy Macroeconomics - I
Lecture 40 - Open Economy Macroeconomics - II
Lecture 41 - Course Summary

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NPTEL Video Course - Economics - NOC:Introduction to Microeconomics in Hindi and without Calculus

Subject Co-ordinator - Prof. Vimal Kumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Definition and Basic Concepts - I
Lecture 3 - Definition and Basic Concepts - II
Lecture 4 - Definition and Basic Concepts - III
Lecture 5 - Graph
Lecture 6 - Optimization
Lecture 7 - Economic Models - I
Lecture 8 - Economic Models - II
Lecture 9 - Example
Lecture 10 - Branches of Economics
Lecture 11 - Introduction to Demand, Supply and Equilibrium
Lecture 12 - Concept of Marginal Change
Lecture 13 - Demand - I
Lecture 14 - Demand - II
Lecture 15 - Factors Affecting Demand
Lecture 16 - Market Demand
Lecture 17 - Supply
Lecture 18 - Market Supply An Example
Lecture 19 - Factors Affecting Supply
Lecture 20 - Market Equilibrium
Lecture 21 - Changes in Market Equilibrium
Lecture 22 - Consumers Surplus and Producers Surplus
Lecture 23 - Total Surplus
Lecture 24 - Market Interventions
Lecture 25 - Elasticity - I
Lecture 26 - Elasticity - II
Lecture 27 - Elasticity - III
Lecture 28 - Other Elasticities
Lecture 29 - Elasticity One more Example

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Lecture 30 - Tax I and Incidence of Tax
Lecture 31 - Incidence of Tax - I
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Lecture 33 - Theory of Consumer Behaviour An Introduction
Lecture 34 - Budget Line
Lecture 35 - Budget Line and Budget Set Some Examples
Lecture 36 - Rationality
Lecture 37 - Utility Function
Lecture 38 - Continuity
Lecture 39 - Nonsatiation
Lecture 40 - Convexity
Lecture 41 - Indifference Curve and MRS
Lecture 42 - Indifference Curve and Example
Lecture 43 - Utility More Examples
Lecture 44 - Consumer Optimization
Lecture 45 - Optimization Some Examples - I
Lecture 46 - Optimization Some Examples - II
Lecture 47 - Optimization Precaution
Lecture 48 - Optimization Economic Interpretation
Lecture 49 - Optimization Summary
Lecture 50 - Income and Price Expansion Path
Lecture 51 - Income and Substitution Effect
Lecture 52 - Income Effect and Substitution Effect (Continued...)
Lecture 53 - Expenditure Minimization
Lecture 54 - Duality
Lecture 55 - Compensated and Uncompensated Demand
Lecture 56 - DBT vs Subsidy
Lecture 57 - Producer Theory An Introduction
Lecture 58 - Types of Firm
Lecture 59 - Technology and Its Representation
Lecture 60 - Average Product and Marginal Product
Lecture 61 - An Example to Demonstrate the Relationship between AP, MP and TP
Lecture 62 - Examples of Production Function
Lecture 63 - Time Constraint and Production Function
Lecture 64 - Returns to Scale
Lecture 65 - Profit Maximization An Introduction
Lecture 66 - Profit Maximization II
Lecture 67 - Profit Maximization Short Run and Long Run
Lecture 68 - Profit Maximization (Continued...)

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Lecture 69 - Cost Minimization
Lecture 70 - Cost Minimization Some Examples
Lecture 71 - Returns to Scale and Cost Minimization
Lecture 72 - Cost Minimization Long Run vs Short Run
Lecture 73 - Fixed Cost Quasi Fixed Cost and Variable Cost
Lecture 74 - Cost Curve - I
Lecture 75 - Cost Curve - II
Lecture 76 - Cost Curve - III
Lecture 77 - Cost Curve - IV
Lecture 78 - Market Structure An Introduction
Lecture 79 - Perfect Competition An Introduction
Lecture 80 - Demand Curve Facing the Firm
Lecture 81 - Supply From a Competitive Firm
Lecture 82 - Obtaining Supply Function
Lecture 83 - Profit Function And Producer's Surplus
Lecture 84 - Free Entry and Exit In Perfectly Competitive Market
Lecture 85 - Conditions for Profitability and Production in a Perfectly Competitive Market
Lecture 86 - Long Run Supply Function in a Perfectly Competitive Market
Lecture 87 - A Solved Example: Long Run Supply Function
Lecture 88 - Upward Sloping Supply Function in Long Run
Lecture 89 - Introduction to Monopoly
Lecture 90 - Reasons for Monopoly
Lecture 91 - Profit Maximization by the Monopolist
Lecture 92 - Equilibrium in Monopoly Market
Lecture 93 - A Monopolist doesn't have a supply curve
Lecture 94 - Monopoly Power
Lecture 95 - The Impact of Taxes on a Monopolist
Lecture 96 - A Monopolist with Multiplant
Lecture 97 - A Monopolist in Multimarket
Lecture 98 - Price Discrimination
Lecture 99 - First Degree Price Discrimination
Lecture 100 - Second Degree Price Discrimination
Lecture 101 - Third Degree Price Discrimination
Lecture 102 - Public Policy Towards Monopoly
Lecture 103 - Monopolistic Competition : An Introduction
Lecture 104 - Monopolistic Competition in Short Run and Long Run
Lecture 105 - Monopolistic Competition Vs Perfect Competition in Long Run
Lecture 106 - Product Differentiation
Lecture 107 - Game Theory : An Introduction

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Lecture 108 - Nash Equilibrium
Lecture 109 - Matching Pennies
Lecture 110 - Extensive form Game
Lecture 111 - Game Theory Summary
Lecture 112 - Oligopoly An Introduction
Lecture 113 - Duopoly
Lecture 114 - Equilibrium in Cournot Competition
Lecture 115 - Equilibrium in Bertrand Competition
Lecture 116 - Stackelberg Competition
Lecture 117 - Collusion and Cartel
Lecture 118 - Comparison of Different Market Structures

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NPTEL Video Course - Economics - NOC:Economics of Banking and Finance Markets

Subject Co-ordinator - Prof. Sukumar Vellakkal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Economics - NOC:Economic Environment and Business Strategy

Subject Co-ordinator - Prof. Sukumar Vellakkal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Business Environment
Lecture 2 - Market Mechanism
Lecture 3 - Understanding the Working of the Market Mechanism
Lecture 4 - Understanding the Elasticity Concepts
Lecture 5 - Business Environment: Technology, Society and Policy
Lecture 6 - Government Interventions in Market System
Lecture 7 - Externalities: A Case for Government Intervention in Market Economies
Lecture 8 - Political and Government Environment
Lecture 9 - Macroeconomic Environment and GDP
Lecture 10 - GDP Concepts
Lecture 11 - Comparing GDP Measures and Economic Welfare
Lecture 12 - Measuring Inflation: Concepts, Tools, and Techniques
Lecture 13 - Inflation Measures: Comparison and the Indian Context
Lecture 14 - Understanding the Financial Environment
Lecture 15 - Financial Instruments and Intermediaries
Lecture 16 - Debt Markets: Bonds and Interest Rate Fundamentals
Lecture 17 - Interest Rate Determination: Market Forces and Policy
Lecture 18 - Theories of Interest Rate Determination - I
Lecture 19 - Credit Rating: Purpose, Process, and Impact
Lecture 20 - Theories of Interest Rate Determination - II
Lecture 21 - Monetary Policy: Objectives and Instruments
Lecture 22 - Central Banking and the Money Supply Process - I
Lecture 23 - Central Banking and the Money Supply Process - II
Lecture 24 - Structure and Formulation of Monetary Policies: Insights
Lecture 25 - Monetary Policy Strategies
Lecture 26 - Fiscal environment
Lecture 27 - Understanding an open economy
Lecture 28 - Foreign exchange
Lecture 29 - Policy Interventions in the Forex Market

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Lecture 30 - International Trade Environment
Lecture 31 - Trade Agreements
Lecture 32 - Business Cycles
Lecture 33 - Major Business Cycles - I
Lecture 34 - Major Business Cycles - II
Lecture 35 - 2007-08 Financial Crisis and Recession 2008-09
Lecture 36 - Policy Lags and Macroeconomic Stability
Lecture 37 - Strategic Management - I
Lecture 38 - Strategic Management - II
Lecture 39 - Strategic Management - III
Lecture 40 - Case Study Approach

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NPTEL Video Course - Economics - NOC:Introduction to Commercial Banking and Fintech

Subject Co-ordinator - Prof. Wasim Ahmad

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Banking in India: Evolution and Functions
Lecture 2 - Banking, Economic Growth, and Financial Stability
Lecture 3 - Money Supply and the Money Multiplier: Theory and Mechanisms
Lecture 4 - Monetary Policy Framework in India
Lecture 5 - Monetary Policy Instruments
Lecture 6 - Liquidity Adjustment Framework
Lecture 7 - Market Operations and Forex Interventions
Lecture 8 - Sterilization, Targeted Liquidity Operations and Money Markets
Lecture 9 - Unconventional Monetary Policy Tools in India
Lecture 10 - Monetary Policy and the Financial Sector
Lecture 11 - Nominal Anchors and Central Bank Credibility
Lecture 12 - Institutional Frameworks for Monetary Policy
Lecture 13 - The Taylor Rules and Interest Rate Smoothing
Lecture 14 - Alternative Monetary Policy Rules
Lecture 15 - The SI-LM Framework: Goods and Money Market Equilibrium
Lecture 16 - IS-LM Model : Comparative Statics
Lecture 17 - Dynamic AD-AS Analysis
Lecture 18 - Monetary Policy Transmission: Overview and Interest Rate Channel
Lecture 19 - Exchange Rate and Asset Price Channels
Lecture 20 - Wealth Effects and Credit Market Frictions
Lecture 21 - Bank Financial Statements: Assets, Liabilities and Earnings
Lecture 22 - Policy Shocks and Bank Financial Performance
Lecture 23 - Bank Profitability Ratios
Lecture 24 - Bank Financial Statement Analysis: A Case Study Approach
Lecture 25 - Monetary Policy Transmission through Banks and Credit Markets
Lecture 26 - The Balance Sheet Channel of Monetary Policy Transmission
Lecture 27 - Money Creation: From Deposits to Credit
Lecture 28 - Credit Creation: Mechanics and Regulation
Lecture 29 - Bank Runs

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Lecture 30 - Why Banks Fail ?
Lecture 31 - The Economics of Bank Risks
Lecture 32 - Bank Risk Taxonomy, NPAs, and Stress Diagnostics
Lecture 33 - The Concept of Write-offs
Lecture 34 - Introduction to Global Banking Regulations and Basel Norms
Lecture 35 - Basel Capital Framework
Lecture 36 - Basel II Framework
Lecture 37 - Basel II Framework (Continued...)
Lecture 38 - Probability of Default Estimation
Lecture 39 - Calculating Expected Loss
Lecture 40 - Introduction to Basel III
Lecture 41 - Leverage Regulation in Banks
Lecture 42 - Liquidity Management Framework in Basel III
Lecture 43 - Systemic Risk, Stress Tests and Early Warning Signals
Lecture 44 - Structural Risk Signals
Lecture 45 - Measures of Systemic Risk
Lecture 46 - Introduction to Climate Risk in Banking
Lecture 47 - Climate Disclosure and Taxonomy
Lecture 48 - Climate Risk Regulation Frameworks
Lecture 49 - The CAMELS Framework
Lecture 50 - Bank Efficiency
Lecture 51 - Introduction to FinTech
Lecture 52 - Economics of FinTech
Lecture 53 - Bank and FinTech: Competition and Complementarity
Lecture 54 - Regulatory Framework for FinTechs
Lecture 55 - Regulatory Sandbox, RegTech and SupTech
Lecture 56 - Fintech Regulation: Indian and Global Landscape
Lecture 57 - Fintech Regulation (Continued...)
Lecture 58 - Emerging Issues in Fintech
Lecture 59 - Course Recap - I
Lecture 60 - Course Recap - II

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NPTEL Video Course - Economics - NOC:Foundational Course: Economics of Education

Subject Co-ordinator - Prof. Shyamsundar Bairagya

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Meaning, definition, subject matter, nature and scope of Economics
Lecture 2 - Economic Growth and Development
Lecture 3 - Concept of Economics of Education
Lecture 4 - Relationship Between Economics and Education
Lecture 5 - Education as Consumption and Investment
Lecture 6 - Meaning, Types, Understanding of Capital
Lecture 7 - Human Capital Theory by Schultz
Lecture 8 - Human Capital Theory by Gary Becker
Lecture 9 - Human capital theory by Jacob Mincer
Lecture 10 - Sources, process of Human Capital formation and Relationship Between Human Capital and Economic
Lecture 11 - Robert E Lucas Endogenous Growth Theory
Lecture 12 - Romerâ s Endogenous Growth Model
Lecture 13 - Endogenous Growth Theory (Lucas, Romer) Linkage with Human Capital
Lecture 14 - Capability Approach of Amartya Sen
Lecture 15 - Amartya Senâ s Capability Approach in Education
Lecture 16 - Signaling Theory and Its Implications for Educational Development
Lecture 17 - Screening hypothesis and rate of return in Education
Lecture 18 - Credentialism and The Credential Society
Lecture 19 - Education and labour market outcomes
Lecture 20 - Skills mismatch and Education
Lecture 21 - Production
Lecture 22 - Education as Production Function
Lecture 23 - Production Function in Education
Lecture 24 - Technical Efficiency
Lecture 25 - Allocative efficiency
Lecture 26 - Internal and External Efficiency in Education
Lecture 27 - Concept of educational productivity
Lecture 28 - Productivity in Educational Institution
Lecture 29 - Models of Educational Productivity

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Lecture 30 - Educational Productivity and Equity: Role of Teachers, Institutions, and Policy
Lecture 31 - Concept of Cost
Lecture 32 - Meaning and Types of Cost of Education
Lecture 33 - Concept of Incremental Cost
Lecture 34 - Determinants of Educational Costs and Per capita Cost
Lecture 35 - Inter-relationship between the Cost of education and productivity
Lecture 36 - Concept of Cost Benefit Analysis
Lecture 37 - Steps for calculation Cost-Benefit Analysis in Education
Lecture 38 - Cost-Effective Analysis in Education
Lecture 39 - Rate of Return in Education
Lecture 40 - Application to Policy decisions
Lecture 41 - Education as a Public Goods
Lecture 42 - Education as a Private Goods
Lecture 43 - Education as a Mixed and Merit Goods
Lecture 44 - Externalities in School and Higher Education
Lecture 45 - Winstonâ s Awkward Economics of Higher Education
Lecture 46 - Introduction to the Arthasastra and Its Historical Context
Lecture 47 - Education for State Administration in Kautilyaâ s Arthasastra
Lecture 48 - Extension Education, Agriculture, and Economic Foundations in the Arthasastra
Lecture 49 - Education, Revenue Collection, and Social Well-Being in the Arthasastra
Lecture 50 - Education, Governance, and State Policy in the Arthasastra
Lecture 51 - Concept of Educational Finance
Lecture 52 - Basic Terminologies and Sources of Educational Finance
Lecture 53 - Educational Grants and Loans
Lecture 54 - Concept of Budgeting
Lecture 55 - Public-Private Partnership (PPP) Models
Lecture 56 - NEP 2020 in the Perspectives of Economics of Education
Lecture 57 - Academic Bank of Credits (ABC) and itâ s Economic Viability of Higher Education
Lecture 58 - Credit-Based Education Reform in India: Understanding NCrF
Lecture 59 - NHEQF: Structure, Equity, Access, Inclusivity and Economic Perspectives
Lecture 60 - Future Directions and Emerging Debates in NEP 2020 for Economics of Education

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NPTEL Video Course - Economics - NOC:Introduction to Econometrics

Subject Co-ordinator - Prof. Sabuj Kumar Mandal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to econometrics and econometric analysis - Part 1
Lecture 2 - Introduction to econometrics and econometric analysis - Part 2
Lecture 3 - Different steps in econometric analysis - Part 1
Lecture 4 - Different steps in econometric analysis - Part 2
Lecture 5 - Desirable properties of the estimates of the population parameters - Part 1
Lecture 6 - Desirable properties of the estimates of the population parameters - Part 2
Lecture 7 - Classical Linear Regression Model - Part 1
Lecture 8 - Classical Linear Regression Model - Part 2
Lecture 9 - Classical Linear Regression Model - Part 3
Lecture 10 - Classical Linear Regression Model - Part 4
Lecture 11 - Classical Linear Regression Model - Part 5
Lecture 12 - Goodness of fit measure, Anova and hypothesis testing - Part 1
Lecture 13 - Goodness of fit measure, Anova and hypothesis testing - Part 2
Lecture 14 - Goodness of fit measure, Anova and hypothesis testing - Part 3
Lecture 15 - Goodness of fit measure, Anova and hypothesis testing - Part 4
Lecture 16 - Goodness of fit measure, Anova and hypothesis testing - Part 5
Lecture 17 - Application of STATA for hypothesis testing and introduction to multiple linear regression model
Lecture 18 - Application of STATA for hypothesis testing and introduction to multiple linear regression model
Lecture 19 - Application of STATA for hypothesis testing and introduction to multiple linear regression model
Lecture 20 - Application of STATA for hypothesis testing and introduction to multiple linear regression model
Lecture 21 - Application of STATA for hypothesis testing and introduction to multiple linear regression model
Lecture 22 - Multiple linear regression model and application of F statistics - Part 1
Lecture 23 - Multiple linear regression model and application of F statistics - Part 2
Lecture 24 - Multiple linear regression model and application of F statistics - Part 3
Lecture 25 - Multiple linear regression model and application of F statistics - Part 4
Lecture 26 - Multiple linear regression model and application of F statistics - Part 5
Lecture 27 - Multiple linear regression model and application of F statistics - Part 6
Lecture 28 - Structural break analysis using Chow test - Part 1
Lecture 29 - Structural break analysis using Chow test - Part 2

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Lecture 30 - Structural break analysis using Chow test - Part 3
Lecture 31 - Structural break analysis using Chow test - Part 4
Lecture 32 - Structural break analysis using Chow test - Part 5
Lecture 33 - Dummy Variable analysis and Application of Difference-inDifference for impact evaluation - Part
Lecture 34 - Dummy Variable analysis and Application of Difference-inDifference for impact evaluation - Part
Lecture 35 - Dummy Variable analysis and Application of Difference-inDifference for impact evaluation - Part
Lecture 36 - Dummy Variable analysis and Application of Difference-inDifference for impact evaluation - Part
Lecture 37 - Dummy Variable analysis and Application of Difference-inDifference for impact evaluation - Part
Lecture 38 - Statistical analysis of Dummy Variable models and Testing for seasonal fluctuations - Part 1
Lecture 39 - Statistical analysis of Dummy Variable models and Testing for seasonal fluctuations - Part 2
Lecture 40 - Statistical analysis of Dummy Variable models and Testing for seasonal fluctuations - Part 3
Lecture 41 - Statistical analysis of Dummy Variable models and Testing for seasonal fluctuations - Part 4
Lecture 42 - Statistical analysis of Dummy Variable models and Testing for seasonal fluctuations - Part 5
Lecture 43 - Statistical analysis of Dummy Variable models and Testing for seasonal fluctuations - Part 6
Lecture 44 - Relaxing the assumptions of CLRM - Multicollinearity and Autocorrelation - Part 1
Lecture 45 - Relaxing the assumptions of CLRM - Multicollinearity and Autocorrelation - Part 2
Lecture 46 - Relaxing the assumptions of CLRM - Multicollinearity and Autocorrelation - Part 3
Lecture 47 - Relaxing the assumptions of CLRM - Multicollinearity and Autocorrelation - Part 4
Lecture 48 - Relaxing the assumptions of CLRM - Multicollinearity and Autocorrelation - Part 5
Lecture 49 - Relaxing the assumptions of CLRM - Multicollinearity and Autocorrelation - Part 6
Lecture 50 - Relaxing the assumptions of CLRM - Autocorrelation and Heteroscedasticity - Part 1
Lecture 51 - Relaxing the assumptions of CLRM - Autocorrelation and Heteroscedasticity - Part 2
Lecture 52 - Relaxing the assumptions of CLRM - Autocorrelation and Heteroscedasticity - Part 3
Lecture 53 - Relaxing the assumptions of CLRM - Autocorrelation and Heteroscedasticity - Part 4
Lecture 54 - Relaxing the assumptions of CLRM - Autocorrelation and Heteroscedasticity - Part 5
Lecture 55 - Relaxing the assumptions of CLRM - Autocorrelation and Heteroscedasticity - Part 6
Lecture 56 - Qualitative Response Models - Linear Probability Model, Logit and Probit Models - Part 1
Lecture 57 - Qualitative Response Models - Linear Probability Model, Logit and Probit Models - Part 2
Lecture 58 - Qualitative Response Models - Linear Probability Model, Logit and Probit Models - Part 3
Lecture 59 - Qualitative Response Models - Linear Probability Model, Logit and Probit Models - Part 4
Lecture 60 - Qualitative Response Models - Linear Probability Model, Logit and Probit Models - Part 5
Lecture 61 - Qualitative Response Models - Probit and Tobit Models - Part 1
Lecture 62 - Qualitative Response Models - Probit and Tobit Models - Part 2
Lecture 63 - Qualitative Response Models - Probit and Tobit Models - Part 3
Lecture 64 - Qualitative Response Models - Probit and Tobit Models - Part 4
Lecture 65 - Qualitative Response Models - Probit and Tobit Models - Part 5

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NPTEL Video Course - Economics - NOC:Environmental and Resource Economics

Subject Co-ordinator - Prof. Sabuj Kumar Mandal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Environmental Economics and Environmental Kuznets Curve Hypothesis Part - 1
Lecture 2 - Introduction to Environmental Economics and Environmental Kuznets Curve Hypothesis Part - 2
Lecture 3 - Introduction to Environmental Economics and Environmental Kuznets Curve Hypothesis Part - 3
Lecture 4 - Introduction to Environmental Economics and Environmental Kuznets Curve Hypothesis Part - 4
Lecture 5 - Introduction to Environmental Economics and Environmental Kuznets Curve Hypothesis Part - 5
Lecture 6 - Introduction to Environmental Economics and Environmental Kuznets Curve Hypothesis Part - 6
Lecture 7 - Policy implications of Environmental Kuznets curve and Economics of sustainable development Part
Lecture 8 - Policy implications of Environmental Kuznets curve and Economics of sustainable development Part
Lecture 9 - Policy implications of Environmental Kuznets curve and Economics of sustainable development Part
Lecture 10 - Policy implications of Environmental Kuznets curve and Economics of sustainable development Part
Lecture 11 - Policy implications of Environmental Kuznets curve and Economics of sustainable development Part
Lecture 12 - Policy implications of Environmental Kuznets curve and Economics of sustainable development Part
Lecture 13 - Daly's Operational Principle of Sustainable Development Part - 1
Lecture 14 - Daly's Operational Principle of Sustainable Development Part - 2
Lecture 15 - Daly's Operational Principle of Sustainable Development Part - 3
Lecture 16 - Daly's Operational Principle of Sustainable Development Part - 4
Lecture 17 - Daly's Operational Principle of Sustainable Development Part - 5
Lecture 18 - Market Failure and Coase Theorem Part - 1
Lecture 19 - Market Failure and Coase Theorem Part - 2
Lecture 20 - Market Failure and Coase Theorem Part - 3
Lecture 21 - Market Failure and Coase Theorem Part - 4
Lecture 22 - Coase Theorem and Incentive Design Part - 1
Lecture 23 - Coase Theorem and Incentive Design Part - 2
Lecture 24 - Coase Theorem and Incentive Design Part - 3
Lecture 25 - Incentive Design Under Uncertainity and Effectiveness Part - 1
Lecture 26 - Incentive Design Under Uncertainity and Effectiveness Part - 2
Lecture 27 - Incentive Design Under Uncertainity and Effectiveness Part - 3
Lecture 28 - Incentive Design Under Uncertainity and Effectiveness Part - 4
Lecture 29 - Incentive Design Under Uncertainity and Effectiveness Part - 5

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Lecture 30 - Effectiveness of Incentive design and Economic valuation of Environmental goods and service Part
Lecture 31 - Effectiveness of Incentive design and Economic valuation of Environmental goods and service Part
Lecture 32 - Effectiveness of Incentive design and Economic valuation of Environmental goods and service Part
Lecture 33 - Effectiveness of Incentive design and Economic valuation of Environmental goods and service Part
Lecture 34 - Effectiveness of Incentive design and Economic valuation of Environmental goods and service Part
Lecture 35 - Effectiveness of Incentive design and Economic valuation of Environmental goods and service Part
Lecture 36 - Effectiveness of Incentive design and Economic valuation of Environmental goods and service Part
Lecture 37 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 1
Lecture 38 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 2
Lecture 39 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 3
Lecture 40 - Qualitative Response Models- Linear Probability Model, Logit and Probit Models Part - 1
Lecture 41 - Qualitative Response Models- Linear Probability Model, Logit and Probit Models Part - 2
Lecture 42 - Qualitative Response Models- Linear Probability Model, Logit and Probit Models Part - 3
Lecture 43 - Qualitative Response Models- Linear Probability Model, Logit and Probit Models Part - 4
Lecture 44 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 4
Lecture 45 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 5
Lecture 46 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 6
Lecture 47 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 7
Lecture 48 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 8
Lecture 49 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 9
Lecture 50 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 1
Lecture 51 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 1
Lecture 52 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 1
Lecture 53 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 1
Lecture 54 - Economic Valuation of Environmental Goods and Services - Different Valuation Approaches Part - 1
Lecture 55 - Natural Resources Economics and Dynamic optmization Part - 1
Lecture 56 - Natural Resources Economics and Dynamic optmization Part - 2
Lecture 57 - Natural Resources Economics and Dynamic optmization Part - 3
Lecture 58 - Natural Resources Economics and Dynamic optmization Part - 4
Lecture 59 - Natural Resources Economics and Dynamic optmization Part - 5
Lecture 60 - Natural Resources Economics and Dynamic optmization Part - 6
Lecture 61 - Dynamic Optimization and Renewable Resources Part - 1
Lecture 62 - Dynamic Optimization and Renewable Resources Part - 2
Lecture 63 - Dynamic Optimization and Renewable Resources Part - 3
Lecture 64 - Dynamic Optimization and Renewable Resources Part - 4
Lecture 65 - Dynamic Optimization and Renewable Resources Part - 5
Lecture 66 - Optimum extraction of renewable resources and Tragedy of Commons Part - 1
Lecture 67 - Optimum extraction of renewable resources and Tragedy of Commons Part - 2
Lecture 68 - Optimum extraction of renewable resources and Tragedy of Commons Part - 3

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Lecture 69 - Optimum extraction of renewable resources and Tragedy of Commons Part - 4
Lecture 70 - Optimum extraction of renewable resources and Tragedy of Commons Part - 5
Lecture 71 - Optimum extraction of renewable resources and Tragedy of Commons Part - 6
Lecture 72 - Optimum extraction of renewable resources and Tragedy of Commons Part - 7

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NPTEL Video Course - Economics - NOC:Spatial Statistics and Spatial Econometrics

Subject Co-ordinator - Prof. Gaurav Arora

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Spatial Data Analysis
Lecture 2 - Spatial Patters and Data Generating Process
Lecture 3 - Spatial Data Structures
Lecture 4 - A short exercise: Land Use Land Cover Analysis
Lecture 5 - A general spatial data model
Lecture 6 - Spatial Statistics: measures of variation; spatial random function
Lecture 7 - Entropy - I
Lecture 8 - Entropy - II
Lecture 9 - Spatial Entropy - I
Lecture 10 - Spatial Entropy - II
Lecture 11 - Introduction to Spatial Aucorrelation
Lecture 12 - Spatial Autocorrelation Implications for Inference - II
Lecture 13 - Spatial Autocorrelation Implications for Inference - II
Lecture 14 - Spatial Autocorrelation Implications for Inference - 2-D Example
Lecture 15 - Spatial Autocorrelation Implications for Inference - Monte Carlo Simulations
Lecture 16 - Exploratory Spatial Data Analysis
Lecture 17 - Exploratory Spatial Data Analysis: Example of Groundwater Data
Lecture 18 - Stationarity in Spatial Statistics
Lecture 19 - Stationarity in Spatial Statistics: Example of Groundwater Data
Lecture 20 - Spatial Dependence
Lecture 21 - Variogram and Semivariogram
Lecture 22 - Covariogram and Correlogram
Lecture 23 - The experimental variogram
Lecture 24 - The experimental variogram on an irregular lattice
Lecture 25 - Variogram estimation
Lecture 26 - Variogram model fitting
Lecture 27 - Variogram model fitting
Lecture 28 - Non-stationary spatial domains
Lecture 29 - Spatial interpolation and Kriging

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Lecture 30 - Spatial Regression Analysis
Lecture 31 - Spatial Regression Analysis
Lecture 32 - Spatial dependence in a regression model
Lecture 33 - Spatial dependence in a regression model
Lecture 34 - Generalized least squares estimation in the presence of spatial dependence
Lecture 35 - Spatial weights matrix
Lecture 36 - Causal Inference in spatial regression models
Lecture 37 - Endogenous effects in a spatial regression model
Lecture 38 - Spatially lagged variables in regression models
Lecture 39 - Spatially lagged variables in regression models
Lecture 40 - LISA statistics
Lecture 41 - Lagrange Multiplier Test for Spatial Regresison Model
Lecture 42 - Exploratory Analysis of Groundwater Level Data in ArcGIS Pro
Lecture 43 - Raster data in ArcGIS Pro
Lecture 44 - Computing experimental variograms in R - I
Lecture 45 - Computing experimental variograms in R - II
Lecture 46 - Fitting model variograms in R
Lecture 47 - Kriging and cross-validation in R
Lecture 48 - Spatial linear regression in R - I
Lecture 49 - Spatial linear regression in R - II

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NPTEL Video Course - Economics - NOC:Economics of Innovation

Subject Co-ordinator - Prof. Ruchi Sharma

Co-ordinating Institute - IIT - Indore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Stylized facts of Innovation
Lecture 3 - Innovation in the History of Economic Thought
Lecture 4 - Types of Innovation - I
Lecture 5 - Types of Innovation - II
Lecture 6 - Types of Innovation - III
Lecture 7 - Revisiting Some Key Concepts
Lecture 8 - Innovation Models
Lecture 9 - An Innovative Firm
Lecture 10 - An Innovative Firm in History
Lecture 11 - Market Stucture: An Introduction
Lecture 12 - Innovation and Market Structure - I
Lecture 13 - Innovation and Market Structure - II
Lecture 14 - Innovation and Market Structure - III
Lecture 15 - Innovation and Firm Size
Lecture 16 - R&D in Indian Industry
Lecture 17 - National Innovation System - I
Lecture 18 - Basics of IPRs
Lecture 19 - Internationalization of Patents
Lecture 20 - Economics of Patents
Lecture 21 - Universities in the NIS
Lecture 22 - Foreign Direct Investment (FDI): Concept and Definition
Lecture 23 - Theories explaining FDI
Lecture 24 - Market for Technology - I
Lecture 25 - Market for Technology - II
Lecture 26 - Innovation and Employment - I
Lecture 27 - Innovation and Employment - II
Lecture 28 - Innovation and Development - I
Lecture 29 - Innovation and Development - II

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Lecture 30 - Diffusion of innovation - 1
Lecture 31 - Diffusion of innovation - 2
Lecture 32 - Innovation in Service Sector - I
Lecture 33 - Innovation in Service Sector - II
Lecture 34 - Science, Technology, and Innovation Policy - I
Lecture 35 - Science, Technology, and Innovation Policy - II
Lecture 36 - Science, Technology, and Innovation Policy - III

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NPTEL Video Course - Economics - NOC:Principles of Economics

Subject Co-ordinator - Prof. Sabuj Kumar Mandal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Ten Principles of Economics - Part 1
Lecture 2 - Ten Principles of Economics - Part 2
Lecture 3 - Ten Principles of Economics - Part 3
Lecture 4 - Ten Principles of Economics - Part 4
Lecture 5 - Thinking like an Economist; Interdependence and the gains from Trade - Part 1
Lecture 6 - Thinking like an Economist; Interdependence and the gains from Trade - Part 2
Lecture 7 - Thinking like an Economist; Interdependence and the gains from Trade - Part 3
Lecture 8 - Thinking like an Economist; Interdependence and the gains from Trade - Part 4
Lecture 9 - Market forces of Supply and Elasticity - Part 1
Lecture 10 - Market forces of Supply and Elasticity - Part 2
Lecture 11 - Market forces of Supply and Elasticity - Part 3
Lecture 12 - Market forces of Supply and Elasticity - Part 4
Lecture 13 - Market forces of Supply and Elasticity - Part 5
Lecture 14 - Application of elasticity:Supply, Demand and Government policies - Part 1
Lecture 15 - Application of elasticity:Supply, Demand and Government policies - Part 2
Lecture 16 - Consumer and producer surplus; cost of taxation and international trade - Part 1
Lecture 17 - Consumer and producer surplus; cost of taxation and international trade - Part 2
Lecture 18 - Consumer and producer surplus; cost of taxation and international trade - Part 3
Lecture 19 - Consumer and producer surplus; cost of taxation and international trade - Part 4
Lecture 20 - Consumer and producer surplus; cost of taxation and international trade - Part 5
Lecture 21 - Externalities and cost of production - Part 1
Lecture 22 - Externalities and cost of production - Part 2
Lecture 23 - Externalities and cost of production - Part 3
Lecture 24 - Externalities and cost of production - Part 4
Lecture 25 - Externalities and cost of production - Part 5
Lecture 26 - Externalities and cost of production - Part 6
Lecture 27 - Competitive market and Monopoly market - Part 1
Lecture 28 - Competitive market and Monopoly market - Part 2
Lecture 29 - Competitive market and Monopoly market - Part 3

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Lecture 30 - Competitive market and Monopoly market - Part 4
Lecture 31 - Game theory and oligopoly, Measures national income, measuring cost of living - Part 1
Lecture 32 - Game theory and oligopoly, Measures national income, measuring cost of living - Part 2
Lecture 33 - Game theory and oligopoly, Measures national income, measuring cost of living - Part 3
Lecture 34 - Game theory and oligopoly, Measures national income, measuring cost of living - Part 4
Lecture 35 - Production and growth; Saving, Investment and the financial system - Part 1
Lecture 36 - Production and growth; Saving, Investment and the financial system - Part 2
Lecture 37 - Production and growth; Saving, Investment and the financial system - Part 3
Lecture 38 - The monetary system - Part 1
Lecture 39 - The monetary system - Part 2
Lecture 40 - Money Growth and inflation - Part 1
Lecture 41 - Money Growth and inflation - Part 2
Lecture 42 - Application of theory - Part 1
Lecture 43 - Application of theory - Part 2
Lecture 44 - Application of theory - Part 3
Lecture 45 - Application of theory - Part 4
Lecture 46 - Application of theory - Part 5
Lecture 47 - Application of theory - Part 6

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NPTEL Video Course - Economics - NOC:Economics of Public Policy

Subject Co-ordinator - Prof. Debdulal Saha

Co-ordinating Institute - IISER Mohali

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to public policy Definition, nature and types, linkages
Lecture 2 - Policy making process agenda setting, policy stages, and disciplinary lenses
Lecture 3 - Economics and public policy
Lecture 4 - Principles of economics and public policy - I
Lecture 5 - Principles of economics and public policy - II
Lecture 6 - Concepts of economics and its applications to public policy
Lecture 7 - Macroeconomic components National output, savings, consumption and investment
Lecture 8 - Economic growth and policy Accumulation process and Harrod Domar Model
Lecture 9 - Neoclassical economic growth and policy Solow model growth
Lecture 10 - Economic Methods, Tools and Techniques in understanding problems and designing public policy
Lecture 11 - Utility, Choice and Equilibrium
Lecture 12 - Budget and Resource Constraint
Lecture 13 - Public Policy as a 'Commodity' Demand, Supply and Equilibrium
Lecture 14 - Factors Influencing Demand and Supply and Types of Goods
Lecture 15 - Price Effects, Income Effects and Substitution Effects
Lecture 16 - Production and Producer's Behaviour in Public Policy
Lecture 17 - Importance of Cost and Supply Function
Lecture 18 - Price Elasticity: Demand and Supply
Lecture 19 - Social Efficiency: Consumer Surplus and Producer Surplus
Lecture 20 - Social Efficiency: Market Failure and Deadweight Loss
Lecture 21 - Pareto Efficiency and Economic Efficiency
Lecture 22 - Market Structure Perfect Competition and Monopoly
Lecture 23 - Pricing Strategy and Measuring Market Power
Lecture 24 - Market Failure and Role of Government
Lecture 25 - Types of Good Public, Private, Club and Common Resources
Lecture 26 - Externality Theory: Economics of Negative Externalities
Lecture 27 - Economics of Positive Externalities
Lecture 28 - Addressing Externality: Coase Theorem
Lecture 29 - Coasian Solution and Problems

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Lecture 30 - Public Sector Solution: Corrective Taxation and Subsidies
Lecture 31 - Price and Quantity Approaches to Address Externalities
Lecture 32 - Market for Pollution Reduction and Efficient Control of Pollution
Lecture 33 - Costs and Benefits with Uncertainty
Lecture 34 - Role of Government in Practice
Lecture 35 - Social Welfare and Measuring Future Cost and Benefits
Lecture 36 - Trade off Between Efficiency and Equity, and Social Choice
Lecture 37 - Role of Government in Production, Natural Monopolies and Government Failure
Lecture 38 - Public Choice
Lecture 39 - Individual Choice, Preferred Level of Government Expenditure, and Utility
Lecture 40 - Majority Voting, Arrowâ s Impossibility Theorem and Median Voter Theorem
Lecture 41 - Uncertainty and Expected Utility
Lecture 42 - Choice, Uncertainty, and Risk Aversion
Lecture 43 - Risk Loving, Risk Neutral and Marginal Utility
Lecture 44 - Risky Assets and Trade off between Risk and Return
Lecture 45 - Role of Information Adverse Selection, Market for Lemon Principles and Moral Hazard
Lecture 46 - Macroeconomic Aggregate Demand, Multiplier and Equilibrium Output
Lecture 47 - Government Expenditure, Balanced Budget Multiplier
Lecture 48 - Budget, Policy and Crowding-out
Lecture 49 - Fiscal Market and Fiscal Policy
Lecture 50 - Money Market, Monetary Policy and Its Interaction with Fiscal Policy
Lecture 51 - Taxation Structure, Types and Characteristics
Lecture 52 - Economic Impacts of Taxation and Tax Rates
Lecture 53 - Economic Effects of Taxation
Lecture 54 - Taxation, Equity and Fairness
Lecture 55 - Tax Incidence and Effects of Elasticity
Lecture 56 - Tax Incidence Under Imperfect Competition
Lecture 57 - Tax, Price Level and Tax Incidence Under General Equilibrium
Lecture 58 - Tax, Economic Efficiency, Elasticity and Economic Burden
Lecture 59 - Optimal Taxation Ramsey's Taxation
Lecture 60 - Taxation in Practice

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NPTEL Video Course - Economics - NOC:Health Economics

Subject Co-ordinator - Prof. Pratap C. Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Health Economics: Overview, Structure, and Beneficiaries
Lecture 2 - Concepts and Terminologies in Health Economics
Lecture 3 - Health as an Economic Good
Lecture 4 - Economics of Health v/s Economics of Healthcare
Lecture 5 - Arrow's Perspective of Healthcare
Lecture 6 - Utility and Health
Lecture 7 - Demand for Health care
Lecture 8 - Demand for Health: Grossman model - I
Lecture 9 - Demand for Health: Grossman model - II
Lecture 10 - Grossman model and Health disparities
Lecture 11 - Physicians as Health Provider - I
Lecture 12 - Physicians as Health Provider - II
Lecture 13 - Hospitals as Health Provider
Lecture 14 - Production and Costs of Health Care
Lecture 15 - Profit and Non-profit Maximization Models in Health care
Lecture 16 - Equity in Healthcare
Lecture 17 - Equity and Redistribution: Theory
Lecture 18 - Equity in Health Financing
Lecture 19 - Equity in Distribution
Lecture 20 - Equity Measurement: A Practical
Lecture 21 - Health Care Financing
Lecture 22 - Uncertainty and Risk: Health Insurance - I
Lecture 23 - Uncertainty and Risk: Health Insurance - II
Lecture 24 - Information Economics in Health: Moral Hazard
Lecture 25 - Information Economics in Health: Adverse Selection
Lecture 26 - Introduction of Behavioral Economics
Lecture 27 - Expected Utility Theory
Lecture 28 - Prospect Theory
Lecture 29 - Nudge Theory

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Lecture 30 - Time Inconsistency and Health: Discounting
Lecture 31 - Health Systems
Lecture 32 - Tax and Social Health Insurance Mechanism - I
Lecture 33 - Tax and Social Health Insurance Mechanism - II
Lecture 34 - Private Financing Mechanisms
Lecture 35 - Health Systems Around the World
Lecture 36 - Theoretical Foundations of Economic Evaluation - I
Lecture 37 - Theoretical Foundations of Economic Evaluation - II
Lecture 38 - Principles of Economic Evaluation: Introduction
Lecture 39 - Principles of Economic Evaluation: CMA, CCA, Cost-Benefit Analysis (CBA)
Lecture 40 - Principles of Economic Evaluation: Cost-Effectiveness Analysis (CEA)
Lecture 41 - Principles of Economic Evaluation: Cost-Utility Analysis (CUA)
Lecture 42 - Monetary Valuation of Health
Lecture 43 - Non-monetary Valuation of Health: QALY
Lecture 44 - Non-monetary Valuation of Health: DALY and HLYE
Lecture 45 - Costing, Discounting and Evaluation under Uncertainty
Lecture 46 - Markov modelling and Sensitivity analysis in Healthcare
Lecture 47 - Concepts of Productivity and Efficiency
Lecture 48 - Data Envelopment Analysis: Introduction
Lecture 49 - Data Envelopment Analysis: CCR Model
Lecture 50 - Data Envelopment Analysis: BCC Model
Lecture 51 - Introduction to DEAP Software
Lecture 52 - Application of DEA in Healthcare Using DEAP
Lecture 53 - Data in Health: Sources and Indicators - I
Lecture 54 - Data in Health: Sources and Indicators - II
Lecture 55 - Econometric Modelling in Health
Lecture 56 - Health Data Handling Packages: Open Source
Lecture 57 - Health Data Handling Packages: Licensed
Lecture 58 - Introduction to Public Health
Lecture 59 - Healthcare Provisioning and Responsiveness
Lecture 60 - Indian Health System and Challenges

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NPTEL Video Course - Economics - NOC:Labour Economics-Theory and Practice

Subject Co-ordinator - Porf. Falguni Pattanaik

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution and Growth of Labour Economics
Lecture 2 - Overview of the Labour Market - I
Lecture 3 - Overview of the Labour Market - II
Lecture 4 - Overview of the Labour Market - III
Lecture 5 - Labour Supply - I
Lecture 6 - Labour Supply - II
Lecture 7 - Labour Supply - III
Lecture 8 - Labour Supply - IV
Lecture 9 - Labour Demand - I
Lecture 10 - Labour Demand - II
Lecture 11 - Labour Demand - III
Lecture 12 - Labour Demand - IV
Lecture 13 - Labour Demand - V
Lecture 14 - Labour Market Equilibrium - I
Lecture 15 - Labour Market Equilibrium - II
Lecture 16 - Labour Market Equilibrium - III
Lecture 17 - Labour Market Equilibrium - IV
Lecture 18 - Labour Market Equilibrium - V
Lecture 19 - Labour Market Equilibrium - VI
Lecture 20 - Labour Market Equilibrium - VII
Lecture 21 - Labour Market Equilibrium - VIII
Lecture 22 - Human Capital - I
Lecture 23 - Human Capital - II
Lecture 24 - Human Capital - III
Lecture 25 - Human Capital - IV
Lecture 26 - Wage Differentials - I
Lecture 27 - Wage Differentials - II
Lecture 28 - Wage Differentials - III
Lecture 29 - Wage Structure - I

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Lecture 30 - Wage Structure - II
Lecture 31 - Labour Market Discrimination - I
Lecture 32 - Labour Market Discrimination - II
Lecture 33 - Labour Market Discrimination - III
Lecture 34 - Labour Mobility - I
Lecture 35 - Labour Mobility - II
Lecture 36 - Unemployment - I
Lecture 37 - Unemployment - II
Lecture 38 - Unemployment - III
Lecture 39 - Labour Market Dynamics in India - I
Lecture 40 - Labour Market Dynamics in India - II

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NPTEL Video Course - Electrical Engineering - Nonlinear Dynamical Systems

Subject Co-ordinator - Prof. Harish K. Pillai, Prof. Madhu N. Belur

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - First Order systems
Lecture 3 - Classification of Equilibrium points
Lecture 4 - Lipschitz Functions
Lecture 5 - Existence/uniqueness theorems
Lecture 6 - Existence/uniqueness of solutions to differential equations
Lecture 7 - Lyapunov theorem on stability
Lecture 8 - Extension of Lyapunov's Theorem in different contexts
Lecture 9 - LaSalle's Invariance principle, Barbashin and Krasovski theorems, periodic orbits
Lecture 10 - Bendixson criterion and Poincare-Bendixson criterion. Example
Lecture 11 - Bendixson and Poincare-Bendixson criteria van-der-Pol Oscillator
Lecture 12 - Scilab simulation of Lotka Volterra predator prey model, van-der-Pol Oscillator Review of linear
Lecture 13 - Signals, operators
Lecture 14 - Norms of signals, systems (operators), Finite gain L2 stable
Lecture 15 - Nyquist plots and Nyquist criterion for stability
Lecture 16 - Interconnection between linear system & non-linearity, passive filters
Lecture 17 - Passive filters, Dissipation equality, positive real lemma
Lecture 18 - Positive real lemma proof
Lecture 19 - Definition for positive realness and Kalman Yakubovich-Popov Theorem
Lecture 20 - Kalman-Yakubovich-Popov Lemma/theorem and memoryless nonlinearities
Lecture 21 - Loop tranformations and circle criterion
Lecture 22 - Nonlinearities based on circle criterion
Lecture 23 - Limit cycles
Lecture 24 - Popov criterion continuous, frequency-domain theorem
Lecture 25 - Popov criterion continuous, frequency-domain theorem
Lecture 26 - Describing function method
Lecture 27 - Describing Function
Lecture 28 - Describing
Lecture 29 - Describing

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Lecture 30 - Describing functions
Lecture 31 - Describing functions
Lecture 32 - Describing functions for nonlinearities
Lecture 33 - Ideal relay with Hysteresis and dead zone
Lecture 34 - Dynamical systems on manifolds-1
Lecture 35 - Dynamical systems on manifolds-2

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NPTEL Video Course - Electrical Engineering - Power System Dynamics and Control

Subject Co-ordinator - Dr. A.M. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Analysis of Dynamical Systems
Lecture 4 - Analysis of Dynamical Systems (Continued.)
Lecture 5 - Analysis of LINEAR Time Invariant Dynamical Systems
Lecture 6 - Analysis of LINEAR Time Invariant Dynamical Systems (Continued.)
Lecture 7 - Stiff Systems, Multi Time Scale Modeling
Lecture 8 - Numerical Integration
Lecture 9 - Numerical Integration (Continued.)
Lecture 10 - Numerical Integration (Continued.)
Lecture 11 - Modeling of Synchronous Machines
Lecture 12 - Modeling of Synchronous Machines (Continued.)
Lecture 13 - Modeling of Synchronous Machines (Continued.)
Lecture 14 - Modeling of Synchronous Machines. dq0 transformation (Continued.)
Lecture 15 - Modeling of Synchronous Machines. Standard Parameters
Lecture 16 - Modeling of Synchronous Machines. Standard Parameters
Lecture 17 - Synchronous Generator Models using Standard Parameters
Lecture 18 - Synchronous Generator Models using Standard Parameters. PER UNIT REPRESENTATION
Lecture 19 - Open Circuit Response of a Synchronous Generator
Lecture 20 - Synchronous Machine Modeling. Short Circuit Analysis (Continued.)
Lecture 21 - Synchronous Machine Modeling. Short Circuit Analysis (Continued.) Synchronization of a Synchronc
Lecture 22 - Synchronization of a Synchronous Machine (Continued.)
Lecture 23 - Simplified Synchronous Machine Models
Lecture 24 - Excitation Systems
Lecture 25 - Excitation System Modeling
Lecture 26 - Excitation System Modeling. Automatic Voltage Regulator
Lecture 27 - Excitation System Modeling. Automatic Voltage Regulator (Continued.)
Lecture 28 - Excitation System Modeling. Automatic Voltage Regulator (Simulation)
Lecture 29 - Excitation System Modeling. Automatic Voltage Regulator (Simulation) â (Continued.)

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Lecture 30 - Excitation System Modeling. Automatic Voltage Regulator. Linearized Analysis
Lecture 31 - Load Modeling
Lecture 32 - Induction Machines, Transmission Lines
Lecture 33 - Transmission Lines. Prime Mover Systems
Lecture 34 - Transmission Lines (Continued.) Prime Mover Systems
Lecture 35 - Prime Mover Systems. Stability in Integrated Power System
Lecture 36 - Stability in Integrated Power System
Lecture 37 - Two Machine System (Continued.)
Lecture 38 - Stability in Integrated Power System
Lecture 39 - Frequency/Angular Stability Programs. Stability Phenomena
Lecture 40 - Voltage Stability Example (Continued.). Fast Transients
Lecture 41 - Torsional Transients
Lecture 42 - Sub-Synchronous Resonance. Stability Improvement
Lecture 43 - Stability Improvement
Lecture 44 - Stability Improvement. Power System Stabilizers
Lecture 45 - Stability Improvement (Large Disturbance Stability)

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NPTEL Video Course - Electrical Engineering - Control Engineering (Prof. S.D. Agashe)

Subject Co-ordinator - Prof. S.D. Agashe

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Control Problem
Lecture 2 - Some More Examples
Lecture 3 - Different Kinds of Control Systems
Lecture 4 - History of Feedback
Lecture 5 - Modern Control Problems
Lecture 6 - DC Motor Speed Control
Lecture 7 - System Modelling, Analogy
Lecture 8 - Causes of System Error
Lecture 9 - Calculation of Error
Lecture 10 - Control System Sensitivity
Lecture 11 - Automatic Control of DC Motor
Lecture 12 - Proportional Control
Lecture 13 - Non-Unity Feedback
Lecture 14 - Signal-Flow Graph
Lecture 15 - Mason's Gain Formula
Lecture 16 - Signal-Flow Graph for DC Motor Control
Lecture 17 - Steady-State Calculations
Lecture 18 - Differential Equation Model and Laplace Transformation Model
Lecture 19 - D-Operator Method
Lecture 20 - Second-Order System Response
Lecture 21 - Frequency Response
Lecture 22 - Laplace Transformation Theorems
Lecture 23 - Final Value Theorem
Lecture 24 - Transfer Function and Pole-Zero Diagram
Lecture 25 - 'Good' Poles and 'Bad' Poles
Lecture 26 - Signal Flow Graph with Transfer Functions
Lecture 27 - s-Domain and t-Domain
Lecture 28 - Second-Order System Response in s-Domain
Lecture 29 - Integral Feedback

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Lecture 30 - Root-Locus Method
Lecture 31 - Root-Locus Rules
Lecture 32 - Asymptotes of Root Locus
Lecture 33 - Routh Array
Lecture 34 - Singular Cases
Lecture 35 - Closed Loop Poles
Lecture 36 - Controller in the Forwarded Path
Lecture 37 - Mapping of Control in the Complex-Plane
Lecture 38 - Encirclement by a Curve
Lecture 39 - Nyquist Criterion
Lecture 40 - Application of the Nyquist Criterion
Lecture 41 - Polar Plot and Bode Plots
Lecture 42 - Logarithmic Scale for Frequency
Lecture 43 - 'Asymptotic' DB Gain
Lecture 44 - Compensating Network
Lecture 45 - Nichols' Chart
Lecture 46 - Time Domain Methods of Analysis and Design
Lecture 47 - State-Variable Equations

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NPTEL Video Course - Electrical Engineering - Power Electronics

Subject Co-ordinator - Prof. Kishore Chatterjee, Prof. B.G. Fernandes

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Power Electronics
Lecture 2 - Power Electronics
Lecture 3 - Power Electronics
Lecture 4 - Power Electronics
Lecture 5 - Power Electronics
Lecture 6 - Power Electronics
Lecture 7 - Power Electronics
Lecture 8 - Power Electronics
Lecture 9 - Power Electronics
Lecture 10 - Power Electronics
Lecture 11 - Power Electronics
Lecture 12 - Power Electronics
Lecture 13 - Power Electronics
Lecture 14 - Power Electronics
Lecture 15 - Power Electronics
Lecture 16 - Power Electronics
Lecture 17 - Power Electronics
Lecture 18 - Power Electronics
Lecture 19 - Power Electronics
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Lecture 25 - Power Electronics
Lecture 26 - Power Electronics
Lecture 27 - Power Electronics
Lecture 28 - Power Electronics
Lecture 29 - Power Electronics

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Lecture 30 - Power Electronics
Lecture 31 - Power Electronics
Lecture 32 - Power Electronics
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Lecture 34 - Power Electronics
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Lecture 36 - Power Electronics
Lecture 37 - Power Electronics
Lecture 38 - Power Electronics
Lecture 39 - Power Electronics
Lecture 40 - Power Electronics
Lecture 41 - Power Electronics
Lecture 42 - Power Electronics
Lecture 43 - Power Electronics

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NPTEL Video Course - Electrical Engineering - Fabrication of Silicon VLSI Circuits using the MOS technology

Subject Co-ordinator - Prof. A.N. Chandorkar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Micro to Nano A Journey into Intergrated Circuit Technology
Lecture 2 - Introduction Micro to Nano A Journey into Intergrated Circuit Technology
Lecture 3 - Crystal Properties and Silico Growth
Lecture 4 - Crystal Properties and Silico Growth (Continued...)
Lecture 5 - IC Fab Labs and Fabrication of IC
Lecture 6 - Diffusion
Lecture 7 - Diffusion (Continued...)
Lecture 8 - Solid State Diffusion
Lecture 9 - Solid State Diffusion (Continued...)
Lecture 10 - Solid State Diffusion (Continued...)
Lecture 11 - Thermal Oxidation of Silicons
Lecture 12 - Thermal Oxidation of Silicons
Lecture 13 - Thermal Oxidation of Silicons
Lecture 14 - Thermal Oxidation of Silicons (Continued...)
Lecture 15 - Thermal Oxidation of Silicons (Continued...)
Lecture 16 - Lithography
Lecture 17 - Lithography
Lecture 18 - Lithography
Lecture 19 - ION Implantation
Lecture 20 - ION Implantation
Lecture 21 - ION Implantation and Silicon IC Processing Flow for CMOS Technology
Lecture 22 - ION Implantation and Silicon IC Processing Flow for CMOS Technology
Lecture 23 - Silicon IC Processing Flow for CMOS Technology
Lecture 24 - Thin Film Deposition
Lecture 25 - Thin Film Deposition
Lecture 26 - Thin Film Deposition
Lecture 27 - Thin Film Deposition and Etching in VLSI Processing
Lecture 28 - Etching in VLSI Processing and Back -End Technology

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NPTEL Video Course - Electrical Engineering - NOC:Computational Electromagnetics and Applications

Subject Co-ordinator - Prof.Krish Sankaran

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1
Lecture 2 - Lecture 2
Lecture 3 - Lecture 3
Lecture 4 - Exercise 1
Lecture 5 - Exercise 2
Lecture 6 - Exercise 3
Lecture 7 - Lab Tour 1
Lecture 8 - Summary week 1
Lecture 9 - Lecture 4
Lecture 10 - Lecture 5
Lecture 11 - Exercise 4
Lecture 12 - Exercise 5
Lecture 13 - Exercise 6
Lecture 14 - Summary Week 2
Lecture 15 - Lecture 6
Lecture 16 - Lecture 7
Lecture 17 - Lecture 8
Lecture 18 - Exercise 7
Lecture 19 - Exercise 8
Lecture 20 - Summary Week 3
Lecture 21 - Lecture 9
Lecture 22 - Lecture 10
Lecture 23 - Lecture 11
Lecture 24 - Lecture 12
Lecture 25 - Lecture 13
Lecture 26 - Lecture 14
Lecture 27 - Exercise 9
Lecture 28 - Lab Tour - 2
Lecture 29 - Summary Week 4

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Lecture 30 - Lecture 15
Lecture 31 - Lecture 16
Lecture 32 - Lecture 17
Lecture 33 - Lecture 18
Lecture 34 - Exercise 10
Lecture 35 - Summary week 5
Lecture 36 - Lecture 19
Lecture 37 - Lecture 20
Lecture 38 - Lecture 21
Lecture 39 - Lecture 22
Lecture 40 - Exercise 11
Lecture 41 - Summary week 6
Lecture 42 - Exercise 12
Lecture 43 - Exercise 13
Lecture 44 - Exercise 14
Lecture 45 - Exercise 15
Lecture 46 - Exercise 16
Lecture 47 - Exercise 17
Lecture 48 - Summary week 7
Lecture 49 - Lecture 23
Lecture 50 - Lecture 24
Lecture 51 - Lecture 25
Lecture 52 - Exercise 18
Lecture 53 - Exercise 19
Lecture 54 - Lab tour 3
Lecture 55 - Summary week 8
Lecture 56 - Lecture 26
Lecture 57 - Lecture 27
Lecture 58 - Lecture 28
Lecture 59 - Lecture 29
Lecture 60 - Lecture 30
Lecture 61 - Lecture 31
Lecture 62 - Lab tour 4
Lecture 63 - Summary week 9
Lecture 64 - Lecture 32
Lecture 65 - Lecture 33
Lecture 66 - Lecture 34
Lecture 67 - Lecture 35
Lecture 68 - Exercise 20

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Lecture 69 - Lab tour 5
Lecture 70 - Summary week 10
Lecture 71 - Lecture 36
Lecture 72 - Lecture 37
Lecture 73 - Lecture 38
Lecture 74 - Lecture 39
Lecture 75 - Lecture 40
Lecture 76 - Summary week 11
Lecture 77 - Lecture 41
Lecture 78 - Lecture 42
Lecture 79 - Lecture 43
Lecture 80 - Lecture 44
Lecture 81 - Exercise 21
Lecture 82 - Exercise 22
Lecture 83 - Summary week 12

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NPTEL Video Course - Electrical Engineering - NOC:Basic Electronics

Subject Co-ordinator - Prof. Mahesh B. Patil

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A brief history of electronics
Lecture 2 - Superposition
Lecture 3 - Useful circuit techniques - 1
Lecture 4 - Useful circuit techniques - 2
Lecture 5 - Phasors - 1
Lecture 6 - Phasors - 2
Lecture 7 - RC/RL circuits in time domain - 1
Lecture 8 - RC/RL circuits in time domain - 2
Lecture 9 - RC/RL circuits in time domain - 3
Lecture 10 - RC/RL circuits in time domain - 4
Lecture 11 - RC/RL circuits in time domain - 5
Lecture 12 - Simulation of RC circuit
Lecture 13 - Diode circuits - 1
Lecture 14 - Diode circuits - 2
Lecture 15 - Diode circuits - 3
Lecture 16 - Diode circuits - 4
Lecture 17 - Diode circuits - 5
Lecture 18 - Diode circuits - 6
Lecture 19 - Diode rectifiers - 1
Lecture 20 - Diode rectifiers - 2
Lecture 21 - Diode rectifiers - 3
Lecture 22 - Bipolar Junction Transistor - 1
Lecture 23 - Bipolar Junction Transistor - 2
Lecture 24 - Bipolar Junction Transistor - 3
Lecture 25 - BJT amplifier - 1
Lecture 26 - BJT amplifier - 2
Lecture 27 - BJT amplifier - 3
Lecture 28 - BJT amplifier - 4
Lecture 29 - BJT amplifier - 5

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Lecture 30 - BJT amplifier - 6
Lecture 31 - BJT amplifier - 7
Lecture 32 - Introduction to op-amps
Lecture 33 - Op-amp circuits - 1
Lecture 34 - Op-amp circuits - 2
Lecture 35 - Op-amp circuits - 3
Lecture 36 - Difference amplifier
Lecture 37 - Instrumentation amplifier - 1
Lecture 38 - Instrumentation amplifier - 2
Lecture 39 - Op-amp nonidealities - 1
Lecture 40 - Op-amp nonidealities - 2
Lecture 41 - Bode plots - 1
Lecture 42 - Bode plots - 2
Lecture 43 - Bode plots - 3
Lecture 44 - Op-amp filters
Lecture 45 - Simulation of op-amp filter
Lecture 46 - Precision rectifiers - 1
Lecture 47 - Precision rectifiers - 2
Lecture 48 - Precision rectifiers - 3
Lecture 49 - Simulation of triangle-to-sine converter
Lecture 50 - Schmitt triggers - 1
Lecture 51 - Schmitt triggers - 2
Lecture 52 - Schmitt triggers - 3
Lecture 53 - Sinusoidal oscillators - 1
Lecture 54 - Sinusoidal oscillators - 2
Lecture 55 - Introduction to digital circuits
Lecture 56 - Boolean algebra
Lecture 57 - Karnaugh maps
Lecture 58 - Combinatorial circuits - 1
Lecture 59 - Combinatorial circuits - 2
Lecture 60 - Combinatorial circuits - 3
Lecture 61 - Introduction to sequential circuits
Lecture 62 - Latch and flip-flop
Lecture 63 - JK flip-flop
Lecture 64 - D flip-flop
Lecture 65 - Shift registers
Lecture 66 - Counters - 1
Lecture 67 - Counters - 2
Lecture 68 - Simulation of a synchronous counter

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Lecture 69 - 555 timer
Lecture 70 - Digital-to-analog conversion - 1
Lecture 71 - Digital-to-analog conversion - 2
Lecture 72 - Analog-to-digital conversion

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NPTEL Video Course - Electrical Engineering - NOC:Antennas

Subject Co-ordinator - Prof. Girish Kumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Antenna Introduction - I
Lecture 2 - Antenna Introduction - II
Lecture 3 - Antenna Introduction - III
Lecture 4 - Antenna Fundamentals - I
Lecture 5 - Antenna Fundamentals - II
Lecture 6 - Antenna Radiation Hazards - I
Lecture 7 - Antenna Radiation Hazards - II
Lecture 8 - Dipole Antennas - I
Lecture 9 - Dipole Antennas - II
Lecture 10 - Dipole Antennas - III
Lecture 11 - Monopole Antennas - I
Lecture 12 - Monopole Antennas - II
Lecture 13 - Loop Antennas
Lecture 14 - Slot Antennas
Lecture 15 - Linear Arrays - I
Lecture 16 - Linear Arrays - II
Lecture 17 - Linear Arrays - III
Lecture 18 - Planar Arrays
Lecture 19 - Microstrip Antennas (MSA)
Lecture 20 - Rectangular MSA
Lecture 21 - MSA Parametric Analysis - I
Lecture 22 - MSA Parametric Analysis - II
Lecture 23 - Circular MSA
Lecture 24 - Broadband MSA - I
Lecture 25 - Broadband MSA - II
Lecture 26 - Broadband MSA - III
Lecture 27 - Broadband MSA - IV
Lecture 28 - Broadband MSA - V
Lecture 29 - Compact MSA - I

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Lecture 30 - Compact MSA - II
Lecture 31 - Compact MSA - III
Lecture 32 - Tunable MSA - I
Lecture 33 - Tunable MSA - II
Lecture 34 - Circularly Polarized MSA - I
Lecture 35 - Circularly Polarized MSA - II
Lecture 36 - Circularly Polarized MSA - III
Lecture 37 - MSA Arrays - I
Lecture 38 - MSA Arrays - II
Lecture 39 - MSA Arrays - III
Lecture 40 - Helical Antennas - I
Lecture 41 - Helical Antennas - II
Lecture 42 - Helical Antennas - III
Lecture 43 - Helical Antennas - IV
Lecture 44 - Helical Antennas - V
Lecture 45 - Horn Antennas - I
Lecture 46 - Horn Antennas - II
Lecture 47 - Horn Antennas - III
Lecture 48 - Horn Antennas - IV
Lecture 49 - Horn Antennas - V
Lecture 50 - Yagi-Uda and Log-Periodic Antennas - I
Lecture 51 - Yagi-Uda and Log-Periodic Antennas - II
Lecture 52 - Yagi-Uda and Log-Periodic Antennas - III
Lecture 53 - IE3D Session TA - I
Lecture 54 - IE3D Session TA - II
Lecture 55 - IE3D Session TA - III
Lecture 56 - Reflector Antennas - I
Lecture 57 - Reflector Antennas - II
Lecture 58 - Reflector Antennas - III
Lecture 59 - Reflector Antennas - IV
Lecture 60 - Lab Session

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NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Wavelets, Filter Banks and Time Frequency A

Subject Co-ordinator - Prof. V.M. Gadre

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1 - Lecture 1 - Introduction
Lecture 2 - Module 1 - Lecture 2 - Origin of Wavelets
Lecture 3 - Module 1 - Lecture 3 - Haar Wavelet
Lecture 4 - Module 2 - Lecture 1 - Dyadic Wavelet
Lecture 5 - Module 2 - Lecture 2 - Dilates and Translates of Haar Wavelets
Lecture 6 - Module 2 - Lecture 3 - L2 Norm of a Function
Lecture 7 - Module 3 - Lecture 1 - Piecewise Constant Representation of a Function
Lecture 8 - Module 3 - Lecture 2 - Ladder of Subspaces
Lecture 9 - Module 3 - Lecture 3 - Scaling Function for Haar Wavelet Demo
Lecture 10 - Demonstration 1
Lecture 11 - Module 4 - Lecture 1 - Vector Representation of Sequences
Lecture 12 - Module 4 - Lecture 2 - Properties of Norm
Lecture 13 - Module 4 - Lecture 3 - Parseval's Theorem
Lecture 14 - Module 5 - Lecture 1 - Equivalence of sequences and functions
Lecture 15 - Module 5 - Lecture 2 - Angle between Functions and their Decomposition
Lecture 16 - Demonstration 2
Lecture 17 - Module 6 - Lecture 1 - Introduction to filter banks
Lecture 18 - Module 6 - Lecture 2 - Haar Analysis Filter Bank in Z-domain
Lecture 19 - Module 6 - Lecture 3 - Haar Synthesis Filter Bank in Z-domain
Lecture 20 - Module 7 - Lecture 1 - Moving from Z-domain to frequency domain
Lecture 21 - Module 7 - Lecture 2 - Frequency Response of Haar Analysis Low pass Filter bank
Lecture 22 - Module 7 - Lecture 3 - Frequency Response of Haar Analysis High pass Filter bank
Lecture 23 - Module 8 - Lecture 1 - Ideal two-band filter bank
Lecture 24 - Module 8 - Lecture 2 - Disqualification of Ideal filter bank
Lecture 25 - Module 8 - Lecture 3 - Realizable two-band filter bank
Lecture 26 - Demonstration 3
Lecture 27 - Module 9 - Lecture 1 - Relating Fourier transform of scaling function to filter bank
Lecture 28 - Module 9 - Lecture 2 - Fourier transform of scaling function
Lecture 29 - Module 9 - Lecture 3 - Construction of scaling and wavelet functions from filter bank

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Lecture 30 - Demonstration 4
Lecture 31 - Module 10 - Lecture 1 - Introduction to upsampling and down sampling as Multirate operations
Lecture 32 - Module 10 - Lecture 2 - Up sampling by a general factor M- a Z-domain analysis.
Lecture 33 - Module 10 - Lecture 3 - Down sampling by a general factor M- a Z-domain analysis
Lecture 34 - Module 11 - Lecture 1 - Z domain analysis of 2 channel filter bank.
Lecture 35 - Module 11 - Lecture 2 - Effect of X (-Z) in time domain and aliasing
Lecture 36 - Module 11 - Lecture 3 - Consequences of aliasing and simple approach to avoid it
Lecture 37 - Module 12 - Lecture 1 - Revisiting aliasing and the Idea of perfect reconstruction
Lecture 38 - Module 12 - Lecture 2 - Applying perfect reconstruction and alias cancellation on Haar MRA
Lecture 39 - Module 12 - Lecture 3 - Introduction to Daubechies family of MRA
Lecture 40 - Module 13 - Lecture 1 - Power Complementarity of low pass filter
Lecture 41 - Module 13 - Lecture 2 - Applying perfect reconstruction condition to obtain filter coefficient
Lecture 42 - Module 14 - Lecture 1 - Effect of minimum phase requirement on filter coefficients
Lecture 43 - Module 14 - Lecture 2 - Building compactly supported scaling functions
Lecture 44 - Module 14 - Lecture 3 - Second member of Daubechies family
Lecture 45 - Module 15 - Lecture 1 - Fourier transform analysis of Haar scaling and Wavelet functions
Lecture 46 - Module 15 - Lecture 2 - Revisiting Fourier Transform and Parseval's theorem
Lecture 47 - Module 15 - Lecture 3 - Transform Analysis of Haar Wavelet function
Lecture 48 - Module 16 - Lecture 1 - Nature of Haar scaling and Wavelet functions in frequency domain
Lecture 49 - Module 16 - Lecture 2 - The Idea of Time-Frequency Resolution
Lecture 50 - Module 16 - Lecture 3 - Some thoughts on Ideal time- frequency domain behavior
Lecture 51 - Module 17 - Lecture 1 - Defining Probability Density function
Lecture 52 - Module 17 - Lecture 2 - Defining Mean, Variance and Â containment in a given domainÂ
Lecture 53 - Module 17 - Lecture 3 - Example
Lecture 54 - Module 17 - Lecture 4 - Variance from a slightly different perspective
Lecture 55 - Module 18 - Lecture 1 - Signal transformations
Lecture 56 - Module 18 - Lecture 2 - Time-Bandwidth product and its properties
Lecture 57 - Module 18 - Lecture 3 - Simplification of Time-Bandwidth formulae
Lecture 58 - Module 19 - Lecture 1 - Introduction
Lecture 59 - Module 19 - Lecture 2 - Evaluation of Time-Bandwidth product
Lecture 60 - Module 19 - Lecture 3 - Optimal function in the sense of Time-Bandwidth product
Lecture 61 - Module 20 - Lecture 1 - Discontent with the Â Optimal functionÂ .
Lecture 62 - Module 20 - Lecture 2 - Journey from infinite to finite Time-Bandwidth product of Haar scaling f
Lecture 63 - Module 20 - Lecture 3 - More insights about Time-Bandwidth product
Lecture 64 - Module 20 - Lecture 4 - Time-frequency plane
Lecture 65 - Module 20 - Lecture 5 - Tiling the Time-frequency plane
Lecture 66 - Module 21 - Lecture 1 - STFT
Lecture 67 - Module 21 - Lecture 2 - STFT
Lecture 68 - Module 21 - Lecture 3 - STFT

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Lecture 69 - Module 21 - Lecture 4 - Continuous Wavelet Transform (CWT)
Lecture 70 - Demonstration 5
Lecture 71 - StudentÂ s Presentation

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NPTEL Video Course - Electrical Engineering - NOC:Analog Circuits (2017)

Subject Co-ordinator - Prof. Jayanta Mukherjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1 - Introduction
Lecture 2 - Module 2 - Poles and zeros
Lecture 3 - Module 3 - OP-AMPs
Lecture 4 - Module 4 - Application of Op-Amps
Lecture 5 - Module 5 - Inverting amplifier and Non Inverting amplifier
Lecture 6 - Module 1 - Non Idealities in Op-AMP (Finite Gain, Finite Bandwidth and Slew Rate)
Lecture 7 - Module 2 - Non Idealities in Op-AMP (Offset Voltage and Bias Current)
Lecture 8 - Module 3 - Bode Plot
Lecture 9 - Module 4 - Frequency Response
Lecture 10 - Module 1 - Frequency Response (High Frequency Response)
Lecture 11 - Module 2 - Frequency Response example
Lecture 12 - Module 3 - Feedback
Lecture 13 - Module 4 - Effects of Feedback
Lecture 14 - Tutorial 1 and 2
Lecture 15 - Module 1 - Effect of feedback and stability
Lecture 16 - Module 2 - Stability
Lecture 17 - Module 3 - Stability and pole location
Lecture 18 - Module 4 - Stability and Pole location continuation
Lecture 19 - Tutorial 3
Lecture 20 - Module 1 - Gain Margin Â An example
Lecture 21 - Module 2 - Frequency Compensation
Lecture 22 - Module 3 - Filters
Lecture 23 - Module 4 - Filter prototypes
Lecture 24 - Tutorial 4
Lecture 25 - Tutorial 5
Lecture 26 - Tutorial 6
Lecture 27 - Module 1 - Chebyshev Prototype, Filter transformation
Lecture 28 - Module 2 - Filter Transformations (Continued....)
Lecture 29 - Module 3 - Active Filters

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Lecture 30 - Module 4 - Non Linear Applications of OPAMPS
Lecture 31 - Module 5 - Limiter, Diodes
Lecture 32 - Module 1 - Oscillators
Lecture 33 - Module 2 - Oscillator Amplitude Control , Quadrature Oscillator
Lecture 34 - Module 3 - Multivibators
Lecture 35 - Module 4 - Multivibrators (Continued...)
Lecture 36 - Module 5 - Monostable Multivibator
Lecture 37 - Module 1 - Zener Effect, Rectifiers
Lecture 38 - Module 2 - Rectifiers
Lecture 39 - Module 3 - Clamper, Peak Rectifier, Super diodes
Lecture 40 - Module 4 - BJT DC Circuits
Lecture 41 - Module 5 - Current Mirror

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NPTEL Video Course - Electrical Engineering - NOC:Microwave Theory and Techniques

Subject Co-ordinator - Prof. Girish Kumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Microwave Theory and Techniques Introduction - I
Lecture 2 - Microwave Theory and Techniques Introduction - II
Lecture 3 - Microwave Theory and Techniques Introduction - III
Lecture 4 - Effects of Microwaves on Human Body - I
Lecture 5 - Effects of Microwaves on Human Body - II
Lecture 6 - Waveguides - I
Lecture 7 - Waveguides - II
Lecture 8 - Waveguides - III
Lecture 9 - Transmission Lines - I
Lecture 10 - Transmission Lines - II
Lecture 11 - Smith Chart and Impedance Matching - I
Lecture 12 - Smith Chart and Impedance Matching - II
Lecture 13 - Smith Chart and Impedance Matching - III
Lecture 14 - ABCD - Parameters
Lecture 15 - S - Parameters
Lecture 16 - Power Dividers - I
Lecture 17 - Power Dividers - II
Lecture 18 - Microwave Couplers - I
Lecture 19 - Microwave Couplers - II
Lecture 20 - Microwave Couplers - III
Lecture 21 - Microwave Filters - I
Lecture 22 - Microwave Filters - II
Lecture 23 - Microwave Filters - III
Lecture 24 - Microwave Filters - IV
Lecture 25 - Microwave Filters - V
Lecture 26 - Microwave Diodes
Lecture 27 - Microwave Attenuators
Lecture 28 - Microwave RF Switches
Lecture 29 - Series and Shunt SPDT Switches and Introduction to Phase Shifters

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Lecture 30 - Microwave Phase Shifters
Lecture 31 - Microwave Transistors
Lecture 32 - Microwave Amplifiers - I
Lecture 33 - Microwave Amplifiers - II
Lecture 34 - Microwave Amplifiers - III
Lecture 35 - Low Noise Amplifiers - I
Lecture 36 - Low Noise Amplifiers - II
Lecture 37 - Power Amplifiers
Lecture 38 - Microwave Tubes - I
Lecture 39 - Microwave Tubes - II
Lecture 40 - Microwave Tubes - III
Lecture 41 - Microwave Oscillators - I
Lecture 42 - Microwave Oscillators - II
Lecture 43 - Microwave Mixers - I
Lecture 44 - Microwave Mixers - II
Lecture 45 - Microwave Mixers - III
Lecture 46 - Fundamentals of Antennas
Lecture 47 - Dipole, Monopole, loop and Slot Antennas
Lecture 48 - Linear and Planar Arrays
Lecture 49 - Microstrip Antennas
Lecture 50 - Horn and Helical Antennas
Lecture 51 - Yagi - Uda, Log-Periodic and Reflector Antennas
Lecture 52 - RF MEMS and Microwave Imaging
Lecture 53 - Microwave Systems
Lecture 54 - Microwave Measurements and Lab Demonstration
Lecture 55 - CST Software Introduction with Filter Design
Lecture 56 - Power Divider and Combiner Design in CST
Lecture 57 - Hybrid Coupler Design
Lecture 58 - Antenna Design and Amplifier Simulation in CST
Lecture 59 - Mixer Design in NI AWR Software - I
Lecture 60 - Mixer Design in NI AWR Software - II

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NPTEL Video Course - Electrical Engineering - NOC:Principles of Digital Communications

Subject Co-ordinator - Prof. S.N. Merchant

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Introduction to Information Theory
Lecture 3 - Entropy and its properties
Lecture 4 - Lossless Source Coding Theorem
Lecture 5 - Prefix Codes and Kraftâ s Inequality
Lecture 6 - Huffman Coding
Lecture 7 - Discrete Memory-less Channels
Lecture 8 - Channel Capacity - I
Lecture 9 - Channel Capacity - II
Lecture 10 - Channel Coding Theorem
Lecture 11 - Differential Entropy - I
Lecture 12 - Differential Entropy - II
Lecture 13 - Channel Capacity - III
Lecture 14 - Channel Capacity - IV
Lecture 15 - Summary of Information Theory
Lecture 16 - Signal Space Representations - I
Lecture 17 - Signal Space Representations - II
Lecture 18 - Vector Representation of a Random Process
Lecture 19 - AWGN Vector Channel
Lecture 20 - Basics of Signal Detection
Lecture 21 - ML,MAP Detectors for AWGN Channel
Lecture 22 - Optimal Receiver
Lecture 23 - Probability of error for Optimal Receiver
Lecture 24 - Probability of Error for M-ary Scheme
Lecture 25 - Pulse Code Modulation
Lecture 26 - Uniform Quantizer
Lecture 27 - Step Size and Quantization Noise
Lecture 28 - Non-uniform Quantizer (Lloyd-Max Quantizer)
Lecture 29 - Companded Quantization - I

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Lecture 30 - Companded Quantization - II
Lecture 31 - Differential Pulse Code Modulation DPCM - I
Lecture 32 - DPCM-II (Linear Prediction)
Lecture 33 - Delta Modulation
Lecture 34 - M-ary PCM/PAM - I
Lecture 35 - M-ary PCM/PAM - II
Lecture 36 - Line Coding - I
Lecture 37 - Line Coding - II
Lecture 38 - Line Coding - III
Lecture 39 - Pulse Shaping for Zero ISI - I
Lecture 40 - Pulse Shaping for Zero ISI - II
Lecture 41 - Pulse Shaping for Zero ISI - III
Lecture 42 - Partial Response Signaling - I
Lecture 43 - Partial Response Signaling - II
Lecture 44 - Principle of Invariance of Probability of Error
Lecture 45 - Binary ASK and PSK
Lecture 46 - Binary Frequency Shift Keying - I
Lecture 47 - Binary Frequency Shift Keying - II
Lecture 48 - Quadrature Phase Shift Keying - I
Lecture 49 - Quadrature Phase Shift Keying - II
Lecture 50 - Quadrature Phase Shift Keying - III
Lecture 51 - Continuous Phase Frequency Shift Keying
Lecture 52 - Minimum Shift Keying - I
Lecture 53 - Minimum Shift Keying - II
Lecture 54 - M-ary Coherent ASK (M-ASK)
Lecture 55 - M-ary PSK
Lecture 56 - M-ary Quadrature Amplitude Modulation (M-QAM)
Lecture 57 - M-ary FSK
Lecture 58 - Comparison of M-ary Schemes
Lecture 59 - Non-coherent BFSK
Lecture 60 - Differential Phase Shift Keying
Lecture 61 - Channel Coding - I
Lecture 62 - Channel Coding - II
Lecture 63 - Channel Coding - III
Lecture 64 - Channel Coding
Lecture 65 - Channel Coding

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NPTEL Video Course - Electrical Engineering - NOC:Fundamental of Power Electronics

Subject Co-ordinator - Prof. Vivek Agarwal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Familiarization with Power Electronic Systems
Lecture 2 - Overview of Basic Power Electronic Circuits from Laymans Point of View
Lecture 3 - Applications, Definitions, and Nature of Power Electronic Circuits
Lecture 4 - Components of a Power Electronic System
Lecture 5 - Analysis of Switched Networks
Lecture 6 - Review of engineering maths for power electronic circuit analysis
Lecture 7 - Review of semiconductor physics
Lecture 8 - P-N Junction
Lecture 9 - Power Diodes
Lecture 10 - Thyristors
Lecture 11 - Motivation for rectifier capacitor filter
Lecture 12 - Circuit Operation
Lecture 13 - Designing the circuit
Lecture 14 - Simulation setup for NgSpice and gEDA schematic capture
Lecture 15 - Simulating the circuit
Lecture 16 - Practicals
Lecture 17 - Inrush current limiting - Intro
Lecture 18 - Inrush current limiting - Resistor solution
Lecture 19 - Inrush current limiting - Thermistor solution
Lecture 20 - Inrush current limiting - Transformer solution
Lecture 21 - Inrush current limiting - MOSFET solution
Lecture 22 - Inrush current limiting - Relay, contactor
Lecture 23 - Three phase rectifier capacitor filter
Lecture 24 - Simulation - 3 phase rectifier capacitor filter
Lecture 25 - Power factor - Motivation
Lecture 26 - Power factor - Discussion
Lecture 27 - Power factor - Sinusoidal
Lecture 28 - Power factor for rectifier cap filter
Lecture 29 - Passive power improvement circuit

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Lecture 30 - Simulation - power factor improvement
Lecture 31 - Linear regulators - Intro
Lecture 32 - Shunt regulator
Lecture 33 - Example on shunt regulator
Lecture 34 - Non-ideality and solution
Lecture 35 - Applications of shunt regulator
Lecture 36 - Series regulator
Lecture 37 - Efficiency of series
Lecture 38 - Negative and dual voltage regulators
Lecture 39 - Over current limiting circuits
Lecture 40 - Improvements to series regulator
Lecture 41 - Regulator performance parameters
Lecture 42 - Datasheet of few IC regulators
Lecture 43 - Common IC regulator circuits
Lecture 44 - Practicals 1
Lecture 45 - Switched mode DC-DC converter intro
Lecture 46 - Volt-sec and Amp-sec balance
Lecture 47 - Input-output relationship
Lecture 48 - Buck converter - operation and waveforms
Lecture 49 - Buck converter - component selection
Lecture 50 - Primary configurations
Lecture 51 - Boost converter
Lecture 52 - Buck-Boost converter
Lecture 53 - Simulating the primary converters
Lecture 54 - Forward converter
Lecture 55 - Core reset in forward converter
Lecture 56 - Simulating with lossy core reset
Lecture 57 - Simulating with lossless core reset
Lecture 58 - Flyback converter
Lecture 59 - Simulating the flyback converter
Lecture 60 - Octave mfile for design
Lecture 61 - Magnetics design intro
Lecture 62 - Magnetics review
Lecture 63 - Permeance
Lecture 64 - Inductor value and energy storage
Lecture 65 - Inductor area product
Lecture 66 - Inductor design
Lecture 67 - Inductor example
Lecture 68 - Transformer design

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Lecture 69 - Transformer example
Lecture 70 - Forward converter design mfile
Lecture 71 - Pushpull converter
Lecture 72 - Flux walking in pushpull
Lecture 73 - PWM generation
Lecture 74 - Simulation of pushpull converter
Lecture 75 - Half bridge converter
Lecture 76 - Simulation of halfbridge converter
Lecture 77 - Full bridge converter
Lecture 78 - Simulation of fullbridge converter
Lecture 79 - Area products and mfiles
Lecture 80 - Intro for drive circuits
Lecture 81 - BJT base drive
Lecture 82 - BJT base drive example
Lecture 83 - Multi-stage base drive
Lecture 84 - Base drive with speed-up circuit
Lecture 85 - Base drive with isolation
Lecture 86 - MOSFET gate drive
Lecture 87 - MOSFET drive with isolation
Lecture 88 - Over-current protection
Lecture 89 - Snubber circuits
Lecture 90 - Intro for close loop control
Lecture 91 - Close looping dc-dc converters
Lecture 92 - Simulation of close loop control
Lecture 93 - Current control for battery charger application
Lecture 94 - Instability in current control and slope compensation
Lecture 95 - Slope compensated current control
Lecture 96 - Simulation of current control
Lecture 97 - Single phase inverter with sinusoidal pwm
Lecture 98 - Simulation of sinusoidal PWM

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NPTEL Video Course - Electrical Engineering - NOC:Electrical Equipment and Machines: Finite Element Analysis

Subject Co-ordinator - Prof. Shrikrishna V. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline and Introduction
Lecture 2 - Analytical and Numerical Methods
Lecture 3 - Revisiting EM Concepts
Lecture 4 - Revisiting EM Concepts
Lecture 5 - Revisiting EM Concepts
Lecture 6 - Revisiting EM Concepts
Lecture 7 - Revisiting EM Concepts
Lecture 8 - Revisiting EM Concepts
Lecture 9 - Revisiting EM Concepts
Lecture 10 - Revisiting EM Concepts
Lecture 11 - FEM
Lecture 12 - Finding Functional for PDEs
Lecture 13 - Whole Domain Approximation
Lecture 14 - 1D FEM
Lecture 15 - 1D FEM
Lecture 16 - 1D FEM
Lecture 17 - 2D FEM
Lecture 18 - 2D FEM
Lecture 19 - 2D FEM Scilab Code
Lecture 20 - 2D FEM Code
Lecture 21 - Computation of B and H Field and Method of Weighted Residuals
Lecture 22 - Galerkin Method
Lecture 23 - Calculation of Leakage Inductance of a Transformer
Lecture 24 - Calculation of Inductance of an Induction Motor and a Gapped-Core Shunt Reactor
Lecture 25 - Insulation Design Using FE Analysis
Lecture 26 - Quadratic Finite Elements
Lecture 27 - Time Harmonic FE Analysis
Lecture 28 - Calculation of Eddy Current Losses
Lecture 29 - Eddy Losses in Transformer Windings

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Lecture 30 - Torque Speed Characteristics of an Induction Motor and FE Analysis of Axisymmetric Problem
Lecture 31 - Permanent Magnets
Lecture 32 - Permanent Magnets
Lecture 33 - Periodic and Antiperiodic Boundary Conditions in Rotating Machines
Lecture 34 - FE Analysis of Rotating Machines
Lecture 35 - Voltage Fed Coupled Circuit Field Analysis
Lecture 36 - Current Fed Coupled Circuit Field Analysis
Lecture 37 - Transient FE Analysis
Lecture 38 - Nonlinear FE Analysis
Lecture 39 - Computation of Forces using Maxwell Stress Tensor
Lecture 40 - Computation of force using virtual work method

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NPTEL Video Course - Electrical Engineering - NOC:Digital Signal Processing and its Applications

Subject Co-ordinator - Prof. V. M. Gadre

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Digital signal processing and its objectives
Lecture 2 - Introduction to sampling and Fourier Transform
Lecture 3 - Sampling of sine wave and associate complication
Lecture 4 - Review of Sampling Theorem
Lecture 5 - Idealized Sampling, Reconstruction
Lecture 6 - Filters And Discrete System
Lecture 7 - Answering questions from previous lectures
Lecture 8 - Desired requirements for discrete system
Lecture 9 - Introduction to phasors
Lecture 10 - Advantages of phasors in discrete systems
Lecture 11 - What do we want from a discrete system?
Lecture 12 - Linearity - Homogeneity and Additivity
Lecture 13 - Shift Invariance and Characterization of LTI systems
Lecture 14 - Characterization of LSI system using itâ s impulse response
Lecture 15 - Introduction to convolution
Lecture 16 - Convolution: Deeper ideas and understanding
Lecture 17 - Characterisation of LSI systems, Convolution-properties
Lecture 18 - Response of LSI Systems to Complex Sinusoids
Lecture 19 - Convergence of Convolution and Bibo Stability
Lecture 20 - Commutativity and Associativity
Lecture 21 - BIBO Stability of an LSI system
Lecture 22 - Causality and memory of an LSI system
Lecture 23 - Frequency response of an LSI system
Lecture 24 - Introduction and conditions of Stability
Lecture 25 - Vectors and Inner Product
Lecture 26 - Interpretation of Frequency Response as Dot Product
Lecture 27 - Interpretation of Frequency Response as Eigenvalues
Lecture 28 - Discrete time fourier transform
Lecture 29 - DTFT in LSI System and Convolution Theorem.

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Lecture 30 - Definitions of sequences and Properties of DTFT
Lecture 31 - Introduction to DTFT, IDTFT
Lecture 32 - Dual to convolution property
Lecture 33 - Multiplication Property, Introduction to Parsevalâ s theorem
Lecture 34 - Introduction and Property of DTFT
Lecture 35 - Review of Inverse DTFT
Lecture 36 - Parsevalâ s Theorem and energy and time spectral density
Lecture 37 - Discussion on Unit Step
Lecture 38 - Introduction to Z transform
Lecture 39 - Example of Z transform
Lecture 40 - Region of Convergence
Lecture 41 - Properties of Z transform
Lecture 42 - Z- Transform
Lecture 43 - Rational System
Lecture 44 - Introduction and Examples of Rational Z Transform and their Inverses
Lecture 45 - Double Pole Examples and their Inverse Z Transform
Lecture 46 - Partial Fraction Decomposition
Lecture 47 - LSI System Examples
Lecture 48 - Why are Rational Systems so important?
Lecture 49 - Solving Linear constant coefficient difference equations which are valid over a finite range of
Lecture 50 - Introduction to Resonance in Rational Systems
Lecture 51 - Characterization of Rational LSI system
Lecture 52 - Causality and stability of the ROC of the system function
Lecture 53 - Recap of Rational Systems and Discrete Time Filters
Lecture 54 - Specifications for Filter Design
Lecture 55 - Four Ideal Piecewise Constant Filters
Lecture 56 - Important Characteristics Of Ideal Filters
Lecture 57 - Synthesis of Discrete Time Filters, Realizable specifications
Lecture 58 - Realistic Specifications for low pass filter. Filter Design Process
Lecture 59 - Introduction to Filter Design. Analog IIR Filter,FIR discrete-time filter, IIR discrete-time fil
Lecture 60 - Analog to discrete transform
Lecture 61 - Intuitive transforms, Bilinear Transformation
Lecture 62 - Steps for IIR filter design
Lecture 63 - Analog filter design using Butterworth Approximation
Lecture 64 - Butterworth filter Derivation And Analysis of butterworth system function
Lecture 65 - Chebychev filter Derivation
Lecture 66 - Midsem paper review discussion
Lecture 67 - The Chebyschev Approximation
Lecture 68 - Next step in design: Obtain poles

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Lecture 69 - Introduction to Frequency Transformations in the Analog Domain
Lecture 70 - High pass transformation
Lecture 71 - Band pass transformation
Lecture 72 - Frequency Transformation
Lecture 73 - Different types of filters
Lecture 74 - Impulse invariant method and ideal impulse response
Lecture 75 - Design of FIR of length (2N+1) by the truncation method,Plotting the function V(w)
Lecture 76 - IIR filter using rectangular window, IIR filter using triangular window
Lecture 77 - Proof that frequency response of an fir filter using rectangular window function centred at 0 is
Lecture 78 - Introduction to window functions
Lecture 79 - Examples of window functions
Lecture 80 - Explanation of Gibbâ s Phenomenon and itâ s application
Lecture 81 - Comparison of FIR And IIR Filterâ s
Lecture 82 - Comparison of FIR And IIR Filterâ s
Lecture 83 - Comparison of FIR And IIR Filterâ s
Lecture 84 - Introduction and approach to realization (causal rational system)
Lecture 85 - Comprehension of Signal Flow Graphs and Achievement of Pseudo Assembly Language Code
Lecture 86 - Introduction to IIR Filter Realization and Cascade Structure
Lecture 87 - Cascade Parallel Structure
Lecture 88 - Lattice Structure
Lecture 89 - Recap And Review of Lattice Structure, Realization of FIR Function
Lecture 90 - Backward recursion, Change in the recursive equation of lattice
Lecture 91 - Lattice structure for an arbitrary rational system
Lecture 92 - Example realization of lattice structure for rational system
Lecture 93 - Introductory Remarks of Discrete Fourier Transform and Frequency Domain Sampling
Lecture 94 - Principle of Duality, The Circular Convolution

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NPTEL Video Course - Electrical Engineering - NOC:Stochastic Control and Communication

Subject Co-ordinator - Prof. Ankur A. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Decision Making under Uncertainty
Lecture 2 - Expected Utility Theory - I
Lecture 3 - Expected Utility Theory - II
Lecture 4 - Expected Utility Theory - III
Lecture 5 - Role of Information in Decision Making
Lecture 6 - State Space Modelling of Sequential Decision Making, Example of Inventory Control
Lecture 7 - Inventory Control Problem (Continued...)
Lecture 8 - Policy-A Closed Loop Solution to Stochastic Control Problem
Lecture 9 - Introduction to Markov Decision Processes (MDP)
Lecture 10 - Types of Policy in MDP
Lecture 11 - Interpreting randomised decision rules
Lecture 12 - Stationary Transition Probability: State Diagram Representation and example of Markov policies
Lecture 13 - Example of History Dependent Policies
Lecture 14 - Complexity of the problem using brute force approach
Lecture 15 - Principle of Optimality
Lecture 16 - Dynamic Programming Algorithm
Lecture 17 - DP Algo applied to Inventory Control Problem
Lecture 18 - DP Algo applied to Inventory Control Problem (Continued...)
Lecture 19 - DP Algo applied to Inventory Control Problem (Continued...)
Lecture 20 - Optimal Stopping Problem
Lecture 21 - Optimal Stopping Example: Secretary Problem
Lecture 22 - Optimal Stopping Example: Secretary Problem (Continued...)
Lecture 23 - Optimal Stopping Example: Secretary Problem (Continued...)
Lecture 24 - Linear System Quadratic Cost Problem
Lecture 25 - Linear System Quadratic Cost Problem (Continued...)
Lecture 26 - Solving it via DP algorithm (Continued...)
Lecture 27 - Equivalence between Optimal HR Policyand optimal Markov Deterministic Policy
Lecture 28 - Stochastic Control under incomplete state information
Lecture 29 - Stochastic Control under incomplete state information (Continued...)

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Lecture 30 - Stochastic Control under incomplete state information: Example
Lecture 31 - Stochastic Control under incomplete state information: Example (Continued...)
Lecture 32 - Stochastic Control under incomplete state information: Example (Continued...)
Lecture 33 - Stochastic Control under incomplete state information: Example (Continued...)
Lecture 34 - LQ systems with Imperfect Information - I
Lecture 35 - LQ systems with Imperfect Information - II
Lecture 36 - LQ systems with Imperfect Information - III
Lecture 37 - LQ systems with Imperfect Information - IV
Lecture 38 - Filtering - I
Lecture 39 - Filtering - II
Lecture 40 - Kalman Filtering - I
Lecture 41 - Kalman Filtering - II
Lecture 42 - Kalman Filtering - III
Lecture 43 - Belief State Formulation - I
Lecture 44 - Belief State Formulation - II
Lecture 45 - Information Structures - I
Lecture 46 - Information Structures - II
Lecture 47 - Witsenhausen Problem - I
Lecture 48 - Witsenhausen Problem - II
Lecture 49 - Witsenhausen Problem - III
Lecture 50 - Witsenhausen Problem - IV
Lecture 51 - Witsenhausen Problem - V
Lecture 52 - Witsenhausen Problem - VI
Lecture 53 - Witsenhausen Problem - VII
Lecture 54 - Team Decision Theory - I
Lecture 55 - Team Decision Theory - II
Lecture 56 - Team Decision Theory - III
Lecture 57 - Team Decision Theory - IV
Lecture 58 - Team Decision Theory - V
Lecture 59 - Team Decision Theory - VI
Lecture 60 - Team Decision Theory - VII
Lecture 61 - Communication Theory - I
Lecture 62 - Communication Theory - II
Lecture 63 - Communication Theory - III
Lecture 64 - Communication Theory - IV
Lecture 65 - Communication Theory - V

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NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra (2024)

Subject Co-ordinator - Prof. Dwaipayan Mukherjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part A
Lecture 2 - Introduction - Part B
Lecture 3 - Introduction - Part C
Lecture 4 - Equivalent Systems - Part A
Lecture 5 - Equivalent Systems - Part B
Lecture 6 - Equivalent Systems - Part C
Lecture 7 - Solution of Ax = b - Part A
Lecture 8 - Solution of Ax = b - Part B
Lecture 9 - Solution of Ax = b - Part C
Lecture 10 - Rings, Integral Domains and Fields - Part A
Lecture 11 - Rings, Integral Domains and Fields - Part B
Lecture 12 - Rings, Integral Domains and Fields - Part C
Lecture 13 - Vector Spaces and Subspaces - Part A
Lecture 14 - Vector Spaces and Subspaces - Part B
Lecture 15 - Vector Spaces and Subspaces - Part C
Lecture 16 - Unions, Intersection, Sums of Subspaces - Part A
Lecture 17 - Unions, Intersection, Sums of Subspaces - Part B
Lecture 18 - Generating sets, Linear independence and basis - Part A
Lecture 19 - Generating sets, Linear independence and basis - Part B
Lecture 20 - Generating sets, Linear independence and basis - Part C
Lecture 21 - Ordered basis and co-ordinates - Part A
Lecture 22 - Ordered basis and co-ordinates - Part B
Lecture 23 - Ordered basis and co-ordinates - Part C
Lecture 24 - Rank-Nullity Theorem (Matrices) - Part A
Lecture 25 - Rank-Nullity Theorem (Matrices) - Part B
Lecture 26 - Rank-Nullity Theorem (Matrices) - Part C
Lecture 27 - Rank-Nullity Theorem (Linear Transformation) - Part A
Lecture 28 - Rank-Nullity Theorem (Linear Transformation) - Part B
Lecture 29 - Rank-Nullity Theorem (Linear Transformation) - Part C

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Lecture 30 - Isomorphism and Inverses - Part A
Lecture 31 - Isomorphism and Inverses - Part B
Lecture 32 - Isomorphism and Inverses - Part C
Lecture 33 - Dual Basis and Annihilator - Part A
Lecture 34 - Dual Basis and Annihilator - Part B
Lecture 35 - Dual Basis and Annihilator - Part C
Lecture 36 - Dual maps and double dual - Part A
Lecture 37 - Dual maps and double dual - Part B
Lecture 38 - Dual maps and double dual - Part C
Lecture 39 - Quotient spaces and quotient map - Part A
Lecture 40 - Quotient spaces and quotient map - Part B
Lecture 41 - Quotient spaces and quotient map - Part C
Lecture 42 - Inner Product Spaces - Part A
Lecture 43 - Inner Product Spaces - Part B
Lecture 44 - Inner Product Spaces - Part C
Lecture 45 - Gram Schmidt Procedure - Part A
Lecture 46 - Gram Schmidt Procedure - Part B
Lecture 47 - Gram Schmidt Procedure - Part C
Lecture 48 - Best Approximation of a Vector - Part A
Lecture 49 - Best Approximation of a Vector - Part B
Lecture 50 - Best Approximation of a Vector - Part C
Lecture 51 - Projection map and summary of Ax = b - Part A
Lecture 52 - Projection map and summary of Ax = b - Part B
Lecture 53 - Projection map and summary of Ax = b - Part C
Lecture 54 - Linear Differential Equations - Part A
Lecture 55 - Linear Differential Equations - Part B
Lecture 56 - Introduction to Eigen values and Eigen vectors - Part A
Lecture 57 - Introduction to Eigen values and Eigen vectors - Part B
Lecture 58 - Introduction to Eigen values and Eigen vectors - Part C
Lecture 59 - Singular Value Decomposition - Part A
Lecture 60 - Singular Value Decomposition - Part B
Lecture 61 - Singular Value Decomposition - Part C
Lecture 62 - Algebraic and geometric multiplicities - Part A
Lecture 63 - Algebraic and geometric multiplicities - Part B
Lecture 64 - A-Invariant Subspaces - Part A
Lecture 65 - A-Invariant Subspaces - Part B
Lecture 66 - A-Invariant Subspaces - Part C
Lecture 67 - Minimal Polynomial-I - Part A
Lecture 68 - Minimal Polynomial-I - Part B

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Lecture 69 - Minimal Polynomial-I - Part C
Lecture 70 - Minimal Polynomial-I - Part D
Lecture 71 - Minimal Polynomial-II - Part A
Lecture 72 - Minimal Polynomial-II - Part B
Lecture 73 - Minimal Polynomial-II - Part C
Lecture 74 - Minimal Polynomial-II - Part D
Lecture 75 - Cayley Hamilton Theorem - Part A
Lecture 76 - Cayley Hamilton Theorem - Part B
Lecture 77 - Cayley Hamilton Theorem - Part C
Lecture 78 - Jordan Canonical Form - Part A
Lecture 79 - Jordan Canonical Form - Part B
Lecture 80 - Jordan Canonical Form - Part C
Lecture 81 - Algebraic Graph Theory and Consensus - Part A
Lecture 82 - Algebraic Graph Theory and Consensus - Part B
Lecture 83 - Algebraic Graph Theory and Consensus - Part C
Lecture 84 - Positive Matrices and Leontieff's Model - Part A
Lecture 85 - Positive Matrices and Leontieff's Model - Part B

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NPTEL Video Course - Electrical Engineering - NOC:Digital Communication using GNU Radio

Subject Co-ordinator - Prof. Kumar Appaiah

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Communication
Lecture 2 - Understanding GNU Radio features for Digital Communication: Basic blocks, input and output
Lecture 3 - Understanding GNU Radio features for Digital Communication: Advanced blocks, hardware interfacing
Lecture 4 - Fundamentals of Digital Communication: Signal Processing methods, vectors, and relevant GNU Radio
Lecture 5 - Fundamentals of Digital Communication: Signal Processing methods, vectors, and relevant GNU Radio
Lecture 6 - Complex Baseband Signal Representation
Lecture 7 - Real Passband Signal Representation, Up and Down Conversion of Complex Baseband Signals
Lecture 8 - Random Variables and Random Processes
Lecture 9 - Fundamentals of Digital Modulation
Lecture 10 - Linear Modulation Methods: Amplitude Shift Keying (ASK)
Lecture 11 - Linear Modulation Methods: Phase Shift Keying (PSK)
Lecture 12 - Linear Modulation Methods: Quadrature Amplitude Modulation (QAM) and Frequency Shift Keying (FSK
Lecture 13 - Pulse Shaping for ISI Free Signaling
Lecture 14 - ASK using Raised Cosine (RC) and Root-Raised Cosine (RRC) Pulse Shaping
Lecture 15 - Basics of Detection: Properties of Gaussian Random Variables
Lecture 16 - Basics of Detection: Gaussian Random Vectors and Hypothesis Testing
Lecture 17 - Optimal Receivers for M-ary Signaling
Lecture 18 - Gram-Schmidt Orthogonalisation
Lecture 19 - Optimal Reception of M-ary Signals in AWGN
Lecture 20 - Detection and Optimal Decision for On-Off Signaling in AWGN Channel
Lecture 21 - Detection and Optimal Decision for M-ary Signaling
Lecture 22 - Python for GNU Radio
Lecture 23 - Extending GNU Radio Features using Python
Lecture 24 - Constructing and Visualising Constellations using GNU Radio
Lecture 25 - Understanding matched filtering using GNU Radio
Lecture 26 - Histograms in GNU Radio
Lecture 27 - Visualising Symbol Error Rate in GNU Radio
Lecture 28 - Signal-to-Noise Ratio and Symbol Error Probability - Part 1
Lecture 29 - Signal-to-Noise Ratio and Symbol Error Probability - Part 2

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Lecture 30 - Symbol error rate and Bit error rate
Lecture 31 - Computing bit error rates in GNU Radio
Lecture 32 - End-to-end Digital Communication System Simulation in GNU Radio
Lecture 33 - Parameter Estimation for Practical Receivers - Part 1
Lecture 34 - Parameter Estimation for Practical Receivers - Part 2
Lecture 35 - Phase Locked Loop and Differential Modulation
Lecture 36 - Maximum Likelihood delay estimate for a single symbol in GNU Radio
Lecture 37 - Maximum Likelihood delay estimate for multiple symbols in GNU Radio
Lecture 38 - Phase offse estimation in GNU Radio
Lecture 39 - Phase Locked Loop in GNU Radio
Lecture 40 - Costas Loop and Differential PSK in GNU Radio
Lecture 41 - Channel Equalisation
Lecture 42 - Detection Strategy for Dispersive Channels
Lecture 43 - Maximum Likelihood sequence estimation: Viterbi Algorithm
Lecture 44 - Suboptimal Channel Equalisation: Zero-forcing Receiver
Lecture 45 - Zero forcing Receiver in GNU Radio
Lecture 46 - Suboptimal Channel Equalisation: Linear Minimum mean-square error receiver
Lecture 47 - LMMSE Receiver in GNU Radio
Lecture 48 - Parallelising Frequency Selective Channels
Lecture 49 - Orthogonal Frequency Division Multiplexing (OFDM)
Lecture 50 - OFDM in the prescence of dispersive channels
Lecture 51 - Equalisation using OFDM in GNU Radio
Lecture 52 - Error Control Coding: Parity Check Codes
Lecture 53 - Error Control Coding: Repetition Codes
Lecture 54 - Error Control Coding: Linear Block Codes
Lecture 55 - Repetition Codes in GNU Radio
Lecture 56 - Error Control Coding: Perfect Codes
Lecture 57 - Error Control Coding: Hamming Codes
Lecture 58 - (7,4) Hamming Code in GNU Radio
Lecture 59 - Rate and error-free Communication
Lecture 60 - Quantisation
Lecture 61 - Visualising Quantisation in GNU Radio
Lecture 62 - Course Summary

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NPTEL Video Course - Electrical Engineering - NOC:Network Security

Subject Co-ordinator - Prof. Gaurav S. Kasbekar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Motivation and Overview
Lecture 3 - Review of Basic Concepts and Terminology in Communication Networks - Part 1
Lecture 4 - Review of Basic Concepts and Terminology in Communication Networks - Part 2
Lecture 5 - Review of Basic Concepts and Terminology in Communication Networks - Part 3
Lecture 6 - Review of Basic Concepts and Terminology in Communication Networks - Part 4
Lecture 7 - Review of Basic Concepts and Terminology in Communication Networks - Part 5
Lecture 8 - Review of Basic Concepts and Terminology in Communication Networks - Part 6
Lecture 9 - Different Types of Attacks on Networks
Lecture 10 - Mathematical Background for Cryptography
Lecture 11 - Principle of Cryptography - Part 1
Lecture 12 - Principle of Cryptography - Part 2
Lecture 13 - Principle of Cryptography - Part 3
Lecture 14 - Principle of Cryptography - Part 4
Lecture 15 - Principle of Cryptography - Part 5
Lecture 16 - Message Integrity, Cryptographic Hash Functions and Digital Signatures - Part 1
Lecture 17 - Message Integrity, Cryptographic Hash Functions and Digital Signatures - Part 2
Lecture 18 - Message Integrity, Cryptographic Hash Functions and Digital Signatures - Part 3
Lecture 19 - Message Integrity, Cryptographic Hash Functions and Digital Signatures - Part 4
Lecture 20 - Authentication - Part 1
Lecture 21 - Authentication - Part 2
Lecture 22 - Authentication - Part 3
Lecture 23 - Authentication - Part 4
Lecture 24 - Authentication - Part 5
Lecture 25 - Authentication - Part 6
Lecture 26 - Public Key Infrastructure - Part 1
Lecture 27 - Public Key Infrastructure - Part 2
Lecture 28 - Secure Email - Part 1
Lecture 29 - Secure Email - Part 2

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Lecture 30 - Secure Sockets Layer (SSL) and Transport Layer Security (TLS) - Part 1
Lecture 31 - Secure Sockets Layer (SSL) and Transport Layer Security (TLS) - Part 2
Lecture 32 - Structure of an intergenic fitness landscape
Lecture 33 - Structure of an intergenic fitness landscape
Lecture 34 - Large scale fitness landscape (folA in E. coli)
Lecture 35 - Fixation probability of a beneficial mutation in a chemostat
Lecture 36 - Marbles in a jar: role of chance in dictating evolution
Lecture 37 - Securing Wireless LANs - Part 3
Lecture 38 - Securing Wireless LANs - Part 4
Lecture 39 - Securing Wireless LANs - Part 5
Lecture 40 - Securing Wireless LANs - Part 6
Lecture 41 - Securing Wireless LANs - Part 7
Lecture 42 - Securing Wireless LANs - Part 8
Lecture 43 - Wireless Cellular Network Security - Part 1
Lecture 44 - Wireless Cellular Network Security - Part 2
Lecture 45 - Wireless Cellular Network Security - Part 3
Lecture 46 - Wireless Cellular Network Security - Part 4
Lecture 47 - Wireless Cellular Network Security - Part 5
Lecture 48 - Wireless Cellular Network Security - Part 6
Lecture 49 - Wireless Cellular Network Security - Part 7
Lecture 50 - Wireless Cellular Network Security - Part 8
Lecture 51 - Firewalls and Intrusion Detection Systems - Part 1
Lecture 52 - Firewalls and Intrusion Detection Systems - Part 2
Lecture 53 - Firewalls and Intrusion Detection Systems - Part 3
Lecture 54 - Firewalls and Intrusion Detection Systems - Part 4
Lecture 55 - Firewalls and Intrusion Detection Systems - Part 5
Lecture 56 - Firewalls and Intrusion Detection Systems - Part 6
Lecture 57 - Firewalls and Intrusion Detection Systems - Part 7
Lecture 58 - Firewalls and Intrusion Detection Systems - Part 8
Lecture 59 - Tor: The Onion Router - Part 1
Lecture 60 - Tor: The Onion Router - Part 2
Lecture 61 - The Bitcoin Cryptocurrency - Part 1
Lecture 62 - The Bitcoin Cryptocurrency - Part 2
Lecture 63 - The Bitcoin Cryptocurrency - Part 3
Lecture 64 - The Bitcoin Cryptocurrency - Part 4
Lecture 65 - The Bitcoin Cryptocurrency - Part 5
Lecture 66 - The Bitcoin Cryptocurrency - Part 6
Lecture 67 - Cloud Security - Part 1
Lecture 68 - Cloud Security - Part 2

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Lecture 69 - Cloud Security - Part 3
Lecture 70 - Cloud Security - Part 4
Lecture 71 - Security of the Internet of Things (IoT), Hardware Security - Part 1
Lecture 72 - Security of the Internet of Things (IoT), Hardware Security - Part 2
Lecture 73 - Security of the Internet of Things (IoT), Hardware Security - Part 3
Lecture 74 - Post-Quantum Cryptography

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NPTEL Video Course - Electrical Engineering - NOC:Behavioural Theory of Systems with a View Toward Data Drive

Subject Co-ordinator - Prof. Debasattam Pal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Dynamical systems in the behavioural setting
Lecture 3 - Ordinary differential and difference equations : Kernel representation
Lecture 4 - Equivalent kernel representations
Lecture 5 - Unimodular transformations, equivalent behaviours - sufficient condition
Lecture 6 - Polynomial matrices: Aryabhatta-Bezout identity, upper triangular form
Lecture 7 - Example - Solution of system of differential equations using back substitution
Lecture 8 - Solving scalar ordinary differential equations, equivalent behaviours
Lecture 9 - Solving multivariable system of differential equations
Lecture 10 - Equivalent behaviours: necessary condition for autonomous systems proof
Lecture 11 - Equivalent Behaviours: non-autonomous systems proof, input-output partitioning
Lecture 12 - Annihilator submodule and associated behaviour
Lecture 13 - Elimination Theory introduction, Fundamental principle of algebraic analysis
Lecture 14 - Proof of Fundamental principle of algebraic analysis
Lecture 15 - Proof revisited: Fundamental principle of Algebraic analysis
Lecture 16 - Elimination Theory proof with example
Lecture 17 - Elimination examples
Lecture 18 - Controllability definition in the behavioural framework
Lecture 19 - Equivalent conditions for controllability proof
Lecture 20 - More equivalent conditions for controllability
Lecture 21 - Moving from controllability to observability
Lecture 22 - Observability (Continued...)
Lecture 23 - Behavioural Pole Placement
Lecture 24 - Identification Basics
Lecture 25 - The Most Powerful Unfalsified Model (MPUM)
Lecture 26 - MPUM for LTI systems: Uniqueness and construction approach
Lecture 27 - Construction approach of MPUM (Continued...)
Lecture 28 - MPUM construction recalled
Lecture 29 - Some simple numerical examples

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Lecture 30 - Finding annhilators and hence kernel representation matrix from data
Lecture 31 - Identification of the behaviour using a single trajectory of finite length
Lecture 32 - Single finite length trajectory based identification (Continued...)
Lecture 33 - More discussions on single finite length trajectory based identification
Lecture 34 - Proof of fundamental lemma of data-driven control
Lecture 35 - Proof of fundamental lemma (Continued...)
Lecture 36 - Some consequences of fundamental lemma discussed
Lecture 37 - Finding low rank approximations of data Hankel matrices using SVD
Lecture 38 - Towards data-driven simulation
Lecture 39 - Data-driven simulation continued and data-driven stability analysis
Lecture 40 - Data-driven Control: Stabilization by state feedback

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NPTEL Video Course - Electrical Engineering - Circuit Theory

Subject Co-ordinator - Prof. S.C. Dutta Roy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Signals and Systems
Lecture 2 - Review of Signals and Systems
Lecture 3 - Network Equations; Initial and Final Conditions
Lecture 4 - Problem Session 1
Lecture 5 - Step, Impulse and Complete Responses
Lecture 6 - 2nd Order Circuits
Lecture 7 - Transformer Transform Domain Analysis
Lecture 8 - Problem Session 2
Lecture 9 - Network Theorems and Network Functions
Lecture 10 - Network Functions (Continued.)
Lecture 11 - Amplitude and Phase of Network Functions
Lecture 12 - Problem Session 3
Lecture 13 - Poles, Zeros and Network Response
Lecture 14 - Single Tuned Circuits
Lecture 15 - Single Tuned Circuits (Continued.)
Lecture 16 - Double Tuned Circuits
Lecture 17 - Double Tuned Circuits (Continued.)
Lecture 18 - Problem Session 4
Lecture 19 - Double Tuned Circuits (Continued.)
Lecture 20 - Concept of Delay and Introduction
Lecture 21 - Two-port Networks (Continued.)
Lecture 22 - Problem Session 5
Lecture 23 - Minor - 1
Lecture 24 - The Hybrid & Transmission Parameters of 2 ports
Lecture 25 - Problem Session 6
Lecture 26 - Two - port Network parameters
Lecture 27 - Two-port Interconnections
Lecture 28 - Interconnection of Two-port Networks (Continued.)
Lecture 29 - Problem Session 7

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Lecture 30 - Scattering Matrix
Lecture 31 - Scattering Parameters of a Two-port
Lecture 32 - Problem Session 8
Lecture 33 - Solutions of Minor - 2 Problems
Lecture 34 - Insertion Loss
Lecture 35 - Example of Insertion Loss and Elements
Lecture 36 - Elements of Realizability Theory (Continued.)
Lecture 37 - Positive Real Functions
Lecture 38 - Testing of Positive Real Functions
Lecture 39 - Problem Session 9
Lecture 40 - More on PRF's and their Synthesis
Lecture 41 - LC Driving Point Functions
Lecture 42 - LC Driving Point Synthesis (Continued.)
Lecture 43 - RC and RL Driving Point Synthesis
Lecture 44 - Problem Session 10
Lecture 45 - RC & RL One-port Synthesis (Continued.)
Lecture 46 - Elementary RLC One-port Synthesis
Lecture 47 - Properties and Synthesis of Transfer Parameters
Lecture 48 - Resistance Terminated LC Ladder
Lecture 49 - Resistance Terminated LC Ladder (Continued.)
Lecture 50 - Problem session 11
Lecture 51 - Network Transmission Criteria

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NPTEL Video Course - Electrical Engineering - Control Engineering (Prof. M. Gopal)

Subject Co-ordinator - Prof. M. Gopal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to control problem
Lecture 2 - Basic Feedback Structure
Lecture 3 - Introduction to Control Problem (Continued.)
Lecture 4 - Dynamic Systems and Dynamic Response
Lecture 5 - Dynamic Systems and Dynamic Response (Continued.)
Lecture 6 - Dynamic Systems and Dynamic Response (Continued.)
Lecture 7 - Dynamic Systems and Dynamic Response (Continued.)
Lecture 8 - Dynamic Systems and Dynamic Response (Continued.)
Lecture 9 - Dynamic Systems and Dynamic Response (Continued.)
Lecture 10 - Models of Industrial Control Devices and Systems
Lecture 11 - Models of Industrial Control Devices and Systems (Continued.)
Lecture 12 - Models of Industrial Control Devices and Systems(Continued.)
Lecture 13 - Models of Industrial Control Devices and Systems(Continued.)
Lecture 14 - Models of Industrial Control Devices and Systems(Continued.)
Lecture 15 - Models of Industrial Control Devices and Systems(Continued.)
Lecture 16 - Models of Industrial Control Devices and Systems (Continued.)
Lecture 17 - Models of Industrial Control Devices and Systems (Continued.)
Lecture 18 - Models of Industrial Control Devices and Systems (Continued.)
Lecture 19 - Basic Principles of Feedback Control
Lecture 20 - Basic Principles of Feedback Control (Continued.)
Lecture 21 - Basic Principles of Feedback Control (Continued.)
Lecture 22 - Basic Principles of Feedback Control (Continued.)
Lecture 23 - Concepts of stability and Routh Stability Criterion
Lecture 24 - Concepts of stability and Routh Stability Criterion (Continued.)
Lecture 25 - Concepts of stability and Routh Stability Criterion (Continued.)
Lecture 26 - The Performance of Feedback Systems
Lecture 27 - The Performance of Feedback Systems (Continued.)
Lecture 28 - The Performance of Feedback Systems (Continued.)
Lecture 29 - The Performance of Feedback Systems (Continued.)

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Lecture 30 - Compensator Design Using Root Locus Plots
Lecture 31 - Compensator Design Using Root Locus Plots (Continued.)
Lecture 32 - Compensator Design Using Root Locus Plots (Continued.)
Lecture 33 - Compensator Design Using Root Locus Plots (Continued.)
Lecture 34 - Compensator Design Using Root Locus Plots (Continued.)
Lecture 35 - The Nyquist Stability Criterion and Stability Margins
Lecture 36 - The Nyquist Stability Criterion and Stability Margins (Continued.)
Lecture 37 - The Nyquist Stability Criterion and Stability Margins (Continued.)
Lecture 38 - The Nyquist Stability Criterion and Stability Margins (Continued.)
Lecture 39 - Feedback System Performance Based on the Frequency Response
Lecture 40 - Feedback System Performance Based on the Frequency Response (Continued.)
Lecture 41 - Compensator Design Using Frequency Response Plots

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NPTEL Video Course - Electrical Engineering - Embedded Systems

Subject Co-ordinator - Prof. Santanu Chaudhary

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Embedded Systems
Lecture 2 - Embedded Hardware
Lecture 3 - PIC
Lecture 4 - PIC Peripherals On Chip
Lecture 5 - ARM Processor
Lecture 6 - More ARM Instructions
Lecture 7 - ARM
Lecture 8 - Digital Signal Processors
Lecture 9 - More on DSP Processors
Lecture 10 - System On Chip (SOC)
Lecture 11 - Memory
Lecture 12 - Memory Organization
Lecture 13 - Virtual Memory and Memory Management Unit
Lecture 14 - Bus Structure
Lecture 15 - Bus Structure - 2
Lecture 16 - Bus Structure - 3 Serial Interfaces
Lecture 17 - Serial Interfaces
Lecture 18 - Power Aware Architecture
Lecture 19 - Software for Embedded Systems
Lecture 20 - Fundamentals of Embedded Operating Systems
Lecture 21 - Scheduling Policies
Lecture 22 - Resource Management
Lecture 23 - Embedded - OS
Lecture 24 - Networked Embedded Systems - I
Lecture 25 - Networked Embedded Systems - II
Lecture 26 - Networked Embedded Systems - III
Lecture 27 - Networked Embedded Systems - IV
Lecture 28 - Designing Embedded Systems - I
Lecture 29 - Designing Embedded Systems - II

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Lecture 30 - Designing Embedded Systems- III
Lecture 31 - Embedded System Design - IV
Lecture 32 - Designing Embedded Systems - V
Lecture 33 - Platform Based Design
Lecture 34 - Compilers for Embedded Systems
Lecture 35 - Developing Embedded Systems
Lecture 36 - Building Dependable Embedded Systems
Lecture 37 - Pervasive and Ubiquitous Computing

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NPTEL Video Course - Electrical Engineering - Power System Generation, Transmission and Distribution (Encapsu

Subject Co-ordinator - Prof. D.P. Kothari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electric Energy Systems A Perspective
Lecture 2 - Structure of Power Systems
Lecture 3 - Conventional Sources of Electric Energy
Lecture 4 - Hydroelectric Power Generation
Lecture 5 - Non Conventional Energy Sources
Lecture 6 - Renewable Energy (Continued.)
Lecture 7 - Energy Storage
Lecture 8 - Deregulation
Lecture 9 - Air Pollutants
Lecture 10 - Transmission Line Parameters
Lecture 11 - Capacitance of Transmission Lines
Lecture 12 - Characteristics and Performance of Transmission Lines
Lecture 13 - Voltage Regulation (VR)
Lecture 14 - Power Flow through a Line
Lecture 15 - Methods of Voltage Control
Lecture 16 - Compensation of Transmission Lines
Lecture 17 - Compensation of Transmission Lines (Continued.)
Lecture 18 - Underground Cables
Lecture 19 - Cables (Continued.)
Lecture 20 - Insulators for Overhead Lines
Lecture 21 - HVDC
Lecture 22 - HVDC (Continued.)
Lecture 23 - Distribution Systems
Lecture 24 - Automatic Generation Control
Lecture 25 - Automatic Generation Control (Continued.)
Lecture 26 - Load Flow Studies
Lecture 27 - Load Flow Problem
Lecture 28 - Load Flow Analysis (Continued.), Gauss Siedel Method
Lecture 29 - Newton Raphson (NR), Load Flow Method

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Lecture 30 - Fast Decoupled Load Flow
Lecture 31 - Control of Voltage Profile
Lecture 32 - Optimal System Operation (Economic Operation)
Lecture 33 - Optimal Unit Commitment
Lecture 34 - Optimal Generation Scheduling
Lecture 35 - Optimal Load Flow (Continued.) and Hydro Thermal Scheduling

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NPTEL Video Course - Electrical Engineering - Power System Dynamics

Subject Co-ordinator - Dr. M.L. Kothari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Power System Stability Problem - Part-1
Lecture 2 - Introduction to Power System Stability Problem - Part-2
Lecture 3 - Introduction to Power System Stability Problem - Part-3
Lecture 4 - Solution of Switching Equation
Lecture 5 - The Equal Area Criterion for Stability - Part-1
Lecture 6 - The Equal Area Criterion for Stability - Part-2
Lecture 7 - Transient Stability Analysis of a Multi Machine System
Lecture 8 - Modeling of Synchronous Machine - Part-1
Lecture 9 - Modeling of Synchronous Machine - Part-2
Lecture 10 - Modeling of Synchronous Machine - Part-3
Lecture 11 - Modeling of Synchronous Machine - Part-4
Lecture 12 - Synchronous Machine Representation for Stability Studies - Part-1
Lecture 13 - Synchronous Machine Representation for Stability Studies - Part-2
Lecture 14 - Excitation Systems - Part-1
Lecture 15 - Excitation Systems - Part-2
Lecture 16 - Modeling of Excitation Systems - Part-1
Lecture 17 - Modeling of Excitation Systems - Part-2
Lecture 18 - Small Signal Stability of a Single Machine Infinite Bus System - Part-1
Lecture 19 - Small Signal Stability of a Single Machine Infinite Bus System - Part-2
Lecture 20 - Small Signal Stability of a Single Machine Infinite Bus System - Part-3
Lecture 21 - Small Signal Stability of a Single Machine Infinite Bus System - Part-4
Lecture 22 - Small Signal Stability of a Single Machine Infinite Bus System - Part-5
Lecture 23 - Dynamic Modeling of Steam turbines and Governors
Lecture 24 - Dynamic modeling of Hydro Turbines and Governors
Lecture 25 - Load modeling for Stability Studies
Lecture 26 - Numerical Integration Methods for Solving a Set of Ordinary Nonlinear Differential Equation
Lecture 27 - Simulation of Power System Dynamic Response
Lecture 28 - Dynamic Equivalents for Large Scale Systems - Part-1
Lecture 29 - Dynamic Equivalents for Large Scale Systems - Part-2

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Lecture 30 - Dynamic Equivalents for Large Scale Systems - Part-3
Lecture 31 - Direct Method of Transient Stability Analysis - Part-1
Lecture 32 - Direct Method of Transient Stability Analysis - Part-2
Lecture 33 - Sub Synchronous Oscillations - Part-1
Lecture 34 - Sub Synchronous Oscillations - Part-2
Lecture 35 - Voltage Stability - Part-1
Lecture 36 - Voltage Stability - Part-2
Lecture 37 - Voltage Stability - Part-3
Lecture 38 - Voltage Stability - Part-4
Lecture 39 - Methods of Improving Stability - Part-1
Lecture 40 - Methods of Improving Stability - Part-2

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NPTEL Video Course - Electrical Engineering - Analog Electronic Circuits

Subject Co-ordinator - Prof. S.C. Dutta Roy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of DC Models of Diodes & BJT's
Lecture 2 - Review of DC Models of BJT (Continued...) and FET
Lecture 3 - FET Characteristics and Models
Lecture 4 - Problem Session-1 on DC Analysis of BJT Circuits
Lecture 5 - BJT Biasing and Bias Stability
Lecture 6 - BJT Bias Stability (Continued...)
Lecture 7 - FET Biasing, Current Sources
Lecture 8 - Problem Session-2 on FET and BJT Characteristics and Biasing
Lecture 9 - Current Mirrors; BJT Small Signal Models
Lecture 10 - Small Signal Amplifiers
Lecture 11 - Mid Frequency Analysis of the CE and CB Amplifier
Lecture 12 - Problem Session-3 on Mid- Frequency Analysis of CE Amplifiers
Lecture 13 - Midband Analysis of CB and CC Amplifiers
Lecture 14 - Midband Analysis of FET Amplifiers
Lecture 15 - Problem Session-4 on Midband Analysis of Amplifiers
Lecture 16 - High Frequency Response of Small Signal Amplifiers
Lecture 17 - High Frequency Response of Small Signal Amplifiers (Continued...)
Lecture 18 - Low Frequency Response of Small Signal Amplifiers
Lecture 19 - Problem Session-5 on Frequency Response of Small Signal Amplifiers
Lecture 20 - Differential Amplifiers
Lecture 21 - Differential Amplifiers (Continued...)
Lecture 22 - Discussion on Minor-1 Problems and Differential Amplifiers (Continued...)
Lecture 23 - Problem Session-6 on Frequency Response of Small Signal Amplifiers (Continued...) and Differenti
Lecture 24 - Use of Current Mirrors in Differential Amplifiers
Lecture 25 - FET Differential Amplifiers and Introduction to Power Amplifiers
Lecture 26 - Class B, Class AB and Class A Power Amplifiers
Lecture 27 - Class A Power Amplifiers; Efficiency Considerations
Lecture 28 - Problem Session-7 on Deferential and Power Amplifiers
Lecture 29 - Introduction to Feedback Amplifiers

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Lecture 30 - Advantages of Negative Feedback Amplifiers
Lecture 31 - Analysis of Feedback Amplifiers
Lecture 32 - Analysis of the Series - Series and Other Feedback Configurations
Lecture 33 - Problem Session-8 on Feedback Amplifiers
Lecture 34 - Sinusoidal Oscillators
Lecture 35 - More on Oscillators
Lecture 36 - Solutions to Minor-2 Exam and Concluding Discussions on Oscillators
Lecture 37 - Problem Session-9 on Oscillators
Lecture 38 - Tuned (or Narrowband) Amplifiers
Lecture 39 - Widebanding Techniques
Lecture 40 - Widebanding By Using an Inductance
Lecture 41 - Problem Session-10 on Tuned Amplifiers
Lecture 42 - Widebanding by Using Compound Devices
Lecture 43 - Cascode Configuration as Wideband Amplifier
Lecture 44 - Widebanding by Local Feedback
Lecture 45 - Problem Session-11 on Minor-3 Problems & Widebanding by Compound Devices
Lecture 46 - Widebanding by Local Feedback and Feedback Cascades
Lecture 47 - Widebanding by Overall Feedback and Dual Loop Feedback
Lecture 48 - The Differential Pair and the Gilbert Cell as Wideband Amplifiers
Lecture 49 - Correction to Gilbert Cell Analysis and Operational Amplifier Imperfections
Lecture 50 - Op-Amp offsets, Compensation and Slew Rate
Lecture 51 - Op-Amp Compensation, Slew Rate and Some Problems

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NPTEL Video Course - Electrical Engineering - Digital Communication

Subject Co-ordinator - Prof. Surendra Prasad

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Digital Representation of Analog Signals, Delta Modulation
Lecture 3 - Digital Representation of Analog Signals, Pulse Code Modulation
Lecture 4 - Digital Representation of Analog Signals
Lecture 5 - Quantization Noise in Delta Modulation (Continued...) and Time Division Multiplexing
Lecture 6 - Introduction to Line Coding
Lecture 7 - Spectral Properties of Line Codes
Lecture 8 - Spectral Properties of Line Codes
Lecture 9 - Spectral Properties of Line Codes
Lecture 10 - Baseband Pulse Shaping
Lecture 11 - Baseband Pulse Shaping; Raised Cosine Family of Pulses
Lecture 12 - Partial Response Signalling
Lecture 13 - Precoding for Duobinary and Modified Duobinary Systems
Lecture 14 - Precoding for Modified Duobinary Systems (Continued...) and General Partial Response Signalling
Lecture 15 - Binary Baseband Digital Modulation Techniques
Lecture 16 - Mâ ary Baseband Digital Modulation Techniques
Lecture 17 - Passband Digital Modulations - I
Lecture 18 - Passband Digital Modulations - II
Lecture 19 - Passband Digital Modulations - III
Lecture 20 - Passband Digital Modulations - IV
Lecture 21 - Passband Modulations for Band Limited Channels
Lecture 22 - Baseband and Passband Digital Demodulations
Lecture 23 - Digital Modulation Part - II Matched Filters
Lecture 24 - Matched Filters and Coherent Demodulation-I
Lecture 25 - Coherent Demodulation for Binary Wave Form
Lecture 26 - Demodulators for Binary Waveforms (Continued...)
Lecture 27 - Performance Analysis of Binary Digital Modulations
Lecture 28 - Error Rates for Binary Signalling
Lecture 29 - Performance of Non Coherent FSK and Differential Phase Shift Keying

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Lecture 30 - Demodulation of DPSK and M\'ary Signals
Lecture 31 - Performance of M\'ary Digital Modulations
Lecture 32 - Performance of M\'ary Digital Modulations (Continued...)
Lecture 33 - Introduction to Information Theory, Part-1
Lecture 34 - Source Coding
Lecture 35 - Error Free Communication Over a Noisy Channel
Lecture 36 - The Concept of Channel Capacity
Lecture 37 - Error Correcting Codes
Lecture 38 - Error Correcting Codes (Continued...)

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NPTEL Video Course - Electrical Engineering - Introduction To Electronic Circuits

Subject Co-ordinator - Prof. S.C. Dutta Roy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course and Basic Electrical Quantity
Lecture 2 - R.L.C. Components, Energy Considerations, Sources and Circuit Laws
Lecture 3 - KCL, KVL and Network Analysis
Lecture 4 - Networks Theorems (Thevenin's Norton's)
Lecture 5 - Source Transformation; Super Position Theorem and Non-Linear One-Ports
Lecture 6 - Signal Wave Forms
Lecture 7 - Periodic Wave Forms and Elements of Amplifiers
Lecture 8 - Operational Amplifiers and Diodes
Lecture 9 - Rectifiers and Power Supplies
Lecture 10 - Wave Shaping Circuits
Lecture 11 - More on Wave Shaping Circuits and Introduction to Natural Response of Circuits
Lecture 12 - Natural Response (Continued...)
Lecture 13 - Natural Response of 2nd Order Circuit
Lecture 14 - Natural Response of 2nd Order Circuit (Continued...)
Lecture 15 - Impedance Functions, Poles, Zeros and their Applications
Lecture 16 - Natural Response and Poles and Zeros and Introduction to Forced Response
Lecture 17 - Phasors and their Applications in AC Ckts, analysis
Lecture 18 - More About Phasors and Introduction to Complete Response
Lecture 19 - Complete Response of Electrical Circuits
Lecture 20 - AC Circuit Analysis
Lecture 21 - Filter Circuits and Resonance
Lecture 22 - Resonance (Continued...)
Lecture 23 - General Network Analysis
Lecture 24 - Two-Port Networks
Lecture 25 - Semiconductor Physics
Lecture 26 - Semiconductor Physics (Continued...)
Lecture 27 - More About Diodes Including Zener Diodes
Lecture 28 - Bipolar Junction Transistors
Lecture 29 - Transistors Characteristics and Biasing

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Lecture 30 - BJT Biasing and Introduction to Power Amplifiers
Lecture 31 - BJT Power Amplifiers
Lecture 32 - Power Amplifier
Lecture 33 - Power Amplifiers (Continued...) and an Introduction to Small Signal Modelling of BJT
Lecture 34 - Small Signal Model and Small Signal Amplifiers
Lecture 35 - Small Signal Amplifiers (Continued...)
Lecture 36 - Small Signal Amplifier (Continued...)
Lecture 37 - Small Signal Amplifiers (Continued...)
Lecture 38 - Negative Feedback
Lecture 39 - Digital Circuits
Lecture 40 - Digital Circuits (Continued...)

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NPTEL Video Course - Electrical Engineering - NOC:Analog Electronic Circuit

Subject Co-ordinator - Dr. Shouribrata Chatterjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Analog Circuits Introduction to the Diode
Lecture 2 - Diodes, Introduction to The Transistor
Lecture 3 - MOS Device, Characteristics
Lecture 4 - DC operating point
Lecture 5 - DC operating point, amplifier design
Lecture 6 - Common source amplifier, small signal analysis
Lecture 7 - Common gate, common drain
Lecture 8 - Common gate circuit
Lecture 9 - Source degenerated amplifier
Lecture 10 - Swing limits
Lecture 11 - Swing limits (Continued...), multi transistor amplifiers
Lecture 12 - Multi-transistor amplifiers
Lecture 13 - Introduction to current sources
Lecture 14 - Current sources/mirrors (Continued...)
Lecture 15 - Current sources, biasing
Lecture 16 - Differential circuits
Lecture 17 - Differential amplifiers-I
Lecture 18 - Differential amplifiers-II
Lecture 19 - Differential amplifiers-III
Lecture 20 - Self biased active load diff. amp
Lecture 21 - Diff. Cascode amplifier, two stage amplifiers
Lecture 22 - Two stage diff. amps, op-amps
Lecture 23 - Op-amps, OTAs
Lecture 24 - Circuits with op-amps
Lecture 25 - Capacitance in MOS devices
Lecture 26 - Common source, drain, gate-revisited
Lecture 27 - Common gate, common drain with capacitances
Lecture 28 - Cascode, cascade-revisit with capacitance
Lecture 29 - Cascade amplifier (with capacitance)

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Lecture 30 - Diversion
Lecture 31 - Diversion Continued
Lecture 32 - Compensation
Lecture 33 - Op-amp Design with Compensation
Lecture 34 - Unity Gain Bandwidth
Lecture 35 - Power Amplification
Lecture 36 - Power Amplifiers-2
Lecture 37 - Power Amplifiers- Class A,B,AB,C ClassD
Lecture 38 - Class D Amplifiers, Push-pull Amplifiers
Lecture 39 - Introduction to Voltage Regulators
Lecture 40 - Voltage Regulators- line, load; Conclusion Regulation

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NPTEL Video Course - Electrical Engineering - NOC:Nonlinear and Adaptive Control

Subject Co-ordinator - Prof. Shubhendu Bhasin

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Preliminaries
Lecture 3 - Model Reference Adaptive Control - Part 1
Lecture 4 - Model Reference Adaptive Control - Part 2
Lecture 5 - Model Reference Adaptive Control - Part 3
Lecture 6 - Adaptive Command Tracking
Lecture 7 - Robust Model Reference Adaptive Control - Part 1
Lecture 8 - Robust Model Reference Adaptive Control - Part 2
Lecture 9 - Robust Model Reference Adaptive Control - Part 3
Lecture 10 - Robust Model Reference Adaptive Control - Part 4

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NPTEL Video Course - Electrical Engineering - NOC:Information Theory, Coding and Cryptography

Subject Co-ordinator - Prof. Ranjan Bose

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Information Theory
Lecture 2 - Entropy, Mutual Information, Conditional and Joint Entropy
Lecture 3 - Measures for Continuous, Random Variable, Relative Entropy
Lecture 4 - Variable Length Codes, Prefix Codes
Lecture 5 - Source Coding Theorem
Lecture 6 - various source coding Techniques
Lecture 7 - Optimum Quantizer, Practical Application of Source Coding
Lecture 8 - Introduction to Super Information
Lecture 9 - Channel Models and Channel Capacity
Lecture 10 - Noisy Channel Coding Theorem
Lecture 11 - Gaussian Channel and Information Capacity Theorem
Lecture 12 - Capacity of MIMO Channels
Lecture 13 - Introduction to Error Control Coding
Lecture 14 - Introduction to Galois Field
Lecture 15 - Equivalent Codes, Generator Matrix and Parity Check Matrix
Lecture 16 - Systematic Codes, Error Detections and Correction
Lecture 17 - Erasure and Errors, Standard Array and Syndrome Decoding
Lecture 18 - Probability of Error, Coding Gain and Hamming Bound
Lecture 19 - Hamming Codes, LDPC Codes and MDS Codes
Lecture 20 - Introduction to Cyclic Codes
Lecture 21 - Generator Polynomial, Syndrome Polynomial and Matrix Representation
Lecture 22 - Fire Code, Golay Code, CRC Codes and Circuit Implementation of Cyclic Codes
Lecture 23 - Introduction to BCH Codes
Lecture 24 - Multiple Error Correcting BCH Codes, Decoding of BCH Codes
Lecture 25 - Introduction to Reed Solomon (RS) Codes
Lecture 26 - Introduction to Convolutional Codes
Lecture 27 - Trellis Codes
Lecture 28 - Vitrebi Decoding and Known good Convolutional Codes
Lecture 29 - Introduction to Turbo Codes

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Lecture 30 - Introduction to Trellis Coded Modulation (TCM)
Lecture 31 - Ungerboek's Design Rules and Performance Evaluation of TCM Schemes
Lecture 32 - TCM for Fading Channel and Space Time Trellis Codes (STTC)
Lecture 33 - Introduction to Space Time Block Codes (STBC)
Lecture 34 - Space Time Codes
Lecture 35 - Space Time Codes (Continued...)
Lecture 36 - Introduction to Cryptography
Lecture 37 - Some Well-Known Algorithms
Lecture 38 - Introduction to Physical Layer Security
Lecture 39 - Secrecy Outage Capacity, Secrecy Outage Probability, Cooperative Jamming

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NPTEL Video Course - Electrical Engineering - Engineering Electromagnetics

Subject Co-ordinator - Prof. Sheel Aditya

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Transmission Lines
Lecture 3 - Transmission Lines
Lecture 4 - Transmission Lines
Lecture 5 - Transmission Lines
Lecture 6 - Transmission Lines
Lecture 7 - Transmission Lines
Lecture 8 - Transmission Lines
Lecture 9 - Transmission Lines
Lecture 10 - Transmission Lines
Lecture 11 - Transmission Lines
Lecture 12 - Wave Propagation
Lecture 13 - Wave Propagation (Continued...)
Lecture 14 - Wave Propagation
Lecture 15 - Wave Propagation
Lecture 16 - Wave Propagation
Lecture 17 - Wave Propagation
Lecture 18 - Reflection and Refraction of waves
Lecture 19 - Reflection and Refraction of waves (Continued...)
Lecture 20 - Reflection and Refraction of waves (Continued...) - 1
Lecture 21 - Reflection and Refraction of waves (Continued...); The Plane slab
Lecture 22 - Reflection and Refraction of waves (Continued...); Transmission Line Analogy for Planes Waves
Lecture 23 - Wave Guides
Lecture 24 - Wave Guides (Continued...) Parallel plane Guide,Transverse Electric Waves,Field Distribution,Sup
Lecture 25 - Wave Guides (Continued...)
Lecture 26 - Wave Guides (Continued...) Parallel plane Guide,Characteristics of TE and Tm Waves,TEM Waves,Wav
Lecture 27 - Wave Guides (Continued...) - 1
Lecture 28 - Wave Guides (Continued...) - 2
Lecture 29 - Wave Guides (Continued...) Rectangular Wave Guides

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Lecture 30 - Wave Guides (Continued...)
Lecture 31 - Wave Guides (Continued...) Rectangular Wave Guides - 1
Lecture 32 - Resonators General Properties
Lecture 33 - Resonators (Continued...) Transmission Line Resonators
Lecture 34 - Resonators (Continued...) Wave Guide Resonators
Lecture 35 - Radiation
Lecture 36 - Radiation (Continued...)
Lecture 37 - Radiation (Continued...) - 1
Lecture 38 - Radiation (Continued...) - 2
Lecture 39 - Radiation (Continued...) Monopole Antennas half Wave Dipole Antenna
Lecture 40 - Radiation (Continued...)
Lecture 41 - Radiation (Continued...) 2 - Element Arrays,Yagi-Uda Array

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NPTEL Video Course - Electrical Engineering - NOC:Principles of Digital Communications (2018)

Subject Co-ordinator - Prof. Abhishek Dixit

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Signal Spaces
Lecture 3 - Inner Product and Orthogonal Expansion
Lecture 4 - Signal Spaces
Lecture 5 - Signal Spaces
Lecture 6 - Signal Spaces
Lecture 7 - Random Variables and Random Processes
Lecture 8 - Random Variables and Random Processes
Lecture 9 - Random Variables and Random Processes
Lecture 10 - Random Variables and Random Processes
Lecture 11 - Random Variables and Random Processes
Lecture 12 - Random Variables and Random Processes
Lecture 13 - Random Variables and Random Processes
Lecture 14 - Random Variables and Random Processes
Lecture 15 - Random Variables and Random Processes
Lecture 16 - Random Variables and Random Processes
Lecture 17 - Random Variables and Random Processes
Lecture 18 - Waveform Coding
Lecture 19 - Modulation
Lecture 20 - Modulation
Lecture 21 - Modulation
Lecture 22 - Modulation
Lecture 23 - Modulation
Lecture 24 - Modulation
Lecture 25 - Modulation
Lecture 26 - Modulation
Lecture 27 - Modulation
Lecture 28 - Modulation
Lecture 29 - Modulation

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Lecture 30 - Detection
Lecture 31 - Detection
Lecture 32 - Detection
Lecture 33 - Detection
Lecture 34 - Detection
Lecture 35 - Detection
Lecture 36 - Detection
Lecture 37 - Detection
Lecture 38 - Detection

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NPTEL Video Course - Electrical Engineering - NOC:Electric Vehicles - Part 1

Subject Co-ordinator - Prof. Amit Jain

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro EV Historical Background
Lecture 2 - Intro EV Benefits of Using EVs
Lecture 3 - Intro EV Overview of types of EVs and its Challenges
Lecture 4 - Intro EV Motor Drive Technologies
Lecture 5 - Intro EV Energy Source Technologies
Lecture 6 - Intro EV Battery Charging Technologies
Lecture 7 - Intro EV Vehicle to Grid
Lecture 8 - Intro EV Subsystems and Configurations
Lecture 9 - Intro HEV Subsystems and Configurations
Lecture 10 - Intro HEV Subsystems and Modes of Operation
Lecture 11 - Vehicle Dynamics intro and tractive effort
Lecture 12 - Vehicle Dynamics Simulation and dynamic equation
Lecture 13 - Vehicle Dynamics Simulation dynamic equation constant Fte
Lecture 14 - Vehicle Dynamics dynamic equation variable Fte
Lecture 15 - Vehicle Dynamics simulation dynamic equation variable Fte
Lecture 16 - Vehicle Dynamics Modelling and simulation in Simulink
Lecture 17 - Summary Electric Vehicles - Part 1 Course
Lecture 18 - Basics of DC Motor Drive
Lecture 19 - Realization of DC Chopper
Lecture 20 - Open Loop Operation of Chopper Fed DC Motor Drive
Lecture 21 - Review of Control Theory
Lecture 22 - Modeling and Current Controller Design for Separately Excited DC Motor Drive
Lecture 23 - Speed Controller Design and Performance Evaluation of DC Motor Drive
Lecture 24 - Fundamentals of Three Phase Induction Motor
Lecture 25 - Equivalent Circuit and Torque-Speed Characteristics of Induction Motor
Lecture 26 - Starting and Speed Control of Induction Motor
Lecture 27 - Realisation of DC to AC Power Converter
Lecture 28 - Impact of Non-Sinusoidal Voltage on Induction Motor
Lecture 29 - Selective Harmonic Elimination and Optimal Pulse Width Modulation Techniques

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Lecture 30 - Switching Energy Losses and Sine-Triangle PWM
Lecture 31 - Analysis of Sine-Triangle PWM
Lecture 32 - Simulation Studies on Open Loop Induction Motor Drive
Lecture 33 - Modeling of Crylindrical Rotor Machine
Lecture 34 - Modeling of Surface Mounted PMSM Drive
Lecture 35 - Sensored Vector Control of PMSM Drive
Lecture 36 - Dynamic Modeling of Squirrel Cage Induction Machine - Part 1
Lecture 37 - Dynamic Modeling of Squirrel Cage Induction Machine - Part 2
Lecture 38 - Controller Design for RFO Vector Controlled IM Drive
Lecture 39 - Estimation of Rotor Flux Vector and Mechanical Speed
Lecture 40 - Case Study - Indian Railway Propulsion System
Lecture 41 - Simulation Exercise - PMSM and IM Drives
Lecture 42 - Basics of Electromagnetic Circuit
Lecture 43 - SRM and BLDC Motor Drives - Part 1
Lecture 44 - SRM and BLDC Motor Drives - Part 2

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NPTEL Video Course - Electrical Engineering - NOC:Power Electronics

Subject Co-ordinator - Prof. G.Bhuvaneshwari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Power Electronics
Lecture 2 - Power Devices
Lecture 3 - Power Devices
Lecture 4 - Power Devices
Lecture 5 - Single-phase Uncontrolled Rectifiers
Lecture 6 - Single-phase Controlled Rectifiers - I
Lecture 7 - Single-phase Controlled Rectifiers - II
Lecture 8 - Three Phase Rectifiers - I
Lecture 9 - Numericals on devices and Single-phase Rectifiers
Lecture 10 - Three Phase Rectifiers - II
Lecture 11 - Dual Converter and Communication Overlap
Lecture 12 - Communication Overlap - II and AC-AC Converter-Introduction
Lecture 13 - Single-Phase and Three-Phase AC Voltage Controllers
Lecture 14 - Three-Phase AC Voltage Controllers and Cycloconverters
Lecture 15 - Non-Isolated DC-DC Converters - I
Lecture 16 - Non-Isolated DC-DC Converters - II
Lecture 17 - Isolated DC-DC Converters - I
Lecture 18 - Isolated DC-DC Converters - II and Cuk Converters
Lecture 19 - Voltage Source Inverters
Lecture 20 - VSI PWM Techniques - I
Lecture 21 - VSI PWM Techniques - II
Lecture 22 - SPWM and SVM Technique
Lecture 23 - Current Source Inverter
Lecture 24 - Power Electronics Applications

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NPTEL Video Course - Electrical Engineering - NOC:Electrical Machines

Subject Co-ordinator - Prof. G.Bhuvaneshwari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Electrical Machines - I
Lecture 2 - Single-phase and Three-phase AC Circuits, Magnetic circuits
Lecture 3 - Magnetic Circuit - II
Lecture 4 - Magnetic Circuit - III
Lecture 5 - Transformers - Introduction
Lecture 6 - Transformers - Amp-Turn Balance, Ideal and practical transformers
Lecture 7 - Transformer Equivalent circuit and Reducing leakage
Lecture 8 - Transformer equivalent circuit parameter determination
Lecture 9 - Transformers - Voltage regulation and efficiency
Lecture 10 - Auto-transformers
Lecture 11 - PU notation and Intoduction to Instrument transformers
Lecture 12 - Instrument Transformers and All Day Efficiency
Lecture 13 - Three Phase Transformers - I
Lecture 14 - Three Phase Transformers - II
Lecture 15 - Electromechanical Energy Conversion - I
Lecture 16 - Electromechanical Energy Conversion - II
Lecture 17 - Electromechanical Energy Conversion - III
Lecture 18 - DC Machines-Introduction, Constructional Features
Lecture 19 - DC Machines - EMF and Torque Equations and Generator Operation
Lecture 20 - DC Machines - OCC and Load Charactristics Classification
Lecture 21 - DC Machines - Armature Reaction
Lecture 22 - DC Machines - Voltage Build-up and Load Characteristics
Lecture 23 - DC Generator Characteristics and Introduction to DC Motors
Lecture 24 - DC Motors
Lecture 25 - DC Motor
Lecture 26 - DC Motor
Lecture 27 - DC Machine
Lecture 28 - DC Machine
Lecture 29 - 3 Phase Induction Machine

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Lecture 30 - 3 Phase Induction Machine
Lecture 31 - 3 Phase Induction Machine
Lecture 32 - Testing of Induction Motor
Lecture 33 - 3 Phase Induction Machine
Lecture 34 - Synchronous Machines
Lecture 35 - Synchronous Machines
Lecture 36 - Numerical Session
Lecture 37 - Synchronization of Alternators
Lecture 38 - Synchronous Machines
Lecture 39 - Synchronous Machines
Lecture 40 - Synchronous Machines
Lecture 41 - Single Phase Induction Motors

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NPTEL Video Course - Electrical Engineering - Special Electromechanical Systems

Subject Co-ordinator - Prof. S.S. Murthy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Special Electromechanical Systems (Introduction)
Lecture 2 - Classification of Machines
Lecture 3 - Single and Two-Phase Motors
Lecture 4 - Single-Phase Induction Motors-Analysis
Lecture 5 - Starting of Single-Phase Induction Motors
Lecture 6 - Single-Phase Induction Motors Analysis
Lecture 7 - Induction Motors Analysis by Symmetrical Components
Lecture 8 - Modelling of 1-Phase Induction Motor (One and Two Windings)
Lecture 9 - Asymmetrical Induction Motor Generalized Rotating Field Theory
Lecture 10 - Generalized Rotating Field Theory (Continued...)
Lecture 11 - Generalized Rotating Field Theory (Continued...)
Lecture 12 - Generalized Rotating Field Theory (Continued...)
Lecture 13 - Analysis of Asymmetrical Machine by Generalized Rotating Field Theory
Lecture 14 - Analysis of Asymmetrical Machine
Lecture 15 - Analysis of Asymmetrical Induction Machine
Lecture 16 - Generalised Rotating-Field Theory of Wound Rotor Ind. Machine Having Asymmetry in Stator and Rot
Lecture 17 - Generalised Rotating-Field Theory of Wound Rotor Ind. Machine Having Asymmetry in Stator and Rot
Lecture 18 - Testing of Small Electrical Machines
Lecture 19 - Testing of 1-Phase Induction Motors
Lecture 20 - Variable Reluctance (VR) Motors
Lecture 21 - Switched Reluctance Motor (Continued...)
Lecture 22 - Switched Reluctance Motor (Continued...)
Lecture 23 - Switched Reluctance Motor (Continued...)
Lecture 24 - Stepper Motors
Lecture 25 - Stepper Motors (Continued...)
Lecture 26 - Induction Generators
Lecture 27 - Induction Generators (Continued...)
Lecture 28 - Doubly Fed Induction Generators
Lecture 29 - Self Excited Induction Generators

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Lecture 30 - Self Excited Induction Generators (Continued...)
Lecture 31 - Permanent Magnet Machines
Lecture 32 - Squareware Permanent Magnet Brushless Motor Drive
Lecture 33 - Sine Wave Permanent Magnet Brushless Motor Drives
Lecture 34 - Permanent Magnet Synchronous Motors

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NPTEL Video Course - Electrical Engineering - NOC:High Power Multilevel Converters - Analysis, Design and Ope

Subject Co-ordinator - Prof. Anand Rup

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Understanding of Converter (Introduction to Power Converters)
Lecture 2 - Basic Understanding of Converter (Half Bridge and Full Bridge Circuit Operation)
Lecture 3 - Basic Understanding of Converter (Sinusoidal Pulse width Modulation and Three Phase Circuit)
Lecture 4 - Basic Understanding of Converter (Harmonics in Sinusoidal PWM)
Lecture 5 - Third harmonic addition in Sine PWM
Lecture 6 - Introduction to Space Vectors
Lecture 7 - Space Vector PWM - Timing Calculation
Lecture 8 - Space Vector PWM - Switching Sequence
Lecture 9 - Space Vector PWM - Using Carriers
Lecture 10 - Basic Introduction to Power Devices
Lecture 11 - Introduction to Multilevel Converters
Lecture 12 - Cascaded H-bridge Multilevel Converters
Lecture 13 - Output Voltage Waveform Synthesis in CHB Converter and Basic of Asymmetrical CHB Converters
Lecture 14 - Cascaded H-Bridge Converters
Lecture 15 - Cascaded H-Bridge Converters
Lecture 16 - Fault Tolerant Operation of Cascaded H-Bridge Converter - Part I
Lecture 17 - Fault Tolerant Operation of Cascaded H-Bridge Converter - Part II
Lecture 18 - Modular Multilevel Converter - Topology and Operation
Lecture 19 - Modular Multilevel Converter - Arm and Cell Voltage Ratings
Lecture 20 - Modular Multilevel Converter - Arm Currents
Lecture 21 - Modular Multilevel Converter - Arm Energy Balancing
Lecture 22 - Modular Multilevel Converter - Different Circuit Topologies
Lecture 23 - Modular Multilevel Converter - PWM Technique and Capacitor Voltage Balancing
Lecture 24 - Modular Multilevel Converter - Fault Tolerant Operation and Commercial Production
Lecture 25 - Design of Components in MMC
Lecture 26 - Neutral Point Clamped Converter - Circuit Topology - Part I
Lecture 27 - Neutral Point Clamped Converter - Circuit Topology - Part II
Lecture 28 - Neutral Point Clamped Converter - Space Vector Diagram
Lecture 29 - Neutral Point Clamped Converter - Space Vector PWM

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Lecture 30 - NPC - Sinusoidal PWM and Space Vector PWM using Single Carrier Strategy
Lecture 31 - Neutral Point Clamped Converter - Mid-point Voltage Fluctuations
Lecture 32 - Neutral Point Clamped Converter - Capacitor Voltage Balancing
Lecture 33 - Neutral Point Clamped Converter - Another Strategy of Capacitor Voltage Balancing
Lecture 34 - Other Topologies of NPC Converters - Higher Level NPC, TNPC and Active NPC
Lecture 35 - Multipulse Transformer - Part I
Lecture 36 - Multipulse Transformer - Part II
Lecture 37 - A Case Study on MMC and CHB
Lecture 38 - Basics of Gate Driver Circuits
Lecture 39 - Gate Driver Circuits - Turn-on and Turn-off Process
Lecture 40 - Gate Driver Circuits - Features of Gate Drivers and Basics of Bootstrap Functionality
Lecture 41 - Condition Monitoring of Converters
Lecture 42 - Other Converter Topologies
Lecture 43 - Summary of the Course

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Embedded System Design

Subject Co-ordinator - Prof. Badri N Subudhi, Prof.Dhananjay V. Gadre

Co-ordinating Institute - IIT - Jammu

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction continued with Project demos
Lecture 3 - Modular Approach to ESD
Lecture 4 - Modular Approach to ESD (Continued...)
Lecture 5 - Salient Features of Modern Microcontrollers
Lecture 6 - Salient Features of Modern Microcontrollers (Continued...)
Lecture 7 - Elements of Microcontroller Ecosystem
Lecture 8 - Elements of Microcontroller Ecosystem (Continued...)
Lecture 9 - Power Supply for Embedded Systems
Lecture 10 - Power Supply for Embedded Systems (Continued...)
Lecture 11 - Introduction to MSP430
Lecture 12 - MSP430 Architecture
Lecture 13 - MSP430 Architecture- (Continued...) And Introduction to Lunchbox
Lecture 14 - Programming Methods for MSP430
Lecture 15 - Physical Interfacing - 1
Lecture 16 - Physical Interfacing - 2
Lecture 17 - Physical Interfacing - 3
Lecture 18 - Physical Interfacing - 4
Lecture 19 - Physical Interfacing - 5
Lecture 20 - Physical Interfacing - 6
Lecture 21 - GIT, CCS Installation and Embedded C
Lecture 22 - MSP430 Digital I/O
Lecture 23 - MSP430 Digital I/O
Lecture 24 - MSP430 Clock System and Reset
Lecture 25 - Interrupts in MSP430
Lecture 26 - Interrupts in MSP430 (Continued...)
Lecture 27 - Interfacing Seven Segment Displays with MSP430; Low Power Modes in MSP430
Lecture 28 - Interfacing Liquid Crystal Displays (LCD)
Lecture 29 - MSP430 Timer Module

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Lecture 30 - Pulse Width Modulation, PWM using Timer Capture
Lecture 31 - Analog to Digital Converter in the MSP430
Lecture 32 - ADC and DAC using R2R Ladder and Random number generation using LFSR
Lecture 33 - Serial Communication Protocols, USCI Module in MSP430
Lecture 34 - MSP430 Timer in Capture Mode
Lecture 35 - Coding Ninja
Lecture 36 - Building an Electronics Project
Lecture 37 - Circuit Prototyping Techniques
Lecture 38 - Single Purpose Computers
Lecture 39 - Single Purpose Computers (Continued...)
Lecture 40 - Recap of Course Coverage and Project Demonstration from Concept to Final

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NPTEL Video Course - Electrical Engineering - NOC:Power Quality

Subject Co-ordinator - Prof. Bhim Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Power Quality - An Introduction
Lecture 2 - Power Quality Standards and Monitoring
Lecture 3 - Power Quality Standards and Monitoring (Continued...)
Lecture 4 - Passive Shunt and Series Compensations
Lecture 5 - Passive Shunt and Series Compensations (Continued...)
Lecture 6 - Passive Shunt and Series Compensations (Continued...)
Lecture 7 - Active Shunt Compensation
Lecture 8 - Active Shunt Compensation (Continued...)
Lecture 9 - Active Shunt Compensation (Continued...)
Lecture 10 - Active Series Compensation
Lecture 11 - Active Series Compensation (Continued...)
Lecture 12 - Unified Power Quality Compensators
Lecture 13 - Unified Power Quality Compensators (Continued...)
Lecture 14 - Unified Power Quality Compensators (Continued...)
Lecture 15 - Loads Which Cause Power Quality Problems
Lecture 16 - Loads Which Cause Power Quality Problems (Continued...)
Lecture 17 - Passive Power Filters
Lecture 18 - Passive Power Filters (Continued...)
Lecture 19 - Passive Power Filters (Continued...)
Lecture 20 - Shunt Active Power Filters
Lecture 21 - Shunt Active Power Filters (Continued...)
Lecture 22 - Shunt Active Power Filters (Continued...)
Lecture 23 - Active Series Power Filters
Lecture 24 - Active Series Power Filters (Continued...)
Lecture 25 - Active Series Power Filters (Continued...)
Lecture 26 - Hybrid Power Filters
Lecture 27 - Hybrid Power Filters (Continued...)
Lecture 28 - Hybrid Power Filters (Continued...)
Lecture 29 - AC-DC Converters That Cause Power Quality

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Lecture 30 - Improved Power Quality Converters - AC-DC Boost Converters
Lecture 31 - Improved Power Quality Converters - AC-DC Boost Converters (Continued...)
Lecture 32 - Improved Power Quality Converters - AC-DC Buck Converters
Lecture 33 - Improved Power Quality Converters - AC-DC Buck-Boost Converters
Lecture 34 - Improved Power Quality Converters - AC-DC Buck-Boost Converters (Continued...)
Lecture 35 - Improved Power Quality Converters - AC-DC Buck-Boost Converters (Continued...)
Lecture 36 - Three Phase AC-DC Improved Power Quality Converters
Lecture 37 - Multipulse Converters
Lecture 38 - Multipulse Converters (Continued...)
Lecture 39 - Multipulse Converters (Continued...)
Lecture 40 - Power Quality Improvement in Solar Energy Conversion System
Lecture 41 - Power Quality Improvement in Solar Energy Conversion System (Continued...)
Lecture 42 - Power Quality Improvement in Wind Energy Conversion System
Lecture 43 - Power Quality Improvement in Diesel Generator Set Based Power Supply System
Lecture 44 - Power Quality Improvement in Diesel Generator Set Based Power Supply System (Continued...)
Lecture 45 - Power Quality Improvement in Distributed Generation Sources Based Microgrids

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Electrical Engineering

Subject Co-ordinator - Prof. Bhim Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
Lecture 41
Lecture 42

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NPTEL Video Course - Electrical Engineering - NOC:Transducers for Instrumentation

Subject Co-ordinator - Ankur Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36

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NPTEL Video Course - Electrical Engineering - NOC:Computer-Aided Design of Electrical Machines

Subject Co-ordinator - Prof. Bhim Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline and Introduction
Lecture 2 - Fundamental - I
Lecture 3 - Equivalent Circuit Approach to Design
Lecture 4 - Transformer Design - I
Lecture 5 - Transformer Design - II
Lecture 6 - Transformer Design - III
Lecture 7 - Transformer Design - IV
Lecture 8 - Windings in Electrical Machines
Lecture 9 - Design of DC Machine - I
Lecture 10 - Design of DC Machine - II
Lecture 11 - Design of DC Machine - III
Lecture 12 - Design of Three-Phase Induction Motors - I
Lecture 13 - Design of Three-Phase Induction Motors - II
Lecture 14 - Design of Three-Phase Induction Motors - III
Lecture 15 - Design of Three-Phase Induction Motors - IV
Lecture 16 - Design of Single-Phase Induction Machine - I
Lecture 17 - Design of Single-Phase Induction Machine - II
Lecture 18 - Design of Single-Phase Induction Machine - III
Lecture 19 - Design of Three-Phase Synchronous Machines - I
Lecture 20 - Design of Three-Phase Synchronous Machines - II
Lecture 21 - Design of Three-Phase Synchronous Machines - III
Lecture 22 - Design of Three-Phase Synchronous Machines - IV
Lecture 23 - Design of Synchronous Reluctance Machines - I
Lecture 24 - Design of Synchronous Reluctance Machines - II
Lecture 25 - Design of Synchronous Reluctance Machines - III
Lecture 26 - Design of Brushless PM Machines - I
Lecture 27 - Design of Brushless PM Machines - II
Lecture 28 - Design of Brushless PM Machines - III
Lecture 29 - Design of Brushless PM Machines - IV

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Lecture 30 - Design of Brushless PM Machines - V
Lecture 31 - Design of Switched Reluctance Machines - I
Lecture 32 - Design of Switched Reluctance Machines - II
Lecture 33 - Design of Switched Reluctance Machines - III
Lecture 34 - Design of Stepper Machines - I
Lecture 35 - Design of Stepper Machines - II
Lecture 36 - Design of Axial Flux Machines - I
Lecture 37 - Design of Axial Flux Machines - II
Lecture 38 - Computer Aided Design and Analysis Method - I
Lecture 39 - Computer Aided Design and Analysis Method - II
Lecture 40 - Case Studies and Tutorials - I and II
Lecture 41 - Tutorial-III : Determination of Transformer Operating Point
Lecture 42 - Tutorial-IV

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NPTEL Video Course - Electrical Engineering - NOC:Electronic Systems Design: Hands-on Circuits and PCB Desigr

Subject Co-ordinator - Prof. Ankur Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Passive Circuit Elements: R, L and C
Lecture 3 - Resistor color coding, Surface mount capacitors and inductors on PCBs
Lecture 4 - Active Circuit Elements: MOSFET, BJTs
Lecture 5 - Network Analysis: Kirchoff's Laws
Lecture 6 - Network Theorems: Thevenin, Norton, Maximum Power Transfer etc
Lecture 7 - Circuit Simulations using SPICE : Operating point analysis
Lecture 8 - DC Simulations and Importing Third-Party Models
Lecture 9 - Small-Signal Simulations, Transient Simulations
Lecture 10 - PCB Substrate and layers
Lecture 11 - Interconnect design
Lecture 12 - CMOS inverter basics
Lecture 13 - CMOS inverter design
Lecture 14 - Combinational Circuit Design - Part 1
Lecture 15 - Combinational Circuit Design - Part 2
Lecture 16 - Dynamic Logic Circuit Design
Lecture 17 - Sequential Logic Circuit Design
Lecture 18 - Digital Design : Boolean Algebra
Lecture 19 - Logic Families, Component Datasheets
Lecture 20 - TTL/CMOS logic Interfacing Constraints
Lecture 21 - Hardware Description Languages : VHDL and Verilog
Lecture 22 - Introduction to Verilog Simulations Software
Lecture 23 - Combinational Circuit Simulation using iVerilog
Lecture 24 - Adders, Multiplexer Simulation using iVerilog
Lecture 25 - High-Speed PCBs
Lecture 26 - Signal Integrity in PCBs
Lecture 27 - Signal Cross-Talk, Skews and Jitter in PCBs
Lecture 28 - KiCad Software Workflow
Lecture 29 - KiCad Design Modules

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Lecture 30 - KiCad Schematic Design Steps
Lecture 31 - KiCad PCB Design Steps
Lecture 32 - KiCad Custom Symbol and Footprints Creation
Lecture 33 - KiCad Example : PCB design using OpAmp IC
Lecture 34 - KiCad Example : PCB design using 555 Timer IC
Lecture 35 - RF PCB Design Guidelines
Lecture 36 - RF PCB Example

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NPTEL Video Course - Electrical Engineering - NOC:Advance Power Electronics

Subject Co-ordinator - Prof. Bhim Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Power Semiconductor Devices
Lecture 3 - Power Module and Gate Circuits
Lecture 4 - Thermal Design and DSP Application
Lecture 5 - Choppers
Lecture 6 - Non-Isolated DC-DC Converters
Lecture 7 - Isolated DC-DC Converter
Lecture 8 - Switch Mode Power Supplies
Lecture 9 - AC-DC Converters
Lecture 10 - Three-Phase AC-DC Converter
Lecture 11 - Lighting and Welding Systems
Lecture 12 - EV Charger Types, Design and various Topologies
Lecture 13 - Power Quality
Lecture 14 - Power Quality Definitions
Lecture 15 - Introduction to High Voltage DC (HVDC) Transmission
Lecture 16 - Harmonics Generation, Analysis and Elimination in HVDC
Lecture 17 - Multi-pulse and Multilevel VSC Based Flexible HVDC System
Lecture 18 - Single Phase Voltage Source Inverter
Lecture 19 - Three Phase Voltage Source Inverter
Lecture 20 - Current Source Inverter
Lecture 21 - Multi-Pulse Converters
Lecture 22 - Multi-Pulse Converters (Continued...)
Lecture 23 - Multilevel Inverters
Lecture 24 - Modular Multilevel Converters
Lecture 25 - Introduction to Inductor Motor Drive and their Power Quality Improvement
Lecture 26 - Power Quality Improvement in Multi-Pulse Converter Fed Multilevel Inverter Based Induction Motor
Lecture 27 - Introduction and Operating Principle of Resonant Converter
Lecture 28 - Resonant Inverters
Lecture 29 - Class E Resonant Converters and Zero Voltage Switching Converters

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Lecture 30 - Zero Current Switching Converters
Lecture 31 - LLC, Multi-Resonant and Phase Controlled Resonant Converters
Lecture 32 - Permanent Magnet Synchronous Motor Drive
Lecture 33 - Permanent Magnet Brushless DC Motor Drive
Lecture 34 - Switched Reluctance Motor Drive
Lecture 35 - Synchronous Reluctance (SyR) Motor Drive
Lecture 36 - Synchronous Motor (SM) Drive
Lecture 37 - Vector Control of Synchronous Motor (SM) Drives

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NPTEL Video Course - Electrical Engineering - NOC:Line Commutated and PWM Rectifiers

Subject Co-ordinator - Prof. Anandarup Das

Co-ordinating Institute - IIT Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Uncontrolled diode rectifiers and effect of source inductance in rectifiers
Lecture 2 - Diode rectifier circuits with C and LC filter
Lecture 3 - Three-phase uncontrolled diode rectifier
Lecture 4 - Single-phase thyristor controlled rectifier
Lecture 5 - Three-phase controlled thyristor rectifier
Lecture 6 - Harmonic analysis of rectifier input current
Lecture 7 - Multipulse Rectifiers
Lecture 8 - Basics of VSC
Lecture 9 - Steady state operation of VSC
Lecture 10 - VSC Space Vector PWM
Lecture 11 - VSC Clarke and Park transformation
Lecture 12 - Hysteresis PWM Switching
Lecture 13 - DQ Modeling of VSC - Part 1
Lecture 14 - DQ Modeling of VSC - Part 2
Lecture 15 - DQ Modeling of VSC - Part 3
Lecture 16 - Per unit model of grid connected VSC and Controller Design
Lecture 17 - Matlab simulation of grid connected VSC
Lecture 18 - Boost PFC analysis
Lecture 19 - Boost PFC analysis (Continued...)
Lecture 20 - Boost PFC control
Lecture 21 - Flyback DC-DC converter
Lecture 22 - Flyback DC-DC converter (Continued...)
Lecture 23 - AC-DC DCM Flyback Converter
Lecture 24 - Bridgeless PFC
Lecture 25 - NPC Rectifier - Part 1
Lecture 26 - NPC Rectifier - Part 1
Lecture 27 - Vienna Rectifier
Lecture 28 - AC-DC Converter for EV Charger
Lecture 29 - Dual Active Bridge Converter

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Lecture 30 - Battery Storage Systems and Battery Management Systems
Lecture 31 - Rectifiers for Electrolysers
Lecture 32 - Conclusion

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NPTEL Video Course - Electrical Engineering - Advanced Control Systems

Subject Co-ordinator - Prof. S. Majhi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Control structures and performance measures
Lecture 3 - Time and frequency domain performance measures
Lecture 4 - Design of controller
Lecture 5 - Design of controller for SISO system
Lecture 6 - Controller design for TITO processes
Lecture 7 - Limitations of PID controllers
Lecture 8 - PI-PD controller for SISO system
Lecture 9 - PID-P controller for Two Input Two Output system
Lecture 10 - Effects of measurement noise and load
Lecture 11 - Identification of dynamic models of plants
Lecture 12 - Relay control system for identification
Lecture 13 - Off-line identification of process dynamics
Lecture 14 - On-line identification of plant dynamics
Lecture 15 - State space based identification
Lecture 16 - State space analysis of systems
Lecture 17 - State space based identification of systems - 1
Lecture 18 - State space based identification of systems - 2
Lecture 19 - Identification of simple systems
Lecture 20 - Identification of FOPDT model
Lecture 21 - Identification of second order plus dead time model
Lecture 22 - Identification of SOPDT model
Lecture 23 - Steady state gain from asymmetrical relay test
Lecture 24 - Identification of SOPDT model with pole multiplicity
Lecture 25 - Existence of limit cycle for unstable system
Lecture 26 - Identification procedures
Lecture 27 - Identification of underdamped systems
Lecture 28 - Off-line identification of TITO systems
Lecture 29 - On-line identification of TITO systems

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Lecture 30 - Review of time domain based identification
Lecture 31 - DF based analytical expressions for on-line identification
Lecture 32 - Model parameter accuracy and sensitivity
Lecture 33 - Improved identification using Fourier series and wavelet transform
Lecture 34 - Reviews of DF based identification
Lecture 35 - Advanced Smith predictor controller
Lecture 36 - Design of controllers for the advanced Smith predictor
Lecture 37 - Model-free controller design
Lecture 38 - Model Based PID controller Design - I
Lecture 39 - Model Based PI-PD controller Design - II
Lecture 40 - Tuning of reconfigurable PID controllers

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NPTEL Video Course - Electrical Engineering - NOC:Optimization Techniques for Digital VLSI Design

Subject Co-ordinator - Dr. Santosh Biswas, Prof. Chandan Karfa

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital VLSI Design Flow
Lecture 2 - High-level Synthesis (HLS) flow with an example
Lecture 3 - Automation of High-level Synthesis Steps
Lecture 4 - Impact of Coding Style on HLS Results
Lecture 5 - Impact of Compiler Optimizations on HLS Results
Lecture 6 - RTL Optimizations for Timing
Lecture 7 - Retiming
Lecture 8 - RTL Optimizations for Area
Lecture 9 - RTL Optimizations for Power
Lecture 10 - High Level Synthesis
Lecture 11 - Overview of FPGA Technology Mapping
Lecture 12 - Introduction to Physical Synthesis
Lecture 13 - Introduction to Digital VLSI Testing - I
Lecture 14 - Introduction to Digital VLSI Testing - II
Lecture 15 - Optimization Techniques for ATPG - Part I
Lecture 16 - Optimization Techniques for ATPG - Part II
Lecture 17 - Optimization Techniques for Design for Testability
Lecture 18 - High-level fault modeling and RTL level Testing
Lecture 19 - LTL/CTL based Verification
Lecture 20 - Verification of Large Scale Systems
Lecture 21 - BDD based verification
Lecture 22 - Verification
Lecture 23 - Verification
Lecture 24 - Verification

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NPTEL Video Course - Electrical Engineering - NOC:Advanced Topics in Probability and Random Processes

Subject Co-ordinator - Prof. Prabin K Bora

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Probability Basics
Lecture 2 - Random Variable - I
Lecture 3 - Random Variable - II
Lecture 4 - Random Vectors and Random Processes
Lecture 5 - Infinite Sequence of Events - I
Lecture 6 - Infinite Sequence of Events - II
Lecture 7 - Convergence of Sequence of Random Variables
Lecture 8 - Weak Convergence - I
Lecture 9 - Weak Convergence - II
Lecture 10 - Laws of Large Numbers
Lecture 11 - Central Limit Theorem
Lecture 12 - Large Deviation Theory
Lecture 13 - Crammer's Theorem for Large Deviation
Lecture 14 - Introduction to Markov Processes
Lecture 15 - Discrete Time Markov Chain - 1
Lecture 16 - Discrete Time Markov Chain - 2
Lecture 17 - Discrete Time Markov Chain - 3
Lecture 18 - Discrete Time Markov Chain - 4
Lecture 19 - Discrete Time Markov Chain - 5
Lecture 20 - Continuous Time Markov Chain - 1
Lecture 21 - Continuous Time Markov Chain - 2
Lecture 22 - Continuous Time Markov Chain - 3
Lecture 23 - Martingale Process - 1
Lecture 24 - Martingale Process - 2

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NPTEL Video Course - Electrical Engineering - NOC:Microwave Engineering

Subject Co-ordinator - Dr. Ratnajit Bhattacharjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microwave Engineering
Lecture 2 - Introduction to Transmission Line Theory
Lecture 3 - Lossy Transmission Line
Lecture 4 - Smith Chart
Lecture 5 - Introduction to Waveguides and Rectangular Waveguide
Lecture 6 - Circular Waveguide
Lecture 7 - Attenuation Waveguide
Lecture 8 - N-port microwave networks and equivalent voltages and currents
Lecture 9 - Scattering Matrix (S-Parameters) Part-1
Lecture 10 - Scattering Matrix (S-parameters) Part-2 and Transmission Matrix (ABCD-Parameters)
Lecture 11 - Impedance Matching Using L-Section and Series Stub Networks
Lecture 12 - Impedance Matching Using Shunt Stub, Double Stub and Quarter wave Transformer
Lecture 13 - Multisection Matching Networks and Tapered Lines
Lecture 14 - Series and Parallel RLC Resonators
Lecture 15 - Transmission Line Resonators
Lecture 16 - Waveguide Resonators
Lecture 17 - Introduction to power dividers
Lecture 18 - Directional couplers
Lecture 19 - Microwave Filters - Part 1
Lecture 20 - Microwave Filters - Part 2
Lecture 21 - Characteristics of Microwave BJT and FET
Lecture 22 - PIN Diodes and Control Circuits
Lecture 23 - Schottky Diodes and Detectors and Tunnel Diodes
Lecture 24 - Gunn Diodes, IMPATT Diodes and Varactor Diodes
Lecture 25 - Two-Port Power Gain and Stability
Lecture 26 - Design of single stage transistor amplifier (for maximum gain, specified gain, low noise)
Lecture 27 - RF oscillator
Lecture 28 - Limitations of Conventional Tubes at Microwave Ranges
Lecture 29 - Introduction to Klystron

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Lecture 30 - Reflex Klystron, Magnetron and TWT
Lecture 31 - Ferrite Devices
Lecture 32 - Planar transmission lines for MIC
Lecture 33 - Lumped elements for MIC
Lecture 34 - Lumped inductor, HMIC and MMIC
Lecture 35 - Overview of Radar
Lecture 36 - Cellular Communication
Lecture 37 - Satellite Communication and Applications of Microwave

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NPTEL Video Course - Electrical Engineering - NOC:Microprocessors and Interfacing

Subject Co-ordinator - Prof. Shaik Rafi Ahamed

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Microprocessor Operations
Lecture 2 - 8086 Flags
Lecture 3 - Functional Diagram of 8086
Lecture 4 - 8086 Common and Minimum Mode Signals
Lecture 5 - 8086 Maximum Mode Signals
Lecture 6 - 8086 Data Transfer Instructions
Lecture 7 - 8086 Arithmetic Instructions - I
Lecture 8 - 8086 Arithmetic Instructions - II
Lecture 9 - 8086 Logical Instructions
Lecture 10 - 8086 Branch and String Instructions
Lecture 11 - 8086 Interrupt and Machine Control Instructions
Lecture 12 - Sum of Products, Multi-byte addition
Lecture 13 - Largest number, 2's complement Programs
Lecture 14 - Programs on Subroutines
Lecture 15 - ROM, RAM
Lecture 16 - Example I
Lecture 17 - Example II
Lecture 18 - Architecture, Interfacing to Simple I/O
Lecture 19 - Keyboard Interface
Lecture 20 - 7-segment Display Interface
Lecture 21 - Multiplexed 7-sgment Display Interface
Lecture 22 - Stepper motor, Liquid level control
Lecture 23 - Traffic light control, A/D converter
Lecture 24 - D/A converter
Lecture 25 - Electronic weighing machine
Lecture 26 - Programable Interval Timer (8254)
Lecture 27 - Modes of 8254
Lecture 28 - Architecture of 8259
Lecture 29 - Initialization command words of 8259

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Lecture 30 - Operational command words of 8259
Lecture 31 - 8237 Architecture, interfacing and Programming
Lecture 32 - Basic Concepts of serial I/O
Lecture 33 - Basic Concepts of serial I/O (Continued...)
Lecture 34 - Architecture of 8251

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NPTEL Video Course - Electrical Engineering - NOC:Statistical Signal Processing

Subject Co-ordinator - Prof. Prabin Kumar Bora

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Statistical Signal Processing
Lecture 2 - Probability and Random Variables
Lecture 3 - Linear Algebra of Random Variables
Lecture 4 - Random Processes
Lecture 5 - Linear Shift Invariant Systems with Random Inputs
Lecture 6 - White Noise and Spectral Factorization Theorem
Lecture 7 - Linear Models of Random Signals
Lecture 8 - Estimation Theory - 1
Lecture 9 - Estimation Theory - 2
Lecture 10 - Cramer Rao Lower Bound 2
Lecture 11 - MVUE through Sufficient Statistic - 1
Lecture 12 - MVUE through Sufficient Statistic - 2
Lecture 13 - Method of Moments and Maximum Likelihood Estimators
Lecture 14 - Properties of Maximum Likelihood Estimator (MLE)
Lecture 15 - Bayesian Estimators - 1
Lecture 16 - Bayesian Estimators - 2
Lecture 17 - Optimal linear filters
Lecture 18 - FIR Wiener filter
Lecture 19 - Non-Causual IIR Wiener Filter
Lecture 20 - Causal IIR Wiener Filter
Lecture 21 - Linear Prediction of Signals - 1
Lecture 22 - Linear Prediction of Signals - 2
Lecture 23 - Linear Prediction of Signals - 3
Lecture 24 - Review Assignment - 1
Lecture 25 - Adaptive Filters - 1
Lecture 26 - Adaptive Filters - 2
Lecture 27 - Adaptive Filters - 3
Lecture 28 - Review Assignment - 2
Lecture 29 - Adaptive Filters - 4

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Lecture 30 - Adaptive Filters - 4 (Continued...)
Lecture 31 - Review Assignment - 3
Lecture 32 - Recursive Least Squares (RLS) Adaptive Filter - 1
Lecture 33 - Recursive Least Squares (RLS) Adaptive Filter - 2
Lecture 34 - Review Assignment - 4
Lecture 35 - Kalman Filter - 1
Lecture 36 - Vector Kalman Filter
Lecture 37 - Linear Models of Random Signals
Lecture 38 - Review - 1
Lecture 39 - Review - 2

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NPTEL Video Course - Electrical Engineering - NOC:Computer Vision and Image Processing - Fundamentals and App

Subject Co-ordinator - Prof. M. K. Bhuyan

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Image Processing
Lecture 2 - Introduction to Computer Vision
Lecture 3 - Introduction to Computer Vision and Basic Concepts of Image Formation
Lecture 4 - Shape From Shading
Lecture 5 - Image Formation: Geometric Camera Models - I
Lecture 6 - Image Formation: Geometric Camera Models - II
Lecture 7 - Image Formation: Geometric Camera Models - III
Lecture 8 - Image Formation in a Stereo Vision Setup
Lecture 9 - Image Reconstruction from a Series of Projections
Lecture 10 - Image Reconstruction from a Series of Projections
Lecture 11 - Image Transforms - I
Lecture 12 - Image Transforms - II
Lecture 13 - Image Transforms - III
Lecture 14 - Image Transforms - IV
Lecture 15 - Image Enhancement
Lecture 16 - Image Filtering - I
Lecture 17 - Image Filtering - II
Lecture 18 - Colour Image Processing - I
Lecture 19 - Colour Image Processing - II
Lecture 20 - Image Segmentation
Lecture 21 - Image Features and Edge Detection
Lecture 22 - Edge Detection
Lecture 23 - Hough Transform
Lecture 24 - Image Texture Analysis - I
Lecture 25 - Image Texture Analysis - II
Lecture 26 - Object Boundary and Shape Representations - I
Lecture 27 - Object Boundary and Shape Representations - II
Lecture 28 - Interest Point Detectors
Lecture 29 - Image Features - HOG and SIFT

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Lecture 30 - Introduction to Machine Learning - I
Lecture 31 - Introduction to Machine Learning - II
Lecture 32 - Introduction to Machine Learning - III
Lecture 33 - Introduction to Machine Learning - IV
Lecture 34 - Introduction to Machine Learning - V
Lecture 35 - Artificial Neural Network for Pattern Classification - I
Lecture 36 - Artificial Neural Network for Pattern Classification - II
Lecture 37 - Introduction to Deep Learning
Lecture 38 - Gesture Recognition
Lecture 39 - Background Modelling and Motion Estimation
Lecture 40 - Object Tracking
Lecture 41 - Programming Examples

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NPTEL Video Course - Electrical Engineering - NOC:System Design through VERILOG

Subject Co-ordinator - Prof. Shaik Rafi Ahamed

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Verilog Operators and Modules
Lecture 2 - Verilog Ports, Data types and Assignments
Lecture 3 - Basics of gate level modeling
Lecture 4 - Half adder, full adder and ripple carry adder
Lecture 5 - Parallel adder/subtractor
Lecture 6 - Multiplier and comparator
Lecture 7 - Decoder, encoder and multiplexer
Lecture 8 - Demultiplexer, read only memory
Lecture 9 - Review of flip-flops
Lecture 10 - Verilog modeling of flip-flops
Lecture 11 - Modeling of CMOS gates and Boolean functions
Lecture 12 - Modeling using transmission gates, CMOS dalay times
Lecture 13 - Signal strengths
Lecture 14 - Basics of dataflow modeling
Lecture 15 - Examples of dataflow modeling
Lecture 16 - Basics of behavioral modeling
Lecture 17 - Examples of behavioral modeling
Lecture 18 - Verilog modeling of counters
Lecture 19 - Verilog modeling of sequence detector
Lecture 20 - Verilog modeling FSMs and shift registers
Lecture 21 - Combinational circuit examples
Lecture 22 - Sequential circuit examples
Lecture 23 - Arithmetic and Logic Unit (ALU)
Lecture 24 - Static RAM and Braun Multiplier
Lecture 25 - FIR filter implementation
Lecture 26 - Baugh-Wooley signed multiplier architecture
Lecture 27 - IIR filter implementation

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NPTEL Video Course - Electrical Engineering - NOC:Usability Engineering

Subject Co-ordinator - Prof. Debayan Dhar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Usability
Lecture 2 - Usability - Historical Foundations
Lecture 3 - Standard Terminologies
Lecture 4 - Elements of User Experience
Lecture 5 - Usability in software development - I
Lecture 6 - Usability in software development - II
Lecture 7 - User Centered Design Process - I
Lecture 8 - User Centered Design Process - II
Lecture 9 - User Centered Design Process - III
Lecture 10 - Requirement Analysis - I (A)
Lecture 11 - Requirement Analysis - I (B)
Lecture 12 - Requirement Analysis - I (C)
Lecture 13 - Requirement Analysis - I (D)
Lecture 14 - Requirement Analysis - I (E)
Lecture 15 - Requirement Analysis - I (F)
Lecture 16 - Requirement Analysis - II (A)
Lecture 17 - Requirement Analysis - II (B)
Lecture 18 - Requirement Analysis - II (C)
Lecture 19 - Requirement Analysis - II (D)
Lecture 20 - Requirement Analysis - III (A)
Lecture 21 - Eye Tracker
Lecture 22 - Demonstration of an Eye tracking device
Lecture 23 - Requirement Analysis - III (B)
Lecture 24 - Mapping Experiences
Lecture 25 - Cognitive Issues - I
Lecture 26 - Cognitive Issues - II
Lecture 27 - Cognitive Issues - III
Lecture 28 - Cognitive Issues - IV
Lecture 29 - Competitive analysis and preparing for design briefing - I

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Lecture 30 - Competitive analysis and preparing for design briefing - II
Lecture 31 - Conceptualization and Prototyping - I (A)
Lecture 32 - Conceptualization and Prototyping - I (B)
Lecture 33 - Conceptualization and Prototyping - I (C)
Lecture 34 - Conceptualization and Prototyping - II (A)
Lecture 35 - Conceptualization and Prototyping - II (B)
Lecture 36 - Usability heuristics and testing - I
Lecture 37 - Usability heuristics and testing - II
Lecture 38 - Usability heuristics and testing - III
Lecture 39 - Usability Testing (A)
Lecture 40 - Usability Testing (B)
Lecture 41 - Usability Testing (C)
Lecture 42 - UI/UX design based on Garret model: a case study
Lecture 43 - Effective contextual enquiry
Lecture 44 - Contextual enquiry: case study

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NPTEL Video Course - Electrical Engineering - NOC:Probability and Random Processes

Subject Co-ordinator - Prof. Ribhu, Prof. Rohit Sinha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Algebra of Events
Lecture 3 - Axioms of Probability
Lecture 4 - Example 1
Lecture 5 - Example 2
Lecture 6 - Example 3
Lecture 7 - Example 4
Lecture 8 - Example 5
Lecture 9 - Conditional Probability
Lecture 10 - Bayes Theorem 1
Lecture 11 - Bayes Theorem 2
Lecture 12 - A Brief Review
Lecture 13 - Example 1
Lecture 14 - Example 2
Lecture 15 - Example 3
Lecture 16 - Example 4
Lecture 17 - Example 5
Lecture 18 - Independent Events
Lecture 19 - A Brief Review
Lecture 20 - Example 1
Lecture 21 - Example 2
Lecture 22 - Example 3
Lecture 23 - Example 4
Lecture 24 - Discrete Random Variables
Lecture 25 - Expectation
Lecture 26 - Moments
Lecture 27 - Variance
Lecture 28 - Binomial Random Variables
Lecture 29 - Poisson Random Variables

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Lecture 30 - More on Poission Random Variables
Lecture 31 - Properties of the CDF
Lecture 32 - A Brief Review - I
Lecture 33 - A Brief Review - II
Lecture 34 - Example 1
Lecture 35 - Example 2
Lecture 36 - Example 3
Lecture 37 - Example 4
Lecture 38 - Example 5
Lecture 39 - Example 6
Lecture 40 - Example 7
Lecture 41 - Example 8
Lecture 42 - Example 9
Lecture 43 - Continuous Random Variables
Lecture 44 - Expectation of Continuous random variables
Lecture 45 - The uniform and the Gaussian Random variables
Lecture 46 - The mean and variance of a Gaussian Random Variable
Lecture 47 - The exponential random variable and other continuous distributions
Lecture 48 - A Brief Review
Lecture 49 - Example 1
Lecture 50 - Example 2
Lecture 51 - Example 3
Lecture 52 - Example 4
Lecture 53 - Example 5
Lecture 54 - Functions of a random varible
Lecture 55 - Functions of a random varible
Lecture 56 - The moment generating function
Lecture 57 - Conditional Distributions
Lecture 58 - Bivariate Distributions
Lecture 59 - Independence of Random Varibles
Lecture 60 - Jointly Gaussian Random Varibales and Circular symmetry
Lecture 61 - Jointly Discrete Random Variables
Lecture 62 - One Function of two random variables
Lecture 63 - Order Statistics
Lecture 64 - Two functions of two random variables
Lecture 65 - Joint Moments
Lecture 66 - Joint Charactristic Functions
Lecture 67 - Conditional Distributions for multiple random variables
Lecture 68 - Conditional Expectations

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Lecture 69 - Examples
Lecture 70 - Random Vectors
Lecture 71 - Independence of Random Varibles
Lecture 72 - Complex Random Varibales
Lecture 73 - Covariance Matrices
Lecture 74 - Conditional Densities
Lecture 75 - Gaussianity
Lecture 76 - Chi Squared Densities
Lecture 77 - Examples
Lecture 78 - Estimation Theory
Lecture 79 - Measurements
Lecture 80 - Sequences of Random Variables
Lecture 81 - Laws of large numbers
Lecture 82 - Random processes
Lecture 83 - Stationarity, Cyclostationarity, Ergodicity
Lecture 84 - Random Processes as Signals (PSD and LTI Response)
Lecture 85 - White and Gaussian Processes Noise

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NPTEL Video Course - Electrical Engineering - NOC:Simulation of Communication Systems using Matlab

Subject Co-ordinator - Dr. Ribhu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics of MATLAB
Lecture 3 - Data Types
Lecture 4 - Floating Point Numbers
Lecture 5 - Scripts and Flow of Control
Lecture 6 - The For Loop
Lecture 7 - Arrays
Lecture 8 - Indexing
Lecture 9 - Some Reuslts from Linear Algebra
Lecture 10 - Matrix Multiplication
Lecture 11 - Eigenvalues and Eigenvectors
Lecture 12 - Complex Numbers
Lecture 13 - Hermitian Matrices
Lecture 14 - Matrix Inversion
Lecture 15 - Signals
Lecture 16 - Convolution
Lecture 17 - Probability
Lecture 18 - Bayes Theorem
Lecture 19 - Random Varibles
Lecture 20 - Clinical Trials - I
Lecture 21 - Clinical Trials - II
Lecture 22 - Random Numbers
Lecture 23 - Random Disttributions
Lecture 24 - Histograms - I
Lecture 25 - Histograms - II
Lecture 26 - Functions of Random Variables
Lecture 27 - Generating Random Disttributions
Lecture 28 - Laws of Large numbers
Lecture 29 - Random Processes

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Lecture 30 - Properties of Random Processes
Lecture 31 - Power Spectra
Lecture 32 - Signals and Noise
Lecture 33 - Stochastic Models
Lecture 34 - The AR-1 Process
Lecture 35 - Stochastic Models II
Lecture 36 - Yule Walker Equations
Lecture 37 - Markov Chains - I
Lecture 38 - Markov Chains - II
Lecture 39 - Markov Chains - III
Lecture 40 - Analog to Digital Coversion
Lecture 41 - K Means
Lecture 42 - Correlation
Lecture 43 - Predictive Coding
Lecture 44 - Image Compression
Lecture 45 - Transform Domain Compression
Lecture 46 - Multi Resolution Coding
Lecture 47 - Introduction to Communications
Lecture 48 - Low Pass and BandPass Signals
Lecture 49 - Signal Spaces
Lecture 50 - PAM
Lecture 51 - Detection
Lecture 52 - Effects of AWGN
Lecture 53 - ML Detection - I
Lecture 54 - ML Detection - II
Lecture 55 - The Union Bound
Lecture 56 - Symbol Error Rates
Lecture 57 - Choosing Constellations
Lecture 58 - Orthogonal Signalling
Lecture 59 - Non-Coherent Dection - 1
Lecture 60 - Non-Coherent Dection - 2
Lecture 61 - DPSK - I
Lecture 62 - DPSK - II
Lecture 63 - Introduction to Wireless Communications
Lecture 64 - Conclusion

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NPTEL Video Course - Electrical Engineering - NOC:Machine Learning and Deep Learning - Fundamentals and Appli

Subject Co-ordinator - Prof. M.K. Bhuyan

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Machine Learning
Lecture 2 - Performance Measures of Classification
Lecture 3 - Bias-Variance Tradeoff
Lecture 4 - Regression
Lecture 5 - Bayesian Decision Theory - 1
Lecture 6 - Bayesian Decision Theory - 2
Lecture 7 - Bayes Decision Theory - Binary Features
Lecture 8 - Bayesian Decision Theory - 3
Lecture 9 - Bayesian Decision Theory - 4
Lecture 10 - Bayesian Belief Networks
Lecture 11 - Parameter Estimation and Maximum Likelihood Estimation
Lecture 12 - Parameter Estimation and Bayesian Estimation
Lecture 13 - Concept of non-parametric techniques
Lecture 14 - Density Estimation by Parzen Window
Lecture 15 - Parzen Window and K nearest neighbor algorithm
Lecture 16 - Linear Discriminant Functions and Perceptron Criteria - Part I
Lecture 17 - Linear Discriminant Functions and Perceptron Criteria - Part II
Lecture 18 - Linear Discriminant Functions and Perceptron Criteria - Part III
Lecture 19 - Support Vector Machine - Part I
Lecture 20 - Support Vector Machine - Part II
Lecture 21 - Logistic Regression
Lecture 22 - Decision Tree
Lecture 23 - Hidden Markov Model (HMM)
Lecture 24 - Ensemble Classifiers - Part I
Lecture 25 - Ensemble Classifiers - Part II
Lecture 26 - Dimensionality Problem and Principal Component Analysis
Lecture 27 - Principal Component Analysis
Lecture 28 - Linear Discriminant Analysis (LDA) - Part I
Lecture 29 - Linear Discriminant Analysis (LDA) - Part II

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Lecture 30 - Gaussian Mixture Model and EM Algorithm
Lecture 31 - K-means clustering.
Lecture 32 - Fuzzy K-means clustering
Lecture 33 - Hierarchical Agglomerative Clustering and Mean-shift Clustering
Lecture 34 - Artificial Neural Networks for Pattern Classification - Part 1
Lecture 35 - Artificial Neural Networks for Pattern Classification - Part 2
Lecture 36 - Artificial Neural Networks for Pattern Classification - Part 3
Lecture 37 - Introduction to Deep Learning and Convolutional Neural Network (CNN)
Lecture 38 - Vanishing and Exploding Gradients in Deep Neural Networks
Lecture 39 - CNN Architectures - LeNet-5 and AlexNet
Lecture 40 - CNN Architectures - VGG 16, GoogLeNet and ResNet
Lecture 41 - Generative Adversarial Networks (GAN) - Fundamentals and Applications
Lecture 42 - U-Net: Convolutional Networks for Image Segmentation
Lecture 43 - Introduction to Autoencoder and Recurrent Neural Networks (RNN)
Lecture 44 - Programming Concepts - 1
Lecture 45 - Programming Concepts - 2
Lecture 46 - Problem Solving Session - 1
Lecture 47 - Problem Solving Session - 2
Lecture 48 - Problem Solving Session - 3

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NPTEL Video Course - Electrical Engineering - NOC:Integrated Circuits and Applications

Subject Co-ordinator - Prof. Shaik Rafi Ahamed

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Integrated Circuits
Lecture 2 - Summing and Difference Amplifiers
Lecture 3 - Instrumentation Amplifier
Lecture 4 - Integrator and Diffrentiator
Lecture 5 - Precision Half Wave and Full Wave Rectifiers
Lecture 6 - Clipper and Clamper circuits
Lecture 7 - Logarithmic and Anti-logarithmic Amplifiers
Lecture 8 - DC Characteristics (Offset Currents and Voltages)
Lecture 9 - AC Charcterstics (Frequency Response)
Lecture 10 - AC Charcterstics (Compensation Techniques and Slew Rate)
Lecture 11 - Examples on Design of Adder and Subtractor Circuits
Lecture 12 - Examples on Transfer Function Computation
Lecture 13 - Examples on Instrumentation Amplifier
Lecture 14 - Examples on CMRR Computation
Lecture 15 - First Order Low Pass Filter
Lecture 16 - Second Order Low Pass Filter
Lecture 17 - Design of Butterworth Low Pass Filter
Lecture 18 - Design of Butterworth High Pass Filter
Lecture 19 - Design of Band Pass Filter
Lecture 20 - Design of Band Stop Filter
Lecture 21 - All Pass Filter
Lecture 22 - RC Phase Shift Oscillator
Lecture 23 - Wien Bridge, Colpitt's and Hartley Oscillators
Lecture 24 - Comparator and Schmitt Trigger Circuits
Lecture 25 - Square Wave and Triangular Waveform Generators
Lecture 26 - Monostable operation
Lecture 27 - Monostable applications - I
Lecture 28 - Monostable applications - II
Lecture 29 - Astable operation

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Lecture 30 - Phase detectors
Lecture 31 - Voltage Controlled oscillator
Lecture 32 - PLL IC 565 operation
Lecture 33 - PLL Applications
Lecture 34 - Fixed Voltage Regulator
Lecture 35 - Adjastable Voltage Regulator
Lecture 36 - Switching Regulators
Lecture 37 - Weighted Resistor D/A Converter
Lecture 38 - R-2R Ladder D/A Converter
Lecture 39 - Inverted R-2R Ladder D/A Converter
Lecture 40 - Analog to Digital Converters
Lecture 41 - CMOS Inverter
Lecture 42 - CMOS NAND Gate
Lecture 43 - Transient Response of CMOS NAND and NOR Gates
Lecture 44 - Boolean function Realization using CMOS and Sizing

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NPTEL Video Course - Electrical Engineering - NOC:Photonic Crystals: Fundamentals and Applications

Subject Co-ordinator - Prof. Debabrata Sikdar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation and Introduction to Photonic Crystals
Lecture 2 - Overview of Photonic Crystal technology
Lecture 3 - Fundamentals of EM theory of Light
Lecture 4 - Electromagnetic Properties of Materials
Lecture 5 - Scaling Properties of Maxwell's Equaltions
Lecture 6 - Electromagnetism as an Eigenvalue Problem
Lecture 7 - Symmetries for Classification of EM Modes
Lecture 8 - Real and Reciprocal lattices
Lecture 9 - Photonic band Structure: Computation and Analysis
Lecture 10 - Fundamentals of 1D Photonic Crystal
Lecture 11 - Analysis and Engineering of 1D Photonic Band Structure
Lecture 12 - Applications of 1D Photonic Crystal
Lecture 13 - Fundamentals of 2D photonic crystals
Lecture 14 - Analysis and Engineering of 2D Photonic Band Structure
Lecture 15 - Applications of 2D photonic crystals
Lecture 16 - Overview of different 3D Photonic Crystals
Lecture 17 - Crystals with complete bandgap
Lecture 18 - Applications of 2D and 3D photonic crystals
Lecture 19 - Overview and Modelling of Periodic Dielectric Waveguides
Lecture 20 - Point Defects in Periodic Dielectric Waveguides and Q-factors of Lossy Cavities
Lecture 21 - Applications: Fiber Bragg Grating
Lecture 22 - Overview of Photonic Crystal Slabs
Lecture 23 - Different types of defects in Photonic Cruystal Slabs
Lecture 24 - Engineering High-Q resonant Cavity
Lecture 25 - Overview of photonic crystal fibers
Lecture 26 - Index-guiding photonic crystal fibers
Lecture 27 - Band-gap guidance in Holey Fibers
Lecture 28 - Overview of Bragg Fibers
Lecture 29 - Losses in Hollow-core Fibers

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Lecture 30 - Applications of Photonic Crystal Fibers
Lecture 31 - Designing a mirror, waveguide, acavity
Lecture 32 - Temporal Coupled Mode Theory: Fundamentals and Applications
Lecture 33 - Waveguide Splitters, Non-linear Filters, and Bistability
Lecture 34 - Unusual Refraction and Diffraction Effects
Lecture 35 - Photonic Crystal Devices for Slow Wave Phenomena
Lecture 36 - Next Generation Devices based on Photonic Crystals
Lecture 37 - Simulation Demonstration of Topological Photonic Crystals Based Waveguides - Part 1
Lecture 38 - Simulation Demonstration of Topological Photonic Crystals Based Waveguides - Part 2

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NPTEL Video Course - Electrical Engineering - NOC:Measurement and Instrumentation

Subject Co-ordinator - Prof. Ravindra Kumar Jha

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamental of Measurement Systems
Lecture 2 - Fundamental of Measurement Systems
Lecture 3 - Fundamental of Measurement Systems
Lecture 4 - Fundamental of Measurement Systems
Lecture 5 - Fundamental of Measurement Systems
Lecture 6 - Introduction to Analog Meters - I
Lecture 7 - Classification of Analog Meters - II
Lecture 8 - Classification of Analog Meters - III
Lecture 9 - Classification of Analog Meters - IV
Lecture 10 - Classification of Analog Meters - V
Lecture 11 - Operating Torque in Electromechanical Instruments
Lecture 12 - Order of Instrument
Lecture 13 - Analog Tools to Measure Current (Ammeter)
Lecture 14 - Analog Tools to Measure Voltage (Voltmeter)
Lecture 15 - Galvanometers
Lecture 16 - Analog Meters - PMMC - I
Lecture 17 - Analog Meters - PMMC - II
Lecture 18 - Analog meters - Moving Iron Instruments
Lecture 19 - Analog meters - Electrodynamometer Instruments - I
Lecture 20 - Analog meters - Electrodynamometer Instruments - II
Lecture 21 - Hot wire Instruments
Lecture 22 - Thermocouple Instruments
Lecture 23 - Induction Instruments
Lecture 24 - Electrostatic Instruments
Lecture 25 - Rectifier Instruments
Lecture 26 - Measurement of Resistance - I
Lecture 27 - Measurement of Resistance - II
Lecture 28 - Measurement of High Resistance
Lecture 29 - Measurement of Power

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Lecture 30 - Energy Meter
Lecture 31 - Fundamentals of Transducer
Lecture 32 - Errors in Transducers
Lecture 33 - Strain Gauge - I
Lecture 34 - Strain Gauge - II
Lecture 35 - Temperature Detector
Lecture 36 - Thermistors
Lecture 37 - Thermocouple
Lecture 38 - Piezoelectric Transducers - Part I
Lecture 39 - Piezoelectric Transducers - Part II
Lecture 40 - Capacitance and Inductance Transducer
Lecture 41 - Operational Amplifier - 1
Lecture 42 - Operational Amplifier - 2
Lecture 43 - Instrumentation Amplifier
Lecture 44 - Filter
Lecture 45 - Signal Conditioning Circuits
Lecture 46 - Digital to Analog Converter - I
Lecture 47 - Digital to Analog Converter - II
Lecture 48 - Analog to Digital Converter - I
Lecture 49 - Analog to Digital Converter - II
Lecture 50 - Grounding and Shielding
Lecture 51 - Introduction to Data Acquisition Systems
Lecture 52 - Analog Data Acquisition Systems
Lecture 53 - Digital Data Acquisition Systems
Lecture 54 - Oscilloscopes
Lecture 55 - Signal Generators and Analyzers
Lecture 56 - Signal Analyzers - 1
Lecture 57 - Signal Analyzers - 2
Lecture 58 - Process Control
Lecture 59 - Display Devices and Recorders
Lecture 60 - Summary of Course

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NPTEL Video Course - Electrical Engineering - NOC:Control Engineering for Robotics

Subject Co-ordinator - Prof. Chayan Bhawal

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Signals and Systems
Lecture 2 - Types of Systems
Lecture 3 - Differential equation of a system
Lecture 4 - Differential equation of an LTI system
Lecture 5 - Laplace Transform
Lecture 6 - Finding response using transfer function
Lecture 7 - Finding transfer functions - Examples
Lecture 8 - Finding transfer functions - Experimentally
Lecture 9 - Natural Response of a system
Lecture 10 - Forced Response of a system
Lecture 11 - Introduction to Bode Plots
Lecture 12 - Bode Plots (Continued...)
Lecture 13 - Finding transfer function from frequency response
Lecture 14 - Configuration of a control system
Lecture 15 - Time domain analysis of standard system - I
Lecture 16 - Time domain analysis of standard system - II
Lecture 17 - Time domain analysis of standard system - III
Lecture 18 - Time-domain specifications of second order systems
Lecture 19 - Effect of poles and zeros on time-domain response
Lecture 20 - Steady state error
Lecture 21 - Introduction to Root Locus
Lecture 22 - Rules to draw Root Locus - I
Lecture 23 - Rules to draw Root Locus - II
Lecture 24 - Stability
Lecture 25 - Routh Hurwitz Criteron
Lecture 26 - Observations on controller design using Root Locus
Lecture 27 - Controller design using Root Locus - I
Lecture 28 - Controller design using Root Locus - II
Lecture 29 - Controller design using Root Locus - III

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Lecture 30 - Controller design using Root Locus - IV
Lecture 31 - Introduction to PID controllers
Lecture 32 - PID Controller Tuning
Lecture 33 - Implementation of PID controllers
Lecture 34 - PID in action for systems
Lecture 35 - State-space modelling of system - I
Lecture 36 - State-space modelling of system - II
Lecture 37 - State-space and transfer function
Lecture 38 - State-space equation to transfer function
Lecture 39 - Solution of a state-space equation
Lecture 40 - Finding matrix exponential
Lecture 41 - Cayley-Hamilton Theorem
Lecture 42 - Diagonal forms and matrix exponential
Lecture 43 - Jordan forms and matrix exponential - I
Lecture 44 - Jordan forms and matrix exponential - II
Lecture 45 - Linear Algebra for system theory
Lecture 46 - Controllability
Lecture 47 - How to check for controllability?
Lecture 48 - State-feedback controller - I
Lecture 49 - State-feedback controller - II
Lecture 50 - Controllability Canonical Form
Lecture 51 - State-feedback for uncontrollable systems
Lecture 52 - State-feedback control for MIMO Systems
Lecture 53 - State-feedback with reference scaling
Lecture 54 - Observability and Observers
Lecture 55 - Observer Based Controller
Lecture 56 - Decomposition of State-space
Lecture 57 - Optimal Control Problems
Lecture 58 - LQR Control Problem
Lecture 59 - Examples of LQR Control Problem
Lecture 60 - Two-Link Robotic Manipulator
Lecture 61 - Control of Two-Link Robotic Manipulator
Lecture 62 - Working of a quadrotor
Lecture 63 - Quadrotor Control - I
Lecture 64 - Quadrotor Control - II
Lecture 65 - Implementation of state-feedback control
Lecture 66 - Conclusion

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NPTEL Video Course - Electrical Engineering - NOC:Analog and Digital Communications-I

Subject Co-ordinator - Prof. Ribhu

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Communications
Lecture 2 - What are signals ?
Lecture 3 - Fourier Series
Lecture 4 - Fourier Transforms
Lecture 5 - Properties of Fourier Transform
Lecture 6 - Convolution
Lecture 7 - Time/Bandwidth
Lecture 8 - LowPass/Bandpass Signals
Lecture 9 - Low Pass equivalents
Lecture 10 - Probability Spaces
Lecture 11 - Bayes Theorem
Lecture 12 - Random Variables
Lecture 13 - Special Random Variables
Lecture 14 - Two Random Variables
Lecture 15 - Complex Random Variables
Lecture 16 - Random Vectors
Lecture 17 - Covariance Matrices
Lecture 18 - Random Processes
Lecture 19 - Stationarity
Lecture 20 - Ergodicity
Lecture 21 - Random Processes as Signals
Lecture 22 - White Gaussian Random Process
Lecture 23 - Noise
Lecture 24 - Modulation
Lecture 25 - Amplitude Modulation
Lecture 26 - Generating AM
Lecture 27 - Diode Detector
Lecture 28 - DSB SC
Lecture 29 - Ring Modulator

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Lecture 30 - Phase Error in DSB-SC
Lecture 31 - Quadrature Amplitude Multiplexing
Lecture 32 - QAM Demodulation
Lecture 33 - Angle Modulation
Lecture 34 - FM Spectrum I
Lecture 35 - FM Spectrum II
Lecture 36 - FM Generation/Demodulation
Lecture 37 - Phase Locked Loop
Lecture 38 - Signal to Noise Ratio
Lecture 39 - Noise in AM/FM
Lecture 40 - Link Budget 1
Lecture 41 - Link Budget 2
Lecture 42 - Introduction to Digital Communications
Lecture 43 - Analog to Digital Conversion
Lecture 44 - Sampling
Lecture 45 - Aliasing
Lecture 46 - Reconstruction
Lecture 47 - Practical Sampling
Lecture 48 - Aliasing Again
Lecture 49 - Band Pass Sampling
Lecture 50 - Sampling Random Processes
Lecture 51 - Quantization
Lecture 52 - Lloyd Max Quantization
Lecture 53 - Uniform Quantization
Lecture 54 - PCM
Lecture 55 - Line Codes
Lecture 56 - Companding
Lecture 57 - Correlation
Lecture 58 - Autoregressive Processes
Lecture 59 - Correlation Matrices
Lecture 60 - Delta Modulation
Lecture 61 - Baseband Pulse Transmission
Lecture 62 - SNR Maximization
Lecture 63 - The Matched Filter
Lecture 64 - Probability of Error
Lecture 65 - Vector Spaces
Lecture 66 - Inner Products
Lecture 67 - Basis and Orthogonalization
Lecture 68 - Signal Spaces

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Lecture 69 - Fourier Series Again

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NPTEL Video Course - Electrical Engineering - Advanced Electric Drives

Subject Co-ordinator - Dr. S.P. Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
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Lecture 19
Lecture 20
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Lecture 22
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Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Electrical Engineering - High Voltage DC Transmission

Subject Co-ordinator - Dr. S.N. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - High Voltage DC Transmission
Lecture 2 - High Voltage DC Transmission
Lecture 3 - High Voltage DC Transmission
Lecture 4 - High Voltage DC Transmission
Lecture 5 - High Voltage DC Transmission
Lecture 6 - High Voltage DC Transmission
Lecture 7 - High Voltage DC Transmission
Lecture 8 - High Voltage DC Transmission
Lecture 9 - High Voltage DC Transmission
Lecture 10 - High Voltage DC Transmission
Lecture 11 - High Voltage DC Transmission
Lecture 12 - High Voltage DC Transmission
Lecture 13 - High Voltage DC Transmission
Lecture 14 - High Voltage DC Transmission
Lecture 15 - High Voltage DC Transmission
Lecture 16 - High Voltage DC Transmission
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Lecture 18 - High Voltage DC Transmission
Lecture 19 - High Voltage DC Transmission
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Lecture 35 - High Voltage DC Transmission
Lecture 36 - High Voltage DC Transmission
Lecture 37 - High Voltage DC Transmission

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NPTEL Video Course - Electrical Engineering - Intelligent Systems and Control

Subject Co-ordinator - Prof. Laxmidhar Behera

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Intelligent Systems and Control
Lecture 2 - Linear Neural networks
Lecture 3 - Multi layered Neural Networks
Lecture 4 - Back Propagation Algorithm revisited
Lecture 5 - Non Linear System Analysis - Part I
Lecture 6 - Non Linear System Analysis - Part II
Lecture 7 - Radial Basis Function Networks
Lecture 8 - Adaptive Learning rate
Lecture 9 - Weight update rules
Lecture 10 - Recurrent networks Back propagation through time
Lecture 11 - Recurrent networks Real time recurrent learning
Lecture 12 - Self organizing Map - Multidimensional networks
Lecture 13 - Fuzzy sets - A Primer
Lecture 14 - Fuzzy Relations
Lecture 15 - Fuzzy Rule base and Approximate Reasoning
Lecture 16 - Introduction to Fuzzy Logic Control
Lecture 17 - Neural Control A review
Lecture 18 - Network inversion and Control
Lecture 19 - Neural Model of a Robot manipulator
Lecture 20 - Indirect Adaptive Control of a Robot manipulator
Lecture 21 - Adaptive neural control for Affine Systems SISO
Lecture 22 - Adaptive neural control for Affine systems MIMO
Lecture 23 - Visual Motor Coordination with KSOM
Lecture 24 - Visual Motor coordination - quantum clustering
Lecture 25 - Direct Adaptive control of Manipulators - Intro
Lecture 26 - NN based back stepping control
Lecture 27 - Fuzzy Control - a Review
Lecture 28 - Mamdani type flc and parameter optimization
Lecture 29 - Fuzzy Control of a pH reactor

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Lecture 30 - Fuzzy Lyapunov controller - Computing with words
Lecture 31 - Controller Design for a T-S Fuzzy model
Lecture 32 - Linear controllers using T-S fuzzy model

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NPTEL Video Course - Electrical Engineering - Power Systems Operation and Control

Subject Co-ordinator - Dr. S.N. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module 1 - Lecture 1
Module 1 - Lecture 2
Module 1 - Lecture 3
Module 2 - Lecture 1
Module 2 - Lecture 2
Module 2 - Lecture 3
Module 2 - Lecture 4
Module 2 - Lecture 5
Module 2 - Lecture 6
Module 2 - Lecture 7
Module 2 - Lecture 8
Module 2 - Lecture 9
Module 2 - Lecture 10
Module 2 - Lecture 11
Module 2 - Lecture 12
Module 2 - Lecture 13
Module 2 - Lecture 14
Module 3 - Lecture 1
Module 3 - Lecture 2
Module 3 - Lecture 3
Module 3 - Lecture 4
Module 3 - Lecture 5
Module 3 - Lecture 6
Module 3 - Lecture 7
Module 3 - Lecture 8
Module 3 - Lecture 9
Module 3 - Lecture 10
Module 4 - Lecture 1
Module 4 - Lecture 2

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Module 4 - Lecture 3
Module 4 - Lecture 4
Module 5 - Lecture 1
Module 5 - Lecture 2
Module 6 - Lecture 1
Module 6 - Lecture 2

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NPTEL Video Course - Electrical Engineering - NOC:Electromagnetic theory

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to EMT
Lecture 2 - Coulombs law
Lecture 3 - Vector analysis-I and Introduction to coordinate system
Lecture 4 - Rectangular coordinate system
Lecture 5 - Vector analysis-II
Lecture 6 - Introduction to Electric field
Lecture 7 - Electric field-I
Lecture 8 - Cylindrical coordinate system
Lecture 9 - Transformation and Electric field-II
Lecture 10 - Electric Potential-I
Lecture 11 - Spherical co-ordinate system and Electric potential-II
Lecture 12 - Vector Analysis-III and Electric potential-III
Lecture 13 - GaussÂ s law and its application-I
Lecture 14 - GaussÂ s law and its application-II
Lecture 15 - Divergence and PoissonÂ s and LaplaceÂ s equation
Lecture 16 - GaussÂ s law and its application -III
Lecture 17 - Vector analysis Â III (curl and its significance)
Lecture 18 - Conductor and dielectric-I
Lecture 19 - Polarization - I
Lecture 20 - Polarization - II
Lecture 21 - Polarization - II (Continued...)
Lecture 22 - Boundary condition
Lecture 23 - Continuity equation and Conductors - III
Lecture 24 - Conductors Â IV
Lecture 25 - Conductors Â IV (Continued...) and Capacitor - I
Lecture 26 - Capacitor - II
Lecture 27 - Capacitor - II (Continued...) and Equipotential Surfaces
Lecture 28 - Solution of LaplaceÂ s equation-I
Lecture 29 - Solution of LaplaceÂ s equation-I I and method of images-I

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Lecture 30 - Method of images-II
Lecture 31 - Solution of LaplaceÂ s equation-III
Lecture 32 - Solution of LaplaceÂ s equation-IV
Lecture 33 - Introduction of magnetic field
Lecture 34 - Biot savart law and its application
Lecture 35 - Biot savart lawandits application-II
Lecture 36 - Magnetic vector potential
Lecture 37 - Magnetic force, torque and dipole
Lecture 38 - Magnetic force, torque and dipole (Continued...)
Lecture 39 - Magnetic materials-I
Lecture 40 - Magnetic materials-I (Continued...) and Magnetic moment
Lecture 41 - Magnetic materials-I (Continued...) and Boundary condition for Magnetic fields
Lecture 42 - Inductor and calculation of inductance for different shapes
Lecture 43 - Inductor and calculation of inductance for different shapes (Continued...)
Lecture 44 - Faradays law and its application-I
Lecture 45 - Faradays law and its application-II
Lecture 46 - Displacement current
Lecture 47 - MaxwellÂ s equation
Lecture 48 - Wave propagation
Lecture 49 - Solution of Helmholtz equation
Lecture 50 - Uniform plane waves
Lecture 51 - Polarization and Poynting Vector
Lecture 52 - Wave reflections (Normal incidence)
Lecture 53 - Waves in imperfect dielectrics and Good conductors
Lecture 54 - Skin depth/effect
Lecture 55 - Oblique incidence of waves
Lecture 56 - Oblique incidence of waves (Continued...)
Lecture 57 - Transmission line
Lecture 58 - Transmission line model
Lecture 59 - Steady state sinusoidal response of T-line-I
Lecture 60 - Steady state sinusoidal response of T-line-II
Lecture 61 - Steady state sinusoidal response of T-line-IIand Smith chart
Lecture 62 - Application of smith chart-I
Lecture 63 - Application of smith chart-II
Lecture 64 - Impedance matching
Lecture 65 - Transients on Transmission line-I
Lecture 66 - Transients on Transmission line-II
Lecture 67 - Pulse on Transmission line
Lecture 68 - Capacitive termination in Transmission line

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Lecture 69 - Waveguide
Lecture 70 - Waveguide Analysis
Lecture 71 - TM modes in Waveguide
Lecture 72 - Rectangular waveguide
Lecture 73 - Rectangular waveguide
Lecture 74 - Waveguide
Lecture 75 - Waveguide losses
Lecture 76 - Dielectric Waveguide
Lecture 77 - Dielectric Waveguide (Continued...)
Lecture 78 - Radiation and Antenna
Lecture 79 - Hertzian Dipole Antenna
Lecture 80 - Hertzian Dipole Antenna (Continued...)
Lecture 81 - Quasi-statistics-I
Lecture 82 - Quasi-statistics-II
Lecture 83 - Long wire Antenna
Lecture 84 - Group velocity and Phase velocity
Lecture 85 - Numerical solution of Laplace's equation

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NPTEL Video Course - Electrical Engineering - NOC:Principles of Communication - Part 1

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics - Definition of Energy and Power of Signals
Lecture 2 - Frequency Domain Representation and Introduction to Discrete Fourier Series
Lecture 3 - Discrete Fourier Series Example and Parseval's Theorem for Periodic Signals
Lecture 4 - Fourier Transform (FT), Inverse Fourier Transform (IFT) of Continuous Signals, Example of FT of P
Lecture 5 - Modulation Property of Fourier Transform, Dirac Delta or Unit Impulse Function - Definition and P
Lecture 6 - Duality Property of Fourier Transform and Introduction to Linear Time Invatiant (LTI) Systems
Lecture 7 - Transmission of Signal through Linear Time Invariant (LTI) Systems and Cross- Correlation of Sign
Lecture 8 - Auto-Correlation of Signal and Energy Spectral Density (ESD)
Lecture 9 - Example for Auto-Correlation of Signal and Energy Spectral Density (ESD)
Lecture 10 - Introduction to Amplitude Modulation (AM), Modulation Index, Envelope Distortion and Over Modula
Lecture 11 - Spectrum of Amplitude Modulated(AM) Signals and Introduction to Envelope Detection
Lecture 12 - Envelope Detection for Amplitude Modulated (AM) Signals and Time Constant for Capacitor in Envel
Lecture 13 - Power of Amplitude Modulated (AM) Signals and Power Efficiency of AM Signals
Lecture 14 - Double Sideband (DSB) Suppressed Carrier (SC) Modulation, Spectrum of DSB-SC Signals and Coherer
Lecture 15 - Double Sideband(DSB) Suppressed Carrier (SC) Demodulation, Non-coherent demodulation, Impact of
Lecture 16 - Carrier Phase Offset Example for Double Sideband (DSB) Suppressed Carrier (SC) Demodulation- Wir
Lecture 17 - Phase Synchronization using Costas Receiver for Double Sideband (DSB) Suppressed Carrier (SC) De
Lecture 18 - Introduction to Quadrature Carrier Multiplexing (QCM) and Demodulation of QCM Signals.
Lecture 19 - Introduction to Single Sideband (SSB) Modulation
Lecture 20 - Generation of Single Sideband (SSB) Modulation Signals through Frequency Discrimination
Lecture 21 - Frequency Domain Description of Hilbert Transform Â Fourier Spectrum of the Hilbert Transformer
Lecture 22 - Time Domain Description of Hilbert Transform Â Impulse Response of the Hilbert Transformer
Lecture 23 - Phase Shifting Method for Generation of Single Sideband (SSB) Modulated Signals based on Hilbert
Lecture 24 - Complex Pre-Envelope and Complex Envelope of Passband Signals
Lecture 25 - Complex Pre- Envelope and Complex Envelope of QCM (Quadrature Carrier Modulated) Signals
Lecture 26 - Introduction to Vestigial Side Band(VSB) Modulation and Non- Ideal Filtering, Spectral Efficienc
Lecture 27 - Properties of Vestigial Side Band Filter for Reconstruction of Message Signal without Distortion
Lecture 28 - Introduction to Angle Modulation, Description of Phase Modulation (PM) and Frequency Modulation
Lecture 29 - Frequency Modulation (FM) with Sinusoidal Modulation Signal and Pictorial Examples, Insights of

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Lecture 30 - Indirect Method for Generation of FM Signals - Generation of Narrowband FM Signal
Lecture 31 - Indirect Method for Generation of FM Signals - Generation of Wideband FM Signal through Frequenc
Lecture 32 - Spectrum of Frequency Modulated (FM) Signals
Lecture 33 - Bandwidth of Frequency Modulated (FM) Signals - Carson's Rule
Lecture 34 - Demodulation of Frequency Modulated (FM) Signals, Condition of Envelope Detection
Lecture 35 - Analog to Digital Conversion of Signals and Introduction to Sampling
Lecture 36 - Spectrum of Sampled Signal, Aliasing and Nyquist Sampling Theorem
Lecture 37 - Ideal Impluse Train Sampling, Reconstruction of Original Signal from Samples, Sinc Interpolation
Lecture 38 - Introduction to Pulse Amplitude Modulation (PAM), Sample and Hold, Flat Top Sampling
Lecture 39 - Pulse Amplitude Modulation (PAM), Spectrum of PAM Signal , Reconstruction of Original Signal fro
Lecture 40 - Introduction to Quantization, Uniform Quantizer, Mid- Tread Quantizer
Lecture 41 - Quantization, Mid- Rise Quantizer, PDF and Power of Quantization Noise, Quantization Noise Power
Lecture 42 - Introduction to Lloyd- Max Quantization Algorithm, Optimal Quantizer Design
Lecture 43 - Lloyd- Max Quantization Algorithm, Iterative Computation of Optimal Quantization Levels and Inte
Lecture 44 - Companding for Non- Uniform Quantization, Mu-law Compressor, A- Law Compressor
Lecture 45 - Introduction to Delta Modulation, One-bit Quantizer
Lecture 46 - Signal Reconstruction in Delta Modulation, Schematic Diagrams, Slope Overload Distortion and Gra
Lecture 47 - Differential Pulse Coded Modulation (DPCM), DPCM Signal Reconstruction and Schematic Diagram
Lecture 48 - Frequency Mixing and Translation in Communication Systems, Heterodyne and Super Heterodyne Recei
Lecture 49 - Frequency Translation and Super Heterodyne Receivers, Problem of Image Frequency
Lecture 50 - Frequency Division Multiplexing (FDM), Carrier Spacing in FDM
Lecture 51 - Time Division Multiplexing (TDM), Operation of TDM, Sample Spacing in TDM
Lecture 52 - Bandwidth Requirements for Time Division Multiplexing (TDM), The T1 TDM System

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NPTEL Video Course - Electrical Engineering - NOC:An Introduction to Coding Theory

Subject Co-ordinator - Dr. Adrish Banerjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Error Control Coding - I
Lecture 2 - Introduction to Error Control Coding - II
Lecture 3 - Introduction to Error Control Coding - III
Lecture 4 - Introduction to Linear Block Codes, Generator Matrix and Parity Check Matrix
Lecture 5 - Syndrome, Error Correction and Error Detection
Lecture 6 - Problem Solving Session - I
Lecture 7 - Decoding of Linear Block Codes
Lecture 8 - Distance Properties of Linear Block Codes - I
Lecture 9 - Distance Properties of Linear Block Codes - II
Lecture 10 - Problem Solving Session - II
Lecture 11 - Some Simple Linear Block Codes - I
Lecture 12 - Some Simple Linear Block Codes - II
Lecture 13 - Bounds on the Size of a Code
Lecture 14 - Problem Solving Session - III
Lecture 15 - Introduction to Convolutional Codes - I
Lecture 16 - Introduction to Convolutional Codes - II
Lecture 17 - Convolutional Codes
Lecture 18 - Convolutional Codes
Lecture 19 - Decoding of Convolutional Codes - I
Lecture 20 - Decoding of Convolutional Codes - II
Lecture 21 - Problem solving session - IV
Lecture 22 - Problem solving session - V
Lecture 23 - Performance Bounds for Convolutional Codes
Lecture 24 - Low Density Parity Check Codes
Lecture 25 - Decoding of Low Density Parity Check Codes - I
Lecture 26 - Decoding of Low Density Parity Check Codes - II
Lecture 27 - Turbo Codes
Lecture 28 - Turbo Decoding
Lecture 29 - Problem Solving Sessions - VI

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Lecture 30 - Distance Properties of Turbo Codes
Lecture 31 - Convergence of Turbo Codes
Lecture 32 - Automatic Repeat reQuest (ARQ) Schemes
Lecture 33 - Applications of Linear Codes

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NPTEL Video Course - Electrical Engineering - NOC:Principles of Communication Systems - Part II

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Communication Systems
Lecture 2 - Spectrum of Transmitted Digital Communication Signal and Wide Sense Stationarity
Lecture 3 - Spectrum of Transmitted Digital Communication Signal, Autocorrelation Function and Power Spectral
Lecture 4 - Spectrum of Transmitted Digital Communication Signal, Relation to Energy Spectral Density and Int
Lecture 5 - Additive White Gaussian Noise (AWGN) Properties, Gaussian Noise and White Noise
Lecture 6 - Structure of Digital Communication Receiver, Receiver Filter and Signal-to-Noise Power Ratio (SNR
Lecture 7 - Digital Communication Receiver, Noise Properties and Output Noise Power
Lecture 8 - Digital Communication Receiver, Optimal SNR and Matched Filter
Lecture 9 - Probability of Error in Digital Communication and Probability Density Functions of Output
Lecture 10 - Probability of Error in Digital Communication, Optimal Decison Rule and Gaussian Q function
Lecture 11 - Introduction to Binary Phase Shift Keying (BPSK) Modulation, Optimal Decision Rule and Probabili
Lecture 12 - Introduction to Amplitude Shift Keying (ASK) Modulation
Lecture 13 - Optimal Decision Rule for Amplitude Shift Keying (ASK), Bit Error Rate (BER) and Comparison with
Lecture 14 - Introduction to Signal Space Concept and Orthonormal Basis Signals
Lecture 15 - Introduction to Frequency Shift Keying (FSK)
Lecture 16 - Optimal Decision Rule for FSK, Bit Error Rate (BER) and Comparison with BPSK, ASK
Lecture 17 - Introduction to Quadrature Phase Shift Keying (QPSK)
Lecture 18 - Waveforms of Quadrature Phase Shift Keying (QPSK)
Lecture 19 - Matched Filtering, Bit Error Rate and Symbol Error Rate for Quadrature Phase Shift Keying (QPSK)
Lecture 20 - Introduction to M-ary PAM (Pulse Amplitude Modulation), Average Symbol Power and Decision rules
Lecture 21 - M-ary PAM (Pulse Amplitude Modulation) -Part-II, Optimal Decision Rule and Probability of Error
Lecture 22 - M-ary QAM (Quadrature Amplitude Modulation) Part-I, Introduction, Transmitted Waveform and Avera
Lecture 23 - M-ary QAM (Quadrature Amplitude Modulation) - Part-II, Optimal Decision Rule, Probability of Err
Lecture 24 - M-ary PSK (Phase Shift Keying) Part-I, Introduction , Transmitted Waveform and Constellation Dia
Lecture 25 - M-ary PSK (Phase Shift Keying) - Part-II, Optimal Decision Rule, Nearest Neighbor Criterion and
Lecture 26 - Introduction to Information Theory, Relevance of Information Theory and Characterization of Info
Lecture 27 - Definition of Entropy, Average of Information / Uncertainity of source and Properties of Entropy
Lecture 28 - Entropy Example- Binary Source Maximum and Minimum Entropy of Binary Source
Lecture 29 - Maximum Entropy of Source with M-ary Alphabet, Concave/Convex Functions and Jensens Inequality

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Lecture 30 - Joint Entropy , Definition of Joint Entropy of Two Sources and Simple Examples for Joint Entropy
Lecture 31 - Properties of Joint Entropy and Relation between Joint Entropy and Marginal Entropies
Lecture 32 - Conditional Entropy, Example of Conditional Entropy and Properties of Conditional Entropy
Lecture 33 - Mutual Information, Diagrammatic Representation and Properties of Mutual Information
Lecture 34 - Simple Example of Mutual Information and Practical Example of Mutual Information-Binary Symmetri
Lecture 35 - Channel Capacity, Implications of Channel Capacity, Claude E. Shannon- Father of Information The
Lecture 36 - Differential Entropy and Example for Uniform Probability Density function
Lecture 37 - Differential Entropy of Gaussian Source and Insights
Lecture 38 - Joint Conditional/ Differential Entropies and Mutual Information
Lecture 39 - Capacity of Gaussian channel - Part I
Lecture 40 - Capacity of Gaussian Channel - Part-II, Practical Implications and Maximum rate in bits\sec
Lecture 41 - Introduction to Source Coding and Data Compression, Variable Length codes and Unique Decodabilit
Lecture 42 - Uniquely Decodable Codes, Prefix-free code, Instantaneous Code and Average Code length
Lecture 43 - Binary Tree Representation of Code, Example and Kraft Inequality
Lecture 44 - Lower Bound on Average Code Length and Kullback-Leibler Divergence
Lecture 45 - Optimal Code length, Constrained Optimization and Morse Code Example
Lecture 46 - Approaching Lower Bound on Average code length and Block Coding
Lecture 47 - Huffman Code, Algorithm, Example and Average Code Length
Lecture 48 - Introduction to channel coding, Rate of Code, Repetition Code and Hamming Distance
Lecture 49 - Introduction to Convolutional Codes, Binary Field Arithmetic and Linear Codes
Lecture 50 - Example of Convolutional Code Output and Convolution Operation for Code generation
Lecture 51 - Matrix Representation of Convolutional Codes, Generator Matrix, Transform Domain Representation
Lecture 52 - State Diagram Representation of Convolutional Code, State transitions and Example of Code Genera
Lecture 53 - Trellis Representation of Convolutional Code and Valid Code Words
Lecture 54 - Decoding of the Convolutional Code, Minimum Hamming distance and Maximum Likelihood Codeword Est
Lecture 55 - Principle of Decoding of Convolutional code
Lecture 56 - Viterbi Decoder for Maximum Likelihood Decoding of Convolutional Code Using Trellis Representati

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NPTEL Video Course - Electrical Engineering - NOC:Applied Engineering Electromagnetics

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Applied Elecromagnetics
Lecture 2 - Introduction to Transmission lines
Lecture 3 - Sinusoidal waves on Transmission lines
Lecture 4 - Terminating T-lines
Lecture 5 - Circuit parameters of a T-line
Lecture 6 - Lossy Transmission lines and primary constants
Lecture 7 - When to apply T-line Theory?
Lecture 8 - Standing Waves on T-lines
Lecture 9 - Lumped equivalent circuits of T-lines
Lecture 10 - Impedance transformation and power flow on T-lines
Lecture 11 - Graphical aid
Lecture 12 - Smith chart applications
Lecture 13 - Further applications of Smith chart - Part 1
Lecture 14 - Further applications of Smith chart - Part 2
Lecture 15 - Impedance matching techniques - Part 1
Lecture 16 - Impedance matching techniques - Part 2
Lecture 17 - Impedance matching techniques - Part 3
Lecture 18 - T-lines in time domain
Lecture 19 - Further examples of use of lattice diagrams
Lecture 20 - High-speed digital signal propagation on T-lines
Lecture 21 - Transient analysis with reactive termination and Time-domain reflectometry
Lecture 22 - Fault detection using TDR
Lecture 23 - Why Electromagnetics?
Lecture 24 - Rectangular coordinate systems
Lecture 25 - Cylindrical coordinate systems
Lecture 26 - Review of vector fields and Gradient
Lecture 27 - Divergence, Curl, and Laplacian operations
Lecture 28 - Towards Maxwells equations - Part 1
Lecture 29 - Towards Maxwells equations - Part 2

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Lecture 30 - Faradays law
Lecture 31 - Completing Maxwells equations and Boundary conditions
Lecture 32 - Boundary conditions for Electromagnetic fields
Lecture 33 - Electrostatics-I
Lecture 34 - Electrostatics-II
Lecture 35 - Electrostatics-III
Lecture 36 - Electrostatics-IV
Lecture 37 - Magnetostatic fields-I
Lecture 38 - Magnetostatic fields-II
Lecture 39 - Inductance calculations
Lecture 40 - From Maxwells equations to uniform plane waves
Lecture 41 - Plane wave propagation in lossless dielectric media
Lecture 42 - Polarization of plane waves
Lecture 43 - Can an Ideal capacitor exist?
Lecture 44 - Skin effect in conductors
Lecture 45 - Skin effect in round wires
Lecture 46 - Finite difference method
Lecture 47 - Reflection of uniform plane waves
Lecture 48 - Application
Lecture 49 - Oblique incidence of plane waves
Lecture 50 - Total internal reflection
Lecture 51 - Application
Lecture 52 - Application
Lecture 53 - Introduction to waveguides
Lecture 54 - Rectangular waveguides
Lecture 55 - Attenuation and Dispersion in rectangular waveguides
Lecture 56 - Planar optical waveguides
Lecture 57 - Application
Lecture 58 - Application
Lecture 59 - Mach-Zehnder Modulator
Lecture 60 - Wave Propagation in Anisotropic Medium
Lecture 61 - Wave Propagation in Ferrites
Lecture 62 - Magnetic Vector Potential - Part 1
Lecture 63 - Magnetic Vector Potential - Part 2
Lecture 64 - Fields of a Dipole Antenna
Lecture 65 - Antenna Parameters and Long wire Antenna
Lecture 66 - Friis Transmission Formula

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NPTEL Video Course - Electrical Engineering - NOC:Principles of Signals and Systems

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles of Signals and Systems- Introduction to Signals and Systems, Signal Classification - C
Lecture 2 - Analog and Digital Signals
Lecture 3 - Energy and Power Signals
Lecture 4 - Real Exponential Signals
Lecture 5 - Memory/Memory-less and Causal/Non-Causal Systems
Lecture 6 - Properties of Linear Systems
Lecture 7 - Example Problems - 1
Lecture 8 - Example Problems - 2
Lecture 9 - Example Problems - 3
Lecture 10 - Properties and Analysis of LTI Systems - I
Lecture 11 - Properties and Analysis of LTI Systems - II
Lecture 12 - Properties and Analysis of LTI Systems - III
Lecture 13 - Properties of Discrete Time LTI Systems
Lecture 14 - Example Problems LTI Systems - I
Lecture 15 - Example Problems LTI Systems - II
Lecture 16 - Example Problems DT-LTI Systems
Lecture 17 - Laplace Transform
Lecture 18 - Laplace Transform Properties - I
Lecture 19 - Laplace Transform Properties - II
Lecture 20 - Laplace Transform of LTI Systems
Lecture 21 - Laplace Transform Example Problems - I
Lecture 22 - Laplace Transform Example Problems - II
Lecture 23 - Laplace Transform of RL, RC Circuit
Lecture 24 - Z-Transform
Lecture 25 - Z-Transform Properties - I
Lecture 26 - Z-Transform Properties - II
Lecture 27 - Z-Transform of LTI Systems
Lecture 28 - Z-Transform Examples - I
Lecture 29 - Z-Transform Examples - II

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Lecture 30 - Z-Transform Examples - III
Lecture 31 - Z-Transform Examples - IV
Lecture 32 - Inverse Z-Transform
Lecture 33 - Fourier Analysis Introduction
Lecture 34 - Complex Exponential and Trigonometric FS
Lecture 35 - Conditions for Existence of FS
Lecture 36 - Fourier Transform (FT) Introduction
Lecture 37 - Properties of Fourier Transform - I
Lecture 38 - Properties of Fourier Transform - II
Lecture 39 - Fourier Transform - Parsevalâ s Relation
Lecture 40 - Fourier Transform of LTI Systems
Lecture 41 - FT- Ideal and Non-Ideal Filters
Lecture 42 - Fourier Analysis Examples - I
Lecture 43 - Fourier Analysis Examples - II
Lecture 44 - Fourier Analysis Examples - III
Lecture 45 - Fourier Analysis Examples - IV
Lecture 46 - Fourier Analysis Examples - V
Lecture 47 - Fourier Analysis Examples - VI
Lecture 48 - Fourier Analysis Bode Plot - I
Lecture 49 - Fourier Analysis Bode Plot - II
Lecture 50 - Fourier Transform Examples
Lecture 51 - Fourier Transform Problems
Lecture 52 - Sampling
Lecture 53 - Sampling
Lecture 54 - Fourier Analysis of Discrete Time Signals and Systems - Introduction
Lecture 55 - Fourier Analysis of Discrete Time Signals - Duality, Parsevalâ s Theorem
Lecture 56 - Discrete Time Fourier Transform
Lecture 57 - Discrete Time Fourier Transform
Lecture 58 - Discrete Time Fourier Transform
Lecture 59 - DTFT
Lecture 60 - Discrete Fourier Transform - Definition, Inverse DFT, Relation between DFT and DFS, Relation bet
Lecture 61 - Discrete Fourier Transform
Lecture 62 - Example Problems
Lecture 63 - Example Problems
Lecture 64 - DTFT Example Problems - III
Lecture 65 - DTFT Example Problems - IV
Lecture 66 - DTFT Example Problems - V
Lecture 67 - DFT Example Problems - I
Lecture 68 - Example Problems

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Lecture 69 - Group/Phase Delay - Part I
Lecture 70 - Group/Phase Delay - Part II
Lecture 71 - IIR Filter Structures
Lecture 72 - IIR Filter Structures
Lecture 73 - IIR Filter Structures
Lecture 74 - IIR Filter Structures
Lecture 75 - IIR Filter

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NPTEL Video Course - Electrical Engineering - NOC:Applied Optimization for Wireless, Machine Learning, Big Da

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vectors and Matrices - Linear Independence and Rank
Lecture 2 - Eigenvectors and Eigenvalues of Matrices and their Properties
Lecture 3 - Positive Semidefinite (PSD) and Postive Definite (PD) Matrices and their Properties
Lecture 4 - Inner Product Space and it's Properties
Lecture 5 - Inner Product Space and it's Properties
Lecture 6 - Properties of Norm, Gaussian Elimination and Echleon form of matrix
Lecture 7 - Gram Schmidt Orthogonalization Procedure
Lecture 8 - Null Space and Trace of Matrices
Lecture 9 - Eigenvalue Decomposition of Hermitian Matrices and Properties
Lecture 10 - Matrix Inversion Lemma (Woodbury identity)
Lecture 11 - Introduction to Convex Sets and Properties
Lecture 12 - Affine Set Examples and Application
Lecture 13 - Norm Ball and its Practical Applications
Lecture 14 - Ellipsoid and its Practical Applications
Lecture 15 - Norm Cone,Polyhedron and its Applications
Lecture 16 - Applications
Lecture 17 - Positive Semi Definite Cone And Positive Semi Definite (PSD) Matrices
Lecture 18 - Introduction to Affine functions and examples
Lecture 19 - norm balls and Matrix properties
Lecture 20 - Inverse of a Positive Definite Matrix
Lecture 21 - Example Problems
Lecture 22 - Problems on Convex Sets (Continued...)
Lecture 23 - Introduction to Convex and Concave Functions
Lecture 24 - Properties of Convex Functions with examples
Lecture 25 - Test for Convexity
Lecture 26 - Application
Lecture 27 - Jensen's Inequality and Practical Application
Lecture 28 - Jensen's Inequality application
Lecture 29 - Properties of Convex Functions

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Lecture 30 - Conjugate Function and Examples to prove Convexity of various Functions
Lecture 31 - Examples on Operations Preserving Convexity
Lecture 32 - Examples on Test for Convexity, Quasi-Convexity
Lecture 33 - Examples on Convex Functions
Lecture 34 - Practical Application
Lecture 35 - Practical Application
Lecture 36 - Practical Application
Lecture 37 - Practical Application
Lecture 38 - Practical Application
Lecture 39 - Practical Application
Lecture 40 - Practical Application
Lecture 41 - Linear modeling and Approximation Problems
Lecture 42 - Geometric Intuition for Least Squares
Lecture 43 - Practical Application
Lecture 44 - Practical Application
Lecture 45 - Least Norm Signal Estimation
Lecture 46 - Regularization
Lecture 47 - Convex Optimization Problem representation
Lecture 48 - Linear Program Practical Application
Lecture 49 - Stochastic Linear Program,Gaussian Uncertainty
Lecture 50 - Practical Application
Lecture 51 - Practical Application
Lecture 52 - Practical Application
Lecture 53 - Practical Application
Lecture 54 - Practical Application
Lecture 55 - Practical Application
Lecture 56 - Practical Application
Lecture 57 - Practical Application- Orthogonal Matching Pursuit (OMP) algorithm for Compressive Sensing
Lecture 58 - Example Problem
Lecture 59 - Practical Application
Lecture 60 - Practical Application of Machine Learning and Artificial Intelligence
Lecture 61 - Practical Application
Lecture 62 - Practical Application
Lecture 63 - Concept of Duality
Lecture 64 - Relation between optimal value of Primal and Dual Problems, concepts of Duality gap and Strong D
Lecture 65 - Example problem on Strong Duality
Lecture 66 - Karush-Kuhn-Tucker (KKT) conditions
Lecture 67 - Application of KKT condition
Lecture 68 - Optimal MIMO Power allocation (Waterfilling)-II

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Lecture 69 - Example problem on Optimal MIMO Power allocation (Waterfilling)
Lecture 70 - Linear objective with box constraints, Linear Programming
Lecture 71 - Example Problems II
Lecture 72 - Examples on Quadratic Optimization
Lecture 73 - Examples on Duality
Lecture 74 - Examples on Duality
Lecture 75 - Semi Definite Program (SDP) and its application
Lecture 76 - Application
Lecture 77 - Introduction to big Data
Lecture 78 - Matrix Completion Problem in Big Data
Lecture 79 - Matrix Completion Problem in Big Data

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NPTEL Video Course - Electrical Engineering - NOC:Fiber-Optic Communication Systems and Techniques

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of fiber-optic communication systems
Lecture 2 - Review of Maxwellâ s equations
Lecture 3 - Uniform plane waves (UWPs) in free-space
Lecture 4 - Properties of UWPs (propagation constant, polarization, and Poynting vector)
Lecture 5 - Boundary conditions and reflection from a PEC
Lecture 6 - Obliquely incident waves-I (TE and TM waves, Snellâ s laws)
Lecture 7 - Obliquely incident waves-II (Reflection and transmission coefficients, Brewster angle)
Lecture 8 - Total internal reflection
Lecture 9 - Ray theory of dielectric slab waveguides
Lecture 10 - Transverse resonance condition for slab waveguides
Lecture 11 - Introduction to optical fibers
Lecture 12 - Ray theory of light propagation in optical fibers
Lecture 13 - Concept of waveguide modes
Lecture 14 - Systematic procedure to obtain modes of a waveguide
Lecture 15 - Systematic analysis of parallel plate metallic waveguide
Lecture 16 - Systematic analysis of dielectric slab waveguides
Lecture 17 - Further discussion on slab waveguides
Lecture 18 - Modal analysis of step index optical fiber
Lecture 19 - Properties of modes of step-index optical fiber - I
Lecture 20 - Properties of modes of step-index optical fiber - II
Lecture 21 - Linearly polarized modes
Lecture 22 - Attenuation and power loss in fibers
Lecture 23 - Introduction to dispersion in fibers
Lecture 24 - Mathematical modelling of dispersion
Lecture 25 - Pulse propagation equation and its solution
Lecture 26 - Pre-chirped pulses and Inter and Intra-modal dispersion in optical fibers
Lecture 27 - Beam Propagation Method
Lecture 28 - Polarization Effects on Pulse Propagation
Lecture 29 - Modes in Optical Fibres and Pulse Propagation in Optical Fibres

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Lecture 30 - Graded Index Fibers
Lecture 31 - Light Sources, Detectors and Amplifiers
Lecture 32 - Basics of Lasers-I (Structure of Lasers, Process of Photon Emission)
Lecture 33 - Basics of Lasers-II (Einstein's Theory of Radiation)
Lecture 34 - Basics of Lasers-III (Population Inversion and Rate Equation for Lasers)
Lecture 35 - Basic Properties of Semiconductor Laser-I (Energy Gap, Intrinsic and Extrinsic Semiconductors)
Lecture 36 - Basic Properties of Semiconductor Laser-II (Fermi Level)
Lecture 37 - Optical Properties of Semiconductors-I (Direct Bandgap and Indirect Bandgap, Density of States)
Lecture 38 - Optical Properties of Semiconductors-II (Gain, Absorption, Recombination rate) Homojunction Lase
Lecture 39 - Double Heterostructure Lasers, Introduction to Quantum Well Lasers
Lecture 40 - Semiconductor Optical Amplifier
Lecture 41 - Erbium-doped fiber amplifier
Lecture 42 - Photodetectors
Lecture 43 - Noise in Photodetectors
Lecture 44 - Introduction to WDM components
Lecture 45 - Couplers, Circulators, FRM and Filters
Lecture 46 - Filter, MUX/DEMUX, Diffraction grating (FBG and Long period grating)
Lecture 47 - Optical Modulators-I (Current modulation)
Lecture 48 - Optical Modulators-II (Electro-optic modulators)
Lecture 49 - Review of Communication Concepts-I (Deterministic and Random Signals, Baseband and Passband Sign
Lecture 50 - Review of Communication Concepts-II (Signal and vectors, Signal energy, Orthonormal basis functi
Lecture 51 - Intensity modulation/ Direct Detection
Lecture 52 - BER discussion for OOK systems
Lecture 53 - Higher order modulation and Coherent Receiver
Lecture 54 - Coherent receiver for BPSK systems and BER calculation
Lecture 55 - Recovering Polarization
Lecture 56 - DSP algorithms for Chromatic dispersion mitigation
Lecture 57 - DSP algorithms for Carrier phase estimation - I
Lecture 58 - DSP algorithms for Carrier phase estimation - II
Lecture 59 - Nonlinear effects in fiber
Lecture 60 - Four wave mixing, Loss measurement, Dispersion measurement
Lecture 61 - Lab Demonstration (Laser diode characteristics, Loss measurement, Optical Intensity Modulation)

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NPTEL Video Course - Electrical Engineering - NOC:Electromagnetic Waves in Guided and Wireless Media

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Types of Transmission Lines
Lecture 2 - Distributed Circuit Model of Uniform Transmission Line
Lecture 3 - Voltage and Current Equation of the Transmission line
Lecture 4 - Sinusoidal Excitation of Transmission Line (Propagation constant, Characteristic Impedance)
Lecture 5 - Properties of Transmission Line (Reflection Coefficient, Input Impedance, Standing Wave Ratio)
Lecture 6 - Power Calculations and Introduction to Smith Chart
Lecture 7 - Smith Chart
Lecture 8 - Additional Applications of Smith Chart
Lecture 9 - Time domain Analysis of Transmission Line - I
Lecture 10 - Time domain Analysis of Transmission Line - II
Lecture 11 - Usage of Lattice Diagrams
Lecture 12 - TDR analysis of Transmission Lines
Lecture 13 - Introduction to Propagation of Electromagnetic Waves
Lecture 14 - Uniform Plane Waves - I
Lecture 15 - Uniform Plane Waves - II
Lecture 16 - Poynting Vector, Average Power, Polarization
Lecture 17 - Uniform Plane Waves in Lossy Medium
Lecture 18 - Normal Incidence of Plane Waves
Lecture 19 - Oblique Incidence of Plane Waves - I
Lecture 20 - Oblique Incidence of Plane Waves - II
Lecture 21 - Total Internal Reflection
Lecture 22 - Slab Waveguides
Lecture 23 - Optical Fibers
Lecture 24 - Parallel Plate Waveguides
Lecture 25 - Rectangular Waveguides
Lecture 26 - Modes of Rectangular Waveguides
Lecture 27 - Waveguides summary and Introduction to Radiation
Lecture 28 - Solution to Electric Scalar Potential and Magnetic Vector Potential Equations
Lecture 29 - Further discussion on Magnetic Vector Potential and Elementary Hertzian Dipole

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Lecture 30 - Near field and Far-field Antenna and Properties of Antennas
Lecture 31 - Linear antenna - I
Lecture 32 - Linear antenna - II and Properties of Transmitting and Receiving Antenna
Lecture 33 - Friis Transmission Formula
Lecture 34 - Antenna Array
Lecture 35 - Wireless Channel
Lecture 36 - Further discussion on Wireless Channel Modelling
Lecture 37 - Diffraction - I
Lecture 38 - Diffraction - II
Lecture 39 - Distribution of Laser Beam
Lecture 40 - Interference (Double slit experiment, Fabry Perot Interferometer)
Lecture 41 - Summary

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NPTEL Video Course - Electrical Engineering - NOC:Basic Electric Circuits

Subject Co-ordinator - Prof. Ankush Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts
Lecture 2 - Sinusoids and Phasors
Lecture 3 - Circuit Elements - Part 1
Lecture 4 - Circuit Elements - Part 2
Lecture 5 - AC Power Analysis
Lecture 6 - RMS Voltage and Current
Lecture 7 - Topology
Lecture 8 - Star-Delta Transformation and Mesh Analysis
Lecture 9 - Mesh Analysis.
Lecture 10 - Nodal Analysis
Lecture 11 - Linearity Property and Superposition Theorem
Lecture 12 - Source Transformation
Lecture 13 - Duality
Lecture 14 - Thevenin's Theorem - 1
Lecture 15 - Thevenin's Theorem - 2
Lecture 16 - Norton's Theorem - 1
Lecture 17 - Norton's Theorem - 2
Lecture 18 - Maximum Power Transfer Theorem - 1
Lecture 19 - Maximum Power Transfer Theorem - 2
Lecture 20 - Reciprocity and Compensation Theorem
Lecture 21 - First Order RC Circuits
Lecture 22 - First Order RL Circuits
Lecture 23 - Singularity Functions
Lecture 24 - Step Response of RC and RL Circuits
Lecture 25 - Second Order Response
Lecture 26 - Step Response of Second Order Circuits-First Order and Second Order Circuits (Continued...)
Lecture 27 - Step Response of Parallel RLC Circuit-First Order and Second Order Circuits (Continued...)
Lecture 28 - Definition of the Laplace Transform
Lecture 29 - Properties of the Laplace Transform

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Lecture 30 - Inverse Laplace Transform
Lecture 31 - Laplace Transform of Circuit Elements
Lecture 32 - Transfer Function
Lecture 33 - Convolution Integral
Lecture 34 - Graphical Approach of Convolution Integral
Lecture 35 - Network Stability and Network Synthesis
Lecture 36 - Impedance Parameters
Lecture 37 - Admittance Parameters
Lecture 38 - Hybrid Parameters
Lecture 39 - Transmission Parameters
Lecture 40 - Interconnection of Networks
Lecture 41 - Nodal and Mesh Analysis
Lecture 42 - Superposition Theorem and Source Transformation
Lecture 43 - Thevenin's, Norton's and, Maximum Power Transfer Theorem
Lecture 44 - Magnetically Coupled Circuits
Lecture 45 - Energy in Coupled Circuits and Ideal Transformer
Lecture 46 - Ideal Transformer and Introduction to Three-Phase Circuits
Lecture 47 - Balanced Three-Phase Connections
Lecture 48 - Balanced Wye-Delta and Delta-Delta Connections
Lecture 49 - Balanced Delta-Wye Connection and Power in Balanced Three-Phase System
Lecture 50 - Unbalanced Three-Phase System and Three-Phase Power Measurement
Lecture 51 - Introduction to Graphical Models
Lecture 52 - State Equations
Lecture 53 - State Diagram
Lecture 54 - State Transition Matrix
Lecture 55 - State Variable Method to Circuit Analysis
Lecture 56 - Characteristic Equation, Eigenvalues, and Eigenvectors-State Variable Analysis (Continued...)
Lecture 57 - Modeling of Mechanical Systems
Lecture 58 - Modeling of The Rotational Motion of Mechanical Systems
Lecture 59 - Modeling of Electrical Systems
Lecture 60 - Solving Analogous Systems

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NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Electric Drives

Subject Co-ordinator - Prof. Shyama Prasad Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Electric Drives
Lecture 2 - Dynamics of Electric Drives, Four Quadrant Operation, Equivalent Drive Parameters
Lecture 3 - Equivalent Drive Parameters, Friction Components, Nature of Load Torque
Lecture 4 - Steady State Stability, Load Equalization
Lecture 5 - Load Equalization, Characteristics of DC Motor
Lecture 6 - Speed Torque Characteristics of Separately Excited DC Motor and Series DC Motor
Lecture 7 - Field Control of Series Motor, Motoring and Braking of Separately Excited and Series DC motors
Lecture 8 - Speed Control of Separately Excited DC Motor Using Controlled Rectifiers
Lecture 9 - Analysis of Single Phase Full Controlled Converter-fed Separately Excited DC Motor
Lecture 10 - Speed Torque Characteristics of Full Controlled Converter-fed Separately Excited DC Motor, Analy
Lecture 11 - Analysis of Single Phase Half Controlled Converter-fed Separately Excited DC Motor.
Lecture 12 - Three Phase Full Controlled Converter-fed Separately Excited DC Motor, Multi-quadrant Operation
Lecture 13 - Dual Converter-fed DC Motor, Multi-quadrant Operation Using Field Current Reversal
Lecture 14 - DC Chopper-fed Separately Excited DC Motor for Motoring and Braking
Lecture 15 - Two-quadrant DC Chopper, Four-quadrant DC Chopper
Lecture 16 - Dynamic Braking of DC Motor by Chopper Controlled Resistor, Closed-loop Operation of DC Drives,
Lecture 17 - Speed Torque Characteristics of Induction Motor, Operation of Induction Motor from Non-sinusoida
Lecture 18 - Operation of Induction Motor from Non-sinusoidal Supply
Lecture 19 - Stator Current of Induction Motor with Non-sinusoidal Supply, Operation of Induction Motor with
Lecture 20 - Single Phasing of Induction Motor, Braking of Induction Motor
Lecture 21 - Dynamic braking of induction motor, AC dynamic braking, DC dynamic braking
Lecture 22 - Analysis of DC dynamic braking of induction motor
Lecture 23 - Self-excited dynamic braking of induction motor, Speed control of induction motor using stator v
Lecture 24 - Variable voltage variable frequency control of induction motor, Open loop V/F control
Lecture 25 - Slip speed control of induction motor, Constant Volt/Hz control with slip speed regulation
Lecture 26 - Closed-loop Volt/Hz control of induction motor with slip speed regulation, Multi-quadrant operat
Lecture 27 - Current Source Inverter (CSI) fed induction motor drive
Lecture 28 - Closed-loop operation of current source inverter (CSI) fed induction motor drive, Control of sli
Lecture 29 - Closed-loop operation of slip ring induction motor with static rotor resistance control, Slip po

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Lecture 30 - Static Kramer drive and its closed-loop control, Introduction to synchronous motor
Lecture 31 - Various types of synchronous motors, Equivalent circuit and phasor diagram of cylindrical synchr
Lecture 32 - Phasor diagram of salient pole synchronous motor, Expression of power and torque for a salient p
Lecture 33 - Open-loop V/f control, Torque-speed characteristics, Self controlled synchronous motor drive emp
Lecture 34 - Detailed analysis of commutation of load commutated thyrisor inverter, Derivation of overlap ang
Lecture 35 - Low cost brushless DC motor (BLDCM), Trapezoidal permanent magnet AC motor
Lecture 36 - Trapezoidal permanent magnet AC motor, Derivation of power and torque, Closed-loop control of tr
Lecture 37 - Construction and operating principle of switched reluctance motor
Lecture 38 - Current/ voltage control for switched reluctance motor, operating modes of switched reluctance m
Lecture 39 - Current collector for mainline trains, Nature of traction load, Duty cycle of traction drives
Lecture 40 - Duty cycle of traction drives, Distance between two stops, Calculation of total tractive effort

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NPTEL Video Course - Electrical Engineering - NOC:Fuzzy Sets, Logic and Systems and Applications

Subject Co-ordinator - Prof. Nishchal K Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Fuzzy Sets and Fuzzy Logic Toolbox in MATLAB - I
Lecture 4 - Fuzzy Sets and Fuzzy Logic Toolbox in MATLAB - II
Lecture 5 - Membership Functions - I
Lecture 6 - Membership Functions - II
Lecture 7 - Nomenclatures used in Fuzzy Set Theory - I
Lecture 8 - Nomenclatures used in Fuzzy Set Theory - II
Lecture 9 - Nomenclatures used in Fuzzy Set Theory - III
Lecture 10 - Set Theoretic Operations on Fuzzy Sets - I
Lecture 11 - Set Theoretic Operations on Fuzzy Sets - II
Lecture 12 - Properties of Fuzzy Sets - I
Lecture 13 - Properties of Fuzzy Sets - II
Lecture 14 - Properties of Fuzzy Sets - III
Lecture 15 - Properties of Fuzzy Sets - IV
Lecture 16 - Properties of Fuzzy Sets - V
Lecture 17 - Distance between Fuzzy Sets - I
Lecture 18 - Distance between Fuzzy Sets - II
Lecture 19 - Distance between Fuzzy Sets - III
Lecture 20 - Arithmetic Operations on Fuzzy Numbers - I
Lecture 21 - Arithmetic Operations on Fuzzy Numbers - II
Lecture 22 - Arithmetic Operations on Fuzzy Numbers - III
Lecture 23 - Complement of Fuzzy Sets
Lecture 24 - T-norm Operators
Lecture 25 - S-norm Operators
Lecture 26 - Parameterized T-Norm Operators
Lecture 27 - Parameterized S-Norm Operators
Lecture 28 - Fuzzy Relation - I
Lecture 29 - Fuzzy Relation - II

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Lecture 30 - Operations on Crisp and Fuzzy Relations
Lecture 31 - Projection of Fuzzy Relation Set
Lecture 32 - Cylindrical Extension of Fuzzy Set
Lecture 33 - Properties of Fuzzy Relation - I
Lecture 34 - Properties of Fuzzy Relation - II
Lecture 35 - Extension Principle
Lecture 36 - Composition of Fuzzy Relations
Lecture 37 - Properties of Composition of Fuzzy Relations
Lecture 38 - Fuzzy Tolerance and Equivalence Relations - I
Lecture 39 - Fuzzy Tolerance and Equivalence Relations - II
Lecture 40 - Fuzzy Tolerance and Equivalence Relations - III
Lecture 41 - Linguistic Hedges
Lecture 42 - Linguistic Hedges and Negation/ Complement and Connectives
Lecture 43 - Concentration and Dilation and Composite Linguistic Term and Some Examples
Lecture 44 - Dilation and Composite Linguistic Term and Some Examples
Lecture 45 - Some Examples on Composite Linguistic Terms
Lecture 46 - Contrast Intensification of Fuzzy Sets
Lecture 47 - Orthogonality of Fuzzy Sets
Lecture 48 - Fuzzy Rules and Fuzzy Reasoning - I
Lecture 49 - Fuzzy Rules and Fuzzy Reasoning - II
Lecture 50 - Fuzzy Inference System
Lecture 51 - Mamdani Fuzzy Model - I
Lecture 52 - Mamdani Fuzzy Model - II
Lecture 53 - Mamdani Fuzzy Model - III
Lecture 54 - Example on Mamdani Fuzzy Model for Single Antecedent with Three Rules
Lecture 55 - Example on Mamdani Fuzzy Model for Two Antecedents with Four Rules
Lecture 56 - Larsen Fuzzy Model - I
Lecture 57 - Larsen Fuzzy Model - II
Lecture 58 - Larsen Fuzzy Model - III
Lecture 59 - Tsukamoto Fuzzy Model
Lecture 60 - TSK Fuzzy Model

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NPTEL Video Course - Electrical Engineering - NOC:Peer to Peer Networks

Subject Co-ordinator - Prof. Yatindra N Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Peer to Peer Networks
Lecture 2 - Peer to Peer Network in Telephony
Lecture 3 - Building DHT Networks
Lecture 4 - Logarithmic Partitioning of Node ID Space and Index Entry Authenticity
Lecture 5 - Implementation of Voice over Internet Telephony in P2P Way
Lecture 6 - Leaf Nodes, Core Nodes and Type of Messages in DHT Networks
Lecture 7 - Static and Dynamic Partitioning of Node ID Space
Lecture 8 - PASTRY Protocol
Lecture 9 - Understanding the PASTRY Protocol through Example
Lecture 10 - Kademlia
Lecture 11 - Tapestry
Lecture 12 - Understanding the Tapestry Protocol through Example
Lecture 13 - Multi-dimensional Distributed Hash Table
Lecture 14 - Multi-Layer DHT
Lecture 15 - Keeping <Key, Value> Pairs at Correct Root Nodes
Lecture 16 - Abrupt and Graceful Exit of Root Node
Lecture 17 - Resilience of <Key, Value> Pairs
Lecture 18 - A P2P Distributed File System
Lecture 19 - Storage Space Problem and Incentives to Share Storage
Lecture 20 - P2P Nodes Communications Challenges in Heterogeneous Network Environments
Lecture 21 - P2P Overlaid Multicast
Lecture 22 - P2P Overlaid Multicast
Lecture 23 - A Design of P2P Email System
Lecture 24 - P2P Mailing List Services
Lecture 25 - P2P Mailing List Services
Lecture 26 - P2P Web
Lecture 27 - P2P Web Search Engine
Lecture 28 - P2P Internet
Lecture 29 - P2P in Blockchain

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Lecture 30 - P2P Anonymous Communication
Lecture 31 - The Anonymous Communication on the Internet through TOR Network
Lecture 32 - An Introduction To TOR Browser
Lecture 33 - Hidden Services on TOR Network
Lecture 34 - MOOC Wrap-Up

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NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra for Signal Processing, Data Analytic

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vector Properties: Addition, Linear Combination, Inner Product, Orthogonality, Norm
Lecture 2 - Vectors: Unit Norm Vector, Cauchy-Schwarz inequality, Radar Application
Lecture 3 - Inner Product Application: Beamforming in Wireless Communication Systems
Lecture 4 - Matrices, Definition, Addition and Multiplication of Matrices
Lecture 5 - Matrix: Column Space, Linear Independence, Rank of Matrix, Gaussian Elimination
Lecture 6 - Matrix: Determinant, Inverse Computation, Adjoint, Cofactor Concepts
Lecture 7 - Applications of Matrices: Solution of System of Linear equations, MIMO Wireless Technology
Lecture 8 - Applications of Matrices: Electric Circuits, Traffic flows
Lecture 9 - Applications of Matrices: Graph Theory, Social Networks, Dominance Directed Graph, Influential No
Lecture 10 - Null Space of Matrix: Definition, Rank-Nullity Theorem, Application in Electric Circuits
Lecture 11 - Gram-Schmidt Orthogonalization
Lecture 12 - Gaussian Random Variable: Definition, Mean, Variance, Multivariate Gaussian, Covariance Matrix
Lecture 13 - Linear Transformation of Gaussian Random Vectors
Lecture 14 - Machine Learning Application: Gaussian Classification
Lecture 15 - Eigenvalue: Definition, Characteristic Equation, Eigenvalue Decomposition
Lecture 16 - Special Matrices: Rotation and Unitary Matrices, Application: Alamouti Code
Lecture 17 - Positive Semi-definite (PSD) Matrices: Definition, Properties, Eigenvalue Decomposition
Lecture 18 - Positive Semidefinite Matrix: Example and Illustration of Eigenvalue Decomposition
Lecture 19 - Machine Learning Application: Principle Component Analysis (PCA)
Lecture 20 - Computer Vision Application: Face Recognition, Eigenfaces
Lecture 21 - Least Squares (LS) Solution, Pseudo-Inverse Concept
Lecture 22 - Least Squares (LS) via Principle of Orthogonality, Projection Matrix, Properties
Lecture 23 - Application: Pseudo-Inverse and MIMO Zero Forcing (ZF) Receiver
Lecture 24 - Wireless Application: Multi-Antenna Channel Estimation
Lecture 25 - Machine Learning Application: Linear Regression
Lecture 26 - Computation Mathematics Application: Polynomial Fitting
Lecture 27 - Least Norm Solution
Lecture 28 - Wireless Application: Multi-user Beamforming
Lecture 29 - Singular Value Decomposition (SVD): Definition, Properties, Example

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Lecture 30 - SVD Application in MIMO Wireless Technology: Spatial-Multiplexing and High Data Rates
Lecture 31 - SVD for MIMO wireless optimization, water-filling algorithm, optimal power allocation
Lecture 32 - SVD application for Machine Learning: Principal component analysis (PCA)
Lecture 33 - Multiple signal classification (MUSIC) algorithm: system model
Lecture 34 - MUSIC algorithm for Direction of Arrival (DoA) estimation
Lecture 35 - Linear minimum mean square error (LMMSE) principle
Lecture 36 - LMMSE estimate and error covariance matrix
Lecture 37 - LMMSE estimation in linear systems
Lecture 38 - LMMSE application: Wireless channel estimation and example
Lecture 39 - Time-series prediction via auto-regressive (AR) model
Lecture 40 - Recommender system: design and rating prediction
Lecture 41 - Recommender system: Illustration via movie rating prediction example
Lecture 42 - Fast Fourier transform (FFT) and Inverse fast Fourier transform (IFFT)
Lecture 43 - IFFT/ FFT application in Orthogonal Frequency Division Multiplexing (OFDM) wireless technology
Lecture 44 - OFDM system: Circulant matrices and properties
Lecture 45 - OFDM system model: Transmitter and receiver processing
Lecture 46 - Single-carrier frequency division for multiple access (SC-FDMA) technology
Lecture 47 - Linear dynamical systems: definition and solution via matrix exponential
Lecture 48 - Linear dynamical systems: matrix exponential via SVD
Lecture 49 - Machine Learning application: Support Vector Machines (SVM)
Lecture 50 - Support Vector Machines (SVM): Problem formulation via maximum hyperplane separation
Lecture 51 - Sparse regression: problem formulation and relation to Compressive Sensing (CS)
Lecture 52 - Sparse regression: solution via the Orthogonal Matching Pursuit (OMP) algorithm
Lecture 53 - OMP Example for Sparse Regression
Lecture 54 - Machine Learning Application: Clustering
Lecture 55 - K-Means Clustering algorithm
Lecture 56 - Introduction to Stochastic Processes and Markov Chains
Lecture 57 - Discrete Time Markov Chains and Transition Probability Matrix
Lecture 58 - Discrete Time Markov Chain Examples
Lecture 59 - m-STEP Transition Probabilities for Discrete Time Markov Chains
Lecture 60 - Limiting Behavior of Discrete Time Markov Chains
Lecture 61 - Least Squares Revisited: Rank Deficient Matrix
Lecture 62 - Least Squares using SVD
Lecture 63 - Weighted Least Squares
Lecture 64 - Weighted Least Squares Example
Lecture 65 - Woodbury Matrix Identity - Matrix Inversion Lemma
Lecture 66 - Woodbury Matrix Identity - Proof
Lecture 67 - Conditional Gaussian Density - Mean
Lecture 68 - Conditional Gaussian Density - Covariance

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Lecture 69 - Scalar Linear Model for Gaussian Estimation
Lecture 70 - MMSE Estimate and Covariance for the Scalar Linear Model

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NPTEL Video Course - Electrical Engineering - NOC:Economic Operations and Control of Power Systems

Subject Co-ordinator - Prof. Gururaj Mirle Vishwanath, Prof. Narayana Prasad Padhy

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Electrical Engineering - NOC:Digital Switching

Subject Co-ordinator - Prof. Yatindra N Singh

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Electrical Engineering - NOC:Analog VLSI Design

Subject Co-ordinator - Prof. Imon Mondal

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Multi-Agent Systems

Subject Co-ordinator - Prof. Twinkle Tripathy

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Networked Dynamical Systems, Motivational examples, Mathematical Preliminaries
Lecture 2 - Introduction to Networked Dynamical Systems, Motivational examples, Mathematical Preliminaries
Lecture 3 - Introduction to Networked Dynamical Systems, Motivational examples, Mathematical Preliminaries
Lecture 4 - Introduction to Networked Dynamical Systems, Motivational examples, Mathematical Preliminaries
Lecture 5 - Mathematical Preliminaries (Continued...)
Lecture 6 - Mathematical Preliminaries (Continued...)
Lecture 7 - Mathematical Preliminaries (Continued...)
Lecture 8 - Elementary Graph theory - Graphs, digraphs, subgraphs, walks and connectivity
Lecture 9 - Elementary Graph theory - Graphs, digraphs, subgraphs, walks and connectivity
Lecture 10 - Elementary Graph theory - Graphs, digraphs, subgraphs, walks and connectivity
Lecture 11 - Elementary Graph theory - Graphs, digraphs, subgraphs, walks and connectivity
Lecture 12 - Elementary Graph theory - Graphs, digraphs, subgraphs, walks and connectivity
Lecture 13 - Algebraic Graph theory - Adjacency matrix, Spectral graph theory, Algebraic connectivity
Lecture 14 - Algebraic Graph theory - Adjacency matrix, Spectral graph theory, Algebraic connectivity
Lecture 15 - Algebraic Graph theory - Adjacency matrix, Spectral graph theory, Algebraic connectivity
Lecture 16 - Algebraic Graph theory - Adjacency matrix, Spectral graph theory, Algebraic connectivity
Lecture 17 - Algebraic Graph theory - Adjacency matrix, Spectral graph theory, Algebraic connectivity
Lecture 18 - Distributed averaging algorithms and their applications
Lecture 19 - Distributed averaging algorithms and their applications
Lecture 20 - Distributed averaging algorithms and their applications
Lecture 21 - Centrality indices
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Lecture 26 - Laplacian and incidence matrices
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Lecture 28 - Laplacian and incidence matrices
Lecture 29 - Laplacian and incidence matrices

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Lecture 30 - Laplacian and incidence matrices
Lecture 31 - Laplacian flows; Controllability in multi-agent systems
Lecture 32 - Laplacian flows; Controllability in multi-agent systems
Lecture 33 - Laplacian flows; Controllability in multi-agent systems
Lecture 34 - Laplacian flows; Controllability in multi-agent systems
Lecture 35 - Laplacian flows; Controllability in multi-agent systems
Lecture 36 - Dynamical systems and stability notions
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Lecture 46 - Opinion evolution in social networks
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Lecture 51 - Consensus protocols for cyber-physical systems and coupled oscillator networks
Lecture 52 - Consensus protocols for cyber-physical systems and coupled oscillator networks
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Lecture 56 - Consensus protocols for cyber-physical systems and coupled oscillator networks

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NPTEL Video Course - Electrical Engineering - NOC:Power Network Analysis

Subject Co-ordinator - Prof. Abheejeet Mohapatra

Co-ordinating Institute - IIT Kanpur

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Lecture 1 - Introduction
Lecture 2 - Basic Circuit Principles - Phasor Diagrams
Lecture 3 - Basic Circuit Principles - Power in 1â AC circuit
Lecture 4 - Basic Circuit Principles - Power in 3â AC circuit
Lecture 5 - Transformers and per unit analysis - Basics of Transformers
Lecture 6 - Transformers and per unit analysis - Basics and 3â transformers
Lecture 7 - Transformers and per unit analysis - per unit analysis
Lecture 8 - Transformers and per unit - example
Lecture 9 - Synchronous - Basics of 3â machines
Lecture 10 - Synchronous Generators - Induced emf, armature reaction
Lecture 11 - Synchronous Generators - equivalent circuit representation
Lecture 12 - Synchronous Generators - power expressions and capability curves
Lecture 13 - Synchronous Generators - capability curves
Lecture 14 - Synchronous Generators - Real and reactive power control
Lecture 15 - Synchronous Generators - Economic Dispatch
Lecture 16 - Synchronous Generators - Parallel Operation
Lecture 17 - Transmission line parameters - line resistance
Lecture 18 - Transmission line parameters - inductance due to internal flux
Lecture 19 - Transmission line parameters - inductance between points outside conductor
Lecture 20 - Transmission line parameters - magnetic flux linkage of a conductor in a group of conductors
Lecture 21 - Transmission line parameters - inductance of 3â lines
Lecture 22 - Transmission line parameters - capacitance evaluation
Lecture 23 - Transmission line parameters - capacitance of 3â lines, effect of earth
Lecture 24 - Transmission line parameters - use of tables for reactance calculation and example
Lecture 25 - Transmission line models and performance - basics, two-port network
Lecture 26 - Transmission line models and performance - short line model
Lecture 27 - Transmission line models and performance - medium line model
Lecture 28 - Transmission line models and performance - long line model
Lecture 29 - Transmission line models and performance - long line model, lossless long line

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Lecture 30 - Transmission line models and performance - surge impedance loading, complex power flow
Lecture 31 - Transmission line models and performance - reactive power compensation
Lecture 32 - Power flow analysis - Basic circuit analysis
Lecture 33 - Power flow analysis - Basis/ assumptions in power flow, Bus admittance matrix
Lecture 34 - Power flow analysis - Effect of mutually coupled impedances and transformer taps in bus admittar
Lecture 35 - Power flow analysis - equations, classification of buses
Lecture 36 - Power flow analysis - equations, classification of buses
Lecture 37 - Power flow analysis - Gauss-Seidel method
Lecture 38 - Power flow analysis - Newton-Raphson method (polar coordinates)
Lecture 39 - Power flow analysis - Newton-Raphson method (rectangular coordinates)
Lecture 40 - Power flow analysis - Fast Decoupled method
Lecture 41 - Power flow analysis - DC Power flow
Lecture 42 - Power flow analysis - backward-forward technique for distribution networks
Lecture 43 - Fault analysis - Synchronous machine parameter variations, time constants
Lecture 44 - Fault analysis - Behaviour of synchronous machine just after a fault, difference between power f
Lecture 45 - Fault analysis - Basis of Theveninâ s theorem
Lecture 46 - Fault analysis - Balanced fault analysis
Lecture 47 - Fault analysis - Fortescueâ s theorem and sequence components
Lecture 48 - Fault analysis - Unbalanced fault analysis
Lecture 49 - Fault analysis - Unbalanced fault analysis
Lecture 50 - Fault analysis - Solved examples
Lecture 51 - Fault analysis - Protection challenges due to Renewable Energy (RE) resource integration
Lecture 52 - Stability analysis - Basics and classification of power system stability
Lecture 53 - Stability analysis - Swing equation - Part I
Lecture 54 - Stability analysis - Swing equation - Part II
Lecture 55 - Stability analysis - Ward reduction, Single machine infinite bus system
Lecture 56 - Stability analysis - Synchronizing power coefficient, Equal area criteria
Lecture 57 - Stability analysis - More on equal area criteria, Basics of numeric integration
Lecture 58 - Stability analysis - Solved examples
Lecture 59 - Stability analysis - Multi-machine transient rotor angle stability
Lecture 60 - Stability analysis - Challenge with RE integration

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NPTEL Video Course - Electrical Engineering - NOC:Basic Overview of Semiconductor Device Processing and IC Fa

Subject Co-ordinator - Prof. S. Sundar Kumar Iyer

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction of Course
Lecture 2 - Historical Perspective on IC Technology
Lecture 3 - Scaling Trends in IC Fabrication
Lecture 4 - Moore's Law
Lecture 5 - Scaling of MOSFET
Lecture 6 - Enablers of VLSI Technology - Part I
Lecture 7 - Enablers of VLSI Technology - Part II
Lecture 8 - Some Background Information
Lecture 9 - Planar Processing of n+-p Diode
Lecture 10 - CMOS Processing - Masks Involved
Lecture 11 - CMOS Planar Processing - Part I
Lecture 12 - CMOS Planar Processing - Part II
Lecture 13 - A Glimpse of Advanced FET Structure Evolution
Lecture 14 - IC Packaging - Far Back End of Line
Lecture 15 - Vacuum Systems - Part I
Lecture 16 - Vacuum Systems - Part II
Lecture 17 - Plasma for Semiconductor Processing
Lecture 18 - Crystalline Substrates - Part I
Lecture 19 - Crystalline Substrates - Part II
Lecture 20 - Crystalline Silicon Substrates
Lecture 21 - Silicon on Insulator (SOI) Substrates
Lecture 22 - GaAs and Other Substrates
Lecture 23 - Oxidation of Silicon - Part I
Lecture 24 - Oxidation of Silicon - Part II
Lecture 25 - Thermal Nitridation of Silicon
Lecture 26 - Diffusion - Part I
Lecture 27 - Diffusion - Part II
Lecture 28 - Diffusion - Part III
Lecture 29 - Ion Implantation - Part I

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Lecture 30 - Ion Implantation - Part II
Lecture 31 - Thin Film Process
Lecture 32 - Chemical Vapour Deposition (CVD) - Part I
Lecture 33 - Chemical Vapour Deposition (CVD) - Part II
Lecture 34 - Physical Vapour Deposition (PVD)
Lecture 35 - Lithography
Lecture 36 - Etch Process
Lecture 37 - Statistical Tools for Processing
Lecture 38 - Concluding Comments

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NPTEL Video Course - Electrical Engineering - NOC:Peer to Peer Networks in Hindi

Subject Co-ordinator - Prof. Y. N. Singh

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - P2P_Vs_Client server, Centralized indexing
Lecture 2 - SIP Telephony
Lecture 3 - Hashing, Consistent Hashing
Lecture 4 - Rendezevous Hashing and Chord
Lecture 5 - Chord-Routing Table Management
Lecture 6 - Chord Backward, Forward RTs, Finger Tables
Lecture 7 - Distance Metric Based Routing, Logarithmic Partitioning
Lecture 8 - Kademlia-Routing Example
Lecture 9 - Pastry-Introduction
Lecture 10 - Pastry-Routing Table Management and Routing
Lecture 11 - Pastry-Routing Table Construction and Maintenance and Routing
Lecture 12 - Tapestry-Introduction
Lecture 13 - Tapestry-Octal-Digits
Lecture 14 - Modified Tapestry, CAN
Lecture 15 - PKI, Random Node ID
Lecture 16 - Node ID Assignment Process
Lecture 17 - Core and Leaf Nodes
Lecture 18 - Differential Routing, Identity Certs, Mutual Authentication
Lecture 19 - Layered DHT
Lecture 20 - Resilience Mechanism
Lecture 21 - VoIP Call Setup, Message and Data Encoding
Lecture 22 - VoIP Conference Call Setup
Lecture 23 - NAT_Traversal - 1
Lecture 24 - NAT_Traversal - 2
Lecture 25 - NAT-Stun-Turn
Lecture 26 - NAT Pass Through in B4
Lecture 27 - Some Special Cases in Nat
Lecture 28 - Message Formats - 1
Lecture 29 - Message Formats - 2

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Lecture 30 - File System-Basic Organisation
Lecture 31 - Distributed File System - 1
Lecture 32 - Distributed File System - 2
Lecture 33 - Reputation, Expiry Time Rest, UFS
Lecture 34 - Free Riding,Messaging
Lecture 35 - Mailing List
Lecture 36 - Broad Cast Routing
Lecture 37 - Overlaid Multicasting
Lecture 38 - Overlaid Multicast-Reputation, Layered Multicast, Video-on-demand
Lecture 39 - Anonymous Routing
Lecture 40 - ToR-Anonymous Network
Lecture 41 - ToR-Circuit Setup-Copy
Lecture 42 - ToR-Darknet Websites

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NPTEL Video Course - Electrical Engineering - Electrical Machines I

Subject Co-ordinator - Dr. D. Kastha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Operating Principles and Construction of Single Phase Transformers
Lecture 3 - Modeling of Single Phase Transformers
Lecture 4 - Equivalent Circuits of Single Phase Transformers
Lecture 5 - Testing of Single Phase Transformers
Lecture 6 - Efficiency of Single Phase Transformers
Lecture 7 - Voltage Regulation of Single Phase Transformers
Lecture 8 - Parallel Operation of Single Phase Transformers
Lecture 9 - Harmonics and Switching Transients in Single Phase Transformers
Lecture 10 - Introduction to Three Phase Transformer
Lecture 11 - Construction of Three Phase Transformers
Lecture 12 - Three Phase Transformer Connections
Lecture 13 - Three Phase Transformer Phase Groups Part - I
Lecture 14 - Three Phase Transformer Phase Groups Part - II
Lecture 15 - Analysis and Testing of Three Phase Transformers
Lecture 16 - Operation of Three Phase Transformers
Lecture 17 - Auto Transformers
Lecture 18 - Three Winding Transformers
Lecture 19 - Scott Connected Transformers
Lecture 20 - Potential and Current Transformers
Lecture 21 - Operating Principles of DC Machines
Lecture 22 - Constructional Features of DC Machines
Lecture 23 - Generated EMF and Torque in DC Machines
Lecture 24 - Armature Reaction
Lecture 25 - Commutation in DC Machines
Lecture 26 - Separately Excited DC Generators
Lecture 27 - DC Shunt Generators
Lecture 28 - Compound DC Generators
Lecture 29 - Interconnected DC Generators

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Lecture 30 - Characteristics of DC Shunt Motors
Lecture 31 - Starting of DC Shunt Motors
Lecture 32 - Speed Control of DC Shunt Motors
Lecture 33 - Braking of DC Shunt Motors
Lecture 34 - Electronic Control of DC Shunt Motors
Lecture 35 - Testing of DC Shunt Motors
Lecture 36 - Characteristics of DC Series Motors
Lecture 37 - Starting and Braking of DC Series Motors
Lecture 38 - Speed Control and of DC Series Motors
Lecture 39 - Testing of DC Series Motors
Lecture 40 - Characteristics of Compound DC Series Motors

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NPTEL Video Course - Electrical Engineering - Optimal Control

Subject Co-ordinator - Prof. G.D. Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization Problem
Lecture 2 - Introduction to Optimization Problem
Lecture 3 - Optimality Conditions for Function of Several Variables
Lecture 4 - Optimality Conditions for Function of Several Variables (Continued.)
Lecture 5 - Unconstrained Optimization Problem (Numerical Techniques)
Lecture 6 - Solution of Unconstrained Optimization Problem Using Conjugate Quadient Method and Networks Metho
Lecture 7 - Solution of Unconstrained Optimization Problem Using Conjugate Quadient Method and Networks Metho
Lecture 8 - Solution of Constraint Optimization Problem-Karush-Kuhn Tucker (KKT) Conditions
Lecture 9 - Solution of Constraint Optimization Problem-Karush-Kuhn Tucker (KKT) Conditions (Continued.)
Lecture 10 - Problem and Solution Session
Lecture 11 - Post Optimality Analysis, Convex Function and its Properties
Lecture 12 - Post Optimality Analysis, Convex Function and its Properties (Continued.)
Lecture 13 - Quadratic Optimization Problem Using Linear Programming
Lecture 14 - Matrix form of the Simplex Method
Lecture 15 - Matrix form of the Simplex Method (Continued.)
Lecture 16 - Solution of Linear Programming Using Simplex Method
Lecture 17 - Solution of Linear Programming Using Simplex Method
Lecture 18 - Solution of LP Problems with Two Phase Method
Lecture 19 - Solution of LP Problems with Two Phase Method (Continued.)
Lecture 20 - Standard Primal and Dual Problems
Lecture 21 - Relationship Between Primal and Dual Variables
Lecture 22 - Solution of Quadratic Programming Problem Using Simplex Method
Lecture 23 - Interior Point Method for Solving Optimization Problems
Lecture 24 - Interior Point Method for Solving Optimization Problems (Continued.)
Lecture 25 - Solution of Nonlinear Programming Problem Using Exterior Penalty Function Method
Lecture 26 - Solution of Nonlinear Programming Problem Using Exterior Penalty Function Method (Continued.)
Lecture 27 - Solution of Nonlinear Programming Problem Using Interior Penalty Function Method
Lecture 28 - Solution of Nonlinear Programming Problem Using Interior Penalty Function Method (Continued.)
Lecture 29 - Multiobjective Optimization Problem

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Lecture 30 - Dynamic Optimization Problem
Lecture 31 - Dynamic Optimization Problem
Lecture 32 - Dynamic Optimization Problem
Lecture 33 - Numerical Example and Solution of Optimal Control Problem using Calculus of Variation principle
Lecture 34 - Numerical Example and Solution of Optimal Control Problem using Calculus of Variation principle
Lecture 35 - Hamiltonian Formulation for solution of optimal Control problem and numerical example
Lecture 36 - Hamiltonian Formulation for solution of optimal Control problem and numerical example (Continued
Lecture 37 - Performance Indices and Linear Quadratic Regulator Problem
Lecture 38 - Performance Indices and Linear Quadratic Regulator Problem (Continued.)
Lecture 39 - Solution and Stability Analysis of Finite - time LQR Problem
Lecture 40 - Solution and Infinite - time LQR Problem and Stability Analysis
Lecture 41 - Numerical Example and Methods for Solution of A.R.E.
Lecture 42 - Numerical Example and Methods for Solution of A.R.E. (Continued.)
Lecture 43 - Frequency Domain Interpretation of LQR Controlled System
Lecture 44 - Gain and Phase Margin of LQR Controlled System
Lecture 45 - The Linear Quadratic Gaussian Problem
Lecture 46 - Loop-Transfer Recovery
Lecture 47 - Dynamic Programming for Discrete Time Systems
Lecture 48 - Minimum â Time Control of a Linear Time Invariant System
Lecture 49 - Solution of Minimum â Time Control Problem with an Example
Lecture 50 - Constraint in Control Inputs and State Variables
Lecture 51 - Constraint in Control Inputs and State Variables (Continued...)
Lecture 52 - Norms for Vectors, Matrices, Signals and Linear Systems
Lecture 53 - Signal and System Norms
Lecture 54 - Internal Stability, Sensitivity and Complementary Sensitivity Functions
Lecture 55 - Internal Stability, Sensitivity and Complementary Sensitivity Functions (Continued...)
Lecture 56 - Plant Uncertainty and Standard form for Robust Stability Analysis
Lecture 57 - Plant Uncertainty and Standard form for Robust Stability Analysis (Continued...)
Lecture 58 - Frequency Response of Linear System and Singular Value Decomposition of System
Lecture 59 - Control Problem Statement in H- alpha Framework
Lecture 60 - Control Problem Statement in H - alpha Framework (Continued...)

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NPTEL Video Course - Electrical Engineering - Chaos, Fractals and Dynamic Systems

Subject Co-ordinator - Prof. S. Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Representations of Dynamical Systems
Lecture 2 - Vector Fields of Nonlinear Systems
Lecture 3 - Limit Cycles
Lecture 4 - The Lorenz Equation - I
Lecture 5 - The Lorenz Equation - II
Lecture 6 - The Rossler Equation and Forced Pendulum
Lecture 7 - The Chua's Circuit
Lecture 8 - Discrete Time Dynamical Systems
Lecture 9 - The Logistic Map and Period doubling
Lecture 10 - Flip and Tangent Bifurcations
Lecture 11 - Intermittency Transcritical and pitchfork
Lecture 12 - Two Dimensional Maps
Lecture 13 - Bifurcations in Two Dimensional Maps
Lecture 14 - Introduction to Fractals
Lecture 15 - Mandelbrot Sets and Julia Sets
Lecture 16 - The Space Where Fractals Live
Lecture 17 - Interactive Function Systems
Lecture 18 - IFS Algorithms
Lecture 19 - Fractal Image Compression
Lecture 20 - Stable and Unstable Manifolds
Lecture 21 - Boundary Crisis and Interior Crisis
Lecture 22 - Statistics of Chaotic Attractors
Lecture 23 - Matrix Times Circle
Lecture 24 - Lyapunov Exponent
Lecture 25 - Frequency Spectra of Orbits
Lecture 26 - Dynamics on a Torus
Lecture 27 - Dynamics on a Torus
Lecture 28 - Analysis of Chaotic Time Series
Lecture 29 - Analysis of Chaotic Time Series

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Lecture 30 - Lyapunou Function and Centre Manifold Theory
Lecture 31 - Non-Smooth Bifurcations
Lecture 32 - Non-Smooth Bifurcations
Lecture 33 - Normal from for Piecewise Smooth 2D Maps
Lecture 34 - Bifurcations in Piecewise Linear 2D Maps
Lecture 35 - Bifurcations in Piecewise Linear 2D Maps
Lecture 36 - Multiple Attractor Bifurcation and Dangerous
Lecture 37 - Dynamics of Discontinuous Maps
Lecture 38 - Introduction to Floquet Theory
Lecture 39 - The Monodromy Matrix and the Saltation Matrix
Lecture 40 - Control of Chaos

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NPTEL Video Course - Electrical Engineering - Digital Signal Processing

Subject Co-ordinator - Prof. T.K. Basu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Discrete Time Signal and System
Lecture 2 - Discrete Time Signal and System (Continued...)
Lecture 3 - Discrete Time Signal and System (Continued...)
Lecture 4 - Frequency Domain Representation of Discrete Signals
Lecture 5 - Z-Transform
Lecture 6 - Z-Transform (Continued...)
Lecture 7 - Solution of Difference Equation
Lecture 8 - Tutorial on Discrete Time Signals & Their Transforms
Lecture 9 - Relation Between Discrete Time and Continuous Signals
Lecture 10 - Discrete Fourier Transform (DFT)
Lecture 11 - Discrete Fourier Transform (DFT) (Continued...)
Lecture 12 - Discrete Fourier Transform (DFT) (Continued...)
Lecture 13 - State Space Representation
Lecture 14 - Filters Introduction
Lecture 15 - FIR Filters
Lecture 16 - FIR Filters (Continued...) Introduction to IIR Filters
Lecture 17 - IIR Filters (Continued...)
Lecture 18 - IIR Filters (Continued...)
Lecture 19 - IIR Filters (Continued...)
Lecture 20 - Tutorial & Introduction to Computer Aided Design of Filters
Lecture 21 - Computer Aided Design of Filters
Lecture 22 - FFT and Computer Aided Design of Filters
Lecture 23 - Introduction to Lattice Filter
Lecture 24 - Lattice Filter (Continued...)
Lecture 25 - Effects of Quantization
Lecture 26 - Effects of Quantization (Continued...)
Lecture 27 - Effects of Quantization (Continued...)
Lecture 28 - Effects of Quantization (Continued...)
Lecture 29 - Random Signals

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Lecture 30 - Relationship Between Real and Imaginary Parts of DTFT
Lecture 31 - Relationship Between Real and Imaginary Parts of DTFT
Lecture 32 - Relationship Between Real and Imaginary Parts of DTFT
Lecture 33 - Multi rate Signal Processing
Lecture 34 - Multi rate Signal Processing (Continued...)
Lecture 35 - Polyphase Decomposition

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NPTEL Video Course - Electrical Engineering - Dynamics of Physical Systems

Subject Co-ordinator - Prof. S. Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to System Elements
Lecture 2 - Newton's Method and Constraints
Lecture 3 - Derivation of the Lagrangian Equation
Lecture 4 - Using the lagrangian Equation to Obtain Differential Equations (Part-I)
Lecture 5 - Using the lagrangian Equation to Obtain Differential Equations (Part-II)
Lecture 6 - Using the lagrangian Equation to Obtain Differential Equations (Part-III)
Lecture 7 - Using the lagrangian Equation to Obtain Differential Equations (Part-IV)
Lecture 8 - Obtaining First Order Equations
Lecture 9 - Application of the Hamiltonian Method
Lecture 10 - Obtaining Differential Equations Using Kirchoff's Laws
Lecture 11 - The Graph Theory Approach for Electrical Circuits (Part-I)
Lecture 12 - The Graph Theory Approach for Electrical Circuits (Part-II)
Lecture 13 - The Bond Graph Approach - I
Lecture 14 - The Bond Graph Approach - II
Lecture 15 - The Bond Graph Approach - III
Lecture 16 - The Bond Graph Approach - IV
Lecture 17 - The Bond Graph Approach - V
Lecture 18 - The Bond Graph Approach - VI
Lecture 19 - The Bond Graph Approach - VII
Lecture 20 - Numerical Solution of Differential Equations
Lecture 21 - Dynamics in the State Space
Lecture 22 - Vector Field Around Equilibrium Points - I
Lecture 23 - Vector Field Around Equilibrium Points - II
Lecture 24 - Vector Field Around Equilibrium Points - III
Lecture 25 - Vector Field Around Equilibrium Points - IV
Lecture 26 - High Dimensional Linear Systems
Lecture 27 - Linear Systems with External Input - I
Lecture 28 - Linear Systems with External Input - II
Lecture 29 - Linear Systems with External Input - III

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Lecture 30 - Dynamics of Nonlinear Systems - I
Lecture 31 - Dynamics of Nonlinear Systems - II
Lecture 32 - Dynamics of Nonlinear Systems - III
Lecture 33 - Discrete-Time Dynamical Systems - I
Lecture 34 - Discrete-Time Dynamical Systems - II

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NPTEL Video Course - Electrical Engineering - Energy Resources and Technology

Subject Co-ordinator - Prof. S. Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thermodynamics
Lecture 2 - Quality of Energy
Lecture 3 - Complete Cycle Analysis of Fossil Fuels
Lecture 4 - Energy in Transportation
Lecture 5 - Other Fossil Fuels
Lecture 6 - Energy Economics
Lecture 7 - Energy Economics
Lecture 8 - Thermal Power Plants
Lecture 9 - Thermal Power Plants
Lecture 10 - Hydroelectric Power
Lecture 11 - Hydroelectric Power
Lecture 12 - Nuclear Power Generation
Lecture 13 - Nuclear Fusion Reactors
Lecture 14 - Environmental Effects of Conventional Power
Lecture 15 - Solar Thermal Energy Conversion
Lecture 16 - Solar Concentrating Collectors
Lecture 17 - Photovoltaic Power Generation
Lecture 18 - Photovoltaic Power Generation (Continued.)
Lecture 19 - Photovoltaic Power Generation (Continued.)
Lecture 20 - Photovoltaic Power Generation (Continued.)
Lecture 21 - Wind Energy - I
Lecture 22 - Wind Energy - II
Lecture 23 - Wind Energy - III
Lecture 24 - Wind Energy - IV
Lecture 25 - Wind Energy - V
Lecture 26 - Wind Energy - VI
Lecture 27 - Wind Electrical Conversion - I
Lecture 28 - Wind Electrical Conversion - II
Lecture 29 - Wind Electrical Conversion - III

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Lecture 30 - Tidal Energy
Lecture 31 - Tidal Energy
Lecture 32 - Tidal Energy
Lecture 33 - Ocean Thermal Energy Conversion
Lecture 34 - Solar Pond and Wave Power
Lecture 35 - Geothermal Energy
Lecture 36 - Solar Distillation and Biomass Energy
Lecture 37 - Energy Storage
Lecture 38 - Magneto hydrodynamic Power Generation
Lecture 39 - Magneto hydrodynamic Power Generation
Lecture 40 - Hydrogen Economy

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NPTEL Video Course - Electrical Engineering - Estimation of Signals and Systems

Subject Co-ordinator - Prof. S. Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Probability Theory
Lecture 3 - Random Variables
Lecture 4 - Function of Random Variable Joint Density
Lecture 5 - Mean and Variance
Lecture 6 - Random Vectors Random Processes
Lecture 7 - Random Processes and Linear Systems
Lecture 8 - Some Numerical Problems
Lecture 9 - Miscellaneous Topics on Random Process
Lecture 10 - Linear Signal Models
Lecture 11 - Linear Mean Sq.Error Estimation
Lecture 12 - Auto Correlation and Power Spectrum Estimation
Lecture 13 - Z-Transform Revisited Eigen Vectors/Values
Lecture 14 - The Concept of Innovation
Lecture 15 - Last Squares Estimation Optimal IIR Filters
Lecture 16 - Introduction to Adaptive Filters
Lecture 17 - State Estimation
Lecture 18 - Kalman Filter-Model and Derivation
Lecture 19 - Kalman Filter-Derivation (Continued...)
Lecture 20 - Estimator Properties
Lecture 21 - The Time-Invariant Kalman Filter
Lecture 22 - Kalman Filter-Case Study
Lecture 23 - System identification Introductory Concepts
Lecture 24 - Linear Regression-Recursive Least Squares
Lecture 25 - Variants of LSE
Lecture 26 - Least Square Estimation
Lecture 27 - Model Order Selection Residual Tests
Lecture 28 - Practical Issues in Identification
Lecture 29 - Estimation Problems in Instrumentation and Control

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Lecture 30 - Conclusion

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NPTEL Video Course - Electrical Engineering - Illumination Engineering

Subject Co-ordinator - Prof. N.K. Kishore

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Illumination Engineering
Lecture 2 - Instructional Objectives
Lecture 3 - Eye and Vision - I
Lecture 4 - Eye and Vision - II
Lecture 5 - Laws of Illumination
Lecture 6 - Photometry
Lecture 7 - Incandescent Lamps
Lecture 8 - Discharge Lamps - I
Lecture 9 - Discharge Lamps - II
Lecture 10 - Discharge Lamps - III
Lecture 11 - Illumination Systems - I
Lecture 12 - Illumination Systems - II
Lecture 13 - Glare
Lecture 14 - Color
Lecture 15 - Interior Lighting
Lecture 16 - Sports Lighting
Lecture 17 - Road Lighting
Lecture 18 - Lighting Calculations
Lecture 19 - Lighting Applications
Lecture 20 - Conclusions on Illumination Engineering

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NPTEL Video Course - Electrical Engineering - Industrial Automation and Control

Subject Co-ordinator - Prof. S. Sen, Prof. S. Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Architecture of Industrial Automation Systems
Lecture 3 - Measurement Systems Characteristics
Lecture 4 - Temperature Measurement
Lecture 5 - Pressure, Force and Torque Sensors
Lecture 6 - Motion Sensing
Lecture 7 - Flow Measurement
Lecture 8 - Signal Conditioning
Lecture 9 - Signal Conditioning (Continued.)
Lecture 10 - Data Acquisition Systems
Lecture 11 - Introduction to Automatic Control
Lecture 12 - P-I-D Control
Lecture 13 - PID Control Tuning
Lecture 14 - Feedforward Control Ratio Control
Lecture 15 - Time Delay Systems and Inverse Response Systems
Lecture 16 - Special Control Structures
Lecture 17 - Concluding Lesson on Process Control
Lecture 18 - Introduction to Sequence Control, PLC, RLL
Lecture 19 - Sequence Control. Scan Cycle,Simple RLL Programs
Lecture 20 - Sequence Control. More RLL Elements, RLL Syntax
Lecture 21 - A Structured Design Approach to Sequence
Lecture 22 - PLC Hardware Environment
Lecture 23 - Introduction To CNC Machines
Lecture 24 - Contour generation and Motion Control
Lecture 25 - Flow Control Valves
Lecture 26 - Hydraulic Control Systems - I
Lecture 27 - Hydraulic Control Systems - II
Lecture 28 - Industrial Hydraulic Circuit
Lecture 29 - Pneumatic Control Systems - I

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Lecture 30 - Pneumatic Systems - II
Lecture 31 - Energy Savings with Variable Speed Drives
Lecture 32 - DC Motor Drives
Lecture 33 - DC and BLDC Servo Drives
Lecture 34 - Induction Motor Drives
Lecture 35 - Step Motor Drives BLDC Drives
Lecture 36 - Embedded Systems
Lecture 37 - The Fieldbus Network - I
Lecture 38 - The Fieldbus Network - II
Lecture 39 - Higher Level Automation Systems
Lecture 40 - Course Review and Conclusion

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NPTEL Video Course - Electrical Engineering - Industrial Instrumentation

Subject Co-ordinator - Prof. Alok Barua

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Industrial Instrumentation
Lecture 2 - Dynamic Characteristics
Lecture 3 - Dynamic Characteristics (Continued.)
Lecture 4 - Strain gauge
Lecture 5 - Load cell
Lecture 6 - Torque Measurement
Lecture 7 - Thermistor
Lecture 8 - Thermocouples
Lecture 9 - Resistance Temperature Detector
Lecture 10 - LVDT
Lecture 11 - Capacitance Transducers
Lecture 12 - Flowmeter - I
Lecture 13 - Flowmeter - II
Lecture 14 - Flowmeter - III
Lecture 15 - Flowmeter - IV
Lecture 16 - Flowmeter - V
Lecture 17 - Problems on Temperature Sensors
Lecture 18 - Pressure Sensors
Lecture 19 - Low Pressure Measurement
Lecture 20 - pH and Viscosity Measurement
Lecture 21 - Problem and Solutions On Industrial Instrumentation
Lecture 22 - Signal Conditioning Circuits - I
Lecture 23 - Signal Conditioning Circuits - II
Lecture 24 - Piezoelectric Sensors
Lecture 25 - Ultrasonic Sensors
Lecture 26 - Nucleonic Instrumentation
Lecture 27 - Measurement Of Magnetic Field
Lecture 28 - Optoelectronic Sensor - I
Lecture 29 - Optoelectronic Sensor - II

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Lecture 30 - Synchro
Lecture 31 - Dissolved Oxygen Sensors - I
Lecture 32 - Dissolved Oxygen Sensors - II
Lecture 33 - Flapper - Nozzle
Lecture 34 - Smart Sensors
Lecture 35 - Chromatography - I
Lecture 36 - Chromatography - II
Lecture 37 - Pollution Measurement
Lecture 38 - Control Valve - I
Lecture 39 - Control Valve - II
Lecture 40 - Signal Conditioning Integrated Circuits

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NPTEL Video Course - Electrical Engineering - Networks Signals and Systems

Subject Co-ordinator - Prof. T.K. Basu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Network Elements and Sources
Lecture 2 - Introduction to Linearity and Nonlinearity
Lecture 3 - Distributed & Lumped Parameters 2-port Networks
Lecture 4 - Two-port Parameters Short Circuit,Open Circuit
Lecture 5 - Tutorial
Lecture 6 - Locus Diagram - Introduction to Signals
Lecture 7 - Signals (Continued.) Laplace Transforms
Lecture 8 - Laplace Transform (Continued.)
Lecture 9 - Tutorial on Laplace Transform
Lecture 10 - Frequency Response Bode Plot
Lecture 11 - Bode Plot (Continued.)
Lecture 12 - Bode Plot (Continued.) - Poles & Zeros
Lecture 13 - Driving Point Immittance Functions - Realisability Conditions
Lecture 14 - Two - Element Synthesis
Lecture 15 - Two - Element Synthesis (Continued.)
Lecture 16 - Tutorial
Lecture 17 - Tutorial
Lecture 18 - Graph Theory
Lecture 19 - Graph Theory (Continued.)
Lecture 20 - Graph Theory (Continued.)
Lecture 21 - Graph Theory (Continued.)
Lecture 22 - Image Impedance, Iterative Impedance
Lecture 23 - Image Impedance, Iterative Impedance
Lecture 24 - Characteristic Impedance and Design of Filters
Lecture 25 - Analysis of Resistive Networks Computer Aided
Lecture 26 - R-L-C Two-Terminal Network
Lecture 27 - Parts of Network Functions
Lecture 28 - Parts of Network Functions (Continued.)
Lecture 29 - Tutorial

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Lecture 30 - Tutorial (Continued.)
Lecture 31 - Tutorial
Lecture 32 - Synthesis of 2-port Network
Lecture 33 - Synthesis of 2-port Network (Continued.)
Lecture 34 - Synthesis of 2-port Network (Continued.)
Lecture 35 - Fourier Series
Lecture 36 - Fourier Series (Continued.)

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NPTEL Video Course - Electrical Engineering - Power System Analysis

Subject Co-ordinator - Prof. A.K. Sinha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Power system analysis
Lecture 2 - Introduction to Single Line Diagram
Lecture 3 - Transmission Line Parameters
Lecture 4 - Inductance Calculation (Three Phase)
Lecture 5 - Transmission Line Capacitance
Lecture 6 - Transmission Line Capacitance (Continued..)
Lecture 7 - Transmission Line Modeling
Lecture 8 - Transmission Line Modeling Long Line
Lecture 9 - Transmission Line Steady State Operation
Lecture 10 - Transmission Line Steady State Control Voltage
Lecture 11 - Transmission System A Review
Lecture 12 - Transformer Model
Lecture 13 - Synchronous Machine Model
Lecture 14 - Synchronous Machine Model
Lecture 15 - Load Model
Lecture 16 - Power Flow - I
Lecture 17 - Power Flow - II
Lecture 18 - Power Flow - III
Lecture 19 - Power Flow - IV
Lecture 20 - Power Flow - V
Lecture 21 - Power Flow - VI
Lecture 22 - Power Flow - VII
Lecture 23 - Review of Power System Component Models
Lecture 24 - Review of Power Flow Study
Lecture 25 - Short Circuit Analysis
Lecture 26 - Symmetrical Component Analysis
Lecture 27 - Sequence Networks
Lecture 28 - Unbalanced Fault Analysis
Lecture 29 - Unbalanced Fault Analysis

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Lecture 30 - Fault Analysis for Large power Systems
Lecture 31 - Bus Impedance Matrix
Lecture 32 - Asymmetrical Fault Analysis Using Z - Bus
Lecture 33 - Power System Stability - I
Lecture 34 - Power System Stability - II
Lecture 35 - Power System Stability - III
Lecture 36 - Power System Stability - IV
Lecture 37 - Power System Stability - V
Lecture 38 - Power System Stability - VI
Lecture 39 - Power System Stability - VII
Lecture 40 - Power System Stability - VIII

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NPTEL Video Course - Electrical Engineering - NOC:Industrial Automation and Control

Subject Co-ordinator - Prof. S. Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Architecture of Industrial Automation Systems
Lecture 4 - Architecture of Industrial Automation Systems (Continued...)
Lecture 5 - Measurement Systems Characteristics
Lecture 6 - Measurement Systems Characteristics (Continued...)
Lecture 7 - Data Acquisition Systems
Lecture 8 - Data Acquisition Systems (Continued...)
Lecture 9 - Introduction to Automatic Control
Lecture 10 - Introduction to Automatic Control (Continued...)
Lecture 11 - P-I-D Control
Lecture 12 - P-I-D Control (Continued...)
Lecture 13 - PID Controller Tuning
Lecture 14 - PID Controller Tuning (Continued...)
Lecture 15 - Feedforward Control Ratio Control
Lecture 16 - Feedforward Control Ratio Control (Continued...)
Lecture 17 - Time Delay Systems and Inverse Response Systems
Lecture 18 - Time Delay Systems and Inverse Response Systems (Continued...)
Lecture 19 - Special Control Structures
Lecture 20 - Special Control Structures (Continued...)
Lecture 21 - Concluding Lesson on Process Control (Self-study)
Lecture 22 - Introduction to Sequence Control, PLC, RLL
Lecture 23 - Introduction to Sequence Control, PLC, RLL (Continued...)
Lecture 24 - Sequence Control, Scan Cycle, Simple RLL Programs
Lecture 25 - Sequence Control, Scan Cycle, Simple RLL Programs (Continued...)
Lecture 26 - Sequence Control, More RLL Elements, RLL Syntax
Lecture 27 - Sequence Control, More RLL Elements, RLL Syntax (Continued...)
Lecture 28 - A Structured Design Approach to Sequence Control
Lecture 29 - A Structured Design Approach to Sequence Control (Continued...)

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Lecture 30 - PLC Hardware Environment
Lecture 31 - PLC Hardware Environment (Continued...)
Lecture 32 - Flow Control Valves
Lecture 33 - Flow Control Valves (Continued...)
Lecture 34 - Hydraulic Control Systems - I
Lecture 35 - Hydraulic Control Systems - I (Continued...)
Lecture 36 - Hydraulic Control Systems - II
Lecture 37 - Hydraulic Control Systems - II (Continued...)
Lecture 38 - Industrial Hydraulic Circuit
Lecture 39 - Industrial Hydraulic Circuit (Continued...)
Lecture 40 - Pneumatic Control Systems - I
Lecture 41 - Pneumatic Control Systems - I (Continued...)
Lecture 42 - Pneumatic Systems - II
Lecture 43 - Pneumatic Systems - II (Continued...)
Lecture 44 - Energy Savings with Variable Speed Drives
Lecture 45 - Energy Savings with Variable Speed Drives (Continued...)
Lecture 46 - Introduction To CNC Machines
Lecture 47 - Introduction To CNC Machines
Lecture 48 - The Fieldbus Network - I
Lecture 49 - The Fieldbus Network - I (Continued...)
Lecture 50 - Higher Level Automation Systems
Lecture 51 - Higher Level Automation Systems (Continued...)
Lecture 52 - Course Review and Conclusion (Self Study)

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NPTEL Video Course - Electrical Engineering - NOC:Medical Image Analysis

Subject Co-ordinator - Prof. Debdoot Sheet

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Medical Image Analysis
Lecture 2 - X Ray and CT Imaging
Lecture 3 - Magnetic Resonance Imaging
Lecture 4 - Ultrasound Imaging
Lecture 5 - Optical Microscopy and Molecular Imaging
Lecture 6 - Texture in Medical Images
Lecture 7 - Region Growing and Clustering
Lecture 8 - Random Walks for Segmentation
Lecture 9 - Active Contours for Segmentation
Lecture 10 - Systematic Evaluation and Validation
Lecture 11 - Decision Trees for Segmentation and Classification
Lecture 12 - Random Forests for Segmentation and Classification
Lecture 13 - Neural Networks for Segmentation and Classification
Lecture 14 - Deep Learning for Medical Image Analysis
Lecture 15 - Deep Learning for Medical Image Analysis (Continued...)
Lecture 16 - Retinal Vessel Segmentation
Lecture 17 - Vessel Segmentation in Computed Tomography Scan of Lungs
Lecture 18
Lecture 19 - Tissue Characterization in Ultrasound
Lecture 20

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NPTEL Video Course - Electrical Engineering - NOC:Biomedical Signal Processing

Subject Co-ordinator - Prof. Sudipta Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation
Lecture 2 - Preliminaries
Lecture 3 - Biomedical Signal Origin and Dynamics
Lecture 4 - Biomedical Signal Origin and Dynamics (Continued...)
Lecture 5 - Biomedical Signal Origin and Dynamics (Continued...)
Lecture 6 - Biomedical Signal Origin and Dynamics (Continued...)
Lecture 7 - Artifact Removal
Lecture 8 - Artifact Removal (Continued...)
Lecture 9 - Artifact Removal (Continued...)
Lecture 10 - Artifact Removal (Continued...)
Lecture 11 - Artifact Removal (Continued...)
Lecture 12 - Artifact Removal (Continued...)
Lecture 13 - Artifact Removal (Continued...)
Lecture 14 - Artifact Removal (Continued...)
Lecture 15 - Artifact Removal (Continued...)
Lecture 16 - Artifact Removal (Continued...)
Lecture 17 - Artifact Removal (Continued...)
Lecture 18 - Event Detection
Lecture 19 - Event Detection (Continued...)
Lecture 20 - Event Detection (Continued...)
Lecture 21 - Event Detection (Continued...)
Lecture 22 - Event Detection (Continued...)
Lecture 23 - Event Detection (Continued...)
Lecture 24 - Event Detection (Continued...)
Lecture 25 - Homomorphic Processing
Lecture 26 - Homomorphic Processing (Continued...)
Lecture 27 - Waveform Analysis
Lecture 28 - Waveform Analysis (Continued...)
Lecture 29 - Waveform Analysis

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Lecture 30 - Waveform Analysis (Continued...)
Lecture 31 - Waveform Analysis (Continued...)
Lecture 32 - Waveform Analysis (Continued...)
Lecture 33 - Waveform Analysis (Continued...)
Lecture 34 - Frequency Domain Characterisation
Lecture 35 - Frequency Domain Characterisation (Continued...)
Lecture 36 - Frequency Domain Characterisation (Continued...)
Lecture 37 - Frequency Domain Characterisation (Continued...)
Lecture 38 - Frequency Domain Characterisation (Continued...)
Lecture 39 - Frequency Domain Characterisation (Continued...)
Lecture 40 - Modelling of Biomedical Systems
Lecture 41 - Modelling of Biomedical Systems (Continued...)
Lecture 42 - Modelling of Biomedical Systems (Continued...)
Lecture 43 - Modelling of Biomedical Systems (Continued...)
Lecture 44 - Modelling of Biomedical Systems (Continued...)
Lecture 45 - Modelling of Biomedical Systems (Continued...)
Lecture 46 - Modelling of Biomedical Systems (Continued...)
Lecture 47 - Tutorial - I
Lecture 48 - Tutorial - I (Continued...)
Lecture 49 - Tutorial - I (Continued...)
Lecture 50 - Tutorial - II
Lecture 51 - Tutorial - II (Continued...)
Lecture 52 - Tutorial - II (Continued...)
Lecture 53 - Tutorial - III
Lecture 54 - Tutorial - III (Continued...)
Lecture 55 - Tutorial - III (Continued...)
Lecture 56 - Tutorial - III (Continued...)
Lecture 57 - Tutorial - IV
Lecture 58 - Tutorial - IV (Continued...)
Lecture 59 - Tutorial - IV (Continued...)
Lecture 60 - Tutorial - IV (Continued...)
Lecture 61 - Tutorial - IV (Continued...)
Lecture 62 - Tutorial - IV (Continued...)
Lecture 63 - Tutorial - V
Lecture 64 - Tutorial - V (Continued...)
Lecture 65 - Tutorial - V (Continued...)
Lecture 66 - Tutorial - V (Continued...)
Lecture 67 - Tutorial - V (Continued...)
Lecture 68 - Live Session

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NPTEL Video Course - Electrical Engineering - NOC:Microprocessors and Microcontrollers

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Basic Computer Organization
Lecture 5 - Basic computer organization
Lecture 6 - Basic Computer Organization
Lecture 7 - 8085 Microprocessors
Lecture 8 - 8085 Microprocessors (Continued...)
Lecture 9 - 8085 Microprocessors (Continued...)
Lecture 10 - 8085 Microprocessors (Continued...)
Lecture 11 - 8085 Microprocessors (Continued...)
Lecture 12 - 8085 Microprocessors (Continued...)
Lecture 13 - 8085 Microprocessors (Continued...)
Lecture 14 - 8085 Microprocessors (Continued...)
Lecture 15 - 8085 Microprocessors (Continued...)
Lecture 16 - 8085 Microprocessors (Continued...)
Lecture 17 - 8085 Microprocessors (Continued...)
Lecture 18 - 8085 Microprocessors (Continued...)
Lecture 19 - 8085 Microprocessors (Continued...)
Lecture 20 - 8085 Microprocessors (Continued...)
Lecture 21 - 8085 Microprocessors (Continued...)
Lecture 22 - 8085 Microprocessors (Continued...)
Lecture 23 - 8051 Microcontroller
Lecture 24 - 8051 Microcontroller (Continued...)
Lecture 25 - 8051Microcontroller (Continued...)
Lecture 26 - 8051 Microcontroller (Continued...)
Lecture 27 - 8051 Microcontroller (Continued...)
Lecture 28 - 8051 Microcontroller (Continued...)
Lecture 29 - 8051 Microcontroller (Continued...)

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Lecture 30 - 8051 Microcontroller (Continued...)
Lecture 31 - 8051 Microcontroller (Continued...)
Lecture 32 - 8051 Microcontroller (Continued...)
Lecture 33 - 8051 Microcontroller (Continued...)
Lecture 34 - 8051 Microcontroller (Continued...)
Lecture 35 - 8051 Microcontroller (Continued...)
Lecture 36 - 8051 Programming Examples
Lecture 37 - 8051 Programming Examples (Continued...)
Lecture 38 - 8051 Programming Examples (Continued...)
Lecture 39 - 8051 Programming Examples (Continued...)
Lecture 40 - 8051 Programming Examples (Continued...)
Lecture 41 - ARM
Lecture 42 - ARM (Continued...)
Lecture 43 - ARM (Continued...)
Lecture 44 - ARM (Continued...)
Lecture 45 - ARM (Continued...)
Lecture 46 - ARM (Continued...)
Lecture 47 - ARM (Continued...)
Lecture 48 - ARM (Continued...)
Lecture 49 - PIC
Lecture 50 - PIC, AVR
Lecture 51 - AVR (Continued...)
Lecture 52 - AVR (Continued...)
Lecture 53 - Interfacing
Lecture 54 - Interfacing (Continued...)
Lecture 55 - Interfacing (Continued...)
Lecture 56 - Interfacing (Continued...)
Lecture 57 - Interfacing (Continued...)
Lecture 58 - Interfacing (Continued...)
Lecture 59 - 8086
Lecture 60 - 8086 (Continued...)
Lecture 61 - 8086 (Continued...)
Lecture 62 - 8086 (Continued...)
Lecture 63 - 8086 (Continued...)
Lecture 64 - 8087

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NPTEL Video Course - Electrical Engineering - NOC:Deep Learning For Visual Computing

Subject Co-ordinator - Prof. Debdoot Sheet

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Visual Computing
Lecture 2 - Feature Extraction for Visual Computing
Lecture 3 - Feature Extraction with Python
Lecture 4 - Neural Networks for Visual Computing
Lecture 5 - Classification with Perceptron Model
Lecture 6 - Introduction to Deep Learning with Neural Networks
Lecture 7 - Introduction to Deep Learning with Neural Networks
Lecture 8 - Multilayer Perceptron and Deep Neural Networks
Lecture 9 - Multilayer Perceptron and Deep Neural Networks
Lecture 10 - Classification with Multilayer Perceptron
Lecture 11 - Autoencoder for Representation Learning and MLP Initialization
Lecture 12 - MNIST handwritten digits classification using autoencoders
Lecture 13 - Fashion MNIST classification using autoencoders
Lecture 14 - ALL-IDB Classification using autoencoders
Lecture 15 - Retinal Vessel Detection using autoencoders
Lecture 16 - Stacked Autoencoders
Lecture 17 - MNIST and Fashion MNIST with Stacked Autoencoders
Lecture 18 - Denoising and Sparse Autoencoders
Lecture 19 - Sparse Autoencoders for MNIST classification
Lecture 20 - Denoising Autoencoders for MNIST classification
Lecture 21 - Cost Function
Lecture 22 - Classification cost functions
Lecture 23 - Optimization Techniques and Learning Rules
Lecture 24 - Gradient Descent Learning Rule
Lecture 25 - SGD and ADAM Learning Rules
Lecture 26 - Convolutional Neural Network Building Blocks
Lecture 27 - Simple CNN Model
Lecture 28 - LeNet Definition
Lecture 29 - Training a LeNet for MNIST Classification

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Lecture 30 - Modifying a LeNet for CIFAR
Lecture 31 - Convolutional Autoencoder and Deep CNN
Lecture 32 - Convolutional Autoencoder for Representation Learning
Lecture 33 - AlexNet
Lecture 34 - VGGNet
Lecture 35 - Revisiting AlexNet and VGGNet for Computational Complexity
Lecture 36 - GoogLeNet - Going very deep with convolutions
Lecture 37 - GoogLeNet
Lecture 38 - ResNet - Residual Connections within Very Deep Networks and DenseNet - Densely connected network
Lecture 39 - ResNet
Lecture 40 - DenseNet
Lecture 41 - Space and Computational Complexity in DNN
Lecture 42 - Assessing the space and computational complexity of very deep CNNs
Lecture 43 - Domain Adaptation and Transfer Learning in Deep Neural Networks
Lecture 44 - Transfer Learning a GoogLeNet
Lecture 45 - Transfer Learning a ResNet
Lecture 46 - Activation pooling for object localization
Lecture 47 - Region Proposal Networks (rCNN and Faster rCNN)
Lecture 48 - GAP + rCNN
Lecture 49 - Semantic Segmentation with CNN
Lecture 50 - UNet and SegNet for Semantic Segmentation
Lecture 51 - Autoencoders and Latent Spaces
Lecture 52 - Principle of Generative Modeling
Lecture 53 - Adversarial Autoencoders
Lecture 54 - Adversarial Autoencoder for Synthetic Sample Generation
Lecture 55 - Adversarial Autoencoder for Classification
Lecture 56 - Understanding Video Analysis
Lecture 57 - Recurrent Neural Networks and Long Short-Term Memory
Lecture 58 - Spatio-Temporal Deep Learning for Video Analysis
Lecture 59 - Activity recognition using 3D-CNN
Lecture 60 - Activity recognition using CNN-LSTM

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NPTEL Video Course - Electrical Engineering - NOC:Power System Engineering

Subject Co-ordinator - Prof. Debapriya Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11 - Cables (Continued...)
Lecture 12 - Transient over voltages and Insulation coordination
Lecture 13 - Transient over voltages and Insulation coordination (Continued...)
Lecture 14 - Transient over voltages and Insulation coordination (Continued...)
Lecture 15 - Transient over voltages and Insulation coordination (Continued...)
Lecture 16 - Transient over voltages and Insulation coordination (Continued...)
Lecture 17 - Transient over voltages and Insulation coordination (Continued...)
Lecture 18 - Transient over voltages and Insulation coordination (Continued...)
Lecture 19 - Transient over voltages and Insulation coordination (Continued...)
Lecture 20 - Corona
Lecture 21 - Corona (Continued...)
Lecture 22 - Corona (Continued...)
Lecture 23 - Corona (Continued...), Sag and Tension Analysis
Lecture 24 - Sag and Tension Analysis (Continued...)
Lecture 25 - Sag and Tension Analysis (Continued...)
Lecture 26 - Sag and Tension Analysis (Continued...)
Lecture 27 - Sag and Tension Analysis (Continued...)
Lecture 28 - Sag and Tension Analysis (Continued...)
Lecture 29 - Load flow of radial distribution networks

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Lecture 30 - Load flow of radial distribution networks (Continued...)
Lecture 31 - Load flow of radial distribution networks (Continued...)
Lecture 32 - Load flow of radial distribution networks (Continued...)
Lecture 33 - Load flow of radial distribution networks (Continued...)
Lecture 34 - Load flow of radial distribution networks (Continued...)
Lecture 35 - Load flow of radial distribution networks (Continued...)
Lecture 36 - Load flow of radial distribution networks (Continued...)
Lecture 37 - Load flow of radial distribution networks (Continued...), Voltage stability of distribution netw
Lecture 38 - Voltage stability of distribution network, Approximate method
Lecture 39 - Application of capacitors in distribution system
Lecture 40 - Application of capacitors in distribution system (Continued...)
Lecture 41 - Application of capacitors in distribution system (Continued...)
Lecture 42 - Application of capacitors in distribution system (Continued...)
Lecture 43 - Application of capacitors in distribution system (Continued...)
Lecture 44 - Application of capacitors in distribution system (Continued...), Load frequency control
Lecture 45 - Load frequency control (Continued...)
Lecture 46 - Load frequency control (Continued...)
Lecture 47 - Load frequency control (Continued...)
Lecture 48 - Load frequency control (Continued...)
Lecture 49 - Load frequency control (Continued...)
Lecture 50 - Load frequency control (Continued...)
Lecture 51 - Load frequency control (Continued...)
Lecture 52 - Load frequency control (Continued...)
Lecture 53 - Load frequency control (Continued...)
Lecture 54 - Load frequency control (Continued...)
Lecture 55 - Load frequency control (Continued...)
Lecture 56 - Load frequency control (Continued...)
Lecture 57 - Automatic generation control
Lecture 58 - Automatic generation control (Continued...)
Lecture 59 - Automatic generation control (Continued...), Unit commitment
Lecture 60 - Unit commitment (Continued...)
Lecture 61 - Live Session

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NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Electrical Engineering

Subject Co-ordinator - Prof. Debapriya Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts, Examples
Lecture 2 - Basic Concepts, Examples (Continued...)
Lecture 3 - Basic Concepts, Examples (Continued...)
Lecture 4 - Basic Concepts, Examples (Continued...)
Lecture 5 - Basic Laws
Lecture 6 - Basic Laws (Continued...)
Lecture 7 - Basic Laws (Continued...)
Lecture 8 - Basic Laws (Continued...)
Lecture 9 - Basic Laws (Continued...)
Lecture 10 - Basic Laws (Continued...)
Lecture 11 - Methods of Circuit Analysis
Lecture 12 - Methods of Circuit Analysis (Continued...)
Lecture 13 - Methods of Circuit Analysis (Continued...)
Lecture 14 - Methods of Circuit Analysis (Continued...)
Lecture 15 - Methods of Circuit Analysis (Continued...)
Lecture 16 - Methods of Circuit Analysis (Continued...)
Lecture 17 - Mesh analysis with current sources, Examples
Lecture 18 - Methods of Circuit Analysis (Continued...) and Circuit Theorems
Lecture 19 - Circuit Theorems (Continued...)
Lecture 20 - Circuit Theorems (Continued...)
Lecture 21 - Circuit Theorems (Continued...)
Lecture 22 - Circuit Theorems (Continued...)
Lecture 23 - Circuit Theorems (Continued...)
Lecture 24 - Circuit Theorems (Continued...)
Lecture 25 - Circuit Theorems (Continued...) and Capacitors and Inductors
Lecture 26 - Capacitors and Inductors (Continued...)
Lecture 27 - Capacitors and Inductors (Continued...)
Lecture 28 - Capacitors and Inductors (Continued...)
Lecture 29 - First Order Circuits

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Lecture 30 - First Order Circuits (Continued...)
Lecture 31 - First Order Circuits (Continued...)
Lecture 32 - First Order Circuits (Continued...)
Lecture 33 - First Order Circuits (Continued...)
Lecture 34 - First Order Circuits (Continued...)
Lecture 35 - First Order Circuits (Continued...)
Lecture 36 - First Order Circuits (Continued...)
Lecture 37 - Single phase AC circuits
Lecture 38 - Single phase AC circuits (Continued...)
Lecture 39 - Single phase AC circuits (Continued...)
Lecture 40 - Single phase AC circuits (Continued...)
Lecture 41 - Single phase AC circuits (Continued...)
Lecture 42 - Single phase AC circuits (Continued...)
Lecture 43 - Single phase AC circuits (Continued...)
Lecture 44 - Resonance and Maximum Power Transfer Theorem
Lecture 45 - Resonance and Maximum Power Transfer Theorem (Continued...)
Lecture 46 - Resonance and Maximum Power Transfer Theorem (Continued...)
Lecture 47 - Three phase circuits
Lecture 48 - Three phase circuits (Continued...)
Lecture 49 - Three phase circuits (Continued...)
Lecture 50 - Three phase circuits (Continued...)
Lecture 51 - Magnetic Circuits
Lecture 52 - Magnetic Circuits (Continued...)
Lecture 53 - Magnetic Circuits (Continued...)
Lecture 54 - Single Phase Transformer
Lecture 55 - Single Phase Transformer (Continued...)
Lecture 56 - Single Phase Transformer (Continued...)
Lecture 57 - Single Phase Transformer (Continued...)
Lecture 58 - Three phase Induction Motors
Lecture 59 - Three phase Induction Motors (Continued...)
Lecture 60 - Three phase Induction Motors (Continued...)
Lecture 61 - Three phase Induction Motors (Continued...)
Lecture 62 - DC Motors
Lecture 63 - DC Motors (Continued...)
Lecture 64 - DC Motors (Continued...)

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NPTEL Video Course - Electrical Engineering - NOC:Digital Circuits

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Number System
Lecture 4 - Number System (Continued...)
Lecture 5 - Number System (Continued...)
Lecture 6 - Number System (Continued...)
Lecture 7 - Number System (Continued...)
Lecture 8 - Boolean Algebra
Lecture 9 - Boolean Algebra (Continued...)
Lecture 10 - Boolean Algebra (Continued...)
Lecture 11 - Boolean Algebra (Continued...)
Lecture 12 - Boolean Algebra (Continued...)
Lecture 13 - Boolean Algebra (Continued...)
Lecture 14 - Logic Gates
Lecture 15 - Logic Gates (Continued...)
Lecture 16 - Logic Gates (Continued...)
Lecture 17 - Logic Gates (Continued...)
Lecture 18 - Logic Gates (Continued...)
Lecture 19 - Logic Gates (Continued...)
Lecture 20 - Arithmetic Circuits
Lecture 21 - Arithmetic Circuits (Continued...)
Lecture 22 - Arithmetic Circuits (Continued...)
Lecture 23 - Decoders, Multiplexers, PLA
Lecture 24 - Decoders, Multiplexers, PLA (Continued...)
Lecture 25 - Decoders, Multiplexers, PLA (Continued...)
Lecture 26 - Decoders, Multiplexers, PLA (Continued...)
Lecture 27 - Decoders, Multiplexers, PLA (Continued...)
Lecture 28 - Sequential Circuits
Lecture 29 - Sequential Circuits (Continued...)

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Lecture 30 - Sequential Circuits (Continued...)
Lecture 31 - Sequential Circuits (Continued...)
Lecture 32 - Sequential Circuits (Continued...)
Lecture 33 - Sequential Circuits (Continued...)
Lecture 34 - Sequential Circuits (Continued...)
Lecture 35 - Finite State Machine
Lecture 36 - Finite State Machine (Continued...)
Lecture 37 - Data Converters
Lecture 38 - Data Converters (Continued...)
Lecture 39 - Data Converters (Continued...)
Lecture 40 - Data Converters (Continued...)
Lecture 41 - Memory
Lecture 42 - Memory (Continued...)
Lecture 43 - Memory (Continued...)
Lecture 44 - FPGA
Lecture 45 - FPGA (Continued...)
Lecture 46 - VHDL
Lecture 47 - VHDL(Continued...)
Lecture 48 - 8085 Microprocessor
Lecture 49 - 8085 Microprocessor (Continued...)
Lecture 50 - 8085 Microprocessor (Continued...)
Lecture 51 - 8085 Microprocessor (Continued...)
Lecture 52 - 8085 Microprocessor (Continued...)
Lecture 53 - 8085 Microprocessor (Continued...)
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Lecture 55 - 8085 Microprocessor (Continued...)
Lecture 56 - 8085 Microprocessor (Continued...)
Lecture 57 - 8085 Microprocessor (Continued...)
Lecture 58 - 8085 Microprocessor (Continued...)
Lecture 59 - 8085 Microprocessor (Continued...)
Lecture 60 - 8085 Microprocessor (Continued...)
Lecture 61 - 8085 Microprocessor (Continued...)
Lecture 62 - 8085 Microprocessor (Continued...)
Lecture 63 - 8086 Microprocessor
Lecture 64 - 8086 Microprocessor (Continued...)
Lecture 65 - 8086 Microprocessor (Continued...)

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NPTEL Video Course - Electrical Engineering - NOC:Analysis and Design Principles of Microwave Antennas

Subject Co-ordinator - Dr. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Scalar and Vector Potentials
Lecture 2 - Radiation From a Current Element (Hertzian Dipole)
Lecture 3 - Specific Properties of the Radiated Fields from a Current Element
Lecture 4 - General Properties of Radiated Fields from an Antenna
Lecture 5 - Farfield and Radiation Pattern of an Antenna
Lecture 6 - Directivity and Gain of an Antenna
Lecture 7 - Idea of Efficiency, Beamwidth, Polarisation and Bandwidth
Lecture 8 - Polarization of Antenna
Lecture 9 - Impedance of Antenna
Lecture 10 - Effective Aperture of an Antenna
Lecture 11 - Friss Transmission Equation and Antenna Temperature
Lecture 12 - Dipole And Monopole Antena
Lecture 13 - Dipole And Monopole Antena (Continued...)
Lecture 14 - BALUN
Lecture 15 - Loop Antenna
Lecture 16 - Folded Dipole Antenna
Lecture 17 - Introduction to Antenna Array
Lecture 18 - Antenna Array Theory
Lecture 19 - Broadside Uniform Linear Array
Lecture 20 - Endfire Linear Uniform Array
Lecture 21 - Parasitic Array and Log Periodic Antenna
Lecture 22 - Analysis Procedures of Aperture Antennas
Lecture 23 - Analysis Procedures of Aperture Antenna (Continued...)
Lecture 24 - Horn Antenna
Lecture 25 - Horn Antenna (Continued...)
Lecture 26 - Reflector Antennas
Lecture 27 - Paraboloid Reflector Antenna (Continued...)
Lecture 28 - Paraboloid Reflector Antenna (Continued...)
Lecture 29 - Dual Reflector Antenna

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Lecture 30 - Generalised Analysis of Antenna
Lecture 31 - Solution of Wave Equation for Electric and Magnetic Current Densities
Lecture 32 - Farfield Evaluation of Spherical Wave Radiation by Generalised Antenna
Lecture 33 - Slot Antenna
Lecture 34 - Open Ended Waveguide Antenna and Microstrip Antenna
Lecture 35 - Numerical Evaluation of Wire Antenna Currents
Lecture 36 - Solution of Intregral Equation by Moment Method
Lecture 37 - Array Pattern Synthesis
Lecture 38 - Array Pattern Synthesis (Continued...)
Lecture 39 - Ultra Wideband Antennas
Lecture 40 - Antenna Measurements

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NPTEL Video Course - Electrical Engineering - NOC:Architectural Design of Digital Integrated Circuits

Subject Co-ordinator - Prof. Indranil Hatai

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to VLSI Design Flow
Lecture 2 - Introduction to VLSI Design Flow
Lecture 3 - Introduction to VLSI Design Flow
Lecture 4 - Algorithm to Efficient Architecture Mapping
Lecture 5 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 6 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 7 - Tutorial on Algorithm to Efficient Architecture Mapping
Lecture 8 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 9 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 10 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 11 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 12 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 13 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 14 - Algorithm to Efficient Architecture Mapping (Continued...)
Lecture 15 - Efficient Adder Architecture
Lecture 16 - Efficient Adder Architecture (Continued...)
Lecture 17 - Efficient Adder Architecture (Continued...)
Lecture 18 - Efficient Adder Architecture
Lecture 19 - Efficient Adder Architecture
Lecture 20 - Efficient Adder Architecture
Lecture 21 - Efficient Adder Architecture
Lecture 22 - Efficient Adder Architecture
Lecture 23 - Efficient Adder Architecture
Lecture 24 - Efficient Adder Architecture
Lecture 25 - Pipelining and Parallel Processing
Lecture 26 - Pipelining and Parallel Processing
Lecture 27 - Multiplier Architecture
Lecture 28 - Multiplier Architecture
Lecture 29 - Multiplier Architecture

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Lecture 30 - Multiplier Architecture
Lecture 31 - Multiplier Architecture
Lecture 32 - Multiplier Architecture
Lecture 33 - Multiplier Architecture
Lecture 34 - Multiplier Architecture
Lecture 35 - Squaring Circuit Design
Lecture 36 - Reconfigurable Constant Multiplier Design
Lecture 37 - Reconfigurable Constant Multiplier Design
Lecture 38 - Reconfigurable Constant Multiplier Design
Lecture 39 - Fixed Point Number Representation
Lecture 40 - Fixed Point Number Representation
Lecture 41 - CORDIC Architecture
Lecture 42 - CORDIC Architecture
Lecture 43 - CORDIC Architecture
Lecture 44 - CORDIC Architecture
Lecture 45 - Timing Analysis
Lecture 46 - Timing Analysis
Lecture 47 - Timing Analysis
Lecture 48 - Logic Hazard
Lecture 49 - FFT Architecture
Lecture 50 - FFT Architecture (Continued...)
Lecture 51 - Timing analysis Basics
Lecture 52 - Timing analysis Basics (Continued...)
Lecture 53 - Timing analysis Basics (Continued...)
Lecture 54 - Timing Issuesin Digital IC Design
Lecture 55 - Timing Issuesin Digital IC Design (Continued...)
Lecture 56 - Timing Issuesin Digital IC Design (Continued...)
Lecture 57 - Timing Issuesin Digital IC Design (Continued...)
Lecture 58 - Architectural Design of Digital Integrated Circuits
Lecture 59 - Design Tips for Basic Circuits Design (Continued...)
Lecture 60 - Design Tips for Basic Circuits Design (Continued...)
Lecture 61 - Design Tips for Basic Circuits Design (Continued...)
Lecture 62 - Low Power Digital Design
Lecture 63 - Low Power Digital Design (Continued...)
Lecture 64 - Low Power Digital Design
Lecture 65 - Low Power Digital Design (Continued...)
Lecture 66 - Hardware for Machine Learning
Lecture 67 - Hardware for Machine Learning

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NPTEL Video Course - Electrical Engineering - NOC:Electrical Machines-II

Subject Co-ordinator - Prof.Tapas Kumar Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Inductance, Self and Mutual
Lecture 2 - Relationship of Inductances in Transformer
Lecture 3 - Equivalent Circuit from Circuit KVL Equations
Lecture 4 - Co-efficient of Coupling , Energy Stored in Coupled Coils
Lecture 5 - A Single Conductor Generator and Motor
Lecture 6 - Analysis of Single Conductor Generator and Motor
Lecture 7 - Analysis of Single Conductor Generator and Motor (Continued...)
Lecture 8 - Flux Density Distribution in Space and Nature emf
Lecture 9 - Flux Density Distribution in Space and Nature emf (Continued...)
Lecture 10 - From Linear to Rotating Machine
Lecture 11 - From Linear to Rotating Machine (Continued...)
Lecture 12 - Basic Underlying Principle of Operation of Rotating Machine
Lecture 13 - Basic Underlying Principle of Operation of Rotating Machine (Continued...)
Lecture 14 - Flux Density Distribution along the Air Gap
Lecture 15 - Flux Density Distribution along the Air Gap (Continued...)
Lecture 16 - Induced Voltage in a Coil in a Rotating Machine
Lecture 17 - Induced Voltage in a Coil in a Rotating Machine (Continued...)
Lecture 18 - Induced Voltage in a Coil in a Rotating Machine (Continued...)
Lecture 19 - Induced Voltage due to Fundamental and Harmonic Components of Flux Density Distribution
Lecture 20 - Distributed Coils Connected in Series Resultant Voltage
Lecture 21 - Distribution Factor
Lecture 22 - Pitch Factor and Winding Factor
Lecture 23 - How to decide about Short Pitch Angle Ã•Âµ
Lecture 24 - Double Layer 3-phase Winding - An Introduction
Lecture 25 - Winding Table for 3-phase Distributed Winding
Lecture 26 - Winding Table for 3-phase Distributed Winding with Examples
Lecture 27 - Winding Table for 3-phase Distributed Winding with Examples (Continued...)
Lecture 28 - 120 degree Phase Spread Winding with Examples
Lecture 29 - Winding Table of 120 degree Phase Spread Coils and Group Connection

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Lecture 30 - Introduction to Rotating Magnetic Field
Lecture 31 - Rotating Magnetic Field (Continued...), Mechanical and Electrical Speed
Lecture 32 - Speed and Direction of Rotating Field
Lecture 33 - Synchronous Speed and How to Calculate Induced Voltage in a Coil
Lecture 34 - Introduction to Induction Motor
Lecture 35 - Introduction to Induction Motor (Continued...)
Lecture 36 - General Expression of Torque in Terms of Stator and Rotor Fields
Lecture 37 - Torque Angle and Torque Expression
Lecture 38 - How to Fix Up Positions of Net Field, Rotor Field and Stator Field
Lecture 39 - Slip
Lecture 40 - Equivalent Circuit of 3-Phase Induction Motor
Lecture 41 - Equivalent Circuit of 3-Phase Induction Motor (Continued...)
Lecture 42 - Equivalent Circuit of 3-Phase Induction Motor (Continued...)
Lecture 43 - Expression for Electromagnetic Torque in terms of Equivalent Circuit Parameters
Lecture 44 - Maximum Electromagnetic Torque and Slip at Which it Occurs
Lecture 45 - Typical Torque Slip Characteristic and Operating Point
Lecture 46 - Change in Torque-slip Characteristic as Supply Voltage and Rotor Resistance are Varied
Lecture 47 - Types of Induction Motor - Slip Ring Type
Lecture 48 - Introduction to Cage Induction Motor
Lecture 49 - Cage Motor Can Operate for Different Stator Poles
Lecture 50 - Core Loss in Induction Motor and Simplified Equivalent Circuit
Lecture 51 - Torque Expression from Simplified Equivalent Circuit and Introduction to Circle Diagram
Lecture 52 - Circle Diagram (Continued...)
Lecture 53 - Exact Power Flow Diagram and Circle Diagram
Lecture 54 - Circle Diagram (Continued...)
Lecture 55 - Circle Diagram
Lecture 56 - Circle Diagram from Test Data
Lecture 57 - Starting of 3 Phase Induction Motor - Introduction
Lecture 58 - DOL and Reactor Starting
Lecture 59 - DOL and Auto Transformer Starting
Lecture 60 - Introduction to Speed Control
Lecture 61 - Idea of VVVF Speed Control of Induction Motor
Lecture 62 - Speed Contro Using Two Motors
Lecture 63 - Electrical Braking of 3 Phase Induction Motor
Lecture 64 - Braking (Continued...)
Lecture 65 - Introduction to Single Phase Induction Motor - Sequence Currents
Lecture 66 - Development of Equivalent Circuit
Lecture 67 - Development of Equivalent Circuit (Continued...)
Lecture 68 - Torque-slip Ch. of 1 ph. I-M Running on Single Winding

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Lecture 69 - Introduction to Starting of 1ph. Induction Motor
Lecture 70 - Expression for Starting Torque and Need for Phase Splitting
Lecture 71 - Resistor Split 1 ph. Induction Motor
Lecture 72 - Capacitor Split 1 ph Induction Motor
Lecture 73 - Starting of 1 ph. Induction Motor (Continued...)
Lecture 74 - Synchronous Machine Construction
Lecture 75 - Synchronous Generator - Introduction
Lecture 76 - Synchronisation
Lecture 77 - Expression for Induced Voltage and O.C. Phasor Diagram
Lecture 78 - Loaded Synchronous Generator - Resultant Field
Lecture 79 - Armature Reaction and Synchronous Reactance. Basic Phasor Diagram
Lecture 80 - General Mode of Operation - Rotro Field, Stator Field and Resultant Field
Lecture 81 - Complete Phasor Diagram and Expression for Complex Power
Lecture 82 - Synchronous Motor Operation, Phasor Diagram and Power Expression
Lecture 83 - Effect of Variation of Field Current in Generator
Lecture 84 - Effect of Variation Field Current in Synchronous Motor, Introduction to Salient Pole Machine
Lecture 85 - Analysis of Salient Pole Synchronous Machine
Lecture 86 - Phasor Diagram of Salient Pole Synchronous Machine for Generator and Motor Mode
Lecture 87 - Expression for Load Angle and Expression for Power
Lecture 88 - Phasor Diagrams of Salient Pole Synchronous Generator under Various Conditions
Lecture 89 - Phasor Diagrams of Salient Pole Synchronous Motor under Various Conditions
Lecture 90 - O.C and S.C Test on Synchronous Generator

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NPTEL Video Course - Electrical Engineering - NOC:Digital Electronic Circuits

Subject Co-ordinator - Prof. Goutam Saha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Transistor as a switch
Lecture 3 - Performance Issues and Introduction to TTL
Lecture 4 - Transistor Transistor Logic (TTL)
Lecture 5 - CMOS Logic
Lecture 6 - Basic Gates and their representations
Lecture 7 - Fundamentals of Boolean Algebra
Lecture 8 - Boolean Function to Truth Table and Implementaion Issues
Lecture 9 - Truth Table to Boolean Function and Implementaion Issues
Lecture 10 - Karnugh Map and Digital Circuit Realization
Lecture 11 - Karnaugh Map to Entered Variable Map
Lecture 12 - Quine - McClusky (QM) Algorithm
Lecture 13 - Cost Criteria and Minimization of Multiple Output Functions
Lecture 14 - Static 1 Hazard
Lecture 15 - Static 0 Hazard and Dynamic Hazard
Lecture 16 - Multiplexer
Lecture 17 - Multiplexer
Lecture 18 - Demultiplexer / Decoder
Lecture 19 - Decoder with BCD Input and Encoder
Lecture 20 - Parity Generator and Checker
Lecture 21 - Number System
Lecture 22 - Negative Number and 2s Complement Arithmetic
Lecture 23 - Arithmetic Building Blocks - I
Lecture 24 - Arithmetic Building Blocks - II
Lecture 25 - Overflow Detection and BCD Arithmetic
Lecture 26 - Magnitude Comparator
Lecture 27 - Arithmetic Logic Unit (ALU)
Lecture 28 - Unweighted Code
Lecture 29 - Error Detection and Correction Code

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Lecture 30 - Multiplication and Division
Lecture 31 - SR Latch and Introduction to Clocked Flip-Flop
Lecture 32 - Edge-Triggered Flip-Flop
Lecture 33 - Representations of Flip-Flops
Lecture 34 - Analysis of Sequential Logic Circuit
Lecture 35 - Conversion of Flip-Flops and Flip-Flop Timing Parameters
Lecture 36 - Register and Shift Register
Lecture 37 - Shift Register
Lecture 38 - Application of Shift Register
Lecture 39 - Linear Feedback Shift Register
Lecture 40 - Serial Addition, Multiplication and Division
Lecture 41 - Asynchronous Counter
Lecture 42 - Decoding Logic and Synchronous Counter
Lecture 43 - Cascading
Lecture 44 - Counter Design with Asynchronous Reset and Preset
Lecture 45 - Counter Design as Synthesis Problem and Few Other Uses of Counter
Lecture 46 - Synthesis of Sequential Logic Circuit
Lecture 47 - Moore Model and Mealy Model
Lecture 48 - Algorithmic State Machine (ASM) Chart and Synthesis of Sequential Logic Circuit
Lecture 49 - Circuit Realization from ASM Chart and State Minimization
Lecture 50 - State Minimization by Implication Table and Partitioning Method
Lecture 51 - Digital to Analog Conversion - I
Lecture 52 - Digital to Analog Conversion - II
Lecture 53 - Analog to Digital Conversion - I
Lecture 54 - Analog to Digital Conversion - II
Lecture 55 - Certain Performance Issue of ADC and DAC
Lecture 56 - Introduction to Memory
Lecture 57 - Static Random Access Memory (SRAM)
Lecture 58 - Dynamic RAM (DRAM) and Memory Expansion
Lecture 59 - Read Only Memory (ROM)
Lecture 60 - PAL, PLA, CPLD, FPGA

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NPTEL Video Course - Electrical Engineering - NOC:Power System Dynamics, Control and Monitoring

Subject Co-ordinator - Prof. Debapriya Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Power System stability
Lecture 2 - Power System stability (Continued...)
Lecture 3 - Power System stability (Continued...)
Lecture 4 - Power System stability (Continued...)
Lecture 5 - Power System stability (Continued...)
Lecture 6 - Power System Stability (Continued...)
Lecture 7 - Power System Stability (Continued...)
Lecture 8 - Power System Stability (Continued...)
Lecture 9 - Power System Stability (Continued...)
Lecture 10 - Power System Stability (Continued...)
Lecture 11 - Power System Stability (Continued...)
Lecture 12 - Power System Stability (Continued...)
Lecture 13 - Power System Stability (Continued...)
Lecture 14 - Power System Stability (Continued...)
Lecture 15 - Power System Stability (Continued...)
Lecture 16 - Power System Stability (Continued...)
Lecture 17 - Power System Stability (Continued...)
Lecture 18 - Power System Stability (Continued...)
Lecture 19 - Power System Stability (Continued...)
Lecture 20 - Power System Stability (Continued...)
Lecture 21 - Power System stability (Continued...)
Lecture 22 - Power System stability, Eigen properties of the state matrix
Lecture 23 - Power System stability, Eigen properties of the state matrix (Continued...)
Lecture 24 - Power System stability, Eigen properties of the state matrix (Continued...)
Lecture 25 - Power System stability, Eigen properties of the state matrix (Continued...)
Lecture 26 - Power System stability, Eigen properties of the state matrix (Continued...)
Lecture 27 - Power System stability, Eigen properties of the state matrix, Transient stability
Lecture 28 - Transient stability
Lecture 29 - Transient stability (Continued...)

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Lecture 30 - Transient stability (Continued...)
Lecture 31 - Transient stability
Lecture 32 - Transient stability, Automatic generation control conventional scenario
Lecture 33 - Automatic generation control conventional scenario
Lecture 34 - Automatic generation control conventional scenario
Lecture 35 - Automatic generation control conventional scenario
Lecture 36 - Automatic generation control conventional scenario
Lecture 37 - Automatic generation control conventional scenario
Lecture 38 - Automatic generation control conventional scenario
Lecture 39 - Automatic generation control conventional scenario
Lecture 40 - Automatic generation control conventional scenario
Lecture 41 - AGC in deregulated system
Lecture 42 - AGC in deregulated system (Continued...)
Lecture 43 - AGC in deregulated system (Continued...)
Lecture 44 - AGC in deregulated system (Continued...)
Lecture 45 - AGC in deregulated system (Continued...)
Lecture 46 - AGC in deregulated system (Continued...)
Lecture 47 - AGC in deregulated system (Continued...)
Lecture 48 - AGC in deregulated system (Continued...)
Lecture 49 - AGC in deregulated system, Reactive power and voltage control
Lecture 50 - Reactive power and voltage control
Lecture 51 - Reactive power and voltage control, State extimation in power system
Lecture 52 - State estimation in power system
Lecture 53 - State estimation in power system (Continued...)
Lecture 54 - State estimation in power system (Continued...)
Lecture 55 - State estimation in power system (Continued...)
Lecture 56 - State estimation in power system (Continued...)
Lecture 57 - Hydraulic turbine modelling
Lecture 58 - Hydraulic turbine modelling (Continued...)
Lecture 59 - Subsynchronous oscillation
Lecture 60 - Subsynchronous oscillation, Windup and non windup limits

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NPTEL Video Course - Electrical Engineering - NOC:Evolution of Air Interface towards 5G

Subject Co-ordinator - Prof. Suvra Sekhar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of wireless Communication
Lecture 2 - Evolution of wireless Communication Standards From 2G to 5G
Lecture 3 - Evolution of wireless Communication Standards From 2G to 5G (Continued...)
Lecture 4 - Evolution of wireless Communication Standards From 2G to 5G (Continued...)
Lecture 5 - Evolution of wireless Communication Standards From 2G to 5G (Continued...)
Lecture 6 - Requirements and operating scenarios of 5G
Lecture 7 - Requirements and operating scenarios of 5G (Continued....)
Lecture 8 - 5G scenarios
Lecture 9 - Ultra reliable low latency communication
Lecture 10 - Designing 5G new radio
Lecture 11 - Fundamental Framework for waveform analysis
Lecture 12 - Fundamental Framework for waveform analysis (Continued...)
Lecture 13 - Waveform Design Aspects of 2G
Lecture 14 - Waveforms in 3G
Lecture 15 - Waveforms in 3G (Continued...)
Lecture 16 - Waveform in 4G and 5G (OFDM)
Lecture 17 - Waveform in 4G and 5G (OFDM) (Continued...)
Lecture 18 - Waveform in 4G and 5G (OFDM) (Continued...)
Lecture 19 - Waveform in 4G and 5G (OFDMA)
Lecture 20 - Waveform in 4G and 5G (OFDMA, SCFDMA, SCFDE)
Lecture 21 - Waveform in 4G and 5G (SCFDMA Continued...)
Lecture 22 - Waveform in 5G
Lecture 23 - Waveform in 5G Numerology
Lecture 24 - Frame Structure in 5G NR
Lecture 25 - Numerology in 5G and adaptive subcarrier bandwidth
Lecture 26 - Numerology in 5G (Continued...)
Lecture 27 - Waveforms beyond 5G
Lecture 28 - Waveforms beyond 5G (Continued...)
Lecture 29 - Waveforms beyond 5G (Continued...)

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Lecture 30 - Waveforms beyond 5G (Continued...)
Lecture 31 - Waveform beyond 5G (Precoded GFDM)
Lecture 32 - Comparison of waveforms
Lecture 33 - Channel models for performance evaluation - Part I
Lecture 34 - Channel models for performance evaluation - Part II
Lecture 35 - Channel models for performance evaluation - Part III
Lecture 36 - MIMO Signal Processing (Receive Diversity)
Lecture 37 - MIMO Signal Processing
Lecture 38 - MIMO Signal Processing (Capacity)
Lecture 39 - MIMO Signal Processing (Capacity and Massive MIMO)
Lecture 40 - Hybrid beamforming (mmWave)

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NPTEL Video Course - Electrical Engineering - NOC:Electrical Measurement and Electronic Instruments

Subject Co-ordinator - Prof. Avishek Chatterjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - PMMC Instruments
Lecture 2 - Electrodynamic Instrument
Lecture 3 - Demonstration of PMMC and Electrodynamic Instruments
Lecture 4 - Features of PMMC and Electrodynamic Instruments
Lecture 5 - Moving Iron Instruments
Lecture 6 - Demonstration of Moving Iron Instrument
Lecture 7 - Electrostatic Instrument
Lecture 8 - Derivation of Deflecting Torque in Electrodynamic, Electrostatic and Moving Iron Instrument
Lecture 9 - Damping and Eddy Current Damping
Lecture 10 - Dynamics of the Moving Coil and Damping
Lecture 11 - Dynamics of the Moving Coil and Damping (Continued...)
Lecture 12 - Ballistic Galvanometer
Lecture 13 - Ammeter - I
Lecture 14 - Ammeter - II
Lecture 15 - Voltmeter
Lecture 16 - Ohmmeters - I
Lecture 17 - Ohmmeters - II
Lecture 18 - Rectifier based Voltmeters and Ammeter - I
Lecture 19 - Rectifier based Voltmetesr and Ammeter - II
Lecture 20 - Resistance measurement with a Voltmeter and an Ammeter
Lecture 21 - Four-Terminal Resistance
Lecture 22 - Problems
Lecture 23 - Error Calculation
Lecture 24 - Sensitivity, Accuracy, and Resolution of Wheatstone Bridge
Lecture 25 - Kelvin Double Bridge
Lecture 26 - High Resistance Measurement
Lecture 27 - Wattmeter Connection and Compensated Wattmeter
Lecture 28 - Single Phase Energy Meter
Lecture 29 - Demonstration

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Lecture 30 - Single Phase Energy Meter (Continued...)
Lecture 31 - Connection of Energy Meter, Wattmeter, and Three Phase Supply
Lecture 32 - DC Potentiometer
Lecture 33 - AC Potentiometer
Lecture 34 - Polar potentiometer and phase shifter
Lecture 35 - Polar potentiometer
Lecture 36 - Co-ordinate potentiometer
Lecture 37 - Kelvin-Varley potential divider
Lecture 38 - Impedance measurement
Lecture 39 - AC bridges - I
Lecture 40 - AC bridges - II
Lecture 41 - AC bridges - III
Lecture 42 - Current transformer and potential transformer
Lecture 43 - Review of transformer and magnetic circuit
Lecture 44 - Errrors in Instrument ransformer
Lecture 45 - Flux density measurement with Ballistic Galvanometer
Lecture 46 - Flux density measurement with Ballistic Galvanometer (Continued...)
Lecture 47 - Background
Lecture 48 - Background
Lecture 49 - Background
Lecture 50 - Background
Lecture 51 - Background
Lecture 52 - Background
Lecture 53 - Inverting amplifier versus Schmitt Trigger
Lecture 54 - Non-inverting amplifier versus Schmitt Trigger
Lecture 55 - Difference amplifier - I
Lecture 56 - Difference amplifier - II
Lecture 57 - Difference amplifier - III
Lecture 58 - Digital frequency meter
Lecture 59 - Digital frequency meter and Schmitt Trigger
Lecture 60 - Schmitt Trigger
Lecture 61 - Schmitt Trigger
Lecture 62 - Digital frequency meter
Lecture 63 - Linear ramp type digital voltmeter
Lecture 64 - Dual slope digital voltmeter - I
Lecture 65 - Dual slope digital voltmeter - II
Lecture 66 - Dual slope digital voltmeter and Integrator circuit
Lecture 67 - Digital ramp type voltmeter
Lecture 68 - Digital ramp type voltmeter and Successive approximation type voltmeter

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Lecture 69 - ADC and DAC - I
Lecture 70 - ADC and DAC - II
Lecture 71 - Why we need electronic Instruments
Lecture 72 - Instruments with op-amp based amplifiers - I
Lecture 73 - Instruments with op-amp based amplifiers - II
Lecture 74 - Instruments with op-amp based amplifiers - III
Lecture 75 - Instrumentation Amplifier
Lecture 76 - Function generator
Lecture 77 - 555-Timer circuit
Lecture 78 - Astable and monostable oscillator circuits
Lecture 79 - Pulse generator
Lecture 80 - Oscilloscope - I
Lecture 81 - Oscilloscope - II
Lecture 82 - Emitter follower voltmeter
Lecture 83 - Linear ohmmeter
Lecture 84 - Ramp generator

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NPTEL Video Course - Electrical Engineering - NOC:Principles and Techniques of Modern Radar Systems

Subject Co-ordinator - Dr. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical Development and Application
Lecture 2 - Radar Bands and System Modeling
Lecture 3 - Radar Equation
Lecture 4 - Some Basic Concepts of Pulsed Radar
Lecture 5 - Some Basic Concepts of Pulsed Radar (Continued...)
Lecture 6 - Some Basic Concepts of Pulsed Radar (Continued...)
Lecture 7 - Some Basic Concepts of Pulsed Radar (Continued...)
Lecture 8 - Tutorial Problems on Basic Concepts of Radar - Part I
Lecture 9 - Tutorial Problems on Basic Concepts of Radar - Part II
Lecture 10 - CW Radar
Lecture 11 - CW Radar Mathematical Model and Applications
Lecture 12 - FM-CW Radar
Lecture 13 - Double Frequency CW Radar
Lecture 14 - Pulsed Radar
Lecture 15 - MTI Filter
Lecture 16 - Clutter and Single DLC
Lecture 17 - Double DLC and Recursive MTI Filter
Lecture 18 - Multiple prf MTI Radar
Lecture 19 - Multiple prf MTI Radar and Clutter Attenuation
Lecture 20 - MTI Improvement Factor
Lecture 21 - Tutorial Problems on CW and Pulsed Radar - Part I
Lecture 22 - Tutorial Problems on CW and Pulsed Radar - Part II
Lecture 23 - Pulsed Doppler Radar
Lecture 24 - Pulsed Doppler Radar (Continued...) and Search Radar
Lecture 25 - Tracking Radar
Lecture 26 - Tracking Radar (Continued...)
Lecture 27 - Tracking Radar (Continued...)
Lecture 28 - Tracking Radar (Continued...)
Lecture 29 - Tracking Radar (Continued...)

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Lecture 30 - Tracking Radar (Continued...)
Lecture 31 - Tracking Radar (Continued...)
Lecture 32 - Tutorial Problems on Search and Tracking Radar
Lecture 33 - Detection in Radar Receiver
Lecture 34 - Detection in Radar Receiver (Continued...)
Lecture 35 - Detection in Radar Receiver (Continued...)
Lecture 36 - Detection in Radar Receiver (Continued...)
Lecture 37 - Detection in Radar Receiver (Continued...)
Lecture 38 - Detection in Radar Receiver (Continued...)
Lecture 39 - Detection in Radar Receiver (Continued...)
Lecture 40 - Detection in Radar Receiver (Continued...)
Lecture 41 - Detection in Radar Receiver (Continued...)
Lecture 42 - Detection in Radar Receiver (Continued...)
Lecture 43 - Detection in Radar Receiver (Continued...)
Lecture 44 - Detection in Radar Receiver (Continued...)
Lecture 45 - Detection in Radar Receiver (Continued...)
Lecture 46 - Detection in Radar Receiver (Continued...)
Lecture 47 - Tutorial Problems on Detection in Radar Receiver
Lecture 48 - SAR Processing
Lecture 49 - SAR Processing (Continued...)
Lecture 50 - SAR Processing (Continued...)
Lecture 51 - SAR Processor
Lecture 52 - Tutorial
Lecture 53 - Statistical Detection Theory
Lecture 54 - Statistical Detection Theory (Continued...)
Lecture 55 - Statistical Detection Theory (Continued...)
Lecture 56 - Statistical Detection Theory (Continued...)
Lecture 57 - Statistical Detection Theory (Continued...)
Lecture 58 - Tutorial
Lecture 59 - Ground Penetrating Radar
Lecture 60 - GPR Measurements and Microwave Tomography

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NPTEL Video Course - Electrical Engineering - NOC:Electrical Machines-I

Subject Co-ordinator - Prof.Tapas Kumar Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Magnetic Circuit and Transformer
Lecture 2 - Magnetising Current from B-H Curve
Lecture 3 - Ideal Transformer, Dot Convention and Phasor Diagram
Lecture 4 - Operation of Ideal Operation with Load Connected
Lecture 5 - Equivalent Circuit of Ideal Transformer
Lecture 6 - Rating of Single Phase Transformer
Lecture 7 - Transformer with Multiple Coils
Lecture 8 - Modelling of Practical Transformer - I
Lecture 9 - Modelling of Practical Transformer - II
Lecture 10 - Modelling of Practical Transformer - III
Lecture 11 - Core Loss - Eddy Current Loss
Lecture 12 - Factors on Eddy Current Loss Depends
Lecture 13 - Hysteresis Loss
Lecture 14 - Exact Equivalent Circuit
Lecture 15 - Approximate Equivalent Circuit
Lecture 16 - Determination of Equivalent Circuit Parameters - No Load Test
Lecture 17 - Short Circuit Test
Lecture 18 - Choosing Sides to Carry Out O.C / S.C Test
Lecture 19 - Efficiency of Transformer - Losses
Lecture 20 - Efficiency (Continued...)
Lecture 21 - Condition for Maximum Efficiency When Load Power Factor Constant
Lecture 22 - Family of Efficiency Curve at Various Power Factor and Energy Efficiency
Lecture 23 - Load Description and Energy Efficiency
Lecture 24 - Regulation
Lecture 25 - Regulation
Lecture 26 - Auto Transformer - Introduction
Lecture 27 - AutoTransformer versus Two Winding Transformer
Lecture 28 - AutoTransformer versus Two Winding Transformer (Continued...)
Lecture 29 - Numerical Problems on Ideal Auto Transformer

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Lecture 30 - Two Winding Transformer Connected as Auto Transformer
Lecture 31 - Practical Auto Transformer
Lecture 32 - Equivalent Circuit of an Auto Transformer
Lecture 33 - Polarity Test and Sumpner Test
Lecture 34 - 3 Phase Transformer Using 3 Single Phase Transformer
Lecture 35 - Various Connections of 3-Phase Transformer - I
Lecture 36 - Various Connections of 3-Phase Transformer - II
Lecture 37 - Vector Group of 3-Phase Transformer
Lecture 38 - Vector Group (Continued...)
Lecture 39 - Open Delta Connection
Lecture 40 - 3-Phase Cone Type and Shell Type Transformer
Lecture 41 - Zig Zag Connection
Lecture 42 - Effect 3rd Harmonic Exciting Current and Flux
Lecture 43 - Choosing Transformer Connection
Lecture 44 - Choosing Transformer Connection (Continued...)
Lecture 45 - Phase Conversion using Transformer
Lecture 46 - Scott Connection (Continued...)
Lecture 47 - 3 Phase to 6 Phase Conversion O.C / S.C Test on 3 Phase Transformer
Lecture 48 - Parallel Operation of Transformers - I
Lecture 49 - Parallel Operation of Transformers - II
Lecture 50 - Parallel Operation of Transformers - III
Lecture 51 - Specific Magnetic and Electric Loadings
Lecture 52 - ooling of Transformer and Fillings of Transformer
Lecture 53 - Output Equation of 3- Phase Transformer
Lecture 54 - Introduction to D.C Machine
Lecture 55 - Single Conductor D.C Generator / Motor Operation
Lecture 56 - Homopolar D.C Generator
Lecture 57 - Homopolar D.C Motor
Lecture 58 - Introduction to Rotating D.C Machines
Lecture 59 - Armature Winding of D.C Machine - I
Lecture 60 - Armature Winding of D.C Machine - II
Lecture 61 - Armature Winding of D.C Machine - III
Lecture 62 - Generated Voltage Across the Armature
Lecture 63 - Electromagnetic Troque in D.C Machine
Lecture 64 - Generator and Motor Operation - Basics
Lecture 65 - O.C.C and Load Characteristic of Separately Excited Generators
Lecture 66 - Voltage Build Up in Shunt Generator
Lecture 67 - Load Characteristic of Shunt Generator
Lecture 68 - Qualitative Discussion on Armature Reaction

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Lecture 69 - Ill Effects of Armature Reaction
Lecture 70 - Compensating and Interpoles
Lecture 71 - Armature Reaction (Continued...)
Lecture 72 - Field Flux Density, Armature Flux Density and Resultant Field Distribution
Lecture 73 - Field Patterns for Both Motor and Generators
Lecture 74 - Demagnetising and Cross Magnetising mmf for Brush Shifted Machine
Lecture 75 - Calculation of Compensating, Interpole and Series Field Turns
Lecture 76 - Estimating Armature and Field Resistance from its Rating
Lecture 77 - Power Flow Diagram, Rotational Loss
Lecture 78 - Shunt Motor
Lecture 79 - Starting of D.C Motor - 3-Point Starter
Lecture 80 - Speed Control of Shunt Motor - I
Lecture 81 - Speed Control of Shunt Motor - II
Lecture 82 - Speed Control of Shunt Motor - III
Lecture 83 - Field Control (Continued...)
Lecture 84 - D.C Motor Braking
Lecture 85 - Introduction to Series Motor
Lecture 86 - Series Motor Characteristics
Lecture 87 - Series Motor Speed Control
Lecture 88 - Universal Motor
Lecture 89 - Swinburne Test
Lecture 90 - Hopkinson Test
Lecture 91 - Efficiency Calculation
Lecture 92 - Field Test on D.C Series Motor
Lecture 93 - Simplex Wave winding
Lecture 94 - Wave Winding (Continued...)

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NPTEL Video Course - Electrical Engineering - NOC:VLSI Signal Processing

Subject Co-ordinator - Prof. Mrityunjay Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Graphical Representation of Signals
Lecture 2 - Signal Flow Graph
Lecture 3 - Data Flow Graph, Critical Path
Lecture 4 - Dependence Graph, Basics of Retiming
Lecture 5 - Retiming Theorem
Lecture 6 - Forward Path and Loop Retiming
Lecture 7 - Loop Bound and Iteration Bound
Lecture 8 - Cutset Retiming
Lecture 9 - Retiming IIR Filters
Lecture 10 - Adaptive Filter Basics (LMS Algorithm)
Lecture 11 - Retiming LMS
Lecture 12 - Retiming Delayed LMS
Lecture 13 - Parallel Processing in DSP by Unfolding
Lecture 14 - Basic Unfolding Relation
Lecture 15 - Retiming for Unfolding
Lecture 16 - Loop Unfolding
Lecture 17 - Iteration bound for Loops
Lecture 18 - Bitserial, Digit serial and Word serial Structures
Lecture 19 - Unfolding a Switch
Lecture 20 - Unfolding Bit Serial Systems
Lecture 21 - Folding of DFG
Lecture 22 - Folding Examples - IIR Filter
Lecture 23 - Retiming for Folding
Lecture 24 - Introduction to Delay Optimization by Folding
Lecture 25 - Life Time Analysis of Storage Variables
Lecture 26 - Foward Backward Data Allocation
Lecture 27 - Life Time Analysis of Storage Variables in a Digital Filter
Lecture 28 - Delay Folded Realization of a Digital Filter
Lecture 29 - Polyphase Decomposition of Sequences

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Lecture 30 - Hardware Efficient 2 - Parallel FIR Filters
Lecture 31 - Hardware Efficient 3 - Parallel FIR Filters
Lecture 32 - Introduction to First Level Architectures
Lecture 33 - 2's Complement Number Systems
Lecture 34 - Multiplication of Two Binary Numbers
Lecture 35 - Carry Ripple and Carry Save Array
Lecture 36 - Bit Serial Multipliers
Lecture 37 - Bit Serial Digital Filters
Lecture 38 - Baugh Wooley Multiplier
Lecture 39 - Distributed Arithmetic

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NPTEL Video Course - Electrical Engineering - NOC:Analog Electronic Circuits

Subject Co-ordinator - Prof. Pradip Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Introduction to the constituent topics of the course and the Layout
Lecture 3 - Revisit to pre-requisite topics
Lecture 4 - Revisit to pre-requisite topics (Continued...)
Lecture 5 - Analysis of Simple Non-Linear Circuit
Lecture 6 - Analysis of Simple Non-linear Circuit (Continued...)
Lecture 7 - Revisiting BJT Characteristic
Lecture 8 - Revisiting BJT Characteristics (Continued...)
Lecture 9 - Revisiting BJT Characteristics (Continued...)
Lecture 10 - Revisiting MOSFET
Lecture 11 - Revisiting MOSFET (Continued...)
Lecture 12 - Revisiting MOSFET (Continued...)
Lecture 13 - Revisiting MOSFET (Continued...)
Lecture 14 - Analysis of simple non-linear circuit containing a BJT
Lecture 15 - Analysis of simple non-linear circuit containing a BJT (Continued...)
Lecture 16 - Analysis of simple non-linear circuit containing a MOSFET
Lecture 17 - Analysis of simple non-linear circuit containing a MOSFET (Continued...)
Lecture 18 - Linearization of non-linear circuit containing BJT
Lecture 19 - Linearization of non-linear circuit containing BJT (Continued...)
Lecture 20 - Linearization of non-linear circuit containing MOSFET
Lecture 21 - Linearization of non-linear circuit containing MOSFET (Continued...)
Lecture 22 - Linear models of Amplifiers - Part A
Lecture 23 - Linear models of Amplifiers - Part B
Lecture 24 - Common Emitter Amplifier - Part A
Lecture 25 - Common Emitter Amplifier - Part B
Lecture 26 - Common Emitter Amplifier (Continued...) - Part A
Lecture 27 - Common Emitter Amplifier (Continued...) - Part B
Lecture 28 - Common Emitter Amplifier (Continued...) - Numerical examples - Part A
Lecture 29 - Common Emitter Amplifier (Continued...) - Numerical examples - Part B

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Lecture 30 - Common Emitter Amplifier (Continued...) - Design guidelines - Part A
Lecture 31 - Common Emitter Amplifier (Continued...) - Design guidelines - Part B
Lecture 32 - Common Source Amplifier - Part A
Lecture 33 - Common Source Amplifier - Part B
Lecture 34 - Common Source Amplifier (Continued...) Numerical examples and design guidelines - Part B
Lecture 35 - Frequency Response of CE and CS Amplifiers - Part A
Lecture 36 - Frequency Response of CE and CS Amplifiers - Part B
Lecture 37 - Frequency Response of CE and CS Amplifiers - Part C
Lecture 38 - Frequency Response of CE and CS Amplifiers (Continued...) - Part A
Lecture 39 - Frequency Response of CE And CS Amplifiers (Continued...) - Part B
Lecture 40 - Frequency Response of CE/CS Amplifiers Considering High Frequency Models of BJT and MOSFET - Par
Lecture 41 - Frequency Response of CE/CS Amplifiers Considering High Frequency Models of BJT and MOSFET - Par
Lecture 42 - Frequency Response of CE/CS Amplifiers Considering High Frequency Models of BJT And MOSFET - Par
Lecture 43 - Limitation of CE and CS Amplifiers in Cascading
Lecture 44 - Common Collector and Common Drain Amplifiers
Lecture 45 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 46 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 47 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 48 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 49 - Common Base and Common Gate Amplifiers
Lecture 50 - Common Base and Common Gate Amplifiers
Lecture 51 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 52 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 53 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 54 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 55 - Multi-Transistor Amplifiers
Lecture 56 - Multi-Transistor Amplifiers
Lecture 57 - Multi-Transistor Amplifiers
Lecture 58 - Multi-Transistor Amplifiers (Continued...)
Lecture 59 - Multi-Transistor Amplifiers (Continued...)
Lecture 60 - Multi-Transistor Amplifiers (Continued...)
Lecture 61 - Multi-Transistor Amplifiers
Lecture 62 - Multi-Transistor Amplifiers
Lecture 63 - Multi-Transistor Amplifiers
Lecture 64 - Multi-Transistor Amplifiers
Lecture 65 - Multi-Transistor Amplifiers
Lecture 66 - Multi-Transistor Amplifiers
Lecture 67 - Multi-Transistor Amplifiers
Lecture 68 - Multi-Transistor Amplifiers

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Lecture 69 - Multi-Transistor Amplifiers
Lecture 70 - Single-ended Vs Differential Signaling and Basic Model of a Differential Amplifier
Lecture 71 - Single-ended Vs Differential Signaling and Basic Model of a Differential Amplifier (Continued...
Lecture 72 - Single-ended Vs Differential Signaling and Basic Model of a Differential Amplifier (Continued...
Lecture 73 - Single-ended Vs Differential Signaling and Basic Model of a Differential Amplifier (Continued...
Lecture 74 - Single-ended Vs Differential Signaling and Basic Model of a Differential Amplifier (Continued...
Lecture 75 - Differential Amplifier
Lecture 76 - Differential Amplifier
Lecture 77 - Differential Amplifier
Lecture 78 - Differential Amplifier
Lecture 79 - Differential Amplifier
Lecture 80 - Differential Amplifier
Lecture 81 - Current mirror circuits - Part A
Lecture 82 - Current mirror circuits - Part B
Lecture 83 - Usage of current mirror - Part A
Lecture 84 - Usage of current mirror - Part B
Lecture 85 - Usage of current mirror - Part C
Lecture 86 - Numerical examples on current mirror and its applications - Part A
Lecture 87 - Numerical examples on current mirror and its applications - Part B
Lecture 88 - Numerical examples on current mirror and its applications - Part C
Lecture 89 - Numerical examples on current mirror and its applications - Part D
Lecture 90 - Feedback system - Part A
Lecture 91 - Feedback system - Part B
Lecture 92 - Feedback system - Part C
Lecture 93 - Feedback system - Part D
Lecture 94 - Feedback system - Part E
Lecture 95 - Effect of feedback on frequency response - Part A
Lecture 96 - Effect of feedback on frequency response - Part B
Lecture 97 - Applications of feedback in amplifier circuits - Part A
Lecture 98 - Applications of feedback in amplifier circuits - Part B
Lecture 99 - Applications of feedback in amplifier circuits - Part C

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NPTEL Video Course - Electrical Engineering - NOC:Network Analysis

Subject Co-ordinator - Prof. T.K. Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Voltage and Current Sources
Lecture 3 - Simple Networks with Voltage and Current Sources
Lecture 4 - Mesh Analysis - I
Lecture 5 - Mesh Analysis - II
Lecture 6 - Nodal Analysis - I
Lecture 7 - Nodal Analysis - II
Lecture 8 - Nodal Analysis - III
Lecture 9 - Inductor - I
Lecture 10 - Initial Condition for Inductor
Lecture 11 - Energy Stored in Inductor with Example
Lecture 12 - R-L Series Circuit Analysis
Lecture 13 - Retrieving Energy or Discharging of Inductor Energy
Lecture 14 - Capacitor
Lecture 15 - Charging of a Capacitor - Voltage, Current and Energy During Charging
Lecture 16 - Discharge of a Charged Capacitor
Lecture 17 - Linearity of R,L,C - Inductor with Initial Current and Capacitor with Initial Voltage
Lecture 18 - General Method for Solving Linear Differential Equation - I
Lecture 19 - General Method for Solving Linear Differential Equation - II
Lecture 20 - General Method for Solving Linear Differential Equation - III
Lecture 21 - Problem Solving
Lecture 22 - R-L Circuit with Sinusoidal Excitation
Lecture 23 - R-C Circuit with Sinusoidal Exponential
Lecture 24 - Solution Due to Exponential Forcing Function
Lecture 25 - Mesh and Nodal Analysis with Time Varying Source
Lecture 26 - Circuit Analysis with Phasor - I
Lecture 27 - Circuit Analysis with Phasor - II
Lecture 28 - Circuit Analysis with Phasor - III
Lecture 29 - Concept of Active and Reactive Power in A.C Circuit - I

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Lecture 30 - Concept of Active and Reactive Power in A.C Circuit - II
Lecture 31 - Expression for Complex Power in A.C Circuit
Lecture 32 - Numerical Example
Lecture 33 - Mesh and Nodal Analysis in A.C Circuit, Introduction to Impulse Function
Lecture 34 - Odd and Even Functions, Relation between Unit Step and Impulse Function
Lecture 35 - Solution of Differential Equation with Impulse Excitation
Lecture 36 - Numerical Example when Excitation is Impulse
Lecture 37 - Self and Mutual Inductances - I
Lecture 38 - Dot Convention in Mutually Coupled Coils
Lecture 39 - Mutually Coupled Coils in Series and Parallel
Lecture 40 - Energy Stored in Mutually Coupled Coils
Lecture 41 - Steady State Response with Sinusoidal Excitation when the Coils are Mutually Coupled
Lecture 42 - Basics of Signals in Brief
Lecture 43 - Laplace Transform - I
Lecture 44 - Laplace Transform - II
Lecture 45 - Laplace Transform Applied to Circuit Analysis - I
Lecture 46 - Laplace Transform Applied to Circuit Analysis - II
Lecture 47 - Numerical Examples - I
Lecture 48 - Numerical Examples - II
Lecture 49 - General Second Order Circuit Analysis with L.T - I
Lecture 50 - General Second Order Circuit Analysis with L.T - II
Lecture 51 - Network Theorem - I
Lecture 52 - Network Theorem - II
Lecture 53 - Norton's Theorem
Lecture 54 - Thevenin Theorem
Lecture 55 - Star-Delta and Delta-Star Transformation
Lecture 56 - Telligen's Theorem
Lecture 57 - Reciprocity Theorem
Lecture 58 - Maximum Power Transfer Theorem
Lecture 59 - Graph Theory Applied to Network Analysis - I
Lecture 60 - Graph Theory Applied to Network Analysis - II
Lecture 61 - Graph Theory Applied to Network Analysis - III
Lecture 62 - Graph Theory Applied to Network Analysis - IV
Lecture 63 - Graph Theory Applied to Network Analysis - V
Lecture 64 - Mesh Analysis with Graph Theory
Lecture 65 - Nodal Analysis with Graph Theory
Lecture 66 - Cut-Set Analysis with Graph Theory
Lecture 67 - Numerical Examples of Network Analysis with Graph Theory
Lecture 68 - Circuit Analysis with Dependent Sources - I

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Lecture 69 - Circuit Analysis with Dependent Sources - II
Lecture 70 - Circuit Analysis with Dependent Sources - III
Lecture 71 - Two Port Network - I
Lecture 72 - Two Port Network - II
Lecture 73 - Two Port Network - III
Lecture 74 - Two Port Network - IV
Lecture 75 - Two Port Network - V
Lecture 76 - Two Port Network - VI
Lecture 77 - Two Port Network - VII
Lecture 78 - Gyrator
Lecture 79 - Ideal Op - Amp
Lecture 80 - Examples of Ideal Op-Amp Circuits - I
Lecture 81 - Examples of Ideal Op-Amp Circuits - II
Lecture 82 - General Impedance Transfer Circuit and Concluding Remarks

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NPTEL Video Course - Electrical Engineering - NOC:Power System Protection

Subject Co-ordinator - Prof. Ashok Kumar Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Faults in Power System
Lecture 2 - Elements and Features of Protection Scheme
Lecture 3 - Fault Analysis Review - Sequence Components
Lecture 4 - Fault Analysis Review - Sequence Components (Continued...)
Lecture 5 - Numerical Relaying Concept
Lecture 6 - Discrete Fourier Transform
Lecture 7 - Recursive and Half Cycle DFT and Cosine Filter
Lecture 8 - Least Square Technique
Lecture 9 - Frequency Response of Phasor Estimation techniques
Lecture 10 - In the Presence of Decaying DC
Lecture 11 - Overcurrent Relay Characteristics
Lecture 12 - Overcurrent Relay Coordination
Lecture 13 - Relay Coordination with Fuse
Lecture 14 - Introduction to Directional Relaying
Lecture 15 - Positive Sequence Directional Relay
Lecture 16 - Negative and Zero Sequence Directional Relay
Lecture 17 - Superimposed Component Based Directional Relaying
Lecture 18 - Introduction to Distance Relay
Lecture 19 - Fault Classification
Lecture 20 - Apparent Impedance Calculation
Lecture 21 - Distance Relay Implementation
Lecture 22 - Application to Double Circuit Line
Lecture 23 - Multi-terminal Lines
Lecture 24 - Protection of series compensated lines - Part I
Lecture 25 - Protection of series compensated lines - Part II
Lecture 26 - Effect of Fault Resistance
Lecture 27 - Load Encroachment
Lecture 28 - Power Swing
Lecture 29 - Power Swing Detection Techniques - Part I

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Lecture 30 - Power Swing Detection Techniques - Part II
Lecture 31 - Adaptive Distance Relaying
Lecture 32 - Communication Assisted Relaying Scheme
Lecture 33 - Current Transformer - Part I
Lecture 34 - Current Transformer - Part II
Lecture 35 - Capacitor Voltage Transformer
Lecture 36 - Fiber Optic Sensors
Lecture 37 - Introduction to Transformer Protection
Lecture 38 - Differential Relay
Lecture 39 - Steps in Differential Relay Processing
Lecture 40 - Inrush Detection
Lecture 41 - CT Saturation, Negative Sequence Differential and Restricted Earth Fault Relay
Lecture 42 - Line Differential - Part I
Lecture 43 - Line Differential - Part II
Lecture 44 - Busbar Protection
Lecture 45 - Fault Characteristics of Renewable Sources
Lecture 46 - Protection Challenges of Distribution Systems with Renewables
Lecture 47 - Protection challenges of transmission systems with renewables
Lecture 48 - Traveling Wave Basics
Lecture 49 - Protection using Travelling Waves
Lecture 50 - Fault Location using Travelling Wave
Lecture 51 - Wide Area Measurement Basics
Lecture 52 - Wide Area Measurement for Protection

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NPTEL Video Course - Electrical Engineering - NOC:Signal Processing for mm Wave communication for 5G and beyo

Subject Co-ordinator - Prof. Amit Kumar Dutta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Tx- Rx Structure
Lecture 2 - Rx -Structure
Lecture 3 - Fundamental of Ray-Tracing model
Lecture 4 - General channel model - Part I
Lecture 5 - General channel model - Part I (Continued...)
Lecture 6 - General channel model - Part I (Continued...)
Lecture 7 - General channel model - Part II
Lecture 8 - Wireless channel-A ray tracing model - Part II
Lecture 9 - Wireless channel-A ray tracing model - Part II (Continued...)
Lecture 10 - Wireless channel-A ray tracing model - Part II (Continued...)
Lecture 11 - Wireless channel-A ray tracing model - Part II (Continued...)
Lecture 12 - RMS Delay spread and Doppler Effect on channel
Lecture 13 - Time Varing Model
Lecture 14 - Doppler Impact on coherence BW
Lecture 15 - Introduction to time series
Lecture 16 - AR,ARMA,MA process
Lecture 17 - Doppler with AR process model
Lecture 18 - Coherence time and parameter summery
Lecture 19 - Basic ISI channel
Lecture 20 - Channel estimation and Equalizer
Lecture 21 - precoder and MIMO
Lecture 22 - precoder and MIMO (Continued...)
Lecture 23 - Basics of mmwave spectrum
Lecture 24 - Angle of arrival and angle of departure
Lecture 25 - 3D concepts, AoA,AoD
Lecture 26 - mmWave channel model with RX beaming
Lecture 27 - mmWave channel model with RX beaming (Continued...)
Lecture 28 - mmWave channel model with RX beaming (Continued...)
Lecture 29 - mmWave channel model with RX beaming (Continued...)

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Lecture 30 - mmwave channel model (Continued...)
Lecture 31 - mmWave channel model (Continued...) -Tx side multiple antenna
Lecture 32 - Basics of Beamforming
Lecture 33 - Single Antenna beamforming
Lecture 34 - Concept of antenna many fold vector
Lecture 35 - 3D Concept of antenna many fold vector
Lecture 36 - Different Geometry of antennafrom electrical point of view
Lecture 37 - Basics of Beamforming pattern - Part I
Lecture 38 - Basics of Beamforming pattern - Part II
Lecture 39 - SISO Beamforming
Lecture 40 - MIMO Beamforming
Lecture 41 - Structural implementation of MIMO Beamforming
Lecture 42 - Different Level of Beamforming
Lecture 43 - MIMO Beamforming in Transmitter side
Lecture 44 - MIMO Beamforming in Receiver side - Part I
Lecture 45 - MIMO Beamforming in Receiver side - Part II
Lecture 46 - Mathematical description of MIMO Beamforming (Continued...)
Lecture 47 - Equalizer based detector
Lecture 48 - Parameter to be designed in MIMO Beamforming
Lecture 49 - OFDM Data Model
Lecture 50 - OFDM Data model (Continued...)
Lecture 51 - General OFDM
Lecture 52 - OFDM spectrum and CFO
Lecture 53 - MIMO OFDM structure
Lecture 54 - MIMO OFDM decode and beamforming
Lecture 55 - Design parameter estimation - Part 1
Lecture 56 - Design parameter estimation - Part 2
Lecture 57 - Design parameter estimation - Part 3
Lecture 58 - Design parameter estimation - Part 4
Lecture 59 - Design parameter estimation - Part 5
Lecture 60 - MU System
Lecture 61 - CFO and other impairment and their effects
Lecture 62 - Multi User Hybrid beam and impairment and analysis - Part 3
Lecture 63 - Multi User Hybrid beam and Impairment and analysis - Part 4
Lecture 64 - Multi User Hybrid beam and Impairment and analysis - Part 5

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NPTEL Video Course - Electrical Engineering - NOC:Control and Tuning Methods in Switched Mode Power Converter

Subject Co-ordinator - Prof. Santanu Kapat

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - DC Power Conversion Systems - Introduction
Lecture 2 - Overview of voltage regulators
Lecture 3 - Switched mode power converter (SMPC)
Lecture 4 - Model Development for MATLAB Simulation
Lecture 5 - Demonstration of MATLAB Simulation
Lecture 6 - Demonstration of MATLAB Simulation (Continued...)
Lecture 7 - Power Stage Design of Basic SMPCs: Summary
Lecture 8 - Fixed Frequency Modulation Techniques
Lecture 9 - Variable Frequency Modulation Techniques
Lecture 10 - Modulation in Discontinuous Conduction Mode (DCM)
Lecture 11 - Synchronizing Simulation and Script files in MATLAB
Lecture 12 - Interactive MATLAB Simulation and Case Studies
Lecture 13 - Converterâ s Objectives and Control Implications
Lecture 14 - Feedforward Control in SMPC
Lecture 15 - Single and Multi Loop Feedback Control Methods
Lecture 16 - Feedback Control of Cascaded SMPCs
Lecture 17 - Combined feedback and feedforward control
Lecture 18 - State feedback control
Lecture 19 - Variable Frequency Control - Understanding Opportunities and Challenges
Lecture 20 - Constant On-time Control Methods
Lecture 21 - Constant Off-time Control Methods
Lecture 22 - Hysteresis Control Methods in SMPCs
Lecture 23 - Stability and Performance Comparison using MATLAB Simulation
Lecture 24 - Light Load Control Methods and Interactive MATLAB Simulation
Lecture 25 - Overview of Modeling Techniques
Lecture 26 - State space averaging and model validation
Lecture 27 - Circuit Averaging Techniques and Equivalent Circuit
Lecture 28 - DC Analysis using Equivalent Circuit Model
Lecture 29 - Derivation of Small-Signal Transfer Functions

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Lecture 30 - Small-Signal Model Validation using MATLAB and Time Domain Correlation
Lecture 31 - Small-signal Modeling with Closed Current Loop
Lecture 32 - Impedance Analysis and Stability
Lecture 33 - Loop Gain Analysis and Understanding Model Limits using MATLAB
Lecture 34 - PID Control Design and Tuning under VMC with MATLAB Case Studies
Lecture 35 - Shaping Output Impedance of a Buck Converter under VMC
Lecture 36 - Design of VMC Boost Converter and MATLAB Design Case Studies
Lecture 37 - Accurate Small-signal Modelling under CMC and Verification using MATLAB
Lecture 38 - Design CMC in a Buck Converter and MATLAB based Model Validation
Lecture 39 - Design of CMC Boost Converter - Output and State Feedback Approaches
Lecture 40 - Loop Interactions in CMC and Design of Average CMC
Lecture 41 - Dynamics of SMPCs and Overview of Model-based Nonlinear Control
Lecture 42 - Dynamics of LTIs and Vector Field with MATLAB Demonstration
Lecture 43 - Geometric Perspectives of Eigenvalues and Eigenvectors in SMPCs
Lecture 44 - Small-signal and Large-signal Model based Nonlinear Control
Lecture 45 - Introduction to Sliding Mode Control in SMPCs
Lecture 46 - Sliding Mode Control Design in a Buck Converter
Lecture 47 - Boundary Control Techniques and Selection of Switching Surfaces
Lecture 48 - Time Optimal Control and Identifying Physical Limits in SMPCs
Lecture 49 - Linking Switching Boundary and PID Controller Structure in SMPCs
Lecture 50 - Large-Signal Controller Tuning in Buck Converter: Objectives and Derivations
Lecture 51 - Large-Signal Controller Tuning in Boost and Buck-Boost Converters
Lecture 52 - Large-Signal Controller Tuning in Fixed- and Variable-Frequency Control
Lecture 53 - Critical Performance Limits in Dynamic Voltage Scaling and Possible Solutions
Lecture 54 - Nonlinear Control vs. Large-Signal Tuning: Comparative Study using MATLAB
Lecture 55 - Small-Signal vs. Large-Signal Tuning: Comparison using MATLAB Simulation
Lecture 56 - Performance Improvement and Size Reduction using Large-Signal based Control
Lecture 57 - Digital Control in High Frequency SMPCs - Introduction and Motivations
Lecture 58 - Overview of Fixed and Variable Frequency Digital Control Architectures
Lecture 59 - Challenges and Opportunities in Digitally Controlled High Frequency SMPCs
Lecture 60 - Course Summary, Key Takeaways, Few Emerging Applications and Future Scopes

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NPTEL Video Course - Electrical Engineering - NOC:Advanced Microwave Guided-Structures and Analysis

Subject Co-ordinator - Prof. Bratin Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Scattering Matrix Concepts
Lecture 2 - Scattering Matrix Concepts (Continued...)
Lecture 3 - Scattering Matrix Concepts (Continued...)
Lecture 4 - Scattering Matrix Concepts (Continued...)
Lecture 5 - Scattering Matrix Concepts Tutorials
Lecture 6 - Scattering Matrix Concepts Tutorials (Continued...)
Lecture 7 - Scattering Matrix Concepts Tutorials (Continued...)
Lecture 8 - Instantaneous form of Maxwellâ s equations
Lecture 9 - Instantaneous form of Maxwellâ s equations (Continued....)
Lecture 10 - Instantaneous form of Maxwellâ s equations (Continued...)
Lecture 11 - Instantaneous form of Maxwellâ s equations (Continued...)
Lecture 12 - Instantaneous form of Maxwellâ s equations (Continued...)
Lecture 13 - Instantaneous form of Maxwellâ s equations Tutorials
Lecture 14 - Instantaneous form of Maxwellâ s equations Tutorials (Continued...)
Lecture 15 - Harmonic form of Maxwellâ s equations
Lecture 16 - Harmonic form of Maxwellâ s equations (Continued...)
Lecture 17 - Harmonic form of Maxwellâ s equations (Continued...)
Lecture 18 - Harmonic form of Maxwellâ s equations Tutorials
Lecture 19 - Wave Equation and Solution
Lecture 20 - Relation between wavenumbers
Lecture 21 - Radiation from an electric current source (Continued...)
Lecture 22 - Radiation from an electric current source (Continued...)
Lecture 23 - Radiation from an electric current source (Continued...)
Lecture 24 - Wave Equation and Solution Tutorials
Lecture 25 - Radiation from an electric current source Tutorials
Lecture 26 - Radiation from a magnetic current source
Lecture 27 - Radiation from a magnetic current source (Continued...)
Lecture 28 - Radiation from a magnetic current source (Continued...)
Lecture 29 - Application of the magnetic current source (Continued...)

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Lecture 30 - Radiation from a magnetic current source Tutorials
Lecture 31 - Radiation from a magnetic current source Tutorials (Continued....)
Lecture 32 - Rectangular waveguide - I
Lecture 33 - Rectangular waveguide - I Tutorials
Lecture 34 - Rectangular waveguide - II
Lecture 35 - Rectangular waveguide - II (Continued...)
Lecture 36 - Rectangular waveguide - II Tutorials
Lecture 37 - Rectangular waveguide - II Tutorials (Continued...)
Lecture 38 - Rectangular cavity resonator
Lecture 39 - Rectangular cavity resonator Tutorials
Lecture 40 - Rectangular cavity resonator Tutorials (Continued...)
Lecture 41 - The Reciprocity Theorem, Computation of Amplitudes of Forward and Backward (Continued...)
Lecture 42 - The Reciprocity Theorem, Computation of Amplitudes of Forward and Backward (Continued...)
Lecture 43 - The Reciprocity Theorem, Computation of Amplitudes Tutorials
Lecture 44 - The Reciprocity Theorem, Computation of Amplitudes Tutorials (Continued...)
Lecture 45 - Analysis of Guided Structures
Lecture 46 - Analysis of Guided Structures (Continued...)
Lecture 47 - Analysis of Guided Structures (Continued...)
Lecture 48 - Analysis of Guided Structures (Continued...)
Lecture 49 - Analysis of Guided Structures (Continued...)
Lecture 50 - Analysis of Guided Structures (Continued...)
Lecture 51 - Analysis of Guided Structures (Continued...)
Lecture 52 - Analysis of Guided Structures (Continued...)
Lecture 53 - Analysis of Guided Structures (Continued...)
Lecture 54 - Analysis of Guided Structures (Continued...)
Lecture 55 - Analysis of Guided Structures (Continued...)
Lecture 56 - Analysis of Guided Structures (Continued...)
Lecture 57 - Analysis of Guided Structures Tutorials
Lecture 58 - Analysis of Guided Structures Tutorials (Continued...)
Lecture 59 - Cylindrical Wave Functions
Lecture 60 - Cylindrical Wave Functions (Continued...)
Lecture 61 - Cylindrical Wave Functions (Continued...)
Lecture 62 - Circular Waveguide
Lecture 63 - Circular Cavity
Lecture 64 - Cylindrical Wave Functions Tutorials
Lecture 65 - Cylindrical Wave Functions Tutorials (Continued...)
Lecture 66 - Application to the Coupling Problem : Aperture-Coupled, Probe-Coupled and Waveguide
Lecture 67 - Application to the Coupling Problem : Aperture-Coupled, Probe-Coupled and Waveguide (Continued..
Lecture 68 - Application to the Coupling Problem : Aperture-Coupled, Probe-Coupled and Waveguide (Continued..

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Lecture 69 - Application to the Coupling Problem : Aperture-Coupled, Probe-Coupled and Waveguide (Continued..

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NPTEL Video Course - Electrical Engineering - NOC:Cognition and its Computation

Subject Co-ordinator - Prof. Rajlakshmi Guha, Prof. Sharba Bandyopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Historical Origin of Cognition Studies
Lecture 3 - The Cognitive Revolution
Lecture 4 - Anatomical Structures of the Brain
Lecture 5 - Frontal Lobes and Cognition
Lecture 6 - Neuropsychological Testing
Lecture 7 - Eye Tracking and Cognition
Lecture 8 - EEG, fMRI, MEG
Lecture 9 - Single neuron level measurements
Lecture 10 - Single Neuron Imaging and Manipulation of Neural Activity
Lecture 11 - Introduction to Computation
Lecture 12 - Currency of Computation in Neurobiology - Action Potential
Lecture 13 - Synapse and Synaptic Transmission
Lecture 14 - Synaptic Plasticity
Lecture 15 - Short Term Plasticity and STDP
Lecture 16 - Coding by neurons
Lecture 17 - Sensory Circuits: Visual - I
Lecture 18 - Sensory Circuits: Visual - II
Lecture 19 - Sensory Circuits: Auditory - I
Lecture 20 - Sensory Circuits: Auditory - II
Lecture 21 - Sensory Circuits: Somatosensory
Lecture 22 - Sensory Circuits: Olfactory and Gustatory
Lecture 23 - Motor circuits - Sensory-motor
Lecture 24 - Reward Circuits
Lecture 25 - Executive Circuits
Lecture 26 - Types of Attention, Theories Broadbent Triessman
Lecture 27 - Alerting Orientation and Executive Network
Lecture 28 - Disorders of Attention
Lecture 29 - Basics of Perception - Object, Depth and Movement

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Lecture 30 - Constancy and Illusions
Lecture 31 - Neurobiology of attention, Working Memory
Lecture 32 - Cholinergic System, Bottom up and Top down
Lecture 33 - Object Recognition
Lecture 34 - Visual Search and Pattern Recognition
Lecture 35 - Auditory Scene Analysis, McGurk Effect
Lecture 36 - Learning Processes
Lecture 37 - Learning Processes (Continued...)
Lecture 38 - Memory
Lecture 39 - Learning Disorders
Lecture 40 - Memory Failure - Forgetting
Lecture 41 - Learning in biological neural networks
Lecture 42 - Examples
Lecture 43 - Different types of Plasticity
Lecture 44 - Developmental Plasticity/Learning/Critical Period
Lecture 45 - Examples of Disorders in Plasticity
Lecture 46 - Introduction to speech and language (Development)
Lecture 47 - Components of Speech, Speech Production
Lecture 48 - Speech Perception
Lecture 49 - Lessons from Animal Communication
Lecture 50 - Language and Thought - Speech Language Disorders
Lecture 51 - Theories of Emotion
Lecture 52 - Neurophysiology of emotions - Limbic System
Lecture 53 - Problem Solving
Lecture 54 - Decision Making
Lecture 55 - Frontal cortex in decision making
Lecture 56 - Topics in current research - I
Lecture 57 - Topics in current research - II
Lecture 58 - Topics in current research - III
Lecture 59 - Topics in current research - IV
Lecture 60 - Topics in current research - V

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NPTEL Video Course - Electrical Engineering - NOC:Digital Control in Switched Mode Power Converters and FPGA-

Subject Co-ordinator - Prof. Santanu Kapat

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Digital Control in Switched Mode Power Converters - Course Introduction
Lecture 2 - Digital Control of SMPCs - Course Instructions, Guidelines and Resources
Lecture 3 - Examples of Some Commercial Digital Control Solutions
Lecture 4 - Overview of Digital Control Implementation Platforms
Lecture 5 - Introducing Basic Digitization in Power Electronic Converters
Lecture 6 - Recap of Feedback and Feedforward Control Methods in SMPCs
Lecture 7 - Recap of Fixed and Variable Frequency Modulation Techniques
Lecture 8 - Levels of Digitization in Single-loop Feedback Control in SMPCs
Lecture 9 - Levels of Digitization in Multi-loop Feedback Control in SMPCs
Lecture 10 - SMPC Topologies and Power Stage Design for Hardware Demonstrations
Lecture 11 - Basics of Sampling under Fixed and Variable Frequency Modulation
Lecture 12 - Voltage Mode Digital Pulse Width Modulators and Sampling Methods
Lecture 13 - Overview of Digital Pulse Width Modulator Architectures
Lecture 14 - Sampling Methods under Fixed Frequency Current Mode Control
Lecture 15 - Overview of Fixed Frequency Current Mode Control Architectures
Lecture 16 - Sampling Methods under Constant On/Off - Time Digital Modulation
Lecture 17 - Constant On/Off- Time Mixed-Signal Current Mode Control Architectures
Lecture 18 - Sampling Methods under Digital Hysteresis Control Methods
Lecture 19 - Overview of Digital Hysteresis Control Architectures
Lecture 20 - Summary of Digital Current Mode Control Architectures
Lecture 21 - Recap of Voltage and Current Mode Control Implementation using MATLAB
Lecture 22 - MATLAB Model Development for Basic Digital Control Blocks
Lecture 23 - MATLAB Model Development for Fixed Frequency Digital Control
Lecture 24 - MATLAB Models for Digital Controllers using Difference Equations
Lecture 25 - MATLAB Model Development for Digital Voltage Mode Control
Lecture 26 - MATLAB Model Development for Mixed-Signal Current Mode Control
Lecture 27 - MATLAB Model Development for Fully Digital Current Mode Control
Lecture 28 - MATLAB Model Development for Constant-On Time Control
Lecture 29 - MATLAB Model Development for Constant-Off Time Control

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Lecture 30 - MATLAB Model Development for Digital Current Hysteresis Control
Lecture 31 - Continuous-Time Small-Signal Modeling under Digital Control
Lecture 32 - Discrete Time Modeling with Closed Current Loop
Lecture 33 - State-Space Modeling and Steps For Deriving Discrete-Time Models
Lecture 34 - Derivation of Discrete-Time Large-Signal Models
Lecture 35 - Validation of Discrete-Time Large-Signal Models using MATLAB - Part I
Lecture 36 - Validation of Discrete-Time Large-Signal Models using MATLAB - Part II
Lecture 37 - Derivation of Discrete-Time Small-Signal Models - I
Lecture 38 - Derivation of Discrete-Time Small-Signal Models - II
Lecture 39 - Discrete-Time Transfer Functions and Closed Loop Block Diagrams
Lecture 40 - Model Accuracy with MATLAB Case Studies - Comparative Study
Lecture 41 - Continuous-Time to Discrete-Time Conversion Methods - A Summary
Lecture 42 - Recap of Frequency Domain Design of Analog VMC and CMC
Lecture 43 - Design under Digital Voltage Mode Control - Frequency Domain Approaches
Lecture 44 - Design under Digital Current Mode Control - Frequency Domain Approaches
Lecture 45 - Design Case Study and MATLAB Simulation of Digital Voltage Mode Control
Lecture 46 - Design Case Study and MATLAB Simulation of Digital Current Mode Control
Lecture 47 - Time Optimal Control of a Buck Converter and Identifying Performance Limits
Lecture 48 - Trajectory based CMC Design for Proximate Time Optimal Recovery
Lecture 49 - Trajectory based Digital CMC Tuning and MATLAB Case Studies
Lecture 50 - Digital Pulse Skipping Control and MATLAB Simulation Case Studies
Lecture 51 - Selection of ADC and DAC in Digitally Controlled SMPCs
Lecture 52 - High Frequency Current Sensing Techniques in Digitally Controlled SMPCs
Lecture 53 - Current Sensing Techniques in Digitally Controlled High Power Converters
Lecture 54 - Signal Conditioning Circuits and PCB Design for Mixed-Signal Implementation
Lecture 55 - Reference Power Stage Design and Schematic for Buck and Boost Converters - I
Lecture 56 - Reference Power Stage Design and Schematic for Buck and Boost Converters - II
Lecture 57 - Step-by-Step Guidelines for Digital Control Implementation using FPGA
Lecture 58 - Test and Measurement of a Buck Converter using Digital Storage Oscilloscope
Lecture 59 - Functionalities in Mixed Signal Oscilloscope for Validating Digital Control
Lecture 60 - Power Spectrum Analysis of SMPCs using Mixed-Signal Oscilloscope
Lecture 61 - Introduction to Verilog Hardware Description Language (HDL)
Lecture 62 - Guidelines for Verilog HDL Programming - Some Key Rules
Lecture 63 - Structural and Dataflow Modeling in Verilog HDL for Combinational Logics
Lecture 64 - Behavioral Modeling in Verilog HDL for Sequential Digital Circuits
Lecture 65 - Simulation of Verilog-HDL based Design using Xilinx Webpack - I
Lecture 66 - Simulation of Verilog-HDL based Design using Xilinx Webpack - II
Lecture 67 - Fixed Point Implementation in Embedded Control System
Lecture 68 - Fixed Point Arithmetic and Concept of Q Format

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Lecture 69 - Counter-based DPWM with Deadtime and Verilog HDL Programming
Lecture 70 - Simulating Counter-based DPWM with Deadtime using Xilinx ISE Simulator
Lecture 71 - Top Down Design Methodology in Digital Voltage Mode Control - I
Lecture 72 - Top Down Design Methodology in Digital Voltage Mode Control - II
Lecture 73 - Digital PID Control Implementation using Verilog HDL Programming
Lecture 74 - Digital PID Controller - Hardware Implementation and Experimental Results
Lecture 75 - Top Down Design Methodology in Mixed-Signal Current Mode Control
Lecture 76 - Top Down Design Method and Verilog HDL Programming of Mixed-Signal CMC
Lecture 77 - Verilog HDL based Digital PI Control Implementation of Mixed-Signal CMC
Lecture 78 - Hardware Implementation of Mixed-Signal CMC and Experimental Results
Lecture 79 - Voltage based Digital Pulse Skip Modulation and Top Down Design Method
Lecture 80 - Implementing Digital Pulse Skip Modulation and Experimental Results
Lecture 81 - STM32 Overview and STM32G4x ecosystem
Lecture 82 - Getting started with STM32CubeMX - Part I
Lecture 83 - Getting started with STM32CubeMX - Part II
Lecture 84 - Practical implementation of LLC converters - Part I
Lecture 85 - Practical implementation of LLC converters - Part II
Lecture 86 - Texas Instruments C2000 Real-time Microcontroller Devices
Lecture 87 - Getting Started with C2000 - Software and Hardware Development
Lecture 88 - Texas Instruments C2000 key peripheral differentiations
Lecture 89 - Texas Instruments TIDM-02008 Reference Design Overview
Lecture 90 - Texas Instruments TIDM-02008 Reference Design Software Overview
Lecture 91 - Steps for FPGA Implementation of Digital Voltage Mode Control
Lecture 92 - Steps for FPGA Implementation of Mixed-Signal Current Mode Control
Lecture 93 - Instability in Digital CMC and Ramp Compensation with Experimental Results
Lecture 94 - Benefits of Constant Off-Time and On-Time Digital CMC Techniques
Lecture 95 - Top Down Design Methodology of Constant On/Off-Time Control
Lecture 96 - Verilog HDL Implementation of Voltage based Constant On-Time Control
Lecture 97 - FPGA Implementation of Constant On/Off-Time Mixed-Signal CMC
Lecture 98 - Stability Comparison of Fixed and Variable Freq. Digital CMC with Experimental Results
Lecture 99 - Assessment of Digital Control Techniques for Light Load DC-DC Converters
Lecture 100 - Adaptive On-Time Digital Control in DCM with Verilog HDL Implementation
Lecture 101 - MATLAB Simulation of a Practical Digital VMC Buck Converter in CCM
Lecture 102 - Data Acquisition and Steps for Validating Simulation and Experimental Results
Lecture 103 - Loop Shaping and Design of Digital Voltage Mode Control in a Buck Converter
Lecture 104 - Digital VMC Design for Shaping Output Impedance in a Buck Converter
Lecture 105 - Hardware Case Studies and Transient Performance in Digital VMC Buck Converter
Lecture 106 - Design and Simulation Case Studies in a Mixed-Signal CMC Buck Converter
Lecture 107 - Hardware Case Studies and Transient Performance in a Digital CMC Buck Converter

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Lecture 108 - Analysis of Output Impedance in Digital CMC with Load Current Feedforward
Lecture 109 - Load Current Feedforward in Digital CMC Buck Converter: Experimental Results
Lecture 110 - Need for Multi-Mode Digital Control and Design Requirements in SMPCs
Lecture 111 - Implementing Bi-frequency Spread Spectrum in Digital VMC using Verilog HDL
Lecture 112 - Performance of Bi-frequency Spread Spectrum DPWM and Experimental Results
Lecture 113 - Top Down Design Methodology of PWM/PSM Multi-Mode Digital Control
Lecture 114 - Verilog HDL based FPGA Prototyping of PWM/PSM Multi-Mode Digital Control
Lecture 115 - FPGA Prototyping of Peak Current based PWM/PFM Multi-Mode Digital Control - I
Lecture 116 - FPGA Prototyping of Peak Current based PWM/PFM Multi-Mode Digital Control - II
Lecture 117 - Industry-Driven Architectures for Digital Control IC in High Frequency SMPC
Lecture 118 - Industry-Driven Architectures for Digital Control System Solutions in SMPCs
Lecture 119 - Exploration of Architectures, Modeling, Design, and Control - Course Summary
Lecture 120 - Key Takeaways and Course Usefulness for Skilled Manpower Development

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NPTEL Video Course - Electrical Engineering - NOC:VLSI Interconnects

Subject Co-ordinator - Prof. Sarang Pendharker

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to VLSI interconnects
Lecture 2 - The distributed RC interconnect model
Lecture 3 - The Elmore delay
Lecture 4 - Elmore delay in interconnects
Lecture 5 - Elmore delay in branched RC interconnects
Lecture 6 - Equivalent circuit for RC interconnects
Lecture 7 - Scaling effects in interconnects
Lecture 8 - Delay mitigation in RC interconnects
Lecture 9 - RC interconnect simulation
Lecture 10 - Inductive effects in interconnects
Lecture 11 - Distributed RLC interconnect model
Lecture 12 - Transmission line equations
Lecture 13 - When to consider the inductive effects?
Lecture 14 - The transfer function of an RLC interconnect
Lecture 15 - Time domain response of a lumped RLC circuit
Lecture 16 - Equivalent Elmore model for RLC interconnects
Lecture 17 - Two-pole model of RLC interconnects from ABCD parameters
Lecture 18 - RLC interconnect simulation
Lecture 19 - Origin of the skin effect
Lecture 20 - Effective resistance at high frequencies
Lecture 21 - Equivalent circuit to simulate skin effect
Lecture 22 - Power dissipation due to interconnects
Lecture 23 - Optimum interconnect width for minimizing total power dissipation
Lecture 24 - Heating effects and thermal modeling
Lecture 25 - Compact thermal modeling with equivalent electrical circuits
Lecture 26 - Electromigration in interconnects
Lecture 27 - Mitigation of electromigration
Lecture 28 - Capacitive coupling in interconnects
Lecture 29 - Cross-talk and timing jitters in two identical interconnects

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Lecture 30 - Coupling effects and mitigation techniques
Lecture 31 - Matrix formulation of coupled interconnects
Lecture 32 - Coupled RLC interconnects
Lecture 33 - Decoupling of interconnects by diagonalization of matrix
Lecture 34 - Analysis of coupled interconnects: Examples - 1
Lecture 35 - Analysis of coupled interconnects: Examples - 2
Lecture 36 - Simulation of RC coupled interconnects
Lecture 37 - Extraction of capacitance - Part 1
Lecture 38 - Extraction of capacitance - Part 2
Lecture 39 - Extraction of inductance - Part 1
Lecture 40 - Extraction of inductance - Part 2
Lecture 41 - Estimation of interconnect parameters from S-parameters

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NPTEL Video Course - Electrical Engineering - NOC:Semiconductor Device Modeling and Simulation

Subject Co-ordinator - Prof. Vivek Dixit

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Crystal Concept
Lecture 4 - Crystal Concept
Lecture 5 - Crystal Concept
Lecture 6 - Reciprocal Space
Lecture 7 - Problem Session - 1
Lecture 8 - Doping In Semiconductors
Lecture 9 - Bandstructure
Lecture 10 - Effective Mass
Lecture 11 - Density of States
Lecture 12 - Mobility
Lecture 13 - Problem Session - 2
Lecture 14 - Semiconductor statistics
Lecture 15 - Semiconductor statistics (Continued...)
Lecture 16 - P-N Junction
Lecture 17 - P-N Junction (Continued...)
Lecture 18 - P-N Junction (Continued...)
Lecture 19 - Problem Session - 3
Lecture 20 - BJT
Lecture 21 - Bipolar Junction Transistor
Lecture 22 - Bipolar Junction Transistor (Continued...)
Lecture 23 - Bipolar Junction Transistor (Continued...)
Lecture 24 - Problem Session - 4
Lecture 25 - Metal- Semiconductor Interface
Lecture 26 - Schottky junction
Lecture 27 - Field Effect Transistor
Lecture 28 - MOS Capacitor
Lecture 29 - MOS-CV

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Lecture 30 - REAL MOS (Continued...)
Lecture 31 - MOSFET
Lecture 32 - MOSFET (Continued...)
Lecture 33 - Problem Session - 5
Lecture 34 - Semiclassical Transport
Lecture 35 - Semiclassical Transport (Continued...)
Lecture 36 - Semiclassical Transport (Continued...)
Lecture 37 - Semiclassical Transport (Continued...)
Lecture 38 - Semiclassical Transport (Continued...)
Lecture 39 - Problem Session - 6
Lecture 40 - Drift-diffusion model
Lecture 41 - Drift-diffusion model (Continued...)
Lecture 42 - Drift-diffusion model (Continued...)
Lecture 43 - Drift-diffusion model (Continued...)
Lecture 44 - Generation-Recombination
Lecture 45 - Generation-Recombination (Continued...)
Lecture 46 - Solving DD Equations (Continued...)
Lecture 47 - Solving DD Equations (Continued...)
Lecture 48 - Problem Session - 7
Lecture 49 - Hydrodynamic Model
Lecture 50 - Hydrodynamic Model (Continued...)
Lecture 51 - Hydrodynamic Model (Continued...)
Lecture 52 - Monte Carlo simuations
Lecture 53 - Problem Session - 8
Lecture 54 - Quantum Mechanics
Lecture 55 - Solving Schrodinger Equation
Lecture 56 - Quantum Correction Models
Lecture 57 - Quantum Transport
Lecture 58 - Transfer Matrix Approach
Lecture 59 - TCAD Tools
Lecture 60 - ATLAS SILVACO
Lecture 61 - Simulating Junctions
Lecture 62 - Models and Simulation Concepts
Lecture 63 - Mixed-mode Simulation

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NPTEL Video Course - Electrical Engineering - NOC:RF and Microwave Networks

Subject Co-ordinator - Prof. Bratin Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The network concept
Lecture 2 - One-port network
Lecture 3 - One-port network, Two-port network
Lecture 4 - Two-port network, Signal flow graph
Lecture 5 - Tutorial - 1
Lecture 6 - General analysis of cylindrical waveguides
Lecture 7 - TE to z mode analysis of cylindrical waveguides
Lecture 8 - TE to z mode analysis of cylindrical waveguides (Continued...), TM to z mode analysis
Lecture 9 - Normalization of mode vectors, Characteristics of eigen values and eigen functions
Lecture 10 - Wave impedance for TE and TM to z modes, Transmission line analogy for mode voltage
Lecture 11 - Transmission line equivalence for TE and TM modes, Power calculation using
Lecture 12 - Tutorial - 2
Lecture 13 - Modal expansion in cylindrical waveguides, Concept of mode orthogonality
Lecture 14 - Concept of mode orthogonality (continued), Determination of arbitrary mode
Lecture 15 - Power orthogonality in cylindrical waveguides
Lecture 16 - Tutorial - 3
Lecture 17 - Modal expansion of fields in rectangular waveguides
Lecture 18 - Modal expansion of fields in rectangular waveguides (Continued), Capacitive rectangular
Lecture 19 - Capacitive rectangular waveguide junction (Continued...)
Lecture 20 - Inductive rectangular waveguide junction (Continued...)
Lecture 21 - Inductive rectangular waveguide junction (Continued...), Construction of solutions
Lecture 22 - Cylindrical waveguide junctions (Continued...)
Lecture 23 - Cylindrical waveguide junctions (Continued...)
Lecture 24 - Cylindrical waveguide junctions (Continued...), Example of capacitive rectangular
Lecture 25 - Cylindrical waveguide junctions (Continued...), Example of capacitive rectangular
Lecture 26 - Example of inductive waveguide junction (Continued...), Alternative equivalent circuit
Lecture 27 - Tutorial - 4
Lecture 28 - Obstacles in waveguides
Lecture 29 - Obstacles in waveguides (Continued...)

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Lecture 30 - Obstacles in waveguides (Continued...)
Lecture 31 - Small obstacles in waveguides
Lecture 32 - Small obstacles in waveguides (Continued...)
Lecture 33 - Small obstacles in waveguides, Reciprocity
Lecture 34 - Reciprocity
Lecture 35 - Reciprocity (Continued...)
Lecture 36 - Tutorial - 5
Lecture 37 - Posts in rectangular waveguide
Lecture 38 - Posts in rectangular waveguide (Continued...)
Lecture 39 - Posts in rectangular waveguide (Continued...)
Lecture 40 - Posts in rectangular waveguide (Continued...)
Lecture 41 - Diaphragms in waveguide
Lecture 42 - Diaphragms in waveguide (Continued...)
Lecture 43 - Diaphragms in waveguide (Continued...)
Lecture 44 - Diaphragms in waveguide (Continued...)
Lecture 45 - Tutorial - 6
Lecture 46 - Currents in Waveguides
Lecture 47 - Currents in Waveguides (Continued...)
Lecture 48 - Coaxial to waveguide junction with matched termination
Lecture 49 - Coaxial to waveguide feeds with arbitrary termination
Lecture 50 - Coaxial to waveguide feeds with arbitrary termination (Continued...)
Lecture 51 - Coaxial to waveguide feeds with arbitrary termination (Continued...)
Lecture 52 - Coaxial to waveguide feeds with arbitrary termination (Continued...)
Lecture 53 - Tutorial - 7
Lecture 54 - Apertures in the ground plane
Lecture 55 - Apertures in the ground plane (Continued...)
Lecture 56 - Apertures in the ground plane (Continued...)
Lecture 57 - Apertures in the ground plane (Continued...), Plane current sheets
Lecture 58 - Plane current sheets (Continued...)
Lecture 59 - Tutorial - 8
Lecture 60 - Excitation of Apertures
Lecture 61 - Tutorial - 9
Lecture 62 - Modal expansion in cavities
Lecture 63 - Probes in cavities
Lecture 64 - Tutorial - 10
Lecture 65 - Aperture coupling to cavities
Lecture 66 - Aperture coupling to cavities (Continued...)
Lecture 67 - Wave interaction with cylindrical structures
Lecture 68 - Wave interaction with cylindrical structures (Continued...)

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Lecture 69 - Wave interaction with cylindrical structures (Continued...)
Lecture 70 - Wave interaction with cylindrical structures (Continued...)
Lecture 71 - Wave interaction with cylindrical structures (Continued...)
Lecture 72 - Wave interaction with cylindrical structures (Continued...)
Lecture 73 - Wave interaction with cylindrical structures (Continued...)
Lecture 74 - Wave interaction with cylindrical structures (Continued...)
Lecture 75 - Tutorial - 12

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Adaptive Signal Processing

Subject Co-ordinator - Prof. Mrityunjoy Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Adaptive Filters
Lecture 2 - Probability and Random Variables
Lecture 3 - General Set of Random Variables
Lecture 4 - Statistical Impedance, Covariance Matrices
Lecture 5 - Multivariate Gaussian Density
Lecture 6 - Complex Random Variables
Lecture 7 - Introduction to Hermitian Matrices
Lecture 8 - Eigenvalues and eigenvectors of Hermitian Matrices
Lecture 9 - Spectral Decomposition of Hermitian Matrices
Lecture 10 - Positive Definite and Semidefinite Matrices
Lecture 11 - Introduction to Discrete Time Random Processes
Lecture 12 - Power Spectral Density (PSD)
Lecture 13 - PSD and Linear Time Invariant Systems
Lecture 14 - Optimal FIR Filter
Lecture 15 - Optimal FIR Filter (Continued...)
Lecture 16 - LMS Algorithm
Lecture 17 - Convergence Proof of LMS Algorithm
Lecture 18 - Convergence Proof of LMS Algorithm (Continued...)
Lecture 19 - Application of Adaptive Filter
Lecture 20 - Application of Adaptive Filter (Continued...)
Lecture 21 - Application of Adaptive Filter (Continued...)
Lecture 22 - Applications of Adaptive Filter
Lecture 23 - Applications of Adaptive Filter
Lecture 24 - Second Order Analysis of LMS Algorithm
Lecture 25 - Second Order Analysis of LMS Algorithm (Continued...)
Lecture 26 - Second Order Analysis of LMS Algorithm (Continued...)
Lecture 27 - Second Order Analysis of LMS Algorithm (Continued...)
Lecture 28 - NLMS Algorithm
Lecture 29 - NLMS Algorithm

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Lecture 30 - Affine Projection Algorithm (APA)
Lecture 31 - Affine Projection Algorithm (APA)
Lecture 32 - Introduction to RLS Algorithm
Lecture 33 - Introduction to RLS Algorithm (Continued...)
Lecture 34 - Introduction to RLS Algorithm (Continued...)
Lecture 35 - Formulation of the RLS Algorithm
Lecture 36 - Introduction to RLS Algorithm
Lecture 37 - Introduction to RLS Algorithm
Lecture 38 - Formulation of the RLS Algorithm
Lecture 39 - Derivation of the RLS transversal adaptive filter
Lecture 40 - Derivation of the RLS transversal adaptive filter
Lecture 41 - Derivation of the RLS transversal adaptive filter

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NPTEL Video Course - Electrical Engineering - NOC:Nanobiophotonics: Touching Our Daily Life

Subject Co-ordinator - Dr. Basudev Lahiri

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Nano Bio Photonics?
Lecture 2 - Why is Nano Bio Photonics?
Lecture 3 - Why do this?
Lecture 4 - Why Photonics?
Lecture 5 - Why Biology?
Lecture 6 - Nature of Light
Lecture 7 - Light-Matter Interactions
Lecture 8 - Introduction to Fluorescence
Lecture 9 - The Cell
Lecture 10 - The Central Dogma
Lecture 11 - Facts of Matter
Lecture 12 - Introduction to Nanotechnology
Lecture 13 - Nanotechnology: The art of small
Lecture 14 - Synthesis of Nanomaterials : Top-Down Approach
Lecture 15 - Applications of Nanomaterials in Photonics
Lecture 16 - Interaction of Light with Cells
Lecture 17 - Light-matter interactions in molecules (Basic of Spectroscopy)
Lecture 18 - Imaging for Biological Matters
Lecture 19 - Fluorophores and Fluorescence Microscopy Techniques
Lecture 20 - Primary Examples
Lecture 21 - Basics of Flow Cytometry - Part 1
Lecture 22 - Basics of Flow Cytometry - Part 2
Lecture 23 - Data manipulation and presentation
Lecture 24 - Application of Flow cytometry in Biology
Lecture 25 - Raman Assisted Flow cytometry
Lecture 26 - Genetic Code
Lecture 27 - Biosensing Background
Lecture 28 - Basics of Microarray Technology
Lecture 29 - DNA Microarray Technology

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Lecture 30 - Protein Microarray Technology
Lecture 31 - Laser Principles and Operation
Lecture 32 - Nonlinear Optical Processes
Lecture 33 - In Vivo Photoexcitation
Lecture 34 - Light/Laser Activated Therapy
Lecture 35 - Laser Tissue Contouring
Lecture 36 - Metamaterials
Lecture 37 - Metamaterials as Biosensors
Lecture 38 - Biosensing with Optical Nano-Antennas
Lecture 39 - Nanoscale Chemical Imaging
Lecture 40 - Optical Tweezers
Lecture 41 - Introduction to Optogenetics
Lecture 42 - Controlling the Brain with Light
Lecture 43 - The Nervous System
Lecture 44 - The Neural Circuits
Lecture 45 - Optical Neuroimaging and Tomography
Lecture 46 - Functional Near-Infrared Spectroscopy (fNIRS) of the Brain
Lecture 47 - Neuro imaging with Light-Sheet Microscopy
Lecture 48 - Brain imaging with Two Photon Microscopy
Lecture 49 - Brain imaging with functional optoacoustic Imaging
Lecture 50 - Tomographic technique for Brain imaging
Lecture 51 - Optogenetic Modulation of Neural Circuits
Lecture 52 - Nanoparticles for Optical Modulation of Neuronal Behavior
Lecture 53 - Optical Stimulation of Neural Circuits in Freely Moving Animals
Lecture 54 - Higher Harmonic Generation Imaging for Neuropathology
Lecture 55 - Multi-Photon Nanosurgery
Lecture 56 - Bioinspired materials for photonics
Lecture 57 - Bioderived Materials
Lecture 58 - Bioinspired Materials
Lecture 59 - Biotemplates
Lecture 60 - Summary and Revisiting Few Topics

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NPTEL Video Course - Electrical Engineering - NOC:EMI-EMC and Signal Integrity: Principles, Techniques and Ap

Subject Co-ordinator - Prof. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Electromagnetic Environment
Lecture 2 - Introduction to Electromagnetic Compatibility
Lecture 3 - EMC Standards
Lecture 4 - EMC Units and Signal Spectrum
Lecture 5 - Single Sided Spectrum
Lecture 6 - Response of Linear Systems to Periodic Input Signals
Lecture 7 - Important Computational Techniques
Lecture 8 - Fourier Coefficient for Piecewise Linear Periodic Waveforms
Lecture 9 - Fourier Coefficient for Piecewise Linear Periodic Waveforms (Continued...)
Lecture 10 - Trapezoidal Clock
Lecture 11 - Spectral Bounds for Trapezoidal Clock
Lecture 12 - Spectral estimation of trapezoidal clock
Lecture 13 - Effect of Rise/Fall Time on Spectral Bound of a Clock
Lecture 14 - Effect of Ringing on Spectral Bounds
Lecture 15 - Spectral Bounds for Linear System Output
Lecture 16 - Resolution Bandwidth of a Spectrum Analyser
Lecture 17 - Detector of Spectrum Analyser
Lecture 18 - Radiated Emission Model Subproblem - I
Lecture 19 - Farfield Characteristics of Current Element: Some Discussion
Lecture 20 - Farfield of Dipole Antena
Lecture 21 - Farfield models of wire antenna and current models
Lecture 22 - Differential mode current emission model
Lecture 23 - Differential mode current emission model (Continued...)
Lecture 24 - Common Mode Current Emission Model
Lecture 25 - Current Measurement
Lecture 26 - Radiated Susceptibility Models
Lecture 27 - Determination of Per Unit Length Inductance (Continued...)
Lecture 28 - Per Unit Length Parameters of Various Two Wire Lines
Lecture 29 - Radiated Susceptibility Model

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Lecture 30 - Radiated Susceptibility Model (Continued...)
Lecture 31 - Radiated Susceptibility Model (Continued...)
Lecture 32 - Crosstalk
Lecture 33 - Development of Multi Conductor Transmission Line Equation
Lecture 34 - Per Unit Length Parameter of a Three Conductor System
Lecture 35 - Parameters of Three Conductor Systems (Continued...)
Lecture 36 - Parameters of Three Conductor Systems (Continued...)
Lecture 37 - Development of crosstalk model infrequency domain
Lecture 38 - Determination of Terminal Currents of a three conductor system
Lecture 39 - Derivation of Chain Parameter Matrix
Lecture 40 - Determination of Crosstalk in a Lossless Line Immersed in Homogeneous Medium
Lecture 41 - Determination of Crosstalk (Continued...)
Lecture 42 - Determination of Crosstalk (Continued...)
Lecture 43 - Determination of Crosstalk (Continued...)
Lecture 44 - Inductive and Capacitive coupling
Lecture 45 - Time Domain Crosstalk
Lecture 46 - Time Domain Crosstalk (Continued...)
Lecture 47 - Inclusion of Losses in Transient Crosstalk
Lecture 48 - Conducted emission and susceptibility
Lecture 49 - Shielding
Lecture 50 - Shielding Effectiveness for Farfield Source
Lecture 51 - Shielding Effectiveness Due to Farfield Source (Continued...)
Lecture 52 - SE Due to Farfield Sources (Continued...) and Free Space Impedance Ar Nearfield
Lecture 53 - Shielding for Nearfield Source
Lecture 54 - EMC System Aspect for Shielding
Lecture 55 - Grounding
Lecture 56 - Grounding (Continued...)
Lecture 57 - Bonds and Joints
Lecture 58 - EMC Case Studies
Lecture 59 - Electrostatic Discharge (ESD)

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NPTEL Video Course - Electrical Engineering - NOC:Embedded Sensing, Actuation and Interfacing Systems

Subject Co-ordinator - Prof. Banibrata Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Real-life Examples Illustration
Lecture 3 - Sensor Structure and Characteristics
Lecture 4 - Sensor and Actuator Characteristics and Numerical Problem
Lecture 5 - Temperature Sensors and its Signal Conditioning Circuits
Lecture 6 - Motion Sensors and its Interfacing Aspects
Lecture 7 - Gyroscope and Strain Gauge
Lecture 8 - Strain Gauge and Optical Sensor
Lecture 9 - Optical Encoder, Gas Sensor and Chemical Sensor
Lecture 10 - Magnetic Sensor and Actuator
Lecture 11 - Electrical Actuator
Lecture 12 - Electrical Actuator: Stepper Motor and Heater
Lecture 13 - Smart Material Actuator
Lecture 14 - Metamaterial and Other Actuators
Lecture 15 - Op-amp based circuits and amplifier
Lecture 16 - Various Op-amp Configurations
Lecture 17 - Instrumentation Amplifier and Filter
Lecture 18 - Passive and Active Filters
Lecture 19 - Universal Filter and Data Converter
Lecture 20 - ADC and DAC
Lecture 21 - Sampling Issue and Communication Protocol
Lecture 22 - Bridge Circuits and their Linearity Improvement
Lecture 23 - Linearization and error reduction schemes
Lecture 24 - Principle of Direct Interfacing Scheme
Lecture 25 - Various Aspects of Direct Interfacing
Lecture 26 - Direct Interfacing for Differential and Bridge Type Resistive Sensor
Lecture 27 - Measurement Uncertainties and Interface of Sensor Array
Lecture 28 - Various Configurations of Capacitive Sensors
Lecture 29 - Analog Interface Circuit and Direct Interfacing Scheme

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Lecture 30 - Direct Interfacing Scheme for Differential Capacitive Sensor
Lecture 31 - Lossy Capacitive Sensor and its Interfacing Aspect
Lecture 32 - Advanced Interfacing Circuits for Lossy Capacitive Sensor
Lecture 33 - Autobalance Active Bridge Interfacing Circuit
Lecture 34 - Background of Miniaturization
Lecture 35 - Micromachining Technology for MEMS Devices
Lecture 36 - Bulk and Surface Micromachining and Fabrication Steps
Lecture 37 - MEMS Fabrication Process - Part 1
Lecture 38 - MEMS Fabrication Process - Part 2
Lecture 39 - MEMS Fabrication Process - Part 3
Lecture 40 - MEMS Fabrication Process - Part 4
Lecture 41 - MEMS-IC Integration Aspects and Miniaturized Sensor
Lecture 42 - MEMS Pressure Sensor and Interfacing Electronics
Lecture 43 - MEMS Accelerometer
Lecture 44 - MEMS Capacitive Accelerometer and Interfacing Electronics
Lecture 45 - Interfacing Electronics Details for MEMS Accelerometer
Lecture 46 - MEMS Gyroscope and Flow sensor
Lecture 47 - MEMS Actuator
Lecture 48 - MEMS Electrostatic Actuator Analysis
Lecture 49 - Background of Renewable Energy Harvesting
Lecture 50 - Various Transduction Mechanisms for Energy Harvester
Lecture 51 - Vibration Energy Harvester and its Interfacing Aspects
Lecture 52 - Interfacing Power Management Circuit for Vibration Energy Harvester
Lecture 53 - Demonstration of Energy Harvester Set-up and Self-powered Embedded System
Lecture 54 - Background of Embedded Sensors and Actuators in Automotives
Lecture 55 - Applications in Safety System of Automotive
Lecture 56 - Applications in Safety System and Engine Control System
Lecture 57 - Application in Cardiovascular Measurements
Lecture 58 - Applications in Remote Healthcare and Smart Medical Devices
Lecture 59 - Electronic Nose and its Applications in Disease Detection
Lecture 60 - Virtual Sensing, Research Scopes, Summary and Key Takeaways of the Course

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NPTEL Video Course - Electrical Engineering - NOC:A Basic Course on Electric and Magnetic Circuits

Subject Co-ordinator - Prof. Ashok Kumar Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electric systems
Lecture 2 - Resistive circuit connections
Lecture 3 - Nodal analysis
Lecture 4 - Mesh Analysis / Loop Analysis
Lecture 5 - Mixed sources - Meshand Nodal analysis
Lecture 6 - Superposition Theorem
Lecture 7 - Thevenin's Theorem and its applications
Lecture 8 - Norton's theorem and Maximum power transfer theorem
Lecture 9 - Review problems on DC circuits
Lecture 10 - Average and RMS values Phasor representation of sinusoids Reactance
Lecture 11 - Series AC circuits, R-L, R-C, R-L-C
Lecture 12 - KVL and KCL Series and parallel combination of impedance Star - delta transformations
Lecture 13 - Power Curves for AC circuits
Lecture 14 - Real and Reactive Power
Lecture 15 - Loop current method, nodal analysis and theorems
Lecture 16 - Theorem-examples, maximum power transfer theorem
Lecture 17 - Resonance
Lecture 18 - Power Factor Improvement
Lecture 19 - Review problems on AC circuits
Lecture 20 - Capacitor - properties series - parallel combinations
Lecture 21 - Inductor - properties series - parallel combinations
Lecture 22 - Source free RC and RL circuits
Lecture 23 - Step response of RC and RL circuits
Lecture 24 - Review Problems on RL and RC transients
Lecture 25 - Basics on three phase systems
Lecture 26 - Line and phase currents and voltages in star connected systems
Lecture 27 - Line and phase voltages and currents in delta connected systems
Lecture 28 - Three phase power
Lecture 29 - Three phase power and Power factor

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Lecture 30 - Measurement of 3 - phase power
Lecture 31 - Magnetic flux, flux density, magnetic field strength
Lecture 32 - Reluctance Equivalent magnetic circuit Solving Magnetic Circuits
Lecture 33 - Solving Magnetic Circuits
Lecture 34 - Hysteresis loop Hysteresis and Eddy Current loss
Lecture 35 - Self and Mutual inductances Dot Convention
Lecture 36 - Solving Magnetic Coupled Circuits
Lecture 37 - Magnetic Circuit applications
Lecture 38 - Transformer Basics, The emf equation
Lecture 39 - Ideal transformer, Impedance referred to primary
Lecture 40 - Practical transformer, Transformer equivalent circuit diagram
Lecture 41 - Voltage Drop and Voltage Regulation Calculation
Lecture 42 - Efficiency of Transformer
Lecture 43 - Transformer Tests, Transformer Applications

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NPTEL Video Course - Electrical Engineering - NOC:Deep Learning for Natural Language Processing

Subject Co-ordinator - Prof. Pawan Goyal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Text Processing Basics, Tokenization
Lecture 3 - N-gram Language Models - Part 1
Lecture 4 - N-gram Language Models - Part 2
Lecture 5 - NLP Tasks and Paradigms
Lecture 6 - Tutorial 1
Lecture 7 - Supervised Learning
Lecture 8 - Shallow Neural Networks
Lecture 9 - Deep Neural Networks
Lecture 10 - Backpropagation
Lecture 11 - Gradient Descent and Initialization
Lecture 12 - Tutorial 2
Lecture 13 - Word Representation
Lecture 14 - Learning Word Representation - Part I
Lecture 15 - Learning Word Representation - Part II
Lecture 16 - Word Vectors: Other Extensions
Lecture 17 - Cross-Lingual Representations
Lecture 18 - Tutorial 3
Lecture 19 - RNN Language Models
Lecture 20 - RNN Applications : Text Generation, Sequence Labeling, Text Classification
Lecture 21 - RNN for Sequence to Sequence
Lecture 22 - Decoding Strategies
Lecture 23 - Better RNN Units : GRU, LSTM
Lecture 24 - Tutorial 4
Lecture 25 - Introduction to Transformers
Lecture 26 - Transformers - Part 2
Lecture 27 - Transformers - Part 3
Lecture 28 - Transformers - Part 4
Lecture 29 - Efficient Transformers

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Lecture 30 - Tutorial 5
Lecture 31 - Pretraining
Lecture 32 - Pretraining Transformer Encoder
Lecture 33 - Pretraining Transformer Encoder, Encoder-Decoder
Lecture 34 - Pretraining Transformer Decoder
Lecture 35 - More on Pretraining
Lecture 36 - Tutorial 6
Lecture 37 - Applications : Question Answering - I
Lecture 38 - Applications : Question Answering - II
Lecture 39 - Applications : Dialogue Systems - I
Lecture 40 - Applications : Dialogue Systems - II
Lecture 41 - Applications : Text Summarization
Lecture 42 - Tutorial 7
Lecture 43 - Instruction Fine-Tuning - I
Lecture 44 - Instruction Fine-Tuning - II
Lecture 45 - Reinforcement Learning from Human Feedback - I
Lecture 46 - Reinforcement Learning from Human Feedback - II
Lecture 47 - Aligning to User Preferences via Direct Preference Optimization
Lecture 48 - Tutorial 8
Lecture 49 - Prompting - I
Lecture 50 - Prompting : Why does in-context learning work?
Lecture 51 - Advanced Prompting Techniques
Lecture 52 - Tool-aided Language Models
Lecture 53 - Automatic Prompt Engineering
Lecture 54 - Tutorial 9
Lecture 55 - Parameter-efficient fine-tuning - I
Lecture 56 - Parameter-efficient fine-tuning - II
Lecture 57 - Efficient fine-tuning for quantized LMs - I
Lecture 58 - Efficient fine-tuning for quantized LMs - II
Lecture 59 - Other Parameter Efficient Methods: Pruning, Distillation
Lecture 60 - Tutorial 10
Lecture 61 - Scaling Laws of LLMs
Lecture 62 - Modern LLMs and Architecture Variations - I
Lecture 63 - Modern LLMs and Architecture Variations: Positional Embeddings
Lecture 64 - Long Sequence Modeling
Lecture 65 - Retrieval Augmented Generation
Lecture 66 - Tutorial 11
Lecture 67 - Model Interpretability
Lecture 68 - Model Interpretability - Multilingual

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Lecture 69 - Model Interpretability - III
Lecture 70 - Trustworty LLMs : Taxonomy
Lecture 71 - Trustworty LLMs : Machine Unlearning
Lecture 72 - Tutorial 12

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NPTEL Video Course - Electrical Engineering - NOC:Modeling and TCAD Simulation of Solar PV Cell

Subject Co-ordinator - Prof. Mukul Kumar Das

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Semiconductor materials
Lecture 3 - Energy band diagram in solid
Lecture 4 - E-k diagram and Density of states
Lecture 5 - Tutorial: concept clearing numerical problem and solution on number of states calculation
Lecture 6 - Basic properties of semiconducting materials
Lecture 7 - Electrostatics of p-n junction: qualitative analysis
Lecture 8 - Electrostatics of p-n junction: quantitative analysis
Lecture 9 - Semiconductor heterojunction
Lecture 10 - Tutorial: Concept clearing numerical problems on p-n junction
Lecture 11 - Metal - Semiconductor junction
Lecture 12 - M-I-S junction
Lecture 13 - Light-matter interaction and Solar radiation
Lecture 14 - p-n junction under Illuminated
Lecture 15 - Tutorial on illuminated semiconductor junction
Lecture 16 - Separation of photogenerated carriers and principle of PV generation
Lecture 17 - I-V characteristics and pperformance metrics of solar cell
Lecture 18 - Origin of series, shunt resistances, equivalent circuit for solar cell
Lecture 19 - Optical and electrical losses
Lecture 20 - Numerical Problems
Lecture 21 - Solar PV cell-Technological progress
Lecture 22 - Bulk (1st Gen.) - Al-BSF, PERC, PERT, PERL, TOPCON
Lecture 23 - Thin film technologies (2nd Gen.), CdTe, CIGS, a-Si
Lecture 24 - 3rd Gen. technologies: Organic, Dye-sensitized, Perovskite
Lecture 25 - Nanostructured and Bifacial solar cell technology
Lecture 26 - Electrical modelling of solar cell
Lecture 27 - Electrical modelling of solar cell
Lecture 28 - Mobility models
Lecture 29 - Mobility model for amorphous material

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Lecture 30 - Tutorials
Lecture 31 - Band Tail States
Lecture 32 - Defect states and recombination
Lecture 33 - Optical modelling for solar cell
Lecture 34 - Model for carrier tunnelling
Lecture 35 - Tutorial
Lecture 36 - Numerical solution of semiconductor equation
Lecture 37 - Numerical solution : discretization technique
Lecture 38 - Meshing technique for numerical solution
Lecture 39 - Mesh refinement
Lecture 40 - Tutorial
Lecture 41 - Solution of Poissonâ s Equation: iterative Method
Lecture 42 - Solution of Poissonâ s Equation: iterative Method (Continued...)
Lecture 43 - Numerical solution Part 2 - Continuity Equation
Lecture 44 - Numerical solution Part 2 - Continuity Equation
Lecture 45 - Example - Numerical solution of Continuity Equation
Lecture 46 - Introduction to SCAPS-1D: Installation and simulation steps
Lecture 47 - Simulation of thin film solar cell using SCAPS-1D
Lecture 48 - Simulation of CdTe based Thin Film Solar Cell using SCAPS-1D
Lecture 49 - Simulation using SCAPS-1D- Parameter Extraction, Performance Optimization
Lecture 50 - TCAD simulation on part 1 - Tutorial
Lecture 51 - Effect of emitter and absorber doping on the performance of Thin Film Solar Cell
Lecture 52 - Effect of interface defect on the performance of Thin Film Solar Cell
Lecture 53 - Effect of back contact material and BSF layer on the performance of Thin Film Solar Cell
Lecture 54 - Craetion of User-defined absorption file for generation and optical absorption, Effects of Band
Lecture 55 - Demonstration of p-i-n solar cell simulation using SCAPS 1D
Lecture 56 - Demonstration of Perovskite solar cell simulation using SCAPS 1D
Lecture 57 - Demonstration of Perovskite-c-Si Tandem solar cell simulation using SCAPS 1D
Lecture 58 - Demonstration of solar cell simulation using SILVACO Victory TCAD (Access through NANOHUB.org)
Lecture 59 - Demonstration of Organic solar cell simulation using SILVACO Victory TCAD (Access through NANOHU
Lecture 60 - A quick overview of the software, Steps for simulation solar cell using PC1D, Parameter extracti

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NPTEL Video Course - Electrical Engineering - NOC:Convex Optimization in Control

Subject Co-ordinator - Prof. Ashish Ranjan Hota

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Optimal Solution and Optimality Conditions
Lecture 3 - Convex Sets
Lecture 4 - Convex Functions
Lecture 5 - Convex Functions (Continued...)
Lecture 6 - Convex Optimization
Lecture 7 - Linear Programming
Lecture 8 - Linear Programming Duality
Lecture 9 - LP and Lagrangian Duality
Lecture 10 - Lagrangian Duality
Lecture 11 - Programming Demonstration
Lecture 12 - Programming Demonstration (Continued...)
Lecture 13 - Linear Matrix Inequalities
Lecture 14 - Linear Matrix Inequalities (Continued...)
Lecture 15 - Linear Matrix Inequalities
Lecture 16 - Dynamical Systems and Lyapunov Stability
Lecture 17 - Continuous-time LTI System
Lecture 18 - Lyapunov Stability and LMIs
Lecture 19 - D-Stability
Lecture 20 - Programming Demo
Lecture 21 - Controllability
Lecture 22 - State Feedback Control
Lecture 23 - Luenberger Observers
Lecture 24 - Analysis for Discrete-time Systems
Lecture 25 - Programming Demo
Lecture 26 - Programming Demo
Lecture 27 - Signal Norms
Lecture 28 - H_2 and H_Inf Spaces
Lecture 29 - LMIs for H_Inf Norm

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Lecture 30 - H_Inf Optimal State Feedback Control
Lecture 31 - Programming Demo
Lecture 32 - H_2 Norm and LMIs
Lecture 33 - H_2 State Feedback Control and LQR
Lecture 34 - H_2 and H_Infinity Optimal Observer Design
Lecture 35 - Programming Demo.
Lecture 36 - Optimal Control Framework
Lecture 37 - Well-Posedness and Stability
Lecture 38 - Optimal Dynamic Output Feedback Control
Lecture 39 - Optimal Dynamic Output Feedback Control (Continued...)
Lecture 40 - Programming Demo
Lecture 41 - H-Infinity Norm for Discrete-Time LTI Systems
Lecture 42 - H-2 Norm for Discrete-Time LTI Systems
Lecture 43 - Stability Notions for Uncertain Systems
Lecture 44 - Quadratic Stability and State-Feedback Synthesis
Lecture 45 - Programming Demo
Lecture 46 - Dissipative Dynamical Systems
Lecture 47 - Dissipative LTI Systems and LMIs
Lecture 48 - Representing Uncertain Systems
Lecture 49 - Integral Quadratic Constraints
Lecture 50 - LMI for Robust L2 gain via IQC
Lecture 51 - IQCs for Discrete-Time Systems
Lecture 52 - Parametric Norm-Bounded Uncertainty
Lecture 53 - Programming Demo
Lecture 54 - Gradient-based Algorithms
Lecture 55 - Convergence of Gradient Descent
Lecture 56 - Convergence under Smoothness and Strong Convexity
Lecture 57 - Convergence under Smoothness and Strong Convexity (Continued...)
Lecture 58 - IQC and Programming Demo
Lecture 59 - IQC and Programming Demo
Lecture 60 - Concluding Remarks and Outlook

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NPTEL Video Course - Electrical Engineering - NOC:Passive Microwave Circuits, Devices, and Measurements

Subject Co-ordinator - Prof. Debapratim Ghosh

Co-ordinating Institute - IIT - Bhubaneshwar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Transmission Line Phenomena
Lecture 2 - Reflections on Transmission Lines
Lecture 3 - Impedance Transformation and its Effects on Transmission Lines
Lecture 4 - Impedance Transformation and Standing Waves on a Transmission Line
Lecture 5 - Introductory Meeting
Lecture 6 - Foundations of the Smith Chart
Lecture 7 - Transmission Lines in Practice
Lecture 8 - Analysis of Transmission Lines in Practice
Lecture 9 - Transient Behavious of Transmission Lines
Lecture 10 - Transient Behavious of Transmission Lines (Continued...)
Lecture 11 - Introduction to Impedance Matching and Quarter Wave Transformer
Lecture 12 - Frequency Reponse of a Quarter Wave Transformer
Lecture 13 - Transient Analysis, and the Theory of Small Reflections
Lecture 14 - Increasing the Bandwidth of Quarter Wave Transformers
Lecture 15 - The Equal Gamma Multi Section Transformer
Lecture 16 - The Butterworth or Binomial Multi Section Transformer
Lecture 17 - Analyzing the Butterworth Multi Section Transformer
Lecture 18 - A Recap of RLC Circuits for Microwave Applications
Lecture 19 - Impedance Matching using RLC Network Transformation
Lecture 20 - Techniques for Matching Complex Load Impedances
Lecture 21 - Matching Complex Load Impedances using L Match Networks
Lecture 22 - A General Introduction to Microwave Networks
Lecture 23 - Introduction to Scattering Parameters in Microwave Networks
Lecture 24 - Properties of S Parameters
Lecture 25 - Relationship between S Parameters and Transmission Parameters
Lecture 26 - An Introduction to Lumped Element Microwave Filters
Lecture 27 - Design of Maximally Flat Lowpass Filters using Lumped Elements
Lecture 28 - Transformation of Filters for Impedance and Frequency Response
Lecture 29 - Transformation of Lowpass to Highpass, Bandpass, Bandstop Filters

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Lecture 30 - Realizing Lumped Element Filters using Transmission Lines
Lecture 31 - Realizing Lumped Element Filters using Transmission Lines (Continued...)
Lecture 32 - Introduction to Three Port Microwave Networks
Lecture 33 - The Tee Junction Divider
Lecture 34 - The Concept of Even and Odd Mode Analysis
Lecture 35 - The Wilkinson Power Divider
Lecture 36 - Planar Microwave Circulators
Lecture 37 - Introduction to Four Port Networks : Branch Line Hybrid Couplers
Lecture 38 - Even and Odd Mode Analysis of Branch Line Hybrid Couplers
Lecture 39 - Calculating the Impedances in a Branch Line Hybrid Coupler
Lecture 40 - Branch Line Hybrid Couplers with More than Two Branches
Lecture 41 - The Rat Race Hybrid Coupler
Lecture 42 - Realization of Hybrid Couplers using Lumped Elements
Lecture 43 - Electromagnetically Coupled Pair of Transmission Lines
Lecture 44 - Coupled-Line Directional Couplers
Lecture 45 - Matching and Isolation in a Coupled Line Directional Coupler
Lecture 46 - Transmission Coefficient and Coupling in Coupled Line Couplers
Lecture 47 - Increasing the Bandwidth of Coupled Line Directional Couplers
Lecture 48 - Introduction to Semiconductor Devices for Microwave Applications
Lecture 49 - Diodes for Switching Applications for Microwaves
Lecture 50 - Diodes for Detection and Rectification at Microwave Frequencies
Lecture 51 - Diodes for Tuning Operations at Microwave Frequencies
Lecture 52 - Introduction to Microwave Power Measurement Techniques
Lecture 53 - Microwave Signal Spectrum Measurement - The Spectrum Analyzer
Lecture 54 - Measurement of S-Parameters using Wave Separation Technique
Lecture 55 - Measurement of S-Parameters using Wave Separation Technique (Continued...)
Lecture 56 - Measurement using Interference Technique - The Six Port Reflectometer
Lecture 57 - Understanding the Solutions forthe Six Port Reflectometer
Lecture 58 - Extending the Six PortReflectometer to Two Port Measurements
Lecture 59 - Introduction to Microwave Simulation Software
Lecture 60 - Simulated Behaviour of Lumped Element Microwave Filters
Lecture 61 - Simulated Behaviour of Hybrids and Coupled Line Directional Couplers

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NPTEL Video Course - Electrical Engineering - NOC:The MOS Transistor Modeling

Subject Co-ordinator - Prof. Navjeet Bagga

Co-ordinating Institute - IIT Bhubaneswar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fundamentals Of Semiconductor
Lecture 3 - Carrier Transport
Lecture 4 - PN Junction - I
Lecture 5 - PN Junction - II
Lecture 6 - Flat Band Voltage
Lecture 7 - Potential and Charge Balance
Lecture 8 - Effect of Gate-Body Voltage on MOS Capacitor
Lecture 9 - General Analysis - I
Lecture 10 - General Analysis - II
Lecture 11 - Region of Operation (Accumulation and Depletion)
Lecture 12 - Region of Operation (Inversion - I)
Lecture 13 - Region of Operation (Inversion - II)
Lecture 14 - Region of Operation (Inversion - III)
Lecture 15 - Small Signal Capacitance - I
Lecture 16 - Small Signal Capacitance - II
Lecture 17 - Small Signal Capacitance - III
Lecture 18 - Contacting Inversion Layer using Third Terminal
Lecture 19 - General Analysis - I
Lecture 20 - General Analysis - II
Lecture 21 - The Body Effect
Lecture 22 - A VCB Control point of View
Lecture 23 - Introduction of MOS Transistor
Lecture 24 - Complete All Region Model - I
Lecture 25 - Complete All Region Model - II
Lecture 26 - A Graphical Interpretation
Lecture 27 - Simplified All Region Models - I
Lecture 28 - Simplified All Region Models - II
Lecture 29 - Simplified All Region Models - III

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Lecture 30 - Strong Inversion - I
Lecture 31 - Strong Inversion - II
Lecture 32 - Strong Inversion - III
Lecture 33 - Weak Inversion
Lecture 34 - Single Piece Model
Lecture 35 - Effective Mobility - I
Lecture 36 - Effective Mobility - II
Lecture 37 - Extrinsic Effects, P channel Transistor
Lecture 38 - Carrier Velocity Saturation - I
Lecture 39 - Carrier Velocity Saturation - II
Lecture 40 - Channel Length Modulation
Lecture 41 - Charge Sharing - I
Lecture 42 - Charge Sharing - II
Lecture 43 - Drain-Induced Barrier Lowering
Lecture 44 - Hot Carrier Effects
Lecture 45 - Polysilicon Depletion
Lecture 46 - DC Gate Current
Lecture 47 - Band to Band Tunneling; GIDL
Lecture 48 - The Quest for Ever-Smaller Devices
Lecture 49 - Quasi-Static Operation
Lecture 50 - Intrinsic Charges in Quasi-Static Operation - I
Lecture 51 - Intrinsic Charges in Quasi-Static Operation - II
Lecture 52 - Transit Time, Limitation of Quasi-static model
Lecture 53 - Non-Quasi-Static Modeling
Lecture 54 - A Low-Frequency Small-Signal Model - Part I
Lecture 55 - A Low-Frequency Small-Signal Model - Part II
Lecture 56 - A Low-Frequency Small-Signal Model - Part III
Lecture 57 - A Medium Frequency Small-Signal Model - Part I
Lecture 58 - A Medium Frequency Small-Signal Model - Part II
Lecture 59 - A Medium Frequency Small-Signal Model - Part III
Lecture 60 - A Few Case Studies

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NPTEL Video Course - Electrical Engineering - Modelling and Analysis of Electric Machines

Subject Co-ordinator - Dr. Krishna Vasudevan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Magnetic Fields
Lecture 3 - Magnetic Circuit
Lecture 4 - Singly Excited Linear Motion System
Lecture 5 - Linear and Cylindrical Motion Systems
Lecture 6 - Systems with Multiple Excitations
Lecture 7 - Non-linear Magnetic Systems
Lecture 8 - Inductances in Constant Air gap Machines
Lecture 9 - Inductance in Salient Pole Machine - I
Lecture 10 - Inductance in Salient Pole Machine - II
Lecture 11 - Inductance in Salient Pole Machine - III
Lecture 12 - Inductance in Salient Pole Machine - IV
Lecture 13 - Inductance in Salient Pole Machine - V
Lecture 14 - Inductances of Distributed Winding - I
Lecture 15 - Inductances of Distributed Winding - II
Lecture 16 - Inductances of Distributed Winding - III
Lecture 17 - Dynamic Equations of Induction Machines
Lecture 18 - Dynamic Equations of Salient Pole Synchronous Machine
Lecture 19 - Three-to-Two Phase Transformation
Lecture 20 - Induction Machine in Two-Phase Reference Frame
Lecture 21 - The Pseudo-Stationary Reference Frame
Lecture 22 - Induction Machine in Pseudo-Stationary Reference Frame
Lecture 23 - The Primitive Machine Equations
Lecture 24 - Dynamic Equations of DC Machines
Lecture 25 - Small Signal Model of DC Machine
Lecture 26 - Small Signal Behaviour of DC Machine
Lecture 27 - The Arbitrary Reference Frame
Lecture 28 - Induction Machine Equations in Arbitrary, Synchronous Reference Frames and Small Signal Modellir
Lecture 29 - Introduction to Field Oriented Control of Induction Machines

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Lecture 30 - Space Vector Formulation of Induction Machine Equations
Lecture 31 - Modelling of Salient Pole Synchronous Machines - I
Lecture 32 - Modelling of Salient Pole Synchronous Machines - II
Lecture 33 - Modelling of Salient Pole Synchronous Machines - III
Lecture 34 - Steady State Models - Induction Machine
Lecture 35 - Steady State Models - Salient Pole Synchronous Machine
Lecture 36 - Solution of Dynamic Equations of Induction Machine - I
Lecture 37 - Solution of Dynamic Equations of Induction Machine - II
Lecture 38 - Reactances of Salient Pole Synchronous Machines - I
Lecture 39 - Reactances of Salient Pole Synchronous Machines - II
Lecture 40 - Reactances of Salient Pole Synchronous Machines - III
Lecture 41 - Suddent Short Circuit of Three Phase Alternator - Analytical Solution
Lecture 42 - Suddent Short Circuit of Three Phase Alternator - Numerical Simulation
Lecture 43 - Course Recapitulation and Assignments

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NPTEL Video Course - Electrical Engineering - Analog ICs

Subject Co-ordinator - Prof. K. Radhakrishna Rao

Co-ordinating Institute - IIT - Madras | Texas Instruments - India

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Building Blocks In Analog ICs
Lecture 2 - Current Mirrors
Lecture 3 - Translinear Networks
Lecture 4 - Differential Amplifier
Lecture 5 - Differential Amplifier Characteristics
Lecture 6 - Video Amplifier and RF/IF Amplifiers
Lecture 7 - Cascade Amplifier
Lecture 8 - IC Negative Feedback Wide Band Amplifiers
Lecture 9 - IC Negative Feedback Amplifiers
Lecture 10 - Voltage Sources And References
Lecture 11 - IC Voltage Regulator
Lecture 12 - Characteristics and Parameters Of Voltage
Lecture 13 - Protection Circuitry For Voltage Regulator
Lecture 14 - Switched Mode Regulator And Operational
Lecture 15 - IC Operational Voltage Amplifier
Lecture 16 - General Purpose Operational Amplifier-747
Lecture 17 - Transconductance Operational Amplifier
Lecture 18 - Audio Power Amplifier and Norton's Amplifier
Lecture 19 - Analog Multipliers
Lecture 20 - Analog Multipliers
Lecture 21 - Voltage Controlled Oscillator
Lecture 22 - Voltage Controlled Oscillator
Lecture 23 - Self Tuned Filter
Lecture 24 - Phase Locked Loop24 Phase Locked Loop
Lecture 25 - Phase Locked Loop
Lecture 26 - Phase Locked Loop
Lecture 27 - Phase Locked Loop
Lecture 28 - Current Mode ICs

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NPTEL Video Course - Electrical Engineering - Digital Integrated Circuits

Subject Co-ordinator - Prof. Amitava Dasgupta

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Semiconductors
Lecture 2 - Modelling of PN Junction Diodes
Lecture 3 - Modelling of BJTs
Lecture 4 - Diode and BJT Model Parameter Extraction
Lecture 5 - BJT Inverters DC and Switching Characteristics
Lecture 6 - Schottky Transistor
Lecture 7 - Specifications of Logic Circuits
Lecture 8 - Qualitative discussion on TTL Circuits
Lecture 9 - Standard TTL Circuits
Lecture 10 - Schottky (74s..) and Low power Schottky (74ls)
Lecture 11 - Advanced TTL Circuits
Lecture 12 - I2 L Technology
Lecture 13 - Edge triggered D-F/F
Lecture 14 - I2 L - Condition for Proper Operation
Lecture 15 - I2 L - Propagation delay Self aligned
Lecture 16 - Schottky Transistor Logic
Lecture 17 - Stacked I2 L
Lecture 18 - ECL Basic Operation
Lecture 19 - Quantitative analysis of ECL 10k Series gates
Lecture 20 - ECL 100k series; Stacked ECL gates; D-F/F
Lecture 21 - Emitter Function Logic;Low Power ECL
Lecture 22 - Polyemitter Bipolar Transistor In ECL;Propagation
Lecture 23 - Heterojunction Bipolar Transistor Based ECL;ECL
Lecture 24 - nMOS Logic Circuits
Lecture 25 - nMOS Logic Circuits(contd); CMOS
Lecture 26 - CMOS Inverter
Lecture 27 - CMOS NAND,NOR and Other Gates
Lecture 28 - Dynamic CMOS ;Transmission Gates;Realization Of MUX,decoder, D-F/F
Lecture 29 - BiCMOS Gates

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Lecture 30 - BiCMOS Driver;BiCMOS 32-bit Adder
Lecture 31 - Digital Integrated Circuits
Lecture 32 - Digital Integrated Circuits
Lecture 33 - CMOS SRAM
Lecture 34 - BiCMOS SRAM
Lecture 35 - DRAM-CMOS and BiCMOS
Lecture 36 - ROM-EPROM,EEPROM and Flash EPROM
Lecture 37 - GaAs MESFET Characteristics and Equivalent Circuits
Lecture 38 - Direct Coupled FET Logic; Superbuffer FET Logic
Lecture 39 - Buffered FET Logic; Schottky Diode FET Logic
Lecture 40 - Transmission Line Effects

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NPTEL Video Course - Electrical Engineering - Electromagnetic Fields

Subject Co-ordinator - Prof. Harishankar Ramachandran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Vector
Lecture 2 - Introduction To Vector (Continued...)
Lecture 3 - Coulomb's Law
Lecture 4 - Electric Field
Lecture 5 - Electro Static Potential
Lecture 6 - The Gradient
Lecture 7 - Gauss's Law
Lecture 8 - Poisson's Equation
Lecture 9 - Energy In The Field
Lecture 10 - Sample Problems In Electrostatics
Lecture 11 - Fields In Materials
Lecture 12 - Fields In Material Bodies
Lecture 13 - Displacement Vectors
Lecture 14 - Capacitors
Lecture 15 - Method Of Images
Lecture 16 - Poisson's Equation 2 Dimensions
Lecture 17 - Field Near Sharp Edges And Points
Lecture 18 - Magnetic Field 1
Lecture 19 - Magnetic Field 2
Lecture 20 - Stokes Theorems
Lecture 21 - The curl
Lecture 22 - Field due to current loop
Lecture 23 - Ampere's law
Lecture 24 - Examples of Ampere's law
Lecture 25 - Inductance
Lecture 26 - Mutual Inductance
Lecture 27 - Faraday's law
Lecture 28 - Magnetic Energy
Lecture 29 - Magnetic Energy (Continued...)

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Lecture 30 - Magnetic Energy (Continued...)
Lecture 31 - Generalised Ampere's Law
Lecture 32 - The Wave Equation
Lecture 33 - The Wave Equation
Lecture 34 - Poynting Theorem
Lecture 35 - Skin Effect
Lecture 36 - Skin Effect (Continued...)
Lecture 37 - Radiation And Circuits
Lecture 38 - Phasor Form Of Poynting Theorem
Lecture 39 - Reflection At Dielectric Boundaries
Lecture 40 - Reflection At Dielectric Boundaries (Continued...)
Lecture 41 - Transmission Lines
Lecture 42 - Transmission Lines (Continued...) and Conclusion

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NPTEL Video Course - Electrical Engineering - Networks and Systems

Subject Co-ordinator - Prof. V.G.K. Murti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Concepts - 1
Lecture 2 - Introductory Concepts - 2
Lecture 3 - Introductory Concepts - 3
Lecture 4 - Introductory Concepts - 4
Lecture 5 - Introductory Concepts - 5
Lecture 6 - Introductory Concepts - 6
Lecture 7 - Fourier Series - 1
Lecture 8 - Fourier Series - 2
Lecture 9 - Fourier Series - 3
Lecture 10 - Fourier Series - 4
Lecture 11 - Fourier Series - 5
Lecture 12 - Fourier Series - 6
Lecture 13 - Fourier Transforms - 1
Lecture 14 - Fourier Transforms - 2
Lecture 15 - Fourier Transforms - 3
Lecture 16 - Fourier Transforms - 4
Lecture 17 - Fourier Transforms - 5
Lecture 18 - Fourier Transforms - 6
Lecture 19 - Fourier Transforms - 7
Lecture 20 - Laplace Transforms - 1
Lecture 21 - Laplace Transforms - 2
Lecture 22 - Laplace Transforms - 3
Lecture 23 - Laplace Transforms - 4
Lecture 24 - Laplace Transforms - 5
Lecture 25 - Laplace Transforms - 6
Lecture 26 - Application of Laplace Transforms - 1
Lecture 27 - Application of Laplace Transforms - 2
Lecture 28 - Application of Laplace Transforms - 3
Lecture 29 - Application of Laplace Transforms - 4

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Lecture 30 - Network Functions - 1
Lecture 31 - Network Functions - 2
Lecture 32 - Network Functions - 3
Lecture 33 - Network Functions - 4
Lecture 34 - Network Theorems - 1
Lecture 35 - Network Theorems - 2
Lecture 36 - Network Theorems - 3
Lecture 37 - Network Theorems - 4
Lecture 38 - Discrete - Time Systems - 1
Lecture 39 - Discrete - Time Systems - 2
Lecture 40 - Discrete - Time Systems - 3
Lecture 41 - Discrete - Time Systems - 4
Lecture 42 - Discrete - Time Systems - 5
Lecture 43 - Discrete - Time Systems - 6
Lecture 44 - Discrete - Time Systems - 7
Lecture 45 - State-Variable Methods - 1
Lecture 46 - State-Variable Methods - 2
Lecture 47 - State Variable Methods - 3
Lecture 48 - State Variable Methods - 4
Lecture 49 - State Variable Methods - 5
Lecture 50 - State Variable Methods - 6

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NPTEL Video Course - Electrical Engineering - Probability Foundation for Electrical Engineers

Subject Co-ordinator - Dr. Krishna Jagannathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Cardinality
Lecture 3 - Countability
Lecture 4 - Uncountable sets - 1
Lecture 5 - Uncountable sets - 2
Lecture 6 - Probability spaces - Introduction
Lecture 7 - Probability spaces - Algebra
Lecture 8 - Probability spaces - Ï -algebra
Lecture 9 - Probability spaces - Measurable space
Lecture 10 - Properties of probability measures
Lecture 11 - Continuity of probability measure
Lecture 12 - Discrete probability space - finite and countably infinite sample space
Lecture 13 - Discrete probability space - Uncountable sample space
Lecture 14 - Generated Ï -algebra, Borel Sets
Lecture 15 - Borel sets
Lecture 16 - Uniform probability measure on Borel sets-Lebesgue measure
Lecture 17 - CarathÃ©odoryâ s extension theorem
Lecture 18 - Lebesgue measure (Continued...)
Lecture 19 - Infinite coin toss model
Lecture 20 - Infinite coin toss model (Continued...)
Lecture 21 - Conditional probability
Lecture 22 - Properties of conditional probability
Lecture 23 - Independence of events
Lecture 24 - Independence of Ï -algebras
Lecture 25 - Borel-Cantelli Lemma - 1
Lecture 26 - Borel-Cantelli Lemma - 2
Lecture 27 - Random Variables
Lecture 28 - Random Variables (Continued...)
Lecture 29 - Cumulative Distribution Function

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Lecture 30 - Properties of CDF
Lecture 31 - Types of Random Variables
Lecture 32 - Examples of Random Variables
Lecture 33 - Continuous Random Variables - 1
Lecture 34 - Examples of Continuous Random Variables - 1
Lecture 35 - Continuous Random Variables - 2, Examples of Continuous RandomVariables - 2
Lecture 36 - Singular Random Variables
Lecture 37 - Several Random Variables - 1
Lecture 38 - Several Random Variables - 2
Lecture 39 - Independent Random Variables - 1
Lecture 40 - Independent Random Variables - 2
Lecture 41 - Conditional PMF, Jointly Continuous Random Variables - 1
Lecture 42 - Jointly Continuous Random Variables - 2
Lecture 43 - Jointly Continuous Random Variables - 3
Lecture 44 - Conditional CDF
Lecture 45 - Transformation of Random Variables - 1
Lecture 46 - Transformation of Random Variables - 2; Independent Random Variables
Lecture 47 - Sums of Discrete Random Variables
Lecture 48 - Sums of Jointly Continuous Random Variables
Lecture 49 - Sums of Random Number of Random Variables
Lecture 50 - General Transformations of Random Variables
Lecture 51 - Jacobian Formula
Lecture 52 - Examples Illustrating the use of Jacobian Formula
Lecture 53 - Introduction Integral and Expectation
Lecture 54 - Definition of the Abstract Integral
Lecture 55 - Simple Functions
Lecture 56 - Computing Expectation using Simple Functions, Properties of Integrals
Lecture 57 - Properties of Integrals (Continued....)
Lecture 58 - Inclusion Exclusion Formula using Indicator RVs and Expectation
Lecture 59 - Monotone Convergence Theorem - 1
Lecture 60 - Monotone Convergence Theorem - 2
Lecture 61 - Expectation of a Discrete Random Variable
Lecture 62 - Examples of Expectation of Discrete Random Variables
Lecture 63 - Expectation of Function of Random Variable
Lecture 64 - Some Examples of Computing Expectation
Lecture 65 - Fatouâ s Lemma
Lecture 66 - Dominated Convergence Theorem
Lecture 67 - Variance
Lecture 68 - Covariance

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Lecture 69 - Covariance Correlation Coefficient - 1
Lecture 70 - Covariance Correlation Coefficient - 2
Lecture 71 - Conditional Expectation
Lecture 72 - Properties of Conditional Expectation
Lecture 73 - MMSE Estimator
Lecture 74 - Transforms
Lecture 75 - Moment Generating Function - 1
Lecture 76 - Moment Generating Function - 2
Lecture 77 - Characteristic Function - 1
Lecture 78 - Characteristic Function - 2
Lecture 79 - Characteristic Function - 3
Lecture 80 - Characteristic Function - 4
Lecture 81 - Concentration Inequalities - 1
Lecture 82 - Concentration Inequalities - 2
Lecture 83 - Convergence of Random Variables - 1
Lecture 84 - Convergence of Random Variables - 2
Lecture 85 - Convergence of Random Variables - 3
Lecture 86 - Convergence of Random Variables - 4
Lecture 87 - Convergence of Random Variables - 5
Lecture 88 - Convergence of Random Variables - 6
Lecture 89 - Convergence Of Characteristic Functions
Lecture 90 - Limit Theorems
Lecture 91 - The Law of Large Numbers - 1
Lecture 92 - The Law of Large Numbers - 2
Lecture 93 - The Central Limit Theorem - 1
Lecture 94 - The Central Limit Theorem - 2
Lecture 95 - A Brief Overview of Multivariate Gaussians - 1
Lecture 96 - A Brief Overview of Multivariate Gaussians - 2

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NPTEL Video Course - Electrical Engineering - NOC:Analog Circuits

Subject Co-ordinator - Dr. Nagendra Krishnapura

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Obtaining power gain
Lecture 3 - Obtaining power gain using a linear two port?
Lecture 4 - One port (two terminal) nonlinear element
Lecture 5 - Nonlinear circuit analysis
Lecture 6 - Small signal incremental analysis - graphical view
Lecture 7 - Small signal incremental analysis
Lecture 8 - Incremental equivalent circuit
Lecture 9 - Large signal characteristics of a diode
Lecture 10 - Analysis of diode circuits
Lecture 11 - Small signal model of a diode
Lecture 12 - Two port nonlinearity
Lecture 13 - Small signal equivalent of a two port network
Lecture 14 - Small signal equivalent circuit of a two port network
Lecture 15 - Gain of a two port network
Lecture 16 - Constraints on small signal parameters to maximize the gain
Lecture 17 - Constraints on large signal characteristics to maximize the gain
Lecture 18 - Implications of constraints in terms of the circuit equivalent
Lecture 19 - MOS transistor-description
Lecture 20 - MOS transistor large signal characteristics
Lecture 21 - MOS transistor large signal characteristics - graphical view
Lecture 22 - MOS transistor small signal characteristics
Lecture 23 - Linear (Triode) region of the MOS transistor
Lecture 24 - Small signal amplifier using the MOS transistor
Lecture 25 - Basic amplifier structure
Lecture 26 - Problems with the basic structure
Lecture 27 - Adding bias and signal-ac coupling
Lecture 28 - Common source amplifier with biasing
Lecture 29 - Common source amplifier: Small signal equivalent circuit

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Lecture 30 - Common source amplifier analysis: Effect of biasing components
Lecture 31 - Constraint on the input coupling capacitor
Lecture 32 - Constraint on the output coupling capacitor
Lecture 33 - Dependence of ID on VDS
Lecture 34 - Small signal output conductance of a MOS transistor
Lecture 35 - Effect of gds on a common source amplifier; Inherent gain limit of a transistor
Lecture 36 - Variation gm with transistor parameters
Lecture 37 - Variation of gm with constant VGS and constant drain current bias
Lecture 38 - Negative feedback control for constant drain current bias
Lecture 39 - Types of feedback for constant drain current bias
Lecture 40 - Sense at the drain and feedback to the gate-Drain feedback
Lecture 41 - Intuitive explanation of low sensitivity with drain feedback
Lecture 42 - Common source amplifier with drain feedback bias
Lecture 43 - Constraint on the gate bias resistor
Lecture 44 - Constraint on the input coupling capacitor
Lecture 45 - Constraint on the output coupling capacitor
Lecture 46 - Input and output resistances of the common source amplifier with constant VGS bias
Lecture 47 - Current mirror
Lecture 48 - Common souce amplifier with current mirror bias
Lecture 49 - Constraint on coupling capacitors and bias resistance
Lecture 50 - Diode connected transistor
Lecture 51 - Source feedback biasing
Lecture 52 - Common source amplifier with source feedback bias
Lecture 53 - Constraints on capacitor values
Lecture 54 - Sensing at the drain and feeding back to the source
Lecture 55 - Sensing at the source and feeding back to the gate
Lecture 56 - Ensuring that transistor is in saturation
Lecture 57 - Using a resistor instead of current source for biasing
Lecture 58 - Controlled sources using a MOS transistor-Introduction
Lecture 59 - Voltage controlled voltage source
Lecture 60 - VCVS using a MOS transistor
Lecture 61 - VCVS using a MOS transistor - Small signal picture
Lecture 62 - VCVS using a MOS transistor - Complete circuit
Lecture 63 - Source follower: Effect of output conductance; Constraints on coupling capacitors
Lecture 64 - VCCS using a MOS transistor
Lecture 65 - VCCS using a MOS transistor: Small signal picture
Lecture 66 - VCCS using a MOS transistor: Complete circuit
Lecture 67 - VCCS using a MOS transistor: AC coupling the output
Lecture 68 - Source degenrated CS amplifier

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Lecture 69 - CCCS using a MOS transistor
Lecture 70 - CCCS using a MOS transistor: Small signal picture
Lecture 71 - CCCS using a MOS transistor: Complete circuit
Lecture 72 - CCVS using a MOS transistor
Lecture 73 - CCVS using a MOS transistor: Gain
Lecture 74 - CCVS using a MOS transistor: Input and output resistances
Lecture 75 - CCVS using a MOS transistor: Complete circuit
Lecture 76 - VCVS using an opamp
Lecture 77 - CCVS using an opamp
Lecture 78 - Negative feedback and virtual short in an opamp
Lecture 79 - Negative feedback and virtual short in a transistor
Lecture 80 - Constraints on controlled sources using opamps and transistors
Lecture 81 - Quick tour of amplifying devices
Lecture 82 - Signal swing limits in amplifiers
Lecture 83 - Swing limit due to transistor entering triode region
Lecture 84 - Swing limit due to transistor entering cutoff region
Lecture 85 - Swing limit calculation example
Lecture 86 - Swing limits-more calculations
Lecture 87 - pMOS transistor
Lecture 88 - Small signal model of the pMOS transistor
Lecture 89 - Common source amplifier using the pMOS transistor
Lecture 90 - Swing limits of the pMOS common source amplifier
Lecture 91 - Biasing a pMOS transistor at a constant current; pMOS current mirror
Lecture 92 - Converting nMOS transistor circuits to pMOS
Lecture 93 - Bias current generation
Lecture 94 - Examples of more than one transistor in feedback
Lecture 95 - Gain limitation in a common source amplifier with resistive load
Lecture 96 - nMOS active load for pMOS common source amplifier
Lecture 97 - CMOS inverter
Lecture 98 - Large signal characteristics of pMOS CS amplifier with nMOS active load
Lecture 99 - Large signal characteristics of nMOS CS amplifier with pMOS active load
Lecture 100 - Large signal characteristics of a CMOS inverter
Lecture 101 - Active load amplifiers as digital gates
Lecture 102 - Sensitivity of output bias to input bias in a CMOS inverter
Lecture 103 - Self biasing a CMOS inverter
Lecture 104 - An application of self biased inverters
Lecture 105 - Current consumption of a self-biased inverter; Current biasing
Lecture 106 - Amplifying a difference signal; Differential pair
Lecture 107 - Differential pair-small signal basics

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Lecture 108 - Biasing a differential pair
Lecture 109 - Differential pair with differential excitation
Lecture 110 - Differential pair with a current mirror load
Lecture 111 - Differential pair with a current mirror load - operating point
Lecture 112 - Differential pair with a current mirror load - Norton equivalent current
Lecture 113 - Differential pair with a current mirror load - Norton equivalent resistance
Lecture 114 - Common mode gain
Lecture 115 - Single stage opamp
Lecture 116 - Single stage opamp: Input common mode swing limits
Lecture 117 - Single stage opamp: Output swing limits
Lecture 118 - Which transistor type to use for the second stage?
Lecture 119 - Small signal gain
Lecture 120 - DC negative feedback biasing of all stages
Lecture 121 - DC negative feedback biasing of all stages (Continued...)
Lecture 122 - Small signal model
Lecture 123 - Swing limits
Lecture 124 - Systematic offset; How to eliminate it
Lecture 125 - Bipolar junction transistor(BJT): Large signal model
Lecture 126 - BJT model for calculating operating points
Lecture 127 - BJT small signal model
Lecture 128 - Biasing a BJT
Lecture 129 - Biasing a BJT, (Continued...)
Lecture 130 - Amplifiers using BJTs
Lecture 131 - PNP transistor

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Non Linear Dynamics

Subject Co-ordinator - Prof. Gaurav Raina

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A brief introduction to modelling
Lecture 2 - Dynamics and Nonlinear systems
Lecture 3 - 1-Dimensional Flows, Flows on the Line, Lecture 1
Lecture 4 - 1-Dimensional Flows, Flows on the Line, Lecture 2
Lecture 5 - 1-Dimensional Flows, Flows on the Line, Lecture 3
Lecture 6 - 1-Dimensional Flows, Flows on the Line, Lecture 4
Lecture 7 - 1-Dimensional Flows, Flows on the Line, Lecture 5
Lecture 8 - 1-Dimensional Flows, Flows on the Line, Lecture 6
Lecture 9 - 1-Dimensional Flows, Bifurcations, Lecture 1
Lecture 10 - 1-Dimensional Flows, Bifurcations, Lecture 2
Lecture 11 - 1-Dimensional Flows, Bifurcations, Lecture 3
Lecture 12 - 1-Dimensional Flows, Bifurcations, Lecture 4
Lecture 13 - 1-Dimensional Flows, Bifurcations, Lecture 5
Lecture 14 - 1-Dimensional Flows, Bifurcations, Lecture 6
Lecture 15 - 1-Dimensional Flows, Flows on the Circle, Lecture 1
Lecture 16 - 1-Dimensional Flows, Flows on the Circle, Lecture 2
Lecture 17 - 2-Dimensional Flows, Linear Systems, Lecture 1
Lecture 18 - 2-Dimensional Flows, Linear Systems, Lecture 2
Lecture 19 - 2-Dimensional Flows, Linear Systems, Lecture 3
Lecture 20 - 2-Dimensional Flows, Linear Systems, Lecture 4
Lecture 21 - 2-Dimensional Flows, Phase Plane, Lecture 1
Lecture 22 - 2-Dimensional Flows, Phase Plane, Lecture 2
Lecture 23 - 2-Dimensional Flows, Phase Plane, Lecture 3
Lecture 24 - 2-Dimensional Flows, Limit Cycles, Lecture 1
Lecture 25 - 2-Dimensional Flows, Limit Cycles, Lecture 2
Lecture 26 - 2-Dimensional Flows, Limit Cycles, Lecture 3
Lecture 27 - 2-Dimensional Flows, Bifurcations, Lecture 1
Lecture 28 - 2-Dimensional Flows, Bifurcations, Lecture 2
Lecture 29 - 2-Dimensional Flows, Bifurcations, Lecture 3

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NPTEL Video Course - Electrical Engineering - NOC:Control Engineering

Subject Co-ordinator - Prof. Ramkrishna.P

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Systems and Control
Lecture 2 - Modelling of Systems
Lecture 3 - Elements of Modelling
Lecture 4 - Examples of Modelling
Lecture 5 - Solving Problems in Modelling of Systems
Lecture 6 - Laplace Transforms
Lecture 7 - Inverse Laplace Transforms
Lecture 8 - Transfer Function of Modelling Block Diagram Representation
Lecture 9 - Solving Problems on Laplace Transforms and Transfer Functions
Lecture 10 - Block Diagram Reduction, Signal Flow Graphs
Lecture 11 - Solving Problems on Block Diagram Reduction, Signal Flow Graphs
Lecture 12 - Time Response Analyzsis of systems
Lecture 13 - Time Response specifications
Lecture 14 - Solving Problems on Time Response Analyzsis ans specifications
Lecture 15 - Stability
Lecture 16 - Routh Hurwitz Criterion
Lecture 17 - Routh Hurwitz Criterion T 1
Lecture 18 - Closed loop System and Stability
Lecture 19 - Root Locus Technique
Lecture 20 - Root Locus Plots
Lecture 21 - Root Locus Plots (Continued...)
Lecture 22 - Root Locus Plots (Continued...)
Lecture 23 - Root Locus Plots (Continued...)
Lecture 24 - Introduction to Frequency Response
Lecture 25 - Frequency Response Plots
Lecture 26 - Relative Stability
Lecture 27 - Bode plots
Lecture 28 - Basics of Control design Proportional, Integral and Derivative Actions
Lecture 29 - Basics of Control design Proportional, Integral and Derivative Actions

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Lecture 30 - Problems on PID Controllers
Lecture 31 - Basics of Control design Proportional, Integral and Derivative Actions
Lecture 32 - Control design in time domain and discusses the lead compensator
Lecture 33 - Improvement of the Transient Response using lead compensation
Lecture 34 - Design of control using lag compensators
Lecture 35 - The design of Lead-Lag compensators using root locus
Lecture 36 - Introduction design of control in frequency domain
Lecture 37 - Design of Lead Compensator using Bode Plots
Lecture 38 - Design of Lag Compensators using Bode Plots
Lecture 39 - Design of Lead-Lag Compensators using Bode plots
Lecture 40 - Experimental Determination of Transfer Function
Lecture 41 - Effect of Zeros on System Response
Lecture 42 - Navigation - Stories and Some Basics
Lecture 43 - Navigation - Dead Reckoning and Reference Frames
Lecture 44 - Inertial Sensors and Their Characteristics
Lecture 45 - Filter Design to Attentuate Inertial Sensor Noise
Lecture 46 - Complementary Filter
Lecture 47 - Complementary Filter - 1
Lecture 48 - Introduction to State Space Systems
Lecture 49 - Linearization of State Space Dynamics
Lecture 50 - Linearization of State Space Dynamics - 1
Lecture 51 - Controllability and Observability

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Analog IC Design

Subject Co-ordinator - Prof. S. Aniruddhan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to MOSFETs
Lecture 2 - Simple MOSFET Circuits
Lecture 3 - MOSFET Current Mirrors
Lecture 4 - Cascode Amplifiers
Lecture 5 - MOSFET in Integrated Circuits
Lecture 6 - MOSFET Capacitances
Lecture 7 - Noise
Lecture 8 - Noise of Simple Circuits
Lecture 9 - Systematic Mismatch
Lecture 10 - Random Mismatch
Lecture 11 - Differential Amplifiers
Lecture 12 - Negative Feedback
Lecture 13 - Stability of Negative Feedback Systems
Lecture 14 - Dominant Pole Compensation
Lecture 15 - Active Load
Lecture 16 - One Stage OpAmps - 1
Lecture 17 - One Stage OpAmps - 2
Lecture 18 - One Stage OpAmps - 3
Lecture 19 - Differential Amplifiers Offset
Lecture 20 - One Stage OpAmps - Noise and Offset
Lecture 21 - One Stage OpAmps - Slew Rate
Lecture 22 - One Stage OpAmps - Datasheet
Lecture 23 - One Stage OpAmps - Example 1
Lecture 24 - One Stage OpAmps - Example 2
Lecture 25 - Telescopic OpAmp - 1
Lecture 26 - Telescopic OpAmp - 2
Lecture 27 - Telescopic OpAmp - 3
Lecture 28 - Telescopic OpAmp - 4
Lecture 29 - Telescopic OpAmp - 5

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Lecture 30 - Telescopic OpAmp - Datasheet
Lecture 31 - Telescopic OpAmp - Design Example
Lecture 32 - Folded-Cascode OpAmp - 1
Lecture 33 - Folded-Cascode OpAmp - 2
Lecture 34 - Folded-Cascode OpAmp - 3
Lecture 35 - Folded-Cascode OpAmp - 4
Lecture 36 - Folded-Cascode OpAmp - 5
Lecture 37 - Negative feedback amplifier
Lecture 38 - Step response, sinusoidal steady state response
Lecture 39 - Loop gain and unity loop gain frequency; Opamp
Lecture 40 - Opamp realization using controlled sources; Delay in the loop
Lecture 41 - Negative feedback amplifier with ideal delay-small delays
Lecture 42 - Negative feedback amplifier with ideal delay-large delays
Lecture 43 - Negative feedback amplifier with parasitic poles and zeros
Lecture 44 - Negative feedback amplifier with parasitic poles and zeros; Nyquist criterion
Lecture 45 - Nyquist criterion; Phase margin
Lecture 46 - Phase margin
Lecture 47 - Single stage opamp realization
Lecture 48 - Two stage miller compensated opamp
Lecture 49 - Two stage miller compensated opamp.
Lecture 50 - Two and three stage miller compensated opamps; Feedforward compensated opamp
Lecture 51 - Two Stage Opamp
Lecture 52 - Two Stage Opamp ; Three Stage and Triple Cascade Opamps
Lecture 53 - Common Mode Rejection Ratio ; Example
Lecture 54 - Fully differential single stage opamp
Lecture 55 - Common mode feedback
Lecture 56 - Fully differential single stage opamp-2
Lecture 57 - Fully differential two stage opamp; Fully differential versus pseudo-differential

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NPTEL Video Course - Electrical Engineering - NOC:Probability Foundations for Electrical Engineers

Subject Co-ordinator - Prof. R.Aravind, Dr. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Experiments, Outcomes and Events
Lecture 2 - Examples
Lecture 3 - Operations on Events
Lecture 4 - Examples
Lecture 5 - Sigma Fields and Probability
Lecture 6 - Discrete Sample Spaces
Lecture 7 - Union and Partition
Lecture 8 - Examples
Lecture 9 - Definition and Basic Properties
Lecture 10 - Bayes' Rule for Partitions
Lecture 11 - Examples
Lecture 12 - Example of Detection
Lecture 13 - Example
Lecture 14 - Independence of Events
Lecture 15 - Examples
Lecture 16 - Combining Independent Experiments
Lecture 17 - Conditional Independence
Lecture 18 - Examples and Computations with Conditional Independence
Lecture 19 - Binomial and Geometric Models
Lecture 20 - Examples
Lecture 21 - Definition and Discrete Setting
Lecture 22 - RandomVariables and Events
Lecture 23 - Examples
Lecture 24 - Important distributions
Lecture 25 - Examples
Lecture 26 - Real-life modeling example
Lecture 27 - More Distributions
Lecture 28 - Conditional PMFs, Conditioning on an event, Indicator random variables
Lecture 29 - Example

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Lecture 30 - Multiple random variables and joint distribution
Lecture 31 - Example
Lecture 32 - Marginal PMF
Lecture 33 - Trinomial joint PMF
Lecture 34 - Events and Conditioning with Two Random Variables
Lecture 35 - Example
Lecture 36 - Independent random variables
Lecture 37 - More on independence
Lecture 38 - Example
Lecture 39 - Addition of Random Variables
Lecture 40 - Sum, Difference and Max of Two Random Variables
Lecture 41 - More Computations
Lecture 42 - Example
Lecture 43 - Real line as sample space
Lecture 44 - Probability density function (pdf)
Lecture 45 - Cumulative distribution function (CDF)
Lecture 46 - Continuous random variables
Lecture 47 - pdf and CDF of continuous random variables
Lecture 48 - Spinning pointer example
Lecture 49 - Important continuous distributions
Lecture 50 - More continuous distributions
Lecture 51 - Two-dimensional real sample space
Lecture 52 - Joint pdf and joint CDF
Lecture 53 - More on assigning probability to regions of x-y plain
Lecture 54 - Darts example and marginal pdfs
Lecture 55 - Independence to two continuous random variables
Lecture 56 - Examples
Lecture 57 - Prob[X > Y]
Lecture 58 - Transformations of random variables
Lecture 59 - CDF method
Lecture 60 - pdf method
Lecture 61 - Examples
Lecture 62 - One-to-one transformations
Lecture 63 - Expected Value or Mean of a Random Variable
Lecture 64 - Properties of Expectation
Lecture 65 - Expectation Computations for Important Distributions
Lecture 66 - Variance
Lecture 67 - Examples of Variance
Lecture 68 - Expectations with Two Random Variables

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Lecture 69 - Correlation and Covariance
Lecture 70 - Examples
Lecture 71 - Examples
Lecture 72 - Examples
Lecture 73 - Live Session

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Photonics

Subject Co-ordinator - Prof. Balaji Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Photonics
Lecture 2 - Diffraction and Interference
Lecture 3 - Tutorial on Ray Optics and Wave Optics
Lecture 4 - Lab Demonstration
Lecture 5 - Interferometers
Lecture 6 - Coherence
Lecture 7 - Spatial and Temporal Coherence
Lecture 8 - Tutorial on Wave Optics
Lecture 9 - Lab Demonstration
Lecture 10 - Electromagnetic Optics
Lecture 11 - Fiber Optics
Lecture 12 - Photon Properties
Lecture 13 - Lab Demonstration
Lecture 14 - Photon Optics
Lecture 15 - Tutorial on Photon optics
Lecture 16 - Photon interaction - 1
Lecture 17 - Photon interaction - 2
Lecture 18 - Lab Demonstration
Lecture 19 - Optical Amplification
Lecture 20 - Three Level systems
Lecture 21 - Four Level Systems
Lecture 22 - EDFA Introduction
Lecture 23 - EDFA Tutorial
Lecture 24 - Lasers Part - 1
Lecture 25 - Lab Demonstration
Lecture 26 - Lasers part- 2
Lecture 27 - Lasers part- 3
Lecture 28 - Lasers part- 4
Lecture 29 - Lab Demonstration

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Lecture 30 - Semiconductor light Source and detector - Band structure
Lecture 31 - Semiconductor light Source and detector - Light emission
Lecture 32 - Semiconductor light Source and detector LED Characteristics
Lecture 33 - Lab Demonstration
Lecture 34 - Semiconductor light Source and detector Laser Characteristics
Lecture 35 - Semiconductor Detectors - 1
Lecture 36 - Semiconductor Detectors - 2
Lecture 37 - Semiconductor Detectors - 3
Lecture 38 - Lab Demonstration
Lecture 39 - Semiconductor Detectors - 4
Lecture 40 - Light manipulation-Mallus' Law
Lecture 41 - Light manipulation-Birefringence
Lecture 42 - Light manipulation-Faraday Rotation
Lecture 43 - Lab Demonstration
Lecture 44 - Non-linear optics-Pockels effect
Lecture 45 - Non-linear optics-Kerr Effect
Lecture 46 - Lab Demonstration
Lecture 47 - Non-linear optics-stimulated Brillouin scattering
Lecture 48 - Non-linear optics-stimulated Raman scattering

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NPTEL Video Course - Electrical Engineering - NOC:Multirate DSP

Subject Co-ordinator - Prof. David Kovil Pillai

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Multirate DSP - Part 1
Lecture 2 - Introduction to Multirate DSP - Part 2
Lecture 3 - Sampling and Nyquist criterion - Part 1
Lecture 4 - Sampling and Nyquist criterion - Part 2
Lecture 5 - Signal Reconstruction - Part 1
Lecture 6 - Signal Reconstruction - Part 2
Lecture 7 - Reconstruction filter - Part 1
Lecture 8 - Reconstruction filter - Part 2
Lecture 9 - Discrete time processing of continuous time signal - Part 1
Lecture 10 - Discrete time processing of continuous time signal - Part 2
Lecture 11 - DT processing of CT signal example
Lecture 12 - Time scaling- upsampler and downsampler - Part 1
Lecture 13 - Time scaling- upsampler and downsampler - Part 2
Lecture 14 - Upsampler and downsampler- continued - Part 1
Lecture 15 - Upsampler and downsampler- continued - Part 2
Lecture 16 - Decimator properties
Lecture 17 - Properties of Upsampler and Downsampler
Lecture 18 - Fractional sampling rate change - Part 1
Lecture 19 - Fractional sampling rate change - Part 2
Lecture 20 - Multiplexer/ demultiplexer interpretation
Lecture 21 - Noble identities and polyphase decomposition - Part 1
Lecture 22 - Noble identities and polyphase decomposition - Part 2
Lecture 23 - Polyphase decomposition continued - Part 1
Lecture 24 - Polyphase decomposition continued - Part 2
Lecture 25 - Introduction to Multirate Filter Banks
Lecture 26 - Applications of Multirate - Part 1
Lecture 27 - Applications of Multirate - Part 2
Lecture 28 - Spectral Analysis of Filter Bank - Part 1
Lecture 29 - Spectral Analysis of Filter Bank - Part 2

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Lecture 30 - DFT and High Resolution Spectral Analysis - Part 1
Lecture 31 - DFT and High Resolution Spectral Analysis - Part 2
Lecture 32 - Transmultiplexer and Maximally Decimated Filterbanks - Part 1
Lecture 33 - Transmultiplexer and Maximally Decimated Filterbanks - Part 2
Lecture 34 - Maximally Decimated Filterbanks 2 - Part 1
Lecture 35 - Maximally Decimated Filterbanks 2 - Part 2
Lecture 36 - Study of Two-channel filter bank
Lecture 37 - Introduction to Quadrature Mirror Filters (QMF)
Lecture 38 - 2-channel QMF Filter Bank Design
Lecture 39 - Study of All-pass filters
Lecture 40 - Study of All-pass lattice
Lecture 41 - All-pass decomposition, the study of Mth band and Nyquist filters
Lecture 42 - Study of two-channel filter bank with perfect reconstruction
Lecture 43 - First part name
Lecture 44 - First part name
Lecture 45 - Capacity of wireless channels - CSIR - Part 1
Lecture 46 - Capacity of wireless channels - CSIT - Part 2
Lecture 47 - Capacity of wireless channels - Formulation of capacity calculation - Part 3
Lecture 48 - Capacity of wireless channels - Formulation of capacity calculation (Continued...) - Part 1
Lecture 49 - Capacity of wireless channels - Formulation of capacity calculation (Continued...) - Part 2
Lecture 50 - Capacity of wireless channels - Time-invariant Frequency selective channel - Part 3
Lecture 51 - Capacity of wireless channels - Time varying Frequency selective channels - Part 1
Lecture 52 - Multi-rate DSP framework for Multi-carrier Modulation - Part 2
Lecture 53 - MCM with overlapping spectra - Part 1
Lecture 54 - Recap of multirate DSP concepts for building OFDM - Part 2
Lecture 55 - Introduction to Redundancy and it's implementation in multi-rate framework - Part 3
Lecture 56 - M-channel multicarrier Transceiver - Part 1
Lecture 57 - M-channel multicarrier Transceiver - Part 2
Lecture 58 - M-channel multicarrier Transceiver - Part 3
Lecture 59 - Pseudo -circulant structure - Part 1
Lecture 60 - Pseudo -circulant structure - Part 2
Lecture 61 - MCM impairments and CP - Part 1
Lecture 62 - MCM impairments and CP - Part 2
Lecture 63 - Orthogonal Frequency Division Multiplexing - Part 1
Lecture 64 - Orthogonal Frequency Division Multiplexing - Part 2
Lecture 65 - Review of OFDM with CP
Lecture 66 - Review of Lec 1-28
Lecture 67 - OFDM applications - Quantization - Part 1
Lecture 68 - OFDM applications - Quantization - Part 2

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Lecture 69 - Some more applications of MDSP

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NPTEL Video Course - Electrical Engineering - NOC:LDPC and Polar Codes in 5G Standard

Subject Co-ordinator - Dr. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Additive White Gaussian Noise (AWGN) Channel and BPSK
Lecture 2 - Bit Error Rate (BER) and Signal to Noise Ratio (SNR)
Lecture 3 - Error Correction Coding in a Digital Communication System
Lecture 4 - Complementary Error Function
Lecture 5 - Simulation of Uncoded BPSK and BER v/s Eb/N0 plot Generation in MATLAB/Octave
Lecture 6 - n = 3 Repetition Code
Lecture 7 - Implementation of n = 3 Repetition Code in MATLAB
Lecture 8 - (7,4) Hamming Code
Lecture 9 - A Brief Introduction to Linear Block Codes
Lecture 10 - Simulation of (7,4) Hamming Code in MATLAB
Lecture 11 - Low Density Parity Check Codes
Lecture 12 - LDPC Codes in 5G
Lecture 13 - Encoding LDPC codes in 5G
Lecture 14 - MATLAB programs for encoding LDPC codes
Lecture 15 - Log-Likelihood Ratio and Soft Input and Soft Output (SISO) Decoder for the Repetition Code
Lecture 16 - Soft Input and Soft Output (SISO) Decoder for the Single Parity Check (SPC) Code
Lecture 17 - Illustration of SISO decoder for (3,2) SPC code and min-sum approximation
Lecture 18 - SISO decoder for a general (n,n-1) SPC code
Lecture 19 - Soft-Input Soft-Output Iterative Message Passing Decoder for LDPC Codes
Lecture 20 - A Toy Example Illustration of the SISO MInsum Iterative Message Passing Decoder
Lecture 21 - Modifications to the Decoder
Lecture 22 - Implementation of SISO Layered Minsum Iterative Message Passing Decoder in MATLAB
Lecture 23 - Debugging and Improvements to the MATLAB Implementation
Lecture 24 - Rate Matching in LDPC Codes using Puncturing and Shortening
Lecture 25 - Implementation of Fixed Point Quantization and Offset Minsum in the Decoder
Lecture 26 - Introduction to Polar Codes
Lecture 27 - Channel Polarization, Definition of (N,K) Polar Code and Encoding
Lecture 28 - MATLAB Implementation for Encoding Polar Codes
Lecture 29 - Successive Cancellation (SC) Decoder for Polar Codes

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Lecture 30 - Successive Cancellation (SC) Decoder for a General (N,K) Polar Code
Lecture 31 - MATLAB Implementation of Successive Cancellation Decoder - Part 1
Lecture 32 - MATLAB Implementation of Successive Cancellation Decoder - Part 2
Lecture 33 - Successive Cancellation List Decoding
Lecture 34 - Fixed Point Quantization for SC Decoder and LDPC Decoder
Lecture 35 - MATLAB Implementation of Successive Cancellation List Decoding
Lecture 36 - Rate Matching for LDPC codes
Lecture 37 - Performance Comparison of LDPC codes and Polar Codes in 5G

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NPTEL Video Course - Electrical Engineering - NOC:Electromagnetic Compatibility, EMC

Subject Co-ordinator - Prof. Daniel Mansson, Prof. Rajeev Thottappillil

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to EMC - Definitions
Lecture 2 - Introduction to EMC - Sources, units etc
Lecture 3 - Electromagnetic principles - Faraday's and Ampere's equations
Lecture 4 - Electromagnetic principles - Gauss's equation, boundary conditions
Lecture 5 - Electromagnetic principles - Uniform plane wave
Lecture 6 - Electromagnetic principles - Transmission lines
Lecture 7 - Electromagnetic principles - Dipoles
Lecture 8 - High-frequency behaviour of components - Conductors
Lecture 9 - High-frequency behaviour of components - Capacitors, inductors, resistors
Lecture 10 - High-frequency behaviour of components - Mechanical switches and transformers
Lecture 11 - Crosstalk or near-field coupling - Capacitive coupling, inductive coupling, common-impedance cou
Lecture 12 - Crosstalk or near-field coupling - Crosstalk combinations
Lecture 13 - Crosstalk or near-field coupling - Coupling to shielded cables
Lecture 14 - Electromagnetic coupling in the far-field
Lecture 15 - Field Coupling - Exercises
Lecture 16 - Solutions to EMC problems - Lay out and control of interfaces
Lecture 17 - Solutions to EMC problems - Grounding or earthing
Lecture 18 - Solutions to EMC problems - Electromagnetic Shielding
Lecture 19 - Solutions to EMC problems - Electromagnetic Shielding (Continued...)
Lecture 20 - Solutions to EMC problems - Shielded cables
Lecture 21 - Solutions to EMC problems - Filters and Surge protectors
Lecture 22 - Lightning Protection - Introduction
Lecture 23 - Lightning protection - Currents, charges and fields
Lecture 24 - Lightning Protection - Buildings
Lecture 25 - Lightning Protection - Towers, Lightning safety
Lecture 26 - EMC Requirements and Standard, Testing and Difficulties - 1
Lecture 27 - EMC Requirements and Standard, Testing and Difficulties - 2
Lecture 28 - Intentional Electromagnetic Interference or IEMI - 1
Lecture 29 - Intentional Electromagnetic Interference or IEMI - 2

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NPTEL Video Course - Electrical Engineering - NOC:Mapping Signal Processing Algorithms to Architectures

Subject Co-ordinator - Prof. Nitin Chandrachoodan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Review of digital logic
Lecture 3 - Timing and Power in digital circuits
Lecture 4 - Implementation Costs and Metrics
Lecture 5 - Example
Lecture 6 - Example
Lecture 7 - Architecture cost components
Lecture 8 - Examples of Architectures
Lecture 9 - Multi-objective Optimization
Lecture 10 - Number representation
Lecture 11 - Scientific notation and Floating point
Lecture 12 - Basic FIR filter
Lecture 13 - Serial FIR filter architectures
Lecture 14 - Simple programmable architecture
Lecture 15 - Block diagrams and SFGs
Lecture 16 - Dataflow Graphs
Lecture 17 - Iteration period
Lecture 18 - FIR filter iteration period
Lecture 19 - IIR filter iteration period
Lecture 20 - Computation Model
Lecture 21 - Constraint analysis for IPB computation
Lecture 22 - Motivational examples for IPB
Lecture 23 - General IPB computation
Lecture 24 - Sample period calculation
Lecture 25 - Parallel architecture
Lecture 26 - Odd-even register reuse
Lecture 27 - Power consumption
Lecture 28 - Pipelining
Lecture 29 - Time-invariant systems

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Lecture 30 - Valid pipelining examples
Lecture 31 - Feedforward cutsets
Lecture 32 - Balanced pipeline
Lecture 33 - Retiming basic concept
Lecture 34 - Retiming basic concept
Lecture 35 - (Missing Title)
Lecture 36 - Resource sharing
Lecture 37 - Changing iteration period
Lecture 38 - Hardware assumptions and constraint analysis
Lecture 39 - Mathematical formulation
Lecture 40 - Examples with formulation
Lecture 41 - Example
Lecture 42 - Hardware architecture
Lecture 43 - Review biquad folding sets
Lecture 44 - Complete biquad hardware
Lecture 45 - DEMO
Lecture 46 - DEMO
Lecture 47 - Obtaining a folding schedule
Lecture 48 - ASAP schedule
Lecture 49 - Utilization Efficiency
Lecture 50 - ALAP schedule
Lecture 51 - Iteration period bound and scheduling
Lecture 52 - Retiming for scheduling
Lecture 53 - Blocked schedules
Lecture 54 - Overlapped schedules
Lecture 55 - Improved blocked schedule
Lecture 56 - Allocation, Binding and Scheduling
Lecture 57 - DEMO
Lecture 58 - DEMO
Lecture 59 - Scheduling
Lecture 60 - Example
Lecture 61 - Heuristic approaches to scheduling
Lecture 62 - Mathematical formulation
Lecture 63 - ILP formulation
Lecture 64 - List scheduling
Lecture 65 - Hardware model
Lecture 66 - Force Directed Scheduling
Lecture 67 - DEMO
Lecture 68 - DEMO

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Lecture 69 - DEMO
Lecture 70 - Software Compilation
Lecture 71 - Optimization Examples
Lecture 72 - Loop optimizations - 1
Lecture 73 - Loop optimizations - 2
Lecture 74 - Loop optimizations - 3
Lecture 75 - Software pipelining - 1
Lecture 76 - Software pipelining - 2
Lecture 77 - FFT Optimization
Lecture 78 - Demo
Lecture 79 - Background
Lecture 80 - Demo
Lecture 81 - Demo
Lecture 82 - Demo
Lecture 83 - Demo
Lecture 84 - Background
Lecture 85 - On-chip communication basics
Lecture 86 - Many-to-Many communication
Lecture 87 - AXI bus handshaking
Lecture 88 - AXI bus (Continued...)
Lecture 89 - Demo
Lecture 90 - Demo
Lecture 91 - Demo
Lecture 92 - DMA and arbitration
Lecture 93 - Network-on-chip basics
Lecture 94 - NoC - Topologies and metrics
Lecture 95 - NoC - Routing
Lecture 96 - NoC - Switching and flow control
Lecture 97 - Systolic Arrays - Background
Lecture 98 - Systolic Arrays - Examples
Lecture 99 - CORDIC algorithm
Lecture 100 - Parallel implementation of FIR filters
Lecture 101 - Unfolding Transformation
Lecture 102 - Lookahead Transformation
Lecture 103 - Introduction to GPUs and Matrix multiplication

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NPTEL Video Course - Electrical Engineering - NOC:Linear System Theory

Subject Co-ordinator - Prof. Ramakrishna Pasumarthi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Linear Systems
Lecture 2 - System Models
Lecture 3 - System Models - Part 1
Lecture 4 - System Models - Part 2
Lecture 5 - General Representation
Lecture 6 - Sets, Functions and Fields
Lecture 7 - Linear Algebra - Vector Spaces and Metric Spaces
Lecture 8 - Linear Algebra - Span, Basis and Subspaces
Lecture 9 - Linear Algebra - Linear Maps and Matrices
Lecture 10 - Linear Algebra - Fundamental Subspaces and Rank-Nullity
Lecture 11 - Tutorial 1 on Linear Algebra
Lecture 12 - Linear Algebra - Change of Basis and Similarity Transformation
Lecture 13 - Linear Algebra - Invariant Subspaces, Eigen Values and Eigen Vectors
Lecture 14 - Linear Algebra - Diagonalization and Jordan Forms
Lecture 15 - Linear Algebra - Eigen Decomposition and Singular Value Decomposition
Lecture 16 - Tutorial 2 on Linear Algebra
Lecture 17 - Solutions to LTI Systems
Lecture 18 - State Transition Matrix for LTI systems
Lecture 19 - Forced Reponse of Continuous and Discrete LTI system
Lecture 20 - State Transition Matrix and Solutions to LTV systems
Lecture 21 - Equilibrium Points
Lecture 22 - Limit Cycles and Linearisation
Lecture 23 - Stability Analysis and Types of Stability
Lecture 24 - Lyapunov Stability
Lecture 25 - Stability of Discrete Time Systems
Lecture 26 - Supplementary Lecture
Lecture 27 - Controllability and Reachability
Lecture 28 - Controllability Matrix and Controllable Systems
Lecture 29 - Controllability Tests

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Lecture 30 - Controllability of Discrete Time Systems
Lecture 31 - Controllable Decomposition
Lecture 32 - Stabilizability
Lecture 33 - Observability
Lecture 34 - Gramians and Duality
Lecture 35 - Observability for Discrete Time Systems and Observability Tests
Lecture 36 - Observable Decompositon and Detectability
Lecture 37 - Kalman Decomposition and Minimal Realisation
Lecture 38 - Canonical Forms and State Feedback Control
Lecture 39 - Control Design using Pole Placement
Lecture 40 - Tutorial for Modules 9 and 10
Lecture 41 - State Estimation and Output Feedback
Lecture 42 - Design of Observer and Observer based Controller
Lecture 43 - Optimal Control and Linear Quadratic Regulator (LQR)
Lecture 44 - Feedback Invariant and Algebraic Ricatti Equation
Lecture 45 - Tutorial for Module 11
Lecture 46 - Linear Matrix Inequalities
Lecture 47 - Properties of LMIs and Delay LMIs

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NPTEL Video Course - Electrical Engineering - NOC:Digital Signal Processing

Subject Co-ordinator - C. S. Ramalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Signal Definition and Classification
Lecture 2 - Affine Transform
Lecture 3 - Recap of Affine Transform
Lecture 4 - Even and Odd Parts of a Signal
Lecture 5 - The Unit Step Sequence
Lecture 6 - The Unit Impulse
Lecture 7 - The Unit Impulse (Continued...)
Lecture 8 - Exponential Signals and Sinusoids
Lecture 9 - Sinusoids (Continued...)
Lecture 10 - When are two sinusoids independent?
Lecture 11 - Another Difference Between CT and DT Sinusoids
Lecture 12 - System definition and properties (linearity)
Lecture 13 - Time-invariance, memory, causality, and stability
Lecture 14 - LTI systems, impulse response, and convolution
Lecture 15 - Properties of convolution, system interconnections
Lecture 16 - Java applet demo of convolution
Lecture 17 - Systems governed by LCCDE
Lecture 18 - FIR and IIR systems
Lecture 19 - Karplus-Strong algorithm
Lecture 20 - Z-transform definition and RoC
Lecture 21 - Z-transform (Continued...)
Lecture 22 - Poles and zeros
Lecture 23 - Recursive implementation of FIR filters
Lecture 24 - Convergence criterion
Lecture 25 - Properties of the RoC
Lecture 26 - DTFT definition and absolute summability
Lecture 27 - Linearity
Lecture 28 - Delay
Lecture 29 - Exponential multiplication

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Lecture 30 - Complex conjugation
Lecture 31 - Time reversal
Lecture 32 - Differentiation in the Z-domain
Lecture 33 - Convolution in the time domain
Lecture 34 - Relationship between x[n] and X(1)
Lecture 35 - Initial Value Theorem
Lecture 36 - Final Value Theorem
Lecture 37 - Multiplication in the time domain
Lecture 38 - Parseval's Theorem
Lecture 39 - Partial Fractions Method
Lecture 40 - Power series method
Lecture 41 - Contour Integral Method
Lecture 42 - Contour Integral Method (Continued...)
Lecture 43 - Inverse DTFT
Lecture 44 - DTFT of Sequences that are not absolutely summable
Lecture 45 - Response to cos(?_0 n+?)
Lecture 46 - Causality and Stability
Lecture 47 - Response to suddenly applied inputs
Lecture 48 - Introduction to frequency response
Lecture 49 - Magnitude response and its geometric interpretation
Lecture 50 - Magnitude Response (Continued...)
Lecture 51 - Response of a single complex zero/pole
Lecture 52 - Resonator and Improved Resonator
Lecture 53 - Notch filter
Lecture 54 - Moving Average Filter
Lecture 55 - Comb filter
Lecture 56 - Phase response of a single complex zero
Lecture 57 - Effect of crossing a unit circle zero, wrapped and unwrapped phase, resonator phase response
Lecture 58 - Allpass Filter
Lecture 59 - Group delay and its physical interpretation
Lecture 60 - Zero-phase filtering, effect on nonlinear phase on waveshape
Lecture 61 - Zero-Phase Filtering, Linear Phase - 1
Lecture 62 - Linear Phase - 2
Lecture 63 - Linear Phase - 3
Lecture 64 - Linear Phase - 3
Lecture 65 - Linear Phase - 3
Lecture 66 - Linear Phase - 4, Sampling - 1
Lecture 67 - Linear Phase - 4, Sampling - 1
Lecture 68 - Linear Phase - 4, Sampling - 1

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Lecture 69 - Sampling - 2
Lecture 70 - Sampling - 3
Lecture 71 - Sampling - 4
Lecture 72 - Sampling - 4
Lecture 73 - Sampling - 4
Lecture 74 - The Discrete Fourier Transform - 1
Lecture 75 - The Discrete Fourier Transform - 1
Lecture 76 - The Discrete Fourier Transform - 2
Lecture 77 - The Discrete Fourier Transform - 3
Lecture 78 - The Discrete Fourier Transform - 3
Lecture 79 - The Discrete Fourier Transform - 3
Lecture 80 - The Discrete Fourier Transform - 4
Lecture 81 - The Discrete Fourier Transform - 4
Lecture 82 - The Discrete Fourier Transform - 4

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NPTEL Video Course - Electrical Engineering - NOC:Computational Electromagnetics

Subject Co-ordinator - Prof. Uday Khankhoje

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Chain rule of differentiation
Lecture 2 - Gradient, Divergence, and Curl operators
Lecture 3 - Common theorems in vector calculus
Lecture 4 - Corollaries of these theorems
Lecture 5 - Mathematical History
Lecture 6 - Different regimes of Maxwell's equations
Lecture 7 - Different ways of solving them
Lecture 8 - Maxwell's Equations
Lecture 9 - Boundary Conditions
Lecture 10 - Uniqueness Theorem
Lecture 11 - Equivalence Theorem
Lecture 12 - Simple Numerical Integration
Lecture 13 - Interpolating a Function
Lecture 14 - Gauss Quadrature
Lecture 15 - Line Charge Problem
Lecture 16 - Solving the Integral Equation
Lecture 17 - Basis Functions
Lecture 18 - Helmholtz Equation
Lecture 19 - Solving Helmholtz Equation
Lecture 20 - Huygen's principle and the Extinction theorem
Lecture 21 - Formulating the integral equations
Lecture 22 - Conclusions of surface integral equations
Lecture 23 - Motivations for Green's functions
Lecture 24 - A one-dimensional example
Lecture 25 - 1-D example
Lecture 26 - 2-D wave example
Lecture 27 - 2-D wave example
Lecture 28 - 2-D example
Lecture 29 - 2-D example

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Lecture 30 - 3-D example
Lecture 31 - Motivation for MoM
Lecture 32 - Linear Vector Spaces
Lecture 33 - Formulating Method of Moments
Lecture 34 - Surface Integral Equations
Lecture 35 - Surface Integral Equations
Lecture 36 - Surface Integral Equations
Lecture 37 - Surface Integral Equations
Lecture 38 - Volume Integral Equations
Lecture 39 - Volume Integral Equations
Lecture 40 - Volume Integral Equations
Lecture 41 - Volume Integral Equations
Lecture 42 - Surface integral equations for PEC
Lecture 43 - Surface v/s volume integral equations
Lecture 44 - Definition of radar cross-section
Lecture 45 - Computational Considerations
Lecture 46 - History and Overview of the FEM
Lecture 47 - Basic framework of FEM
Lecture 48 - 1D Basis Functions
Lecture 49 - 2D Basis Functions
Lecture 50 - Weak form of 1D-FEM - Part 1
Lecture 51 - Weak form of 1D-FEM - Part 2
Lecture 52 - Generating System of Equations for 1D FEM
Lecture 53 - 1D wave equation
Lecture 54 - 1D Wave Equation
Lecture 55 - 1D Wave Equation
Lecture 56 - 1D Wave Equation
Lecture 57 - 2D FEM Shape Functions
Lecture 58 - Converting to Weak Form (2D FEM)
Lecture 59 - Radiation Boundary Condition
Lecture 60 - Total field formulation
Lecture 61 - Scattered field formulation
Lecture 62 - Comparing total and scattered field formulation
Lecture 63 - Matrix assembly - Part 1
Lecture 64 - Matrix assembly - Part 2
Lecture 65 - Computing Far Field
Lecture 66 - Numerical Aspects of 2D FEM
Lecture 67 - Summary of FEM Procedure
Lecture 68 - Introduction to FDTD

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Lecture 69 - 2D FDTD Formulation
Lecture 70 - 2D FDTD Formulation
Lecture 71 - 2D FDTD Formulation
Lecture 72 - Stability Criteria - Part 1
Lecture 73 - Stability Criteria - Part 2
Lecture 74 - Stability Criteria - Higher Dimensions
Lecture 75 - Accuracy Considerations - 1D
Lecture 76 - Accuracy Considerations - Higher Dimensions
Lecture 77 - Dealing with non-dispersive dielectric media
Lecture 78 - Dealing with dispersive dielectric media
Lecture 79 - Debye Model - Part 1
Lecture 80 - Debye Model - Part 2
Lecture 81 - Absorbing Boundary Conditions - 1D
Lecture 82 - Absorbing Boundary Conditions - 2D
Lecture 83 - Implementing ABC in FDTD
Lecture 84 - Failure of ABC
Lecture 85 - Perfectly Matched Layers (PML) - Introduction
Lecture 86 - Implementing PML using Coordinate Stretching
Lecture 87 - PML - Phase Matching
Lecture 88 - PML - Tangential Boundary Conditions
Lecture 89 - Perfectly Matched Interface
Lecture 90 - PML theory - Summary
Lecture 91 - Implementing PML into FDTD - Part 1
Lecture 92 - Implementing PML into FDTD - Part 2
Lecture 93 - Sources in FDTD - Currents
Lecture 94 - Sources in FDTD - Part 2
Lecture 95 - Summary of FDTD
Lecture 96 - MEEP
Lecture 97 - Inverse Problems - Introduction
Lecture 98 - Inverse Problems - Mathematical Formulation
Lecture 99 - Inverse Problems - Challenges
Lecture 100 - Inverse Problems - Non-Linearity
Lecture 101 - Inverse Problems - Summary
Lecture 102 - Antennas - Potential formulation
Lecture 103 - Antennas - Hertz Dipole - Part 1
Lecture 104 - Antennas - Hertz Dipole - Part 2
Lecture 105 - Antennas - Radiation Patterns
Lecture 106 - Antennas - Motivation for CEM
Lecture 107 - Antennas - Pocklingtonâ s Integral Equation - Part 1

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Lecture 108 - Antennas - Pocklingtonâ s Integral Equation - Part 2
Lecture 109 - Antennas - Source Modeling
Lecture 110 - Antennas - Circuit Model
Lecture 111 - Antennas - MoM details
Lecture 112 - Antennas - Mutual Coupling - Part 1
Lecture 113 - Antennas - Mutual Coupling - Part 2
Lecture 114 - Hybrid Methods - Motivation
Lecture 115 - Finite Element-Boundary Integral - Part 1
Lecture 116 - Finite Element-Boundary Integral - Part 2
Lecture 117 - Finite Element-Boundary Integral - Part 3

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NPTEL Video Course - Electrical Engineering - NOC:Transmission Lines and Electromagnetic Waves

Subject Co-ordinator - Dr. Ananth Krishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Transmission lines
Lecture 2 - LosslessTransmission lines
Lecture 3 - Introduction to finite difference method
Lecture 4 - Octave simulation of wave equation
Lecture 5 - Octave simulation of Telegrapher's equation
Lecture 6 - Reflections and reflection coefficient
Lecture 7 - AC signals in loss-less transmission lines
Lecture 8 - Transmission lines with losses
Lecture 9 - Octave simulation of Transmission lines with losses
Lecture 10 - Voltage reflection coefficient and standing wave ratio
Lecture 11 - Graphical representation of reflection coefficient
Lecture 12 - Impedance matching using Smith chart
Lecture 13 - Demonstration of Impedance matching using VNA
Lecture 14 - Transmission Line Limitations and Maxwell's Equation
Lecture 15 - Maxwell's Curl Equation
Lecture 16 - Octave simulation of an Electromagnetic Wave Equation
Lecture 17 - Polarisation of an Electromagnetic Wave
Lecture 18 - Octave Simulation of different types of Polarisation
Lecture 19 - Electromagnetic Waves in a conductive Medium
Lecture 20 - Plane Waves
Lecture 21 - Plane Waves at normal incidence
Lecture 22 - Plane waves at Oblique Incidence - I
Lecture 23 - Plane waves at Oblique Incidence - II
Lecture 24 - Plane waves at Oblique Incidence - III
Lecture 25 - Octave simulation of perpendicular polarisation
Lecture 26 - Octave simulation of perpendicular polarisation (Continued...)
Lecture 27 - Dielectric-ideal conductor interface
Lecture 28 - Parallel plate waveguide
Lecture 29 - Rectangular Waveguide

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Lecture 30 - Octave simulation of modes of a Rectangular Waveguide
Lecture 31 - Phase Velocity and Group velocity
Lecture 32 - Octave simulation of Field pattern of a parellel plate waveguide
Lecture 33 - Cavity resonatorand Real life applications of waveguides and cavity

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NPTEL Video Course - Electrical Engineering - NOC:Digital IC Design

Subject Co-ordinator - Prof. Janakiraman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Digital IC Design
Lecture 2 - PN Junction
Lecture 3 - MOS Capacitor Threshold Voltage
Lecture 4 - MOS Transistor Current Expression
Lecture 5 - Body Effect and I-V Plots
Lecture 6 - Short Channel Transistors - Channel Length Modulation
Lecture 7 - Velocity Saturation and Level-1 SPICE Model
Lecture 8 - Drain Induced Barrier Lowering
Lecture 9 - Sub-Threshold Leakage
Lecture 10 - Substrate and Gate Leakage
Lecture 11 - The PMOS Transistor
Lecture 12 - Transistor Capacitance - 1
Lecture 13 - Transistor Capacitance - 2
Lecture 14 - CMOS Inverter Construction
Lecture 15 - Voltage Transfer Characteristics
Lecture 16 - Load Line Analysis
Lecture 17 - Trip Point for Short Channel Device Inverter
Lecture 18 - Trip Point for Long Channel Device Inverter
Lecture 19 - Noise Margin Analysis - 1
Lecture 20 - Noise Margin Analysis - 2
Lecture 21 - Noise Margin Analysis - 3
Lecture 22 - Noise Margin Analysis-Long Channel Device Inverter - 1
Lecture 23 - Noise Margin Analysis-Long Channel Device Inverter - 2
Lecture 24 - Pass Transistors
Lecture 25 - NMOS Transistor ON Resistance and Fall Delay
Lecture 26 - Elmore Delay Model
Lecture 27 - Inverter: Transient Response
Lecture 28 - Inverter: Dynamic Power
Lecture 29 - Inverter: Short Circuit Power

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Lecture 30 - Inverter: Leakage Power and Transistor Stacks
Lecture 31 - Stacking Effect and Sleep Transistors
Lecture 32 - Ring Oscillators and Process Variations
Lecture 33 - Implementing Any Boolean Logic Function
Lecture 34 - Implementing Any Boolean Logic Function: Examples. Gate sizing
Lecture 35 - Gate Sizing
Lecture 36 - Logic Gate Capacitance
Lecture 37 - Gate Delay
Lecture 38 - Parasitic Delay
Lecture 39 - Gate Delay with a Load Capacitance
Lecture 40 - Logical Effort
Lecture 41 - Gate Delay
Lecture 42 - Path Delay Calculation and Optimization Formulation
Lecture 43 - Path Delay Optimization: Intuition
Lecture 44 - Path Delay Optimization: Example
Lecture 45 - Buffer Insertion
Lecture 46 - Input Ordering and Asymmetric Gates
Lecture 47 - Skewed Gates
Lecture 48 - Special Functions
Lecture 49 - Pseudo NMOS Logic
Lecture 50 - Pseudo NMOS Inverter
Lecture 51 - Pseudo NMOS Logical Effort and CVSL
Lecture 52 - Dynamic Circuits and Input Monotonicity
Lecture 53 - Domino Logic and Weak Keepers
Lecture 54 - Transmission Gate Logic
Lecture 55 - Gate Sizing for Large Circuits
Lecture 56 - Ripple Adder Introduction
Lecture 57 - Full Adder Circuit Implementation
Lecture 58 - Full Adder Optimization
Lecture 59 - Carry Skip Adder
Lecture 60 - Carry Select Adder
Lecture 61 - Linear and Square Root Carry Select Adder
Lecture 62 - Two's Complement Arithmetic
Lecture 63 - Two's Complement Sign Extension
Lecture 64 - Array Multiplier
Lecture 65 - Array Multiplier - Timing Analysis
Lecture 66 - Carry Save Multiplier
Lecture 67 - Carry Save Multiplier - Signed Multiplication
Lecture 68 - Introduction to Pipelining

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Lecture 69 - Time Borrowing
Lecture 70 - Master Slave Flip Flop
Lecture 71 - Flop Timing Parameters
Lecture 72 - Alternate Circuit Implementations
Lecture 73 - Clock Overlap
Lecture 74 - C2MOS Flop
Lecture 75 - Flop Characterization
Lecture 76 - Max and Min Delay of Flop Based Systems
Lecture 77 - Flop Min Delay Constraint
Lecture 78 - Latch - Max and Min Delay Constraints
Lecture 79 - Latch - Timing Analysis with Skew
Lecture 80 - Time Borrowing

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NPTEL Video Course - Electrical Engineering - NOC:Power Management Integrated Circuits

Subject Co-ordinator - Prof. Qadeer Ahmad Khan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to PMIC - Part 1
Lecture 2 - Introduction to PMIC - Part 2
Lecture 3 - Linear versus Switching Regulators
Lecture 4 - Performance Parameters of Regulators
Lecture 5 - Local vs Remote Feedback, Point of Load Regulators
Lecture 6 - Kelvin Sensing, Droop Compensation
Lecture 7 - Current Regulator Applications, Introduction to Bandgap Voltage References, PTAT and CTAT voltage
Lecture 8 - Adding PTAT and CTAT Voltages
Lecture 9 - Bandgap Voltage Reference Circuit, Brokaw Bandgap Circuit
Lecture 10 - Sub-1-volt Bandgap Circuit
Lecture 11 - Generating Multiple Reference Voltages; Applications of Linear Regulators
Lecture 12 - Designing a Linear Regulator, Negative and Positive Feedback
Lecture 13 - First-Order Systems, Phase Margin
Lecture 14 - Closed-Loop Response of Second-Order Systems
Lecture 15 - Relationship between Damping Factor and Phase Margin, Frequency Compensation, MOS Parasitic Capa
Lecture 16 - Finding the Poles of the Error Amplifier - Part 1
Lecture 17 - Finding the Poles of the Error Amplifier - Part 2
Lecture 18 - Dominant Pole Frequency Compensation
Lecture 19 - Dominant Pole Compensation at No-Load
Lecture 20 - Dominant Pole Compensation using Miller Effect, RHP zero due to Miller Capacitor
Lecture 21 - Intuitive Method of Finding the Poles, Pole Splitting after Miller Compensation
Lecture 22 - Effect of RHP zero on Stability, Mitigating the Effect of RHP zero, LDO with NMOS Pass Element
Lecture 23 - Output Impedance of PMOS LDO
Lecture 24 - Line Regulation and PSRR of PMOS LDO
Lecture 25 - PSRR of PMOS versus PSRR of NMOS LDO
Lecture 26 - Sources of Error in Linear and Switching Regulators
Lecture 27 - Offset in Amplifiers; Real Life Analogy; Static Offset Cancellation
Lecture 28 - Dynamic Offset Cancellation Techniques (Chopping, Auto-zeroing)
Lecture 29 - Digital LDO, Technique to Avoid Limit Cycle Oscillations in Digital LDO

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Lecture 30 - Hybrid LDO, Short-Circuit Protection
Lecture 31 - Hiccup Mode and Foldback Current Limit
Lecture 32 - Introduction to Switching Regulators
Lecture 33 - volt-second Balance, Non-Idealities in the Power Stage of a Buck Converter
Lecture 34 - Transformer Model of a Buck Converter, Conduction Efficiency, Efficiency of an LDO versus Effici
Lecture 35 - Synchronous versus Non-Synchronous Switching Regulators, PWM Control Techniques
Lecture 36 - Losses in Switching Regulators (Conduction Loss, Gate-Driver Switching Loss)
Lecture 37 - Dead-Time Switching Loss in DC-DC Converters
Lecture 38 - Hard Switching Loss in DC DC Converters
Lecture 39 - Magnetic Loss in DC-DC Converters, Relative Significance of Losses as a Function of the Load Cur
Lecture 40 - Output Voltage Ripple of a Buck Converter
Lecture 41 - Choosing the Inductor and Capacitor for a Buck Converter
Lecture 42 - CCM Vs DCM Operation in DC DC Converters
Lecture 43 - CCM DCM Boundary Condition, Voltage Conversion Ratio in DCM
Lecture 44 - Concept of Pulse Frequency Modulation PFM
Lecture 45 - Classification of Pulse Width Modulators
Lecture 46 - DC - DC Converter Control Techniques, Stability Analysis of Voltage Mode Buck Converter - Part 1
Lecture 47 - Stability Analysis of Voltage Mode Buck Converter - Part 2
Lecture 48 - Stability Analysis of Voltage Mode Buck Converter - Part 3
Lecture 49 - Dominant Pole Compensation (Type-I with Gm-C Architecture)
Lecture 50 - Dominant Pole Compensation (Type-I with Op Amp-RC Architecture)
Lecture 51 - Introduction to Type-II Compensation
Lecture 52 - Type-II Compensator using Gm-C Architecture - Part 1
Lecture 53 - Type-II Compensator using Gm-C Architecture - Part 2
Lecture 54 - Type-II Compensator using Gm-C Architecture - Part 3
Lecture 55 - Type-II Compensator using Op Amp-RC Architecture
Lecture 56 - Introduction to Type-III Compensator
Lecture 57 - Type-III Compensator using Op Amp-RC Architecture
Lecture 58 - Simulation of DC-DC Converter with Type-III Compensator
Lecture 59 - Type-III Compensator using Gm-C Architecture
Lecture 60 - Feed-Forward Line Compensation, Loop Gain Compensation by Modulating Gm
Lecture 61 - Designing a Buck Converter, Power Loss Budgeting
Lecture 62 - Sizing Power MOSFETs
Lecture 63 - Estimating Switching Losses and Choosing the Switching Frequency
Lecture 64 - Choosing Inductance and Capacitance Values
Lecture 65 - Choosing 'C' Depending on Factors that Limit the Load Transient Response
Lecture 66 - Inductor and Capacitor Characteristics, Reducing the Effect of Capacitor ESL
Lecture 67 - Gate Buffer and Non-Overlap Clock Generator in Gate-Driver Circuit
Lecture 68 - Pulse-Width Modulator- Trailing Edge, Leading Edge and Dual Edge; Triangle Wave Generator

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Lecture 69 - Average Ramp Voltage of Single-Edge PW Modulator,Design Considerations of EA
Lecture 70 - Delays Associated with PW Modulator, PFM and PSM Operation, DCM Operation using NMOS
Lecture 71 - Designing a Zero-Cross Comparator, Inverter-Based Auto-Zeroed Comparator, Simulation Demo
Lecture 72 - Current Mode Control- Peak, Valley, Emulated; VMC versus CMC; Sub-Harmonic Oscillation
Lecture 73 - Ramp-Adaptive Slope Compensation to Avoid Current Loop Instability
Lecture 74 - Non-Linear Control of DC-DC Converters, Phase-Shift between i_L and v_C
Lecture 75 - Stabilising a Voltage-Mode Hysteretic Converter using R_esr, Relation between F_sw and the Hyste
Lecture 76 - Hysteretic Converter - Simulation Demo
Lecture 77 - Current-Mode Hysteretic Converter, Using R-C as Ripple Generator
Lecture 78 - Controlling the Switching Frequency of a Hysteretic Converter, Delay in the Hysteretic Comparato
Lecture 79 - Frequency and Voltage Regulation Loops in a Fixed-Frequency Hysteretic Converter
Lecture 80 - Resetting the Capacitor Voltage in a Hysteretic Converter, Constant ON-Time Control
Lecture 81 - Introduction to Boost Converter, RHP Zero in a Boost Converter
Lecture 82 - Introduction to Buck-Boost Converter
Lecture 83 - Tri-Mode Buck-Boost Converter (Buck, Buck-Boost and Boost)
Lecture 84 - Boundary Conditions for Mode Transition in a Tri-Mode Buck-Boost Converter
Lecture 85 - Generating Buck and Boost Duty Cycles in a Tri-Mode Buck-Boost Converter
Lecture 86 - Introduction to Switched-Capacitor DC-DC Converters,Switched-Capacitor DC-DC Converter with V_o
Lecture 87 - Applications of Switched-Capacitor DC-DC Converters in Open-Loop, Regulating the Output using Fe
Lecture 88 - H-Bridge Switched-Capacitor DC-DC Converter,SC DC-DC converter with Multiple Gain Settings
Lecture 89 - Current Sensing Techniques in DC-DC Converters
Lecture 90 - Analog Layout Techniques - Part 1
Lecture 91 - Analog Layout Techniques - Part 2
Lecture 92 - Digital Control of DC-DC Converters, ADC Architectures
Lecture 93 - Digital Pulse-Width Modulator Architectures, Adaptive Compensation
Lecture 94 - Limitations of Analog and Digital Controllers, Time-Based Controller for Buck Converter
Lecture 95 - Time-Based Controller for Buck Converter and for LDO, Issues with Time-Based Control
Lecture 96 - Multi-Phase DC-DC Converters
Lecture 97 - Dynamic Voltage and Frequency Scaling, Single Inductor Multiple Output (SIMO) DC-DC Converter
Lecture 98 - LCD/AMOLED Display Drivers - Part 1
Lecture 99 - LCD/AMOLED Display Drivers - Part 2
Lecture 100 - LCD/AMOLED Display Drivers - Part 3
Lecture 101 - LED Drivers for Camera Flash
Lecture 102 - Li-Ion Battery and its Charging Phases
Lecture 103 - Battery Charger IC

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NPTEL Video Course - Electrical Engineering - NOC:DC Power Transmission Systems

Subject Co-ordinator - Prof. Krishna S

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course contents
Lecture 2 - Introduction
Lecture 3 - Historical developments
Lecture 4 - Power semiconductor devices
Lecture 5 - General converter configuration
Lecture 6 - Choice of converter configuration
Lecture 7 - Choice of converter configuration
Lecture 8 - Converter configuration for pulse number equal to 6
Lecture 9 - Analysis of 6 pulse LCC neglecting inductance
Lecture 10 - Analysis of 6 pulse LCC neglecting inductance
Lecture 11 - Analysis of 6 pulse LCC neglecting inductance
Lecture 12 - Fourier series - Part 1
Lecture 13 - Fourier series - Part 2
Lecture 14 - Analysis of 6 pulse LCC neglecting inductance
Lecture 15 - Analysis of 6 pulse LCC neglecting inductance
Lecture 16 - Definitions
Lecture 17 - Commutation margin angle in a 6 pulse LCC neglecting inductance - Part 1
Lecture 18 - Commutation margin angle in a 6 pulse LCC neglecting inductance - Part 2
Lecture 19 - Instantaneous power on AC and DC sides in a 6 pulse LCC neglecting inductance
Lecture 20 - Average power on AC and DC sides in a 6 pulse LCC neglecting inductance
Lecture 21 - 6 pulse LCC with inductance
Lecture 22 - 2 and 3 valve conduction mode of 6 pulse LCC
Lecture 23 - 2 and 3 valve conduction mode of 6 pulse LCC
Lecture 24 - 2 and 3 valve conduction mode of 6 pulse LCC
Lecture 25 - 2 and 3 valve conduction mode of 6 pulse LCC
Lecture 26 - Extinction angle
Lecture 27 - Extinction angle
Lecture 28 - 3 and 4 valve conduction mode of 6 pulse LCC
Lecture 29 - Analysis of 3 and 4 valve conduction mode of 6 pulse LCC - Part 1

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Lecture 30 - Analysis of 3 and 4 valve conduction mode of 6 pulse LCC - Part 2
Lecture 31 - Analysis of 3 and 4 valve conduction mode of 6 pulse LCC - Part 3
Lecture 32 - 3 valve conduction mode of 6 pulse LCC
Lecture 33 - Commutation margin angle
Lecture 34 - Normalization
Lecture 35 - Characteristics of 6 pulse LCC - Part 1
Lecture 36 - Characteristics of 6 pulse LCC - Part 2
Lecture 37 - Steady state analysis of a general LCC - Part 1
Lecture 38 - Steady state analysis of a general LCC - Part 2
Lecture 39 - Steady state analysis of a general LCC - Application to 6 pulse LCC
Lecture 40 - 6 pulse LCC with resistance included on the AC side
Lecture 41 - 6 pulse LCC with resistance, inductance and voltage source on the DC side - Part 1
Lecture 42 - 6 pulse LCC with resistance, inductance and voltage source on the DC side - Part 2
Lecture 43 - Power factor
Lecture 44 - Capacitor commutated converter - Part 1
Lecture 45 - Capacitor commutated converter - Part 2
Lecture 46 - 12 pulse LCC - Part 1
Lecture 47 - 12 pulse LCC - Part 2
Lecture 48 - Modes of operation of 12 pulse LCC
Lecture 49 - Purposes of transformer
Lecture 50 - Applications of DC transmission
Lecture 51 - Types of DC link
Lecture 52 - Types of DC link
Lecture 53 - DC link control
Lecture 54 - DC link control
Lecture 55 - Considerations that influence selection of control
Lecture 56 - Converter control characteristics
Lecture 57 - MTDC systens
Lecture 58 - Types of MTDC systems
Lecture 59 - Non-characteristic harmonics
Lecture 60 - Effect of firing angle errors
Lecture 61 - Problems with harmonics
Lecture 62 - Single tuned filter
Lecture 63 - Design of single tuned filter - Part 1
Lecture 64 - Design of single tuned filter - Part 2
Lecture 65 - Double tuned and damped filters
Lecture 66 - Reactive power requirement
Lecture 67 - Comparison of AC and DC transmission

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NPTEL Video Course - Electrical Engineering - NOC:Optical Engineering

Subject Co-ordinator - Prof. Shanti Bhattacharya

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optical Engineering
Lecture 2 - Geometric Optics Basics
Lecture 3 - Refraction at a single surface
Lecture 4 - Lab 1 Introduction to OSLO
Lecture 5 - Stops and Rays
Lecture 6 - Aperture stop - Part 1
Lecture 7 - Aperture stop - Part 2
Lecture 8 - Lab 2 OSLO
Lecture 9 - Imaging equation for thick lens using ABCD matrix
Lecture 10 - Ray Tracing Matrix - Part 1
Lecture 11 - Ray Tracing Matrix - Part 2
Lecture 12 - Principal Planes
Lecture 13 - Lab 3 OSLO
Lecture 14 - Tracing rays through optical pupils - Part 1
Lecture 15 - Tracing rays through optical pupils - Part 2
Lecture 16 - Aberrations
Lecture 17 - Monochromatic Aberrations - Part 1
Lecture 18 - Monochromatic Aberrations - Part 2
Lecture 19 - Lab 4 - OSLO
Lecture 20 - Chromatic Aberrations and Aberration correction
Lecture 21 - Aberration correction
Lecture 22 - Revisiting Ray intercept curves
Lecture 23 - Lab 5 - OSLO
Lecture 24 - Interesting Geometric phenomena and applications
Lecture 25 - Gaussian beams introduction
Lecture 26 - Gaussian beams
Lecture 27 - Lab 6 - OSLO
Lecture 28 - ransformation of a Gaussian beam
Lecture 29 - Transformation of a Gaussian beam due to a lens and a mirror

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Lecture 30 - Application of Gaussian beam equations
Lecture 31 - Interferometry basics
Lecture 32 - Interferometry basics - Part 1
Lecture 33 - Introduction to Python
Lecture 34 - Python - Part 2
Lecture 35 - Introduction to Matlab
Lecture 36 - Interferometry basics - Part 2
Lecture 37 - Python - Part 3
Lecture 38 - Matlab tutorial on interference
Lecture 39 - Applications of interference - Part 1
Lecture 40 - Holography
Lecture 41 - Applications of interference
Lecture 42 - Applications of Optical Engineering
Lecture 43 - Diffractive Optics
Lecture 44 - Diffraction Grating

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NPTEL Video Course - Electrical Engineering - NOC:Nonlinear System Analysis

Subject Co-ordinator - Dr. Arun D. Mahindrakar, Prof. Ramkrishna Pasumarthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Examples of Nonlinear Physical Systems
Lecture 2 - Math Preliminaries - Part 1
Lecture 3 - Math Preliminaries - Part 2
Lecture 4 - Math Preliminaries - Part 3
Lecture 5 - Lipschitz Continuity and Contraction Mapping Theorem - Part 1
Lecture 6 - Lipschitz Continuity and Contraction Mapping Theorem - Part 2
Lecture 7 - Lipschitz Continuity and Contraction Mapping Theorem - Part 3
Lecture 8 - Existence and Uniqueness Theorem of ODE - Part 1
Lecture 9 - Existence and Uniqueness Theorem of ODE - Part 2
Lecture 10 - Existence and Uniqueness Theorem of ODE - Part 3
Lecture 11 - Existence and Uniqueness Theorem of ODE - Part 4
Lecture 12 - Equilibrium Points
Lecture 13 - Phase Portrait - Part 1
Lecture 14 - Phase Portrait - Part 2
Lecture 15 - Phase Portrait - Part 3
Lecture 16 - Phase portrait of Nonlinear Systems
Lecture 17 - Limit Cycles
Lecture 18 - Limit Cycles - Examples - Part 1
Lecture 19 - Limit Cycles - Examples - Part 2
Lecture 20 - Introduction to Bifurcation Theory - 1
Lecture 21 - Introduction to Bifurcation Theory - 2
Lecture 22 - Necessary and Sufficient Conditions for Local Bifurcation
Lecture 23 - Problems on Bifurcation Theory.
Lecture 24 - Stability Notions
Lecture 25 - Stability Notions
Lecture 26 - Stability Notions
Lecture 27 - Stability Notions
Lecture 28 - Stability Analysis and types of stability
Lecture 29 - Lypaunov Stability

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Lecture 30 - Supplementary lecture
Lecture 31 - Center Manifold Theorem
Lecture 32 - Interconnection between non linearity and a linear system - Sector Nonlinearities And Aizermannâ
Lecture 33 - Counter example for Aizermannâ s conjecture
Lecture 34 - Passivity inspiration - passive circuits - dissipation equality
Lecture 35 - Dissipative Equality for circuit (Continued...)
Lecture 36 - PR condition for passivity of SISO system
Lecture 37 - Examples of PR transfer functions
Lecture 38 - Relation between storage function and Lyapunov function - PR Lemma
Lecture 39 - Proof of PR Lemma
Lecture 40 - Proof (Continued...) using spectral factorization theorem
Lecture 41 - PR definition for MIMO case
Lecture 42 - PSD Storage function in PR Lemma and how to make it PD (strictly PR)
Lecture 43 - KYP Theorem
Lecture 44 - Passivity preservation under interconnection
Lecture 45 - Aizermannâ s conjecture under passivity assumption is true
Lecture 46 - Sector Nonlinearities and need for generlaizing KYP Lemma
Lecture 47 - Need for Loop transformations
Lecture 48 - Loop Transformations - Part 1
Lecture 49 - Loop Transformations - Part 2
Lecture 50 - Circle criterion for PR
Lecture 51 - Examples based on circle criterion and stability under circle transformations

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NPTEL Video Course - Electrical Engineering - NOC:Signals and Systems

Subject Co-ordinator - Prof. Kushal K. Shah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Real and Complex Number
Lecture 2 - Sinusoid and Phasor
Lecture 3 - Limits and Continuity
Lecture 4 - Differentiation and Integration
Lecture 5 - Lâ Hospitalâ s Rule
Lecture 6 - LTI System Examples; Impedance
Lecture 7 - Dirac Delta function; Impulse
Lecture 8 - Continuous and Discrete Time Systems
Lecture 9 - Even Signal; Odd Signal
Lecture 10 - Orthogonality of Signals
Lecture 11 - Shifting and Scaling in Continuous Time - I
Lecture 12 - Shifting and Scaling in Continuous Time - II
Lecture 13 - Shifting and Scaling in Discrete Time
Lecture 14 - Signal and Noise
Lecture 15 - Signals in the Physical World
Lecture 16 - Signals and Sensory Perception
Lecture 17 - Frequency Domain Representation
Lecture 18 - Definition of Fourier Transform
Lecture 19 - Fourier Transform
Lecture 20 - Dirichlet Conditions
Lecture 21 - Inverse Fourier Transform
Lecture 22 - Fourier Transform
Lecture 23 - Frequency-Time Uncertainty Relation
Lecture 24 - Fourier Transform
Lecture 25 - Fourier Transform
Lecture 26 - Fourier Transform
Lecture 27 - Fourier Transform
Lecture 28 - Fourier Transform
Lecture 29 - Fourier Transform

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Lecture 30 - Fourier Transform of Noise
Lecture 31 - Types of Noise
Lecture 32 - Overview of Systems and General Properties
Lecture 33 - Linearity and Time Invariance
Lecture 34 - LTI System Examples
Lecture 35 - Frequency Response of RLC circuits - I
Lecture 36 - Frequency Response of RLC circuits - II
Lecture 37 - LCCDE Representation of Continuous-Time LTI Systems
Lecture 38 - Frequency Domain Representation of LCCDE Systems
Lecture 39 - Time Domain Representation of LTI Systems
Lecture 40 - Continuous-Time Convolution Integral
Lecture 41 - Continuous-Time Convolution
Lecture 42 - Continuous-Time Convolution
Lecture 43 - Continuous-Time Convolution
Lecture 44 - LTI Systems
Lecture 45 - LTI Systems
Lecture 46 - LTI Systems
Lecture 47 - Fourier Transform in Complex Frequency Domain
Lecture 48 - Laplace Transform
Lecture 49 - Laplace Transform
Lecture 50 - Laplace Transform
Lecture 51 - Laplace Transform
Lecture 52 - Laplace Analysis of LTI Systems
Lecture 53 - Laplace Analysis of RLC Circuits - I
Lecture 54 - Laplace Transform
Lecture 55 - Laplace Transform
Lecture 56 - Laplace Transform
Lecture 57 - Laplace Analysis of LTI Systems
Lecture 58 - Laplace Analysis of LTI Systems
Lecture 59 - Laplace Analysis of First Order RLC Circuits
Lecture 60 - Laplace Analysis of Second Order RLC Circuits
Lecture 61 - Fourier Transform of Periodic Signals
Lecture 62 - Fourier Series Representation in Continuous-Time
Lecture 63 - Fourier Series Properties - I
Lecture 64 - Fourier Series Properties - II
Lecture 65 - LTI System Response for Periodic Input Signal
Lecture 66 - Fourier Series in Continuous-Time
Lecture 67 - Fourier Series in Continuous-Time
Lecture 68 - Discrete-Time Convolution Sum

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Lecture 69 - Discrete-Time Convolution Sum Examples and Properties
Lecture 70 - LCCDE Representation of Discrete-Time LTI Systems
Lecture 71 - Impulse Train Sampling
Lecture 72 - Reconstruction of Continuous-Time Signal
Lecture 73 - Nyquist Sampling Theorem and Aliasing
Lecture 74 - Fourier Transform of Sampled Signals
Lecture 75 - DTFT
Lecture 76 - DTFT Properties I
Lecture 77 - DTFT Properties II
Lecture 78 - DTFT Properties III
Lecture 79 - DTFT
Lecture 80 - DTFT in Complex Frequency Domain
Lecture 81 - Z-Transform
Lecture 82 - Z-Transform Properties I
Lecture 83 - Z-Transform Properties II
Lecture 84 - Z-Transform Properties III
Lecture 85 - Z-Transform
Lecture 86 - Z-Transform
Lecture 87 - Block Diagram Representation

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NPTEL Video Course - Electrical Engineering - NOC:Linear Dynamical Systems

Subject Co-ordinator - Prof. Tushar Jain

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Response and state-space solution of Linear systems
Lecture 2 - Solution of LTV systems
Lecture 3 - Solution of LTI systems
Lecture 4 - Equivalent State Equations
Lecture 5 - Realization of LTI and LTV Systems
Lecture 6 - Tutorial - 1
Lecture 7 - Introduction to Stability Analysis
Lecture 8 - Lyapunov Stability - Part I
Lecture 9 - Lyapunov Stability - Part II
Lecture 10 - Proof of lyapunov stability theorem
Lecture 11 - BIBO vs Lyapunov Stability
Lecture 12 - BIBO vs Lyapunov Stability
Lecture 13 - Tutorial - 2
Lecture 14 - Introduction to Controllability
Lecture 15 - Reachability and Controllability Gramians
Lecture 16 - Controllability Matrix
Lecture 17 - Discrete-time Reachability and Controllability Gramians
Lecture 18 - Tests for controllability - I
Lecture 19 - Tests for controllability - II
Lecture 20 - Tutorial - 3
Lecture 21 - Tests for controllability - III
Lecture 22 - Tests for controllability - IV
Lecture 23 - Controllable Decomposition - I
Lecture 24 - Stabilizable Systems
Lecture 25 - Tests for Stabilizability
Lecture 26 - Tutorial - 4
Lecture 27 - State Feeback - I
Lecture 28 - State Feeback - II
Lecture 29 - Lyapunov Method of State Feedback Design

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Lecture 30 - Regulation and Tracking
Lecture 31 - Tutorial - 5
Lecture 32 - Robust Tracking and Disturbance Rejection
Lecture 33 - State Feedback design for Multi-input systems
Lecture 34 - Linear Quadratic Regulator
Lecture 35 - Tutorial - 6
Lecture 36 - Output feedback and observability
Lecture 37 - Duality and Observability tests
Lecture 38 - Decompostions and Detectability
Lecture 39 - Minimal Realisations
Lecture 40 - Observer Design and Output Feedback
Lecture 41 - Observer Design and Output Feedback
Lecture 42 - UIO
Lecture 43 - Tutorial - 7 and 8 (combined)

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NPTEL Video Course - Electrical Engineering - NOC:A brief Introduction of Micro-Sensors

Subject Co-ordinator - Prof. Santanu Talukder

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microscale Sensors or MEMS
Lecture 2 - Scaling effect
Lecture 3 - Some Simple Mechanics
Lecture 4 - Basic Mechanics - Part 1
Lecture 5 - Basic Mechanics - Part 2
Lecture 6 - Basic Mechanics - Part 3
Lecture 7 - Electrostatics
Lecture 8 - Electrostatic force
Lecture 9 - Coupled electromechanics
Lecture 10 - Stiction
Lecture 11 - Si crystal structure
Lecture 12 - Si etching
Lecture 13 - KOH etching
Lecture 14 - TMAH etching
Lecture 15 - Deposition and Lithography
Lecture 16 - Lithography
Lecture 17 - Pressure sensor types, membrane, Piezoelectric sensing, capacitive sensing
Lecture 18 - Pressure Sensor - II
Lecture 19 - Pressure Sensor - III
Lecture 20 - Accelerometer - I
Lecture 21 - Accelerometer - II
Lecture 22 - Assignment 1
Lecture 23 - Assignment 2

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NPTEL Video Course - Electrical Engineering - NOC:Fiber Optic Communication Technology

Subject Co-ordinator - Prof. Deepa Venkitesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to FOCT
Lecture 2 - Communication through the ages
Lecture 3 - Communication
Lecture 4 - Communication
Lecture 5 - Digital Communication for Optical Communication
Lecture 6 - Digital modulation
Lecture 7 - Digital modulation
Lecture 8 - Optical communication system
Lecture 9 - Assignment Discussion - Week 1
Lecture 10 - Optical Sources
Lecture 11 - Semiconductor gain media- structure, spectrum
Lecture 12 - Optical sources
Lecture 13 - External Quantum Efficiency
Lecture 14 - Modulation Bandwidth of LED
Lecture 15 - Optical and Electrical Bandwidth of LED
Lecture 16 - Emission Pattern of LED
Lecture 17 - Optical Sources
Lecture 18 - Laser Diodes
Lecture 19 - Laser Diodes
Lecture 20 - Laser Diodes
Lecture 21 - Assignment Discussion - Week 2
Lecture 22 - Laser Diodes
Lecture 23 - Laser Diodes
Lecture 24 - Laser rate equation
Lecture 25 - Laser rate equation
Lecture 26 - Laser power derivation
Lecture 27 - Modulation Response of Laser - 1
Lecture 28 - Modulation Response of Laser - 2
Lecture 29 - Modulation Response of Laser - 3

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Lecture 30 - Setbacks of direct modulation of laser
Lecture 31 - Setbacks of direct modulation of laser
Lecture 32 - Assignment Discussion - Week 3
Lecture 33 - Recap of direction modulation consequences
Lecture 34 - Noise in Lasers
Lecture 35 - Relative Intensity Noise
Lecture 36 - Laser Phase Noise - 1
Lecture 37 - Laser Phase Noise - 2
Lecture 38 - Effect of Laser Phase Noise
Lecture 39 - Electro-optic phase modulation
Lecture 40 - Electro-optic intensity modulator
Lecture 41 - Biasing of MZM
Lecture 42 - Biasing of MZM
Lecture 43 - Line coding schemes and their bandwidth requirements
Lecture 44 - Assignment Discussion - Week 4
Lecture 45 - Introduction to optical Fiber
Lecture 46 - Attenuation in optical fibers
Lecture 47 - Fiber Modes
Lecture 48 - Modes of a step index fiber - 1
Lecture 49 - Modes of a step index fiber - 2
Lecture 50 - Modes of a step index fiber - 3
Lecture 51 - Modes of a step index fiber - 4
Lecture 52 - Modes of a step index fiber - 5
Lecture 53 - Modes and Cut-off conditions
Lecture 54 - Universal b-V curves
Lecture 55 - Modal Profiles in step index fiber
Lecture 56 - Mode Field Diameter
Lecture 57 - Dispersion- Intermodal dispersion derivation
Lecture 58 - Dispersion-Bit rate distance Product
Lecture 59 - Phase Velocity and Group Velocity - 1
Lecture 60 - Phase Velocity and Group Velocity - 2
Lecture 61 - Material dispersion
Lecture 62 - Waveguide dispersion
Lecture 63 - Total Dispersion in optical fiber
Lecture 64 - Polarization mode dispersion
Lecture 65 - Photodetectors concepts
Lecture 66 - p-n and p-i-n Photodetectors
Lecture 67 - Avalance Photodetector
Lecture 68 - Direct detection receiver and sources of noise

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Lecture 69 - Quantifying noises in direct detection receivers
Lecture 70 - SNR and Operation Regimes
Lecture 71 - Noise Equivalent power and SNR in APDs
Lecture 72 - Coherent Receivers
Lecture 73 - SNR analysis of coherent receivers
Lecture 74 - Performance Evaluation - 1
Lecture 75 - Performance Evaluation - 2
Lecture 76 - Performance Metrics
Lecture 77 - Performance Metrics
Lecture 78 - Quantum limit of photodetection
Lecture 79 - Optical Amplifier
Lecture 80 - Erbium doped fiber amplifier - 1
Lecture 81 - Erbium doped fiber amplifier - 2
Lecture 82 - Erbium doped fiber amplifier - 3
Lecture 83 - Erbium doped fiber amplifier - 4
Lecture 84 - Link Design - Rise Time Budget
Lecture 85 - Link Design - Case Study
Lecture 86 - Link Design - Passive Optical Network and long haul link
Lecture 87 - Dispersion - Recap
Lecture 88 - Dispersion Compensation - Pulse Propagation with disperison
Lecture 89 - Pulse propagation - 2
Lecture 90 - Dispersion Compensation - Dispersion Transfer Function
Lecture 91 - Dispersion Compensation - Case Study
Lecture 92 - Dispersion COmpensation - WDM and DSP
Lecture 93 - Nonlinear Effects- Nonlinear refractive Index
Lecture 94 - Self Phase Modulation
Lecture 95 - Cross Phase Modulation
Lecture 96 - Scattering Processes in optical fibers
Lecture 97 - Stimulated Brillouin Scattering
Lecture 98 - Stimulated Raman Scattering
Lecture 99 - Components - Directional Couplers
Lecture 100 - Components - VOA, Polariser, Polarisation Controllers
Lecture 101 - Components - Isolator
Lecture 102 - Components - Circulator, Definitions
Lecture 103 - Components - Wavelength filters
Lecture 104 - Components - Arrayed Waveguide Gratings, WSS
Lecture 105 - Balanced Detection
Lecture 106 - Polarisation Diverse Coherent Receiver
Lecture 107 - Phase and Polarisation Diverse Coherent Reciever

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Lecture 108 - Overview of impairments in coherent optical communication
Lecture 109 - Transceiver impairments - Generation and Compensation
Lecture 110 - Channel Impairments - Generation and Compensation
Lecture 111 - Demo video
Lecture 112 - Introduction to Optical Networks
Lecture 113 - Layers of Optical Network
Lecture 114 - SDH/SONET Layering, Frame Structure
Lecture 115 - Physical Networks Topologies
Lecture 116 - Topology specific Link Design
Lecture 117 - Network Protection
Lecture 118 - Access Networks- PON
Lecture 119 - Optical Interconnects, Data Centers
Lecture 120 - Optical communication for Wireless Fronthauling

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NPTEL Video Course - Electrical Engineering - NOC:Image Signal Processing

Subject Co-ordinator - Prof. A. N. Rajagopalan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Applications of Image processing
Lecture 3 - Applications of Image processing (Continued...)
Lecture 4 - Basics of Images
Lecture 5 - Shot Noise
Lecture 6 - Geometric Transformations
Lecture 7 - Geometric Transformations (Continued...)
Lecture 8 - Bilinear Interpolation
Lecture 9 - Geometric Transformations (Continued...)
Lecture 10 - Projective Transformation
Lecture 11 - Homography
Lecture 12 - Homography - Special cases
Lecture 13 - Computing Homography
Lecture 14 - RANSAC
Lecture 15 - Rotational Homography
Lecture 16 - Research Challenges
Lecture 17 - Real Aperture Camera
Lecture 18 - Real aperture camera - Introduction
Lecture 19 - Cricle of confusion
Lecture 20 - Depth of field, Linearity
Lecture 21 - Space-Invariance
Lecture 22 - 2D Convolution
Lecture 23 - 2D Convolution
Lecture 24 - Blur Models
Lecture 25 - Space-variant Blurring
Lecture 26 - Shape from X - Introduction
Lecture 27 - 2-View Stereo
Lecture 28 - Introduction to Shape from Focus
Lecture 29 - SFF Principle

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Lecture 30 - Shape from focus - Gaussian fitting
Lecture 31 - Shape from focus - Focus operators
Lecture 32 - Shape from Focus - Examples
Lecture 33 - Shape from Focus - Tensor Voting
Lecture 34 - DFD Principle
Lecture 35 - Motion Blur
Lecture 36 - Image Transforms - Introduction
Lecture 37 - Image Transforms - Motivation
Lecture 38 - 1D Unitary Transforms - Introduction
Lecture 39 - Extending 1D Unitary Transform to 2D - Motivation
Lecture 40 - Extending 1D Unitary Transform to 2D - Example
Lecture 41 - Alternative Forms of 2D
Lecture 42 - Kronecker Product
Lecture 43 - Kronecker Product - (Example Revisited)
Lecture 44 - Extending 1D Unitary Transform to 2D - Summary
Lecture 45 - 1D DFT to 2D DFT
Lecture 46 - 2D DFT Visualization
Lecture 47 - 2D DFT - Computation
Lecture 48 - 1D DCT - Definition, Motivation
Lecture 49 - Relation to DFT
Lecture 50 - 2D DCT and Walsh-Haddamard Transform
Lecture 51 - Data Dependent Transforms, Karhunen Loeve Transform
Lecture 52 - Karhunen-Loeve Transform (KLT) - Concept
Lecture 53 - Karhunen-Loeve Transform (KLT) - Applications
Lecture 54 - Karhunen-Loeve Transform (KLT) - Applications
Lecture 55 - Singular Value Decomposition (SVD)
Lecture 56 - Applications of SVD
Lecture 57 - Change detection
Lecture 58 - Image Thresholding
Lecture 59 - Adaptive Local thresholding - Motivation
Lecture 60 - Chow-Kaneko Local thresholding
Lecture 61 - K-Means Method
Lecture 62 - ISODATA Method
Lecture 63 - Theory of Histogram Equalization and Modification
Lecture 64 - Histogram Equalization example
Lecture 65 - Image sequence and Single image filtering in Gaussian noise
Lecture 66 - Non-local Means Method
Lecture 67 - Non-local Means Filtering (Examples)
Lecture 68 - Impulse Noise Generator

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Lecture 69 - Impulse noise filtering
Lecture 70 - Transform Domain Filtering
Lecture 71 - Illumination Handling
Lecture 72 - Applications of Restoration, and Image Deblurring
Lecture 73 - Haddamard's conditions and Least squares solution
Lecture 74 - Min-norm solution and Norm of Linear operator
Lecture 75 - Numerical stability analysis
Lecture 76 - Image Deblurring
Lecture 77 - Tikhonov-Miller Regularization
Lecture 78 - Conditional Mean as an Estimator
Lecture 79 - Linear Estimator
Lecture 80 - Wiener Filter
Lecture 81 - Fourier Wiener Filter
Lecture 82 - 1D Superresolution
Lecture 83 - Superresolution Examples

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NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Electric Vehicles: Technology and Economics

Subject Co-ordinator - Prof. Ashok Jhunjhunwala, Prof. Prabhjot Kaur, Prof. Kaushal Kumar Jha, Prof. L Kannar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Electric Vehicles in India
Lecture 2 - Can India Drive its EV program Innovatively and Differently and scale? - Part 1
Lecture 3 - Can India Drive its EV program Innovatively and Differently and scale? - Part 2
Lecture 4 - A bit about batteries
Lecture 5 - Charging and Swapping Infrastructure
Lecture 6 - Where will we get Lithium for batteries?
Lecture 7 - EV Subsystems
Lecture 8 - Forces acting when a vehicle move
Lecture 9 - Aerodynamic drag, Rolling Resistance and Uphill Resistance
Lecture 10 - Power and Torque to accelerate
Lecture 11 - Putting it all together - 1
Lecture 12 - Putting it all together - 2
Lecture 13 - Concept of Drive Cycle - 1
Lecture 14 - Concept of Drive Cycle - 2
Lecture 15 - Drive Cycles and Energy used per km - Part 1
Lecture 16 - Drive Cycles and Energy used per km - Part 2
Lecture 17 - EV Subsystem
Lecture 18 - EV Subsystem
Lecture 19 - Introduction to Battery Parameters - Part 1
Lecture 20 - Introduction to Battery Parameters - Part 2
Lecture 21 - Why Lithium Ion Battery? - Part 1
Lecture 22 - Why Lithium Ion Battery? - Part 2
Lecture 23 - Batteries in Future
Lecture 24 - Li-Ion Battery Cells
Lecture 25 - SoH and SoC estimation and Self Discharge - Part 1
Lecture 26 - SoH and SoC estimation and Self Discharge - Part 2
Lecture 27 - Battery Pack Development - Part 1
Lecture 28 - Battery Pack Development - Part 2
Lecture 29 - Computation of Effective cost of battery - Part 1

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Lecture 30 - Computation of Effective cost of battery - Part 2
Lecture 31 - Charging Batteries
Lecture 32 - Fundamentals of Battery Pack Design
Lecture 33 - Mechanical Design - Part 1
Lecture 34 - Mechanical Design - Part 2
Lecture 35 - Mechanical Design - Part 3
Lecture 36 - Mechanical Design - Part 4
Lecture 37 - Thermal Design - Part 1
Lecture 38 - Thermal Design - Part 2
Lecture 39 - Thermal Design - Part 3
Lecture 40 - Thermal Design - Part 4
Lecture 41 - Electrical Design - Part 1
Lecture 42 - Electrical Design - Part 2
Lecture 43 - Electrical Design - Part 3
Lecture 44 - BMS Design of Electic Vehicle - Part 1
Lecture 45 - BMS Design of Electic Vehicle - Part 2
Lecture 46 - BMS Design of Electic Vehicle - Part 3
Lecture 47 - EV Motors and Controllers - Understanding Flow - Part 1
Lecture 48 - EV Motors and Controllers - Understanding Flow - Part 2
Lecture 49 - Power and Efficiency
Lecture 50 - Torque Production - Part 1
Lecture 51 - Torque Production - Part 2
Lecture 52 - Torque Production - Part 3
Lecture 53 - Speed and Back EMF
Lecture 54 - The d-q Equivalent circuit - Part 1
Lecture 55 - The d-q Equivalent circuit - Part 2
Lecture 56 - Field-oriented Control
Lecture 57 - Three phase AC - Part 1
Lecture 58 - Three phase AC - Part 2
Lecture 59 - Thermal Design - Part 1
Lecture 60 - Thermal Design - Part 2
Lecture 61 - Engineering Considerations - Part 1
Lecture 62 - Engineering Considerations - Part 2
Lecture 63 - Future Frontiers
Lecture 64 - EV Chargers
Lecture 65 - EV Chargers
Lecture 66 - EV Chargers
Lecture 67 - Battery Swapping
Lecture 68 - Standardization and On board Chargers

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Lecture 69 - Public Chargers - Part 1
Lecture 70 - Public Chargers - Part 2
Lecture 71 - Bulk Chargers/Swap Stations - Part 1
Lecture 72 - Bulk Chargers/Swap Stations - Part 2
Lecture 73 - Economics of Public Chargers in context
Lecture 74 - Analytics - Part 1
Lecture 75 - Analytics - Part 2
Lecture 76 - Course Summary

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NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra

Subject Co-ordinator - Prof. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Vector Spaces
Lecture 3 - Linear Combinations and Span
Lecture 4 - Subspaces, Linear Dependence and Independence
Lecture 5 - Basis and Dimension
Lecture 6 - Sums, Direct Sums and Gaussian Elimination
Lecture 7 - Linear Maps and Matrices
Lecture 8 - Null space, Range, Fundamental theorem of linear maps
Lecture 9 - Column space, null space and rank of a matrix
Lecture 10 - Algebraic operations on linear maps
Lecture 11 - Invertible maps, Isomorphism, Operators
Lecture 12 - Solving Linear Equations
Lecture 13 - Elementary Row Operations
Lecture 14 - Translates of a subspace, Quotient Spaces
Lecture 15 - Row space and rank of a matrix
Lecture 16 - Determinants
Lecture 17 - Coordinates and linear maps under a change of basis
Lecture 18 - Simplifying matrices of linear maps by choice of basis
Lecture 19 - Polynomials and Roots
Lecture 20 - Invariant subspaces, Eigenvalues, Eigenvectors
Lecture 21 - More on Eigenvalues, Eigenvectors, Diagonalization
Lecture 22 - Eigenvalues, Eigenvectors and Upper Triangularization
Lecture 23 - Properties of Eigenvalues
Lecture 24 - Linear state space equations and system stability
Lecture 25 - Discrete-time Linear Systems and Discrete Fourier Transforms
Lecture 26 - Sequences and counting paths in graphs
Lecture 27 - PageRank Algorithm
Lecture 28 - Dot product and length in Cn, Inner product and norm in V over F
Lecture 29 - Orthonormal basis and Gram-Schmidt orthogonalisation

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Lecture 30 - Linear Functionals, Orthogonal Complements
Lecture 31 - Orthogonal Projection
Lecture 32 - Projection and distance from a subspace
Lecture 33 - Linear equations, Least squares solutions and Linear regression
Lecture 34 - Minimum Mean Squared Error Estimation
Lecture 35 - Adjoint of a linear map
Lecture 36 - Properties of Adjoint of a Linear Map
Lecture 37 - Adjoint of an Operator and Operator-Adjoint Product
Lecture 38 - Self-adjoint Operator
Lecture 39 - Normal Operators
Lecture 40 - Complex Spectral Theorem
Lecture 41 - Real Spectral Theorem
Lecture 42 - Positive Operators
Lecture 43 - Quadratic Forms, Matrix Norms and Optimization
Lecture 44 - Isometries
Lecture 45 - Classification of Operators
Lecture 46 - Singular Values and Vectors of a Linear Map
Lecture 47 - Singular Value Decomposition
Lecture 48 - Polar decomposition and some applications of SVD

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NPTEL Video Course - Electrical Engineering - NOC:Basic Electrical Circuits

Subject Co-ordinator - Dr. Nagendra Krishnapura

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preliminaries
Lecture 2 - Current
Lecture 3 - Voltage
Lecture 4 - Electrical elements and circuits
Lecture 5 - Kirchhoff's current law (KCL)
Lecture 6 - Kirchhoff's voltage law (KVL)
Lecture 7 - Voltage source
Lecture 8 - Current source
Lecture 9 - Resistor
Lecture 10 - Capacitor
Lecture 11 - Inductor
Lecture 12 - Mutual inductor
Lecture 13 - Linearity of elements
Lecture 14 - Series connection-Voltage sources in series
Lecture 15 - Series connection of R, L, C, current source
Lecture 16 - Elements in parallel
Lecture 17 - Current source in series with an element; Voltage source in parallel with an element
Lecture 18 - Extreme cases
Lecture 19 - Summary
Lecture 20 - Voltage controlled voltage source (VCVS)
Lecture 21 - Voltage controlled current source (VCCS)
Lecture 22 - Current controlled voltage source (CCVS)
Lecture 23 - Current controlled current source (CCCS)
Lecture 24 - Realizing a resistance using a VCCS or CCCS
Lecture 25 - Scaling an element's value using controlled sources
Lecture 26 - Example calculation
Lecture 27 - Power and energy absorbed by electrical elements
Lecture 28 - Power and energy in a resistor
Lecture 29 - Power and energy in a capacitor

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Lecture 30 - Power and energy in an inductor
Lecture 31 - Power and energy in a voltage source
Lecture 32 - Power and energy in a current source
Lecture 33 - Goals of circuit analysis
Lecture 34 - Number of independent KCL equations
Lecture 35 - Number of independent KVL equations and branch relationships
Lecture 36 - Analysis of circuits with a single independent source
Lecture 37 - Analysis of circuits with multiple independent sources using superposition
Lecture 38 - Superposition
Lecture 39 - What is nodal analysis
Lecture 40 - Setting up nodal analysis equations
Lecture 41 - Structure of the conductance matrix
Lecture 42 - How do elements circuit appear in the nodal analysis formulation
Lecture 43 - Completely solving the circuit starting from nodal analysis
Lecture 44 - Nodal analysis example
Lecture 45 - Matrix inversion basics
Lecture 46 - Nodal analysis with independent voltage sources
Lecture 47 - Supernode for nodal analysis with independent voltage sources
Lecture 48 - Nodal analysis with VCCS
Lecture 49 - Nodal analysis with VCVS
Lecture 50 - Nodal analysis with CCVS
Lecture 51 - Nodal analysis with CCCS
Lecture 52 - Nodal analysis summary
Lecture 53 - Planar circuits
Lecture 54 - Mesh currents and their relationship to branch currents
Lecture 55 - Mesh analysis
Lecture 56 - Mesh analysis with independent current sources-Supermesh
Lecture 57 - Mesh analysis with current controlled voltage sources
Lecture 58 - Mesh analysis with current controlled current sources
Lecture 59 - Mesh analysis using voltage controlled sources
Lecture 60 - Nodal analysis versus Mesh analysis
Lecture 61 - Superposition theorem
Lecture 62 - Pushing a voltage source through a node
Lecture 63 - Splitting a current source
Lecture 64 - Substitution theorem
Lecture 65 - Substitution theorem
Lecture 66 - Substituting a voltage or current source with a resistor
Lecture 67 - Extensions to Superposition and Substitution theorem
Lecture 68 - Thevenin's theorem

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Lecture 69 - Worked out example
Lecture 70 - Norton's theorem
Lecture 71 - Worked out example
Lecture 72 - Maximum power transfer theorem
Lecture 73 - Preliminaries
Lecture 74 - Two port parameters
Lecture 75 - y parameters
Lecture 76 - y parameters
Lecture 77 - z parameters
Lecture 78 - z parameters
Lecture 79 - h parameters
Lecture 80 - h parameters
Lecture 81 - g parameters
Lecture 82 - g parameters
Lecture 83 - Calculations with a two-port element
Lecture 84 - Calculations with a two-port element
Lecture 85 - Degenerate cases
Lecture 86 - Relationships between different two-port parameters
Lecture 87 - Equivalent circuit representation of two-ports
Lecture 88 - Reciprocity
Lecture 89 - Proof of reciprocity of resistive two-ports
Lecture 90 - Proof for 4-terminal two-ports
Lecture 91 - Reciprocity in terms of different two-port parameters
Lecture 92 - Reciprocity in circuits containing controlled sources
Lecture 93 - Examples
Lecture 94 - Feedback amplifier using an opamp
Lecture 95 - Ideal opamp
Lecture 96 - Negative feedback around the opamp
Lecture 97 - Finding opamp sign for negative feedback
Lecture 98 - Example
Lecture 99 - Analysis of circuits with opamps
Lecture 100 - More on opamps
Lecture 101 - Inverting amplifier
Lecture 102 - Summing amplifier
Lecture 103 - Instrumentation amplifier
Lecture 104 - Negative resistance
Lecture 105 - Finding opamp signs for negative feedback-circuits with multiple opamps
Lecture 106 - Opamp supply voltages and saturation
Lecture 107 - KCL with an opamp and supply currents

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Lecture 108 - Circuits with storage elements (capacitors and inductors)
Lecture 109 - First order circuit with zero input-natural response
Lecture 110 - First order RC circuit with zero input-Example
Lecture 111 - First order circuit with a constant input
Lecture 112 - General form of the first order circuit response
Lecture 113 - First order RC circuit with a constant input-Example
Lecture 114 - First order circuit with piecewise constant input
Lecture 115 - First order circuit with piecewise constant input-Example
Lecture 116 - First order circuit-Response of arbitrary circuit variables
Lecture 117 - Summary
Lecture 118 - Does a capacitor block DC?
Lecture 119 - Finding the order of a circuit
Lecture 120 - First order RC circuits with discontinuous capacitor voltages
Lecture 121 - Summary
Lecture 122 - First order RL circuits
Lecture 123 - First order RL circuit with discontinuous inductor current-Example
Lecture 124 - First order RC circuit with an exponential input
Lecture 125 - First order RC response to its own natural response
Lecture 126 - First order RC response to a sinusoidal input
Lecture 127 - First order RC response to a sinusoidal input-via the complex exponential
Lecture 128 - Summary
Lecture 129 - Three methods of calculating the sinusoidal steady state response
Lecture 130 - Calculating the total response including initial conditions
Lecture 131 - Why are sinusoids used in measurement?
Lecture 132 - Second order system natural response
Lecture 133 - Second order system as a cascade of two first order systems
Lecture 134 - Second order system natural response-critically damped and underdamped
Lecture 135 - Generalized form of a second order system
Lecture 136 - Numerical example
Lecture 137 - Series and parallel RLC circuits
Lecture 138 - Forced response of a second order system
Lecture 139 - Steady state response calculation and Phasors
Lecture 140 - Phasors (Continued...)
Lecture 141 - Magnitude and Phase plots
Lecture 142 - Magnitude and phase plotes of a second order system
Lecture 143 - Maximum power transfer and Conjugate matching

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NPTEL Video Course - Electrical Engineering - NOC:Optical Fiber Sensors

Subject Co-ordinator - Prof. Balaji Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to optical sensors
Lecture 2 - Different types of optical sensors
Lecture 3 - Overview of distributed sensors
Lecture 4 - Optical sensors system
Lecture 5 - Optical sources
Lecture 6 - Optical receivers - 1
Lecture 7 - Optical receivers - 2
Lecture 8 - Optical receivers - 3
Lecture 9 - Optical receiver design
Lecture 10 - Noise Analysis
Lecture 11 - Sensor Performance characteristics
Lecture 12 - Noise Mitigation Techniques
Lecture 13 - Lock in detection
Lecture 14 - Amplitude modulated sensors - 1
Lecture 15 - Gas absoprtion spectroscopy
Lecture 16 - Amplitude modulated sensors - 2
Lecture 17 - Amplitude modulated sensors - 3
Lecture 18 - Amplitude modulated sensors - 4
Lecture 19 - Problem Discussion
Lecture 20 - Pulse-oximeter
Lecture 21 - Phase modulated sensors - 1
Lecture 22 - Phase modulated sensors - 2
Lecture 23 - Phase modulated Sensors - 3
Lecture 24 - Phase modulated sensors - 4
Lecture 25 - Phase modulated sensors - 5
Lecture 26 - Phase modulated sensors - 6
Lecture 27 - Phase modulated sensors - 7
Lecture 28 - Phase modulated sensors - 8
Lecture 29 - Phase modulated sensors - 9

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Lecture 30 - Phase modulated sensors - 10
Lecture 31 - Phase modulated Sensors - 11
Lecture 32 - Wavelength modulated sensors - 1
Lecture 33 - Wavelength modulated sensors - 2
Lecture 34 - Wavelength modulated sensors - 3
Lecture 35 - Wavelength modulated sensors - 4
Lecture 36 - Wavelength modulated sensors - 5
Lecture 37 - Wavelength modulated sensors - 6
Lecture 38 - Wavelength modulated sensors - 7
Lecture 39 - Wavelength modulated sensors - 8
Lecture 40 - Polarization modulated sensors - 1
Lecture 41 - Polarization modulated sensors - 2
Lecture 42 - Polarization modulated sensors - 3

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Time - Varying Electrical Networks

Subject Co-ordinator - Prof. Shanthi Pavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction and Motivation
Lecture 2 - Kirchoff's Current and Voltage Laws, and the Incidence Matrix
Lecture 3 - Power Conservation and Tellegen's Theorem
Lecture 4 - Intuition behind Tellegen's Theorem
Lecture 5 - Tellegen's Theorem and reciprocity in linear resistive networks
Lecture 6 - Why is reciprocity useful in practice?
Lecture 7 - Inter-reciprocity in linear time-invariant networks
Lecture 8 - Inter-reciprocity in linear time-invariant networks (Continued...)
Lecture 9 - Inter-reciprocity in networks with ideal operational amplifiers
Lecture 10 - Review of Modified Nodal Analysis (MNA) of linear networks
Lecture 11 - MNA stamps of controlled sources - the VCCS and VCVS
Lecture 12 - MNA stamps of controlled sources - the CCCS and CCVS
Lecture 13 - Inter-reciprocity in linear networks - using the MNA stamp approach
Lecture 14 - The Adjoint Network
Lecture 15 - MNA stamp of an ideal opamp
Lecture 16 - Properties of circuits with multiple ideal opamps
Lecture 17 - Introduction to noise in electrical networks
Lecture 18 - Noise processed by a linear time-invariant system
Lecture 19 - kT/C noise in a sample-and-hold circuit
Lecture 20 - Noise in RLC networks
Lecture 21 - Total integrated noise in RLC Networks
Lecture 22 - Bode's Noise Theorem - Frequency domain
Lecture 23 - Input referred noise in electrical networks - Part 1
Lecture 24 - Input referred noise in electrical networks - Part 2
Lecture 25 - Input referred noise and the noise factor
Lecture 26 - Noise Factor Examples
Lecture 27 - Motivation to learn about time-varying circuits and systems - Part 1
Lecture 28 - Motivation to learn about time-varying circuits and systems - Part 2
Lecture 29 - Convolution integral for LTV systems

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Lecture 30 - Frequency response of an LTV system
Lecture 31 - LTV system example : Time-varying RC filter
Lecture 32 - Linear Periodically Time-Varying Systems (LPTV)
Lecture 33 - Response of an LPTV system to a complex exponential input
Lecture 34 - Harmonic Transfer Functions
Lecture 35 - Zadeh expansion of an LPTV system
Lecture 36 - MNA analysis of LPTV networks
Lecture 37 - MNA stamp of a periodically time varying conductance
Lecture 38 - MNA stamp of a capacitor and a voltage source in an LPTV network
Lecture 39 - Analysis of an example LPTV network - Part 1
Lecture 40 - Analysis of an example LPTV network - Part 2
Lecture 41 - LPTV network analysis, RC filter, time-varying
Lecture 42 - Impedance and admittance in LTI and LPTV networks
Lecture 43 - Thevenin and Norton's Theorems for LPTV networks
Lecture 44 - The N-path principle
Lecture 45 - N-path example
Lecture 46 - Time-domain intuition of the N-path principle
Lecture 47 - N-path example: Time-Interleaved ADCs
Lecture 48 - Dc-dc converter as an LPTV system
Lecture 49 - N-path principle: Multiphase dc-dc converter
Lecture 50 - The N-path filter
Lecture 51 - Computing H_0(j2\pi f_s) for a 4-path filter
Lecture 52 - Input impedance of the 4-path filter at f_s
Lecture 53 - Computing H_0(j2\pi 2 f_s) for a 4-path filter
Lecture 54 - Determining H_0 for input frequency deviations from f_s
Lecture 55 - Reciprocity and Inter-reciprocity in LPTV networks : Part 1
Lecture 56 - Reciprocity and Inter-reciprocity in LPTV networks : Part 2, the transfer-function theorem
Lecture 57 - Why is the transfer-function theorem important?
Lecture 58 - The frequency-reversal theorem for inter-reciprocal (adjoint) LPTV networks : introduction
Lecture 59 - The frequency-reversal theorem for inter-reciprocal (adjoint) LPTV networks : derivation
Lecture 60 - Why is the frequency-reversal theorem important?
Lecture 61 - Inter-reciprocity in signal-flow graphs
Lecture 62 - Applications of inter-reciprocity: analysis of chopped amplifiers
Lecture 63 - Applications of inter-reciprocity: analysis of chopped amplifiers (Continued...)
Lecture 64 - Applications of inter-reciprocity: chopping with square-wave modulation
Lecture 65 - Applications of inter-reciprocity: the switched-RC network
Lecture 66 - Time-domain implications of inter-reciprocity and the adjoint network
Lecture 67 - Time-domain implications of inter-reciprocity and the adjoint network : Example calculation
Lecture 68 - LPTV networks with sampled outputs: Switched capacitor circuits

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Lecture 69 - LPTV networks with sampled outputs: A continuous-time delta-sigma data converter
Lecture 70 - LPTV networks with sampled outputs: The equivalent LTI filter
Lecture 71 - Finding the equivalent LTI filter of a sampled LPTV system : example
Lecture 72 - Equivalent LTI filter for a switched-RC network
Lecture 73 - Finding the equivalent LTI filter of a sampled LPTV system : example of a continuous-time delta-
Lecture 74 - Finding the equivalent LTI filter of a sampled LPTV system with offset sampling
Lecture 75 - LPTV networks driven by modulated inputs
Lecture 76 - Introduction to noise in LPTV Networks
Lecture 77 - Noise in LPTV networks with sampled outputs
Lecture 78 - Total integrated noise in networks with R,L,C and periodically operated switches

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NPTEL Video Course - Electrical Engineering - NOC:Digital System Design

Subject Co-ordinator - Prof. Neeraj Goel

Co-ordinating Institute - IIT - Ropar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Analog vs Digital
Lecture 3 - Binary number system - 1
Lecture 4 - Binary number system - 2
Lecture 5 - Negative number representation - 1
Lecture 6 - Negative number representation - 2
Lecture 7 - Other number systems
Lecture 8 - Floating point numbers - 1
Lecture 9 - Floating point numbers - 2
Lecture 10 - Floating point numbers - 3
Lecture 11 - Floating point numbers - 4
Lecture 12 - Floating point numbers - 5
Lecture 13 - Boolean functions
Lecture 14 - Boolean Algebra
Lecture 15 - SOP and POS Representation
Lecture 16 - Algebraic simplifications
Lecture 17 - Canonical form
Lecture 18 - Boolean minimization using K-Maps
Lecture 19 - More Logic gates
Lecture 20 - Hardware description language:Verilog
Lecture 21 - Verilog simulation demo
Lecture 22 - K-maps
Lecture 23 - QM-method
Lecture 24 - Area delay model
Lecture 25 - Multi-level logic
Lecture 26 - Multiplexer
Lecture 27 - Four state logic
Lecture 28 - Decoders - 1
Lecture 29 - Decoders - 2

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Lecture 30 - Encoders
Lecture 31 - Programmable hardware
Lecture 32 - Ripple carry adder
Lecture 33 - Carry look ahead adder
Lecture 34 - Modeling BUS in Verilog
Lecture 35 - Fast adder:Carry select adder
Lecture 36 - Multiple operand adder
Lecture 37 - Multiplication
Lecture 38 - Iterative circuits - 1
Lecture 39 - Iterative circuits - 2
Lecture 40 - Introduction to sequential circuits
Lecture 41 - Latches
Lecture 42 - D-Flip-flops
Lecture 43 - More Flip-flops
Lecture 44 - Counters
Lecture 45 - Verilog-Behavior model - 1
Lecture 46 - Verilog-Behavior model - 2
Lecture 47 - Registers - 1
Lecture 48 - Registers - 2
Lecture 49 - Memory
Lecture 50 - Sequential circuit analysis
Lecture 51 - Derivation state graph
Lecture 52 - Sequence detector: Example 1
Lecture 53 - Sequence detector: Example 2
Lecture 54 - State machine reduction
Lecture 55 - State encoding
Lecture 56 - Multi-cycle adder design
Lecture 57 - Pipelined adder design
Lecture 58 - Multiplication design
Lecture 59 - Division hardware design
Lecture 60 - Interacting state machines
Lecture 61 - Register Transfer Level design
Lecture 62 - GCD computer at RTL Level
Lecture 63 - RTL Design - Bubble sort
Lecture 64 - RTL Design - Traffic light controller
Lecture 65 - FPGA
Lecture 66 - Xilinx CLB
Lecture 67 - FPGA - Design flow
Lecture 68 - FPGA design demo

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Lecture 69 - Introduction to ASIC design flow - Part 1
Lecture 70 - Introduction to ASIC design flow - Part 2
Lecture 71 - Future directions

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NPTEL Video Course - Electrical Engineering - NOC:Stochastic Modeling and the Theory of Queues

Subject Co-ordinator - Prof. Krishna Jagannathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Probability Theory: Random Variable
Lecture 2 - Sequence of Random Variables
Lecture 3 - Laws of Large Numbers and Central Limit Theorem
Lecture 4 - What is a stochastic process?
Lecture 5 - Counting Process
Lecture 6 - Poisson Process - Introduction
Lecture 7 - Poisson Process - Memorylessness
Lecture 8 - Poisson Process - Increment properties
Lecture 9 - Distribution of arrival epoch Sn and N(t) for a Poisson Process
Lecture 10 - Alternate definitions of a Poisson Process
Lecture 11 - Merging of Poisson Processes - Part 1
Lecture 12 - Merging of Poisson Processes - Part 2
Lecture 13 - Splitting of Poisson Process - Part 1
Lecture 14 - Splitting of Poisson Process - Part 2
Lecture 15 - Example: Poisson Splitting
Lecture 16 - Conditional arrival density and order statistics - Part 1
Lecture 17 - Conditional arrival density and order statistics - Part 2
Lecture 18 - Non Homogeneous Poisson Process
Lecture 19 - Introduction to Queueing (with examples)
Lecture 20 - Examples: Non homogeneous Poisson process
Lecture 21 - Examples: Competing Poisson processes
Lecture 22 - Introduction to Renewal Processes
Lecture 23 - Strong law for renewal processes
Lecture 24 - Strong law for renewal processes - Proof
Lecture 25 - Residual life, age and duration (Time average) - Part 1
Lecture 26 - Residual life, age and duration (Time average) - Part 2
Lecture 27 - Renewal Reward Theorem (Time average) - Part 1
Lecture 28 - Renewal Reward Theorem (Time average) - Part 2
Lecture 29 - Stopping time

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Lecture 30 - Wald's Equality
Lecture 31 - Wald's Equality (Continued...)
Lecture 32 - Elementary Renewal Theorem
Lecture 33 - The Renewal Equation
Lecture 34 - The Renewal Equation (Continued...)
Lecture 35 - G/G/1 Queue and Little's theorem
Lecture 36 - Little's theorem
Lecture 37 - M/G/1 Queue
Lecture 38 - M/G/1 Queue and PK Formula
Lecture 39 - M/G/1 Queue and PK Formula (Continued...)
Lecture 40 - Ensemble rewards - Age and Duration
Lecture 41 - Ensemble rewards - Age and Duration (Continued...)
Lecture 42 - Key Renewal Theorem and Ensemble rewards
Lecture 43 - Introduction to finite state Discrete Time Markov Chains
Lecture 44 - Class and Types of Classes in a DTMC
Lecture 45 - Periodicity in a DTMC
Lecture 46 - Matrix Representation of a DTMC
Lecture 47 - The long term behaviour of a DTMC
Lecture 48 - Stationary Distribution and Long term behaviour of a DTMC - Part 1
Lecture 49 - Stationary Distribution and Long term behaviour of a DTMC - Part 2
Lecture 50 - Stationary Distribution and Long term behaviour of a DTMC - Part 3
Lecture 51 - Spectral Properties of Stochastic Matrices - Part 1
Lecture 52 - Spectral Properties of Stochastic Matrices - Part 2
Lecture 53 - The Short-term Behaviour of a DTMC
Lecture 54 - Introduction to Countable-state DTMC
Lecture 55 - Introduction to Countable-state DTMC (Continued...)
Lecture 56 - The Strong Markov Property
Lecture 57 - Renewal Theory applied to DTMC's
Lecture 58 - Stationary Distribution of a Countable State Space DTMC and Renewal Theory
Lecture 59 - Stationary Distribution of a Countable State Space DTMC and Renewal Theory (Continued...)
Lecture 60 - Stationary Distribution and The Steady State Behaviour of a Countable-state DTMC - Part 1
Lecture 61 - Stationary Distribution and The Steady State Behaviour of a Countable-state DTMC - Part 2
Lecture 62 - Convergence to Steady State of a Coutable-state DTMC (Stochastic Coupling)
Lecture 63 - The Birth-Death Markov Chains
Lecture 64 - The Reversibility Markov Chains
Lecture 65 - The Reversibility Markov Chains (Continued...)
Lecture 66 - Time Sampled M/M/1 Queue and The Burke's Theorem
Lecture 67 - Introduction to Continuous Time Markov Chains
Lecture 68 - Introduction to CTMC (Continued...)

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Lecture 69 - The Steady State Behaviour of CTMC - Part 1
Lecture 70 - The Steady State Behaviour of CTMC - Part 2
Lecture 71 - The Steady State Behaviour of CTMC - Part 3
Lecture 72 - The Steady State Behaviour of CTMC - Part 4
Lecture 73 - The chapman-kolmogrov equations for CTMC's
Lecture 74 - The Birth-Death Continuous time Markov Chains
Lecture 75 - The Reversibility of Continuous time Markov Chains
Lecture 76 - Burke's Theorem and the Tandem Queues - Part 1
Lecture 77 - Burke's Theorem and the Tandem Queues - Part 2
Lecture 78 - The Jackson Networks - Part 1
Lecture 79 - The Jackson Networks - Part 2
Lecture 80 - Semi Markov Processes - Part 1
Lecture 81 - Semi Markov Processes - Part 2

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NPTEL Video Course - Electrical Engineering - NOC:Integrated Photonics Devices and Circuits

Subject Co-ordinator - Prof. Bijoy Krishna Das

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Background and Learning Outcome
Lecture 2 - Moore's Law and Interconnect Bottleneck
Lecture 3 - Progress in Optical Interconnect Technology and Beyond
Lecture 4 - Evolution of Silicon Photonics Platform
Lecture 5 - Fundamentals of Lightwaves: EM Waves: Maxwell Equations and Plane Wave Solutions
Lecture 6 - Fundamentals of Lightwaves: EM Waves: Wave Propagation in Lossy Dielectric Medium
Lecture 7 - Fundamentals of Lightwaves: EM Waves in Metals and Semiconductors
Lecture 8 - Fundamentals of Lightwaves: EM Waves: Plasma Dispersion
Lecture 9 - Fundamentals of Lightwaves: EM Waves Principle of Optical Waveguiding
Lecture 10 - Fundamentals of Lightwaves: 1-D Optical Waveguide: Ray Optics Model
Lecture 11 - Optical Waveguides: Theory and Design: TIR Based Eigen Mode Solutions for Slab Waveguides
Lecture 12 - Optical Waveguides: Theory and Design: TIR Based Design Solutions for Slab Waveguides
Lecture 13 - Optical Waveguides: Theory and Design: Guided ModeSolutions for Slab Waveguides
Lecture 14 - Optical Waveguides: Theory and Design: Guided ModeSolutions for Slab Waveguides cont
Lecture 15 - Optical Waveguides: Theory and Design: Guided Mode Dispersionand Power in Slab Waveguides
Lecture 16 - Optical Waveguides: Theory and Design: Optical Waveguide with 2D confinement
Lecture 17 - Optical Waveguides: Theory and Design: Dispersion and Polarization of Guided Modes
Lecture 18 - Optical Waveguides: Theory and Design: Orthogonalityof Guided Modes
Lecture 19 - Optical Waveguides: Theory and Design: Coupled Mode Theoryof Guided Modes
Lecture 20 - Optical Waveguides: Theory and Design: Coupled Mode Theory (Continued...)
Lecture 21 - Optical Waveguides: Theory and Design: Coupled Mode Theory (Continued...)
Lecture 22 - Integrated Optical Components: Y-Junction Power Splitter/Combiner and Mach-Zehnder Interferomete
Lecture 23 - Integrated Optical Components: Directional Coupler: Coupled Waveguides
Lecture 24 - Integrated Optical Components: Directional Coupler: Coupled Waveguides (Continued...)
Lecture 25 - Integrated Optical Components: Directional Coupler: Design and Modelling
Lecture 26 - Integrated Optical Components: DC based MZI and Microring Resonator (MRR)
Lecture 27 - Integrated Optical Components: Microring Resonator (MRR): Passive Characteristics
Lecture 28 - Integrated Optical Components: Distributed Bragg Reflector (DBR)
Lecture 29 - Integrated Optical Components: Distributed Bragg Reflector (DBR): Device Design - Part 1

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Lecture 30 - Integrated Optical Components: Distributed Bragg Reflector (DBR): Device Design - Part 2
Lecture 31 - Tunable Devices and Reconfigurable Circuits: Phase Error Interference
Lecture 32 - Tunable Devices and Reconfigurable Circuits: Post Fabrication Phase Error Corrections
Lecture 33 - Tunable Devices and Reconfigurable Circuits: Thermo-Optic Switching and Tuning
Lecture 34 - Tunable Devices and Reconfigurable Circuits: Programmable Silicon Photonics
Lecture 35 - Electro-Optic Modulators for Integrated Photonics: Basic Design and Working Principle
Lecture 36 - Electro-Optic Modulators for Integrated Photonics: Various Physical Mechanisms
Lecture 37 - Electro-Optic Modulators for Integrated Photonics: FCCE Based Silicon Photonics Modulator
Lecture 38 - Light Sources and Photodetectors for Integrated Photonics: Integrated Photonic light Sources - P
Lecture 39 - Light Sources and Photodetectors for Integrated Photonics: Integrated Photonic light Sources - P
Lecture 40 - Light Sources and Photodetectors for Integrated Photonics: Photodetectors for Silicon Photonics

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Semiconductor Devices

Subject Co-ordinator - Prof. Naresh Kumar Emani

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Types of Semiconductors
Lecture 2 - Classical Vs Quantum Mechanics
Lecture 3 - Electrons in infinite and finite 1D potential well
Lecture 4 - 3D potential well model of atom and Bohr's model
Lecture 5 - Covalent bonds and inter-atomic interactions in Silicon
Lecture 6 - Energy band formation
Lecture 7 - Electron hole pair generation
Lecture 8 - Direct and Indirect bandgap semiconductors
Lecture 9 - Energy levels in infinite and finite potential wells (short demo)
Lecture 10 - Effective mass in Semiconductors
Lecture 11 - Intrinsic carrier density
Lecture 12 - Doping and extrinsic semiconductors
Lecture 13 - Fermi level in extrinsic semiconductors
Lecture 14 - Temperature dependence of Fermi level
Lecture 15 - Temperature dependence of Fermi level
Lecture 16 - Charge neutrality relationship
Lecture 17 - Drift current and energy band representation of kinetic energy of carriers
Lecture 18 - Semiconductor bands in a electric field
Lecture 19 - Diffusion current
Lecture 20 - Non-uniform doping
Lecture 21 - Equilibrium Vs Nonequilibrium carrier response
Lecture 22 - Minority carrier diffusion equation (MCDE) - Example problems
Lecture 23 - Quasi Fermi level in nonequilibrium conditions
Lecture 24 - Quasi Fermi level and minority carrier diffusion length
Lecture 25 - Semiconductor device fabrication
Lecture 26 - PN Junctions - An introduction
Lecture 27 - PN Junction electrostatics
Lecture 28 - Energy band diagram of PN junction
Lecture 29 - Depletion width and peak electric field

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Lecture 30 - PN junction electrostatics - examples
Lecture 31 - Demo of PN Junction Lab on Nanohub
Lecture 32 - Forward and reverse biased PN junctions
Lecture 33 - Minority carrier injection in PN junctions
Lecture 34 - Current in forward biased PN junction
Lecture 35 - Current in reverse biased PN junction
Lecture 36 - Depletion capacitance in PN junction
Lecture 37 - Non-idealities in PN junction diode
Lecture 38 - Nanohub Demo - PN Junction with applied bias
Lecture 39 - Schottky barrier in metal-semiconductor junction
Lecture 40 - Current flow across a Schottky barrier
Lecture 41 - Ohmic vs rectifying contacts
Lecture 42 - An Ideal MOS Capacitor
Lecture 43 - Operating regimes of a MOSCAP
Lecture 44 - Simplified band diagrams of accumulation and depletion in MOSCAP
Lecture 45 - Inversion in a MOSCAP
Lecture 46 - NMOSCAP in accumulation mode
Lecture 47 - NMOSCAP in depletion mode
Lecture 48 - NMOSCAP in inversion mode
Lecture 49 - Exact solution vs delta-depletion approximation
Lecture 50 - Threshold voltage in a MOSCAP
Lecture 51 - Nanohub Demo - MOSCAP tool
Lecture 52 - Non-ideal MOS Capacitor
Lecture 53 - MOSCAP Capacitance-Voltage (CV) Characteristics
Lecture 54 - Example problems with MOSCAPs
Lecture 55 - Impact of doping, oxide thickness and temperature on CV
Lecture 56 - Nanohub Demo - MOS CV
Lecture 57 - Introduction to MOSFET
Lecture 58 - Operating modes of a MOSFET
Lecture 59 - IV Characteristics of a long channel MOSFET
Lecture 60 - Example problems with MOSFETs
Lecture 61 - MOSFET device metrics
Lecture 62 - CMOS Technology
Lecture 63 - MOSFET Scaling and technology nodes
Lecture 64 - Limits of scaling
Lecture 65 - Current characteristics of a short channel MOSFET
Lecture 66 - Threshold voltage characteristics of short channel MOSFET
Lecture 67 - MOSFETs in the 21st century
Lecture 68 - Optical absorption and bandgap

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Lecture 69 - Introduction to solar cells
Lecture 70 - Efficiency of a solar cell
Lecture 71 - Types of photodetectors
Lecture 72 - PIN and avalanche Photodectectors
Lecture 73 - Photodetector metrics
Lecture 74 - Radiative absoption and emission processes
Lecture 75 - Materials for optoelectronic devices
Lecture 76 - Operation of a light emitting diode (LED)
Lecture 77 - LED emission spectrum
Lecture 78 - Stimulated emission and lasing

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NPTEL Video Course - Electrical Engineering - NOC:Electric Vehicles and Renewable Energy

Subject Co-ordinator - Prof. Ashok Jhunjhunwala, Prof. Prabhjot Kaur, Prof. Kaushal Kumar Jha, Prof. L Kannar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electric Vehicle Introduction
Lecture 2 - The drive Torque, Power, Speed and Energy
Lecture 3 - Energy Source
Lecture 4 - Vehicle Auxillary, Petrol pumps and Charging stations
Lecture 5 - Introduction to Electric Vehicles in India
Lecture 6 - Can India Drive its EV program Innovatively and Differently and scale
Lecture 7 - Battery Cost reduction strategy
Lecture 8 - A bit about Batteries, Charging and Swapping Infrastructure
Lecture 9 - Where will we get Lithium for batteries and EV Subsystems
Lecture 10 - Forces acting when a vehicle move
Lecture 11 - Aerodynamic drag, Rolling Resistance and Uphill Resistance
Lecture 12 - Power and torque to accelerate
Lecture 13 - Putting it all together - 1
Lecture 14 - Putting it all together - 2
Lecture 15 - Concept of drive cycle - 1
Lecture 16 - Concept of drive cycle - 2
Lecture 17 - Drive Cycles and Energy used per km - Part 1
Lecture 18 - Drive Cycles and Energy used per km - Part 2
Lecture 19 - EV Subsystem: Design of EV Drive Train - Part 1
Lecture 20 - EV Subsystem: Design of EV Drive Train - Part 2
Lecture 21 - Introduction to Battery Parameters - Part 1
Lecture 22 - Introduction to Battery Parameters - Part 2
Lecture 23 - Why Lithium Ion Battery? - Part 1
Lecture 24 - Why Lithium Ion Battery? - Part 2
Lecture 25 - Batteries in Future
Lecture 26 - Li-Ion Battery Cells
Lecture 27 - SoH and SoC estimation and Self Discharge - Part 1
Lecture 28 - SoH and SoC estimation and Self Discharge - Part 2
Lecture 29 - Battery Pack Development - Part 1

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Lecture 30 - Battery Pack Development - Part 2
Lecture 31 - Computation of Effective cost of battery - Part 1
Lecture 32 - Computation of Effective cost of battery - Part 2
Lecture 33 - Charging Batteries
Lecture 34 - Fundamentals of Battery Pack Design
Lecture 35 - Electrical Design of Battery Pack - Part 1
Lecture 36 - Electrical Design of Battery Pack - Part 2
Lecture 37 - Electrical Design of Battery Pack - Part 3
Lecture 38 - Mechanical Design of Battery Pack - Part 1
Lecture 39 - Mechanical Design of Battery Pack - Part 2
Lecture 40 - Mechanical Design of Battery Pack - Part 3
Lecture 41 - Mechanical Design of Battery Pack - Part 4
Lecture 42 - Thermal Design of Battery Pack - Part 1
Lecture 43 - Thermal Design of Battery Pack - Part 2
Lecture 44 - Thermal Design of Battery Pack - Part 3
Lecture 45 - Thermal Design of Battery Pack - Part 4
Lecture 46 - BMS Design and Embedded System - Part 1
Lecture 47 - BMS Design and Embedded System - Part 2
Lecture 48 - BMS Design and Embedded System - Part 3
Lecture 49 - BMS Design and Embedded System - Part 4
Lecture 50 - BMS Design and Embedded System - Part 5
Lecture 51 - Cell Testing and Characterization - Part 1
Lecture 52 - Cell Testing and Characterization - Part 2
Lecture 53 - EV Motors and Controllers - Vehicle Dynamics - Part 1
Lecture 54 - EV Motors and Controllers - Vehicle Dynamics - Part 2
Lecture 55 - EV Motors and Controllers - Understanding Flow - Part 1
Lecture 56 - EV Motors and Controllers - Understanding Flow - Part 2
Lecture 57 - Power and Efficiency
Lecture 58 - Torque Production - Part 1
Lecture 59 - Torque Production - Part 2
Lecture 60 - Torque Production - Part 3
Lecture 61 - Speed and Back EMF
Lecture 62 - The d-q Equivalent circuit - Part 1
Lecture 63 - The d-q Equivalent circuit - Part 2
Lecture 64 - Field-oriented Control
Lecture 65 - Three phase AC - Part 1
Lecture 66 - Three phase AC - Part 2
Lecture 67 - Thermal Design - Part 1
Lecture 68 - Thermal Design - Part 2

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Lecture 69 - Thermal Design - Part 3
Lecture 70 - Engineering Considerations - Part 1
Lecture 71 - Engineering Considerations - Part 2
Lecture 72 - Engineering Considerations - Part 3 and Future Frontiers
Lecture 73 - EV Charger Introduction
Lecture 74 - Charger Paramaters and Types
Lecture 75 - Slow Fast chargers and Swapping
Lecture 76 - Swapping
Lecture 77 - Standardization and on board chargers
Lecture 78 - Public chargers
Lecture 79 - Public charger economics in Indian Context
Lecture 80 - Bulk Chargers, Swapping stations and data analytics
Lecture 81 - Introduction to Energy Scenario in India - Part 1
Lecture 82 - Introduction to Energy Scenario in India - Part 2
Lecture 83 - A novel Approach towards 100% RE in India - Part 1
Lecture 84 - A novel Approach towards 100% RE in India - Part 2
Lecture 85 - Going Beyond solar, wind, Li Ion and chilled water storage
Lecture 86 - Solar Photovoltaic
Lecture 87 - Solar Cell and its Characteristics
Lecture 88 - Solar Cells to Modules
Lecture 89 - Wind Energy
Lecture 90 - The War of Currents
Lecture 91 - The Birth of Solar - DC
Lecture 92 - Storage Options for Energy - Part 1
Lecture 93 - Storage Options for Energy - Part 2
Lecture 94 - Storage Options for Energy - Part 3
Lecture 95 - Storage Options for Energy - Part 4
Lecture 96 - The EV Ecosystem - Part 1
Lecture 97 - The EV Ecosystem - Part 2

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NPTEL Video Course - Electrical Engineering - Phase-locked loops

Subject Co-ordinator - Dr. Saurabh Saxena

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction and Motivation - Part I
Lecture 2 - Course Introduction and Motivation - Part II
Lecture 3 - Basic Operation of a Phase Locked Loop
Lecture 4 - Simple Implementation of a Phase Locked Loop
Lecture 5 - Input Output Characteristics of Basic PLL Blocks
Lecture 6 - Time Domain Analysis of a Simple PLL
Lecture 7 - Time Domain Versus Small Signal Analysis of a Simple PLL
Lecture 8 - Type and Order of PLL
Lecture 9 - Small Signal Analysis of Type-I/II/III PLLs for Phase Step, Frequency Step and Frequency Ramp
Lecture 10 - Frequency Acquisition Range for PLLs
Lecture 11 - Frequency Acquisition in Type-I PLLs
Lecture 12 - Frequency Acquisition Limits in Type-I PLLs
Lecture 13 - Frequency Acquisition in Type II PLLs
Lecture 14 - Frequency Acquisition Ranges in Type II PLLs with Ideal and Non Ideal Integrator
Lecture 15 - Frequency Domain Insight in Frequency Acquisition for Type II PLLs
Lecture 16 - Introduction to Clock Multipliers
Lecture 17 - Analog Phase Error Detectors - Part I
Lecture 18 - Analog Phase Error Detectors - Part II
Lecture 19 - Digital Phase Error Detectors - Part I
Lecture 20 - Digital Phase Error Detectors - Part II
Lecture 21 - Range Extension for Phase Error Detectors
Lecture 22 - Phase Frequency Detector
Lecture 23 - Digital Frequency Detector
Lecture 24 - Charge Pump PLL
Lecture 25 - Small Signal and Stability Analysis of Type II Order 2 Charge Pump PLL
Lecture 26 - Problems in Charge Pump PLL - Dead Zone in PFD
Lecture 27 - Problems in Charge Pump PLL - Reference Spur
Lecture 28 - Design Procedure for Type-II Order 3 Charge Pump PLL
Lecture 29 - Design Procedure for Charge Pump Clock Multiplier

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Lecture 30 - Sources of Non-Linearities in CP-PLL - Part I
Lecture 31 - Sources of Non-Linearities in CP-PLL - Part II
Lecture 32 - Noise Analysis in CP-PLL - Part I
Lecture 33 - Noise Analysis in CP PLL - Part II
Lecture 34 - Noise Analysis in CP-PLL - Part III
Lecture 35 - Noise Simulations for CP-PLL Blocks
Lecture 36 - Introduction to Oscillators
Lecture 37 - Low Swing Ring Oscillator - Part I
Lecture 38 - Low-Swing Ring Oscillator - Part II
Lecture 39 - Large-Swing Ring Oscillator - Part I
Lecture 40 - Large-Swing Ring Oscillator - Part II
Lecture 41 - Large-Swing Ring Oscillator - Part III
Lecture 42 - Large-Swing Ring Oscillator - Part IV
Lecture 43 - Large-Swing Ring Oscillator - Part V
Lecture 44 - Supply Regulated VCO - Part I
Lecture 45 - Supply Regulated VCO - Part II
Lecture 46 - Supply Regulated VCO - Part III
Lecture 47 - Phase Noise in Ring Oscillators
Lecture 48 - Circuit level Design of PFD - Part I
Lecture 49 - Circuit level Design of PFD - Part II
Lecture 50 - Circuit level Design of PFD - Part III
Lecture 51 - Circuit level Design of Charge Pump - Part I
Lecture 52 - Circuit-level Design of Charge Pump - Part II
Lecture 53 - Circuit-level Design of Charge Pump - Part III
Lecture 54 - Circuit-level Design of Charge Pump - Part IV
Lecture 55 - Circuit-level Design of Charge Pump - Part V
Lecture 56 - Circuit-level Design of Charge Pump - Part VI
Lecture 57 - Circuit-level Design of Clock Frequency Divider
Lecture 58 - Techniques for Wide Frequency Range Clock Multiplier
Lecture 59 - Introduction to Digital PLL
Lecture 60 - Design of Time-to-Digital Converter
Lecture 61 - Small Signal Analysis of Digital PLL
Lecture 62 - Noise Analysis in Digital PLL
Lecture 63 - Analog/Digital Hybrid PLL - Part I
Lecture 64 - Analog/Digital Hybrid PLL - Part II
Lecture 65 - Course Summary

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NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Nano and Quantum Photonics

Subject Co-ordinator - Prof. Naresh Kumar Emani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Maxwell's Equations
Lecture 2 - Wave Equation
Lecture 3 - Dispersion Relation
Lecture 4 - Propagating and Evanescent Waves
Lecture 5 - Diffraction Limit and Spatial Frequencies
Lecture 6 - Plane Waves
Lecture 7 - Optical Response of Materials
Lecture 8 - Lorentz Model
Lecture 9 - Properties of Lorentz Oscillator Model
Lecture 10 - Drude-Lorentz Model for Metals
Lecture 11 - Kramers-Kronig Relation
Lecture 12 - Engineering Optical Response of Materials
Lecture 13 - Low dimensional systems
Lecture 14 - Absorption in Semiconductors
Lecture 15 - Optical gain in semiconductors
Lecture 16 - Absorption in low-dimensional semiconductors
Lecture 17 - Selection rules for optical processes
Lecture 18 - Scattering of EM radiation
Lecture 19 - LSPR: Quasi-static approximation
Lecture 20 - Size dependence of Plasmon Resonance
Lecture 21 - Tuning Plasmonic Resonances
Lecture 22 - Surface Plasmon Polariton(SPP)
Lecture 23 - Understanding SPP Dispersion Diagram
Lecture 24 - Exciting Surface Plasmon Polaritons
Lecture 25 - Analytical Calculation of Scattering Coefficients - IPython code overview
Lecture 26 - EM Waves in Multilayer Stack - T Matrix formulation
Lecture 27 - Photonic Bandgap in 1D
Lecture 28 - EM Waves in 1D Photonic Crystal
Lecture 29 - Diffracton Grating

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Lecture 30 - Applications of Photonic Crystals
Lecture 31 - PhC in 1D - T-matrix examples
Lecture 32 - Introduction to Metamaterials
Lecture 33 - Metamaterials at GHz and THz frequecies
Lecture 34 - Negative index materials at optical frequencies
Lecture 35 - Plasmonic Metasurfaces
Lecture 36 - Dielectric Metasurfaces
Lecture 37 - Tunable and Active Metamaterials
Lecture 38 - Radiative Absorption and Emission
Lecture 39 - Miniaturization of Integrated Photonic Devices
Lecture 40 - Recent trends in nanoscale lasers
Lecture 41 - Non-Hermitian Systems
Lecture 42 - Resonant light-atom interactions
Lecture 43 - Experimental observation of Rabi oscillations
Lecture 44 - Atom-Cavity Interaction - Weak and strong coupling regimes
Lecture 45 - Experimental observation of weak and strong coupling
Lecture 46 - Fabrication of nanophotonic structures - 1
Lecture 47 - Fabrication of nanophotonic structures - 2
Lecture 48 - Measuring light quanta
Lecture 49 - Photon Statistics
Lecture 50 - Photodetection and shot noise limit
Lecture 51 - Second order correlation function
Lecture 52 - Hanbury Brown-Twiss Experiment with Photons
Lecture 53 - EM Waves as harmonic oscillator
Lecture 54 - Vacuum fluctuations
Lecture 55 - Coherent and squeezed states
Lecture 56 - Squeezed and photon number states
Lecture 57 - Application of squeezed states
Lecture 58 - Preliminaries for quantum theory of light
Lecture 59 - Quantum theory of light
Lecture 60 - Operator solution of quantum harmonic oscillator
Lecture 61 - Photon number states
Lecture 62 - Field quadratures and operators
Lecture 63 - Uncertainty relations for quantum light
Lecture 64 - Applications of quantum light - Quantum Key Distribution

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NPTEL Video Course - Electrical Engineering - NOC:Analog Electronic Circuits (IITM)

Subject Co-ordinator - Prof. Shanthi Pavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Linear and Nonlinear Network
Lecture 2 - Small Signal Analysis of Nonlinear Networks
Lecture 3 - Small Signal Analysis
Lecture 4 - Incremental Model for Common Two Terminal Element Passive Two Terminal Elements
Lecture 5 - Linear and Nonlinear Two Ports and the Incremental Y Matrix
Lecture 6 - Graphical Representation of the Y Matrix
Lecture 7 - Nonlinear Two Ports With Incremental Gain
Lecture 8 - IV Charateristic of a Nonlinear 2 port with Incremental Gain
Lecture 9 - The MOSFET and its Characterisitics
Lecture 10 - Deriving the Common V Source Amplifier - Part 1
Lecture 11 - The Common Source Amplifier
Lecture 12 - Large Signal Behaviour of the Common Source Amplifier
Lecture 13 - The Common Source Amplifier Swing Limits
Lecture 14 - Introduction to Robust Biasing
Lecture 15 - Robust Biasing Part 1 Common Source Amplifier with DC Drain Feedback
Lecture 16 - Robust Biasing with the Current Mirror and Drain Gate Resistor
Lecture 17 - Robust Baising With Source Feedback - Part 1
Lecture 18 - Robust Biasing with Source Feedback - Part 2
Lecture 19 - Robust Biasing with Source Degeneration
Lecture 20 - Introduction to Negative Feedback
Lecture 21 - The Ideal Operational Amplifier
Lecture 22 - Negative Feedback (Continued...)
Lecture 23 - Robust Baising with Drain Measurement and Source Feedback
Lecture 24 - Robust biasing with source measurement and gate feedback
Lecture 25 - The Incremental Voltage Controlled Voltage Source The Common drain Amplifier Incremental Picture
Lecture 26 - Baising of the Common Drain Amplifier and Signal Swings
Lecture 27 - The VCVS Continued, the Incremental
Lecture 28 - Introducing the Current Controlled Voltage Source
Lecture 29 - The Incremental Current Controlled Voltage Source Transimpedance Amplifier

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Lecture 30 - The Transimpedance amplifier (Continued...)
Lecture 31 - The Incremental current controlled current source, the common gate amplifier
Lecture 32 - Summary of controlled Sources and finite output Impedance of the Transistor
Lecture 33 - Effect of Finite Output Resistance on the Basic Building Blocks - Part 1
Lecture 34 - Effect of Finite Output Resistance on the Basic Building Blocks - Part 2
Lecture 35 - Effect of Finite Output Resistance on the Basic Building Blocks - Part 3
Lecture 36 - Finite output Effect in current Mirrors the Cascode Current Mirror
Lecture 37 - Comparison of Current Mirrors The High Swing Cascode
Lecture 38 - Precision High Swing Cascode
Lecture 39 - The PMOS transistor
Lecture 40 - Small Signal Model and Bias Stabilization
Lecture 41 - Basic Building Blocks with PMOS Devices
Lecture 42 - Fixed Transconductance Bias Circuits from First Principles
Lecture 43 - Limitation of a Resistive Load
Lecture 44 - The Active Load
Lecture 45 - The Active Load (Continued...)
Lecture 46 - The CMOS Inverter
Lecture 47 - The CMOS Inverter (Continued...)
Lecture 48 - The Differential Amplifier
Lecture 49 - Half - Circuit Analysis
Lecture 50 - The Different Amplifier with Active Load - Part 1
Lecture 51 - The Different Amplifier with Active Load - Part 2
Lecture 52 - Large Signal Behaviour of the Different Pair
Lecture 53 - The two Stage Opamp and Single Supply Operation
Lecture 54 - The two Stage Opamp (Continued...)
Lecture 55 - The Two Stage Opamp (Continued...)
Lecture 56 - Swing Limits of the Two Stage OTA
Lecture 57 - The Two-Stage Opamp
Lecture 58 - The Bandgap Reference Principle
Lecture 59 - The Bandgap Reference - Part 1
Lecture 60 - The Bandgap Reference - Part 2
Lecture 61 - Memory Effects in MOS Transistors
Lecture 62 - The Common Source Amplifier with Parasitic Capacitances
Lecture 63 - The Common Source Amplifier with Parasitic Capacitances
Lecture 64 - Frequency Response of the Common Drain Amplifier
Lecture 65 - Frequency Response of the Common Gate Amplifier
Lecture 66 - Stability of Negative Feedback System The First Order Forward Amplifier
Lecture 67 - Stabilty of Second Order Feedback System
Lecture 68 - Stability of Third Order Negative Feedback System

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Lecture 69 - Dominant Pole Compensation - Part 1
Lecture 70 - Dominant Pole Cpmpensation - Part 2
Lecture 71 - Phase Margin
Lecture 72 - Example Phase Margin Caculations
Lecture 73 - Dominant Pole Compensation Summary
Lecture 74 - Phase Margin Example
Lecture 75 - The 2 Stage Miller Compensated Amplifier
Lecture 76 - 2 Stage Operational Amplifier and Miller Compensation (Continued...)
Lecture 77 - Intuition Behind the Dominant and Second Poles in a Miller Compensated OTA
Lecture 78 - 2 Stage Operational Amplifier and Miller Compensation Cancelling the RHP Zero
Lecture 79 - Miller Compensation OTA Schematic
Lecture 80 - Bipolar Junction Transistor Circuits-Device Equations and Small Signal Model
Lecture 81 - BJT Biasing and Basic Building Blocks
Lecture 82 - Bipolar Junction Transistor Circuits Swing Limits and Two Stage Opamp
Lecture 83 - Input Stage of the 741 Opamp
Lecture 84 - Basic Analysis of the 741

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NPTEL Video Course - Electrical Engineering - NOC:Modern Computer Vision

Subject Co-ordinator - Prof. A. N. Rajagopalan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course introduction - 1
Lecture 2 - Course introduction - 2
Lecture 3 - Introduction to Deep Learning - 1
Lecture 4 - Introduction to Deep Learning - 2
Lecture 5 - Introduction to Deep Learning - 3
Lecture 6 - Introduction to Neuron - 1
Lecture 7 - Introduction to Neuron - 2
Lecture 8 - Introduction to Neuron - 3
Lecture 9 - Multilayer Perceptron
Lecture 10 - Regression and classification losses
Lecture 11 - Training a neural network
Lecture 12 - Gradient descent
Lecture 13 - Activation function
Lecture 14 - Backpropagation in MLP - 1
Lecture 15 - Backpropagation in MLP - 2
Lecture 16 - Optimization and Regularization - 1
Lecture 17 - Optimization and Regularization - 2
Lecture 18 - Regularization
Lecture 19 - Dropout
Lecture 20 - Pre-processing
Lecture 21 - Convolutional Neural Networks - 1
Lecture 22 - Convolutional Neural Networks - 2
Lecture 23 - Convolutional Neural Networks - 3
Lecture 24 - CNN Properties
Lecture 25 - Alexnet
Lecture 26 - CNN Architectures - 1
Lecture 27 - CNN Architectures - 2
Lecture 28 - CNN Architectures - 3
Lecture 29 - Introduction to RNN - 1

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Lecture 30 - Introduction to RNN - 2
Lecture 31 - Encoder-Decoder models in RNN
Lecture 32 - LSTM
Lecture 33 - Low-level vision - 1
Lecture 34 - Low-level vision - 2
Lecture 35 - Low-level vision - 3
Lecture 36 - Spatial Domain Filtering
Lecture 37 - Frequency Domain Filtering
Lecture 38 - Edge Detection - 1
Lecture 39 - Edge Detection - 2
Lecture 40 - DeepNets for Edge Detection
Lecture 41 - Line detection
Lecture 42 - Feature detectors
Lecture 43 - Harris Corner Detector - 1
Lecture 44 - Harris Corner Detector - 2
Lecture 45 - Harris Corner Detector - 3
Lecture 46 - Blob detection - 1
Lecture 47 - Blob detection - 2
Lecture 48 - Blob detection - 3
Lecture 49 - SIFT - 1
Lecture 50 - SIFT - 2
Lecture 51 - Feature descriptors - 1
Lecture 52 - Feature descriptors - 2
Lecture 53 - SURF - 1
Lecture 54 - SURF - 2
Lecture 55 - Single-View Geometry - 1
Lecture 56 - Single-View Geometry - 2
Lecture 57 - 2D Geometric transformations - 1
Lecture 58 - 2D Geometric transformations - 2
Lecture 59 - Camera intrinsics and extrinsics - 1
Lecture 60 - Camera intrinsics and extrinsics - 2
Lecture 61 - Two-view stereo - 1
Lecture 62 - Two-view stereo - 2
Lecture 63 - Two-view stereo - 3
Lecture 64 - Algebraic representation of epipolar geometry - 1
Lecture 65 - Algebraic representation of epipolar geometry - 2
Lecture 66 - Fundamental matrix computation - 1
Lecture 67 - Fundamental matrix computation - 2
Lecture 68 - Structure from Motion - 1

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Lecture 69 - Structure from Motion - 2
Lecture 70 - Structure from Motion - 3
Lecture 71 - Batch processing in SFM
Lecture 72 - Multi-view SFM
Lecture 73 - Factorization methods in SFM
Lecture 74 - Bundle adjustment
Lecture 75 - Dense 3D reconstruction
Lecture 76 - Some results in Stereo and SFM
Lecture 77 - Deepnets for stereo and SFM - 1
Lecture 78 - Deepnets for stereo and SFM - 2
Lecture 79 - Mid-level vision - 1
Lecture 80 - Mid-level vision - 2
Lecture 81 - Lucas-Kanade method for OF
Lecture 82 - Handling large motion in optical flow
Lecture 83 - Image segmentation
Lecture 84 - GMM for clustering
Lecture 85 - Deepnets for Segmentation and OF -1
Lecture 86 - Deepnets for Segmentation and OF -2
Lecture 87 - Deepnets for Segmentation and OF -3
Lecture 88 - Deepnets for Object Detection - 1
Lecture 89 - Deepnets for Object Detection - 2
Lecture 90 - Vision and Language

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NPTEL Video Course - Electrical Engineering - NOC:Optical Wireless Communications for Beyond 5G Networks and

Subject Co-ordinator - Prof. Anand Srivastava

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optical Wireless Communications (OWC)
Lecture 2 - Basics of Lighting System
Lecture 3 - Optical Sources (LED)
Lecture 4 - Optical Sources (LASER)
Lecture 5 - Photodetecors
Lecture 6 - Photodetectors (Continued...)
Lecture 7 - SNR for PIN and APD
Lecture 8 - Indoor OWC channel modelling
Lecture 9 - Indoor OWC channel modelling (Continued...)
Lecture 10 - Channel model for single source
Lecture 11 - Channel model for multiple sources
Lecture 12 - MIMO channel
Lecture 13 - MIMO channel (Continued...)
Lecture 14 - Outdoor Optical Channel Modelling
Lecture 15 - Range equation of FSO link
Lecture 16 - Range equation of FSO link (Continued...)
Lecture 17 - Atmospheric Turbulence
Lecture 18 - Atmospheric Turbulence (Continued...)
Lecture 19 - Turbulence Mitigation techniques
Lecture 20 - Underwater OWC Channel Model
Lecture 21 - Underwater OWC Channel Model (Continued...)
Lecture 22 - Modulation Schemes for OWC, BER for OOK
Lecture 23 - BER of M-PPM, BER of L-PPM
Lecture 24 - Differential Pulse Interval Modulation (DPIM) and (DAPPM)
Lecture 25 - Variable Pulse Position Modulation (VPPM)
Lecture 26 - OFDM Basics
Lecture 27 - Cyclic Prefix (CP), OFDM with CP, BER of OFDM System
Lecture 28 - Frequency Offset in OFDM, PAPR in OFDM
Lecture 29 - OFDM in VLC, DCO-OFDM

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Lecture 30 - ACO-OFDM
Lecture 31 - Color Shift Keying (CSK)
Lecture 32 - Higher order CSK
Lecture 33 - NOMA
Lecture 34 - NOMA VLC
Lecture 35 - MIMO
Lecture 36 - VLC based MIMO NOMA
Lecture 37 - Power allocation in VLC based MIMO NOMA
Lecture 38 - Hybrid Network LiFi and WiFi Coexistance
Lecture 39 - Vehicle to Vehicle communication using Visible light
Lecture 40 - Anand Singh Part - 1
Lecture 41 - Anand Singh Part - 2
Lecture 42 - Dilnasin lecture - 1
Lecture 43 - Saswati Paramita
Lecture 44 - Dilnashin Tutorial - 2
Lecture 45 - Guriendar Prof Anand 001
Lecture 46 - Rehana Prof Anand

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NPTEL Video Course - Electrical Engineering - NOC:VLSI Design Flow: RTL to GDS

Subject Co-ordinator - Prof. Sneh Saurabh

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts of Integrated Circuit - I
Lecture 2 - Basic Concepts of Integrated Circuit - II
Lecture 3 - Overview of VLSI Design Flow - I
Lecture 4 - Overview of VLSI Design Flow - II
Lecture 5 - Tutorial 1
Lecture 6 - Overview of VLSI Design Flow - III
Lecture 7 - Overview of VLSI Design Flow - IV
Lecture 8 - Overview of VLSI Design Flow - V
Lecture 9 - Overview of VLSI Design Flow - VI
Lecture 10 - Introduction to TCL
Lecture 11 - Hardware Modeling: Introduction to Verilog - I
Lecture 12 - Hardware Modeling: Introduction to Verilog - II
Lecture 13 - Functional Verification using Simulation
Lecture 14 - High-level synthesis using Bambu - Tutorial 3
Lecture 15 - RTL Synthesis - Part I
Lecture 16 - RTL Synthesis - Part II
Lecture 17 - Logic Optimization - Part I
Lecture 18 - Simulation-based Verification using Icarus
Lecture 19 - Logic Optimization - Part II
Lecture 20 - Logic Optimization - Part III
Lecture 21 - Formal Verification - I
Lecture 22 - Logic Synthesis using Yosys
Lecture 23 - Formal Verification - II
Lecture 24 - Formal Verification - III
Lecture 25 - Formal Verification - IV
Lecture 26 - Technology Library
Lecture 27 - Logic Optimization using Yosys
Lecture 28 - Static Timing Analysis - I
Lecture 29 - Static Timing Analysis - II

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Lecture 30 - Static Timing Analysis - III
Lecture 31 - Static Timing Analysis using OpenSTA
Lecture 32 - Constraints - I
Lecture 33 - Constraints - II
Lecture 34 - Technology Mapping
Lecture 35 - Timing-driven Optimization
Lecture 36 - Technology Library and Constraints
Lecture 37 - Power Analysis
Lecture 38 - Power Optimization
Lecture 39 - Basic Concepts of DFT
Lecture 40 - Scan Design Flow
Lecture 41 - Power Analysis using OpenSTA
Lecture 42 - Automatic Test Pattern Generation (ATPG)
Lecture 43 - Built-in Self Test (BIST)
Lecture 44 - Basic Concepts for Physical Design - I
Lecture 45 - Basic Concepts for Physical Design - II
Lecture 46 - Installation of OpenRoad
Lecture 47 - Chip Planning - I
Lecture 48 - Chip Planning - II
Lecture 49 - Placement
Lecture 50 - Chip Planning and Placement
Lecture 51 - Clock Tree Synthesis (CTS)
Lecture 52 - Routing
Lecture 53 - Post-layout Verification and Signoff
Lecture 54 - Clock Tree Synthesis (CTS) and Routing

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NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Wireless Communication (Hindi)

Subject Co-ordinator - Dr.Vivek Bohara

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Basics of Wireless Communication Systems
Lecture 3 - Path-Loss Models for a Wireless Channel
Lecture 4 - Log-Normal Shadowing
Lecture 5 - Small-Scale Fading
Lecture 6 - Statistical Multipath Channel Models
Lecture 7 - MATLAB programming for Path Loss Models
Lecture 8 - Statistical Multipath Channel Models - Part 1
Lecture 9 - Statistical Multipath Channel Models - Part 2
Lecture 10 - Digital Modulation and Detection (Binary Modulations) - Part 1
Lecture 11 - Digital Modulation and Detection (Binary Modulations) - Part 2
Lecture 12 - Digital Modulation and Detection (Binary Modulations) - Part 3
Lecture 13 - MATLAB programming for Wireless Fading Channels
Lecture 14 - Digital Modulation and Detection (Binary Modulations) - Part 1
Lecture 15 - Digital Modulation and Detection (Binary Modulations) - Part 2
Lecture 16 - Digital Modulation and Detection (M-ary Modulation) - Part 1
Lecture 17 - Digital Modulation and Detection (M-ary Modulation) - Part 2
Lecture 18 - Digital Modulation and Detection (M-ary Modulation) - Part 3
Lecture 19 - MATLAB programming for Modulation Schemes
Lecture 20 - Digital Modulation and Detection (GMSK)
Lecture 21 - Performance of Digital Modulation over Wireless Channels
Lecture 22 - Performance of Digital Modulation over Wireless Channels
Lecture 23 - MATLAB programaming: Error performance in AWGN channel
Lecture 24 - Receiver Diversity Techniques - Part 1
Lecture 25 - Receiver Diversity Techniques - Part 2
Lecture 26 - Receiver Diversity Techniques - Part 3
Lecture 27 - Error performance in Fading Channel Part 1
Lecture 28 - Error performance in Fading Channel Part 2
Lecture 29 - Multi-Carrier Modulation and OFDM - Part 1

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Lecture 30 - Multi-Carrier Modulation and OFDM - Part 2
Lecture 31 - Multi-Carrier Modulation and OFDM - Part 3
Lecture 32 - Multi-Carrier Modulation and OFDM - Part 4
Lecture 33 - Numerical on OFDM
Lecture 34 - Programming for OFDM
Lecture 35 - OFDM System with Cyclic Prefix
Lecture 36 - OFDM Signal Transmission and OFDM System Design
Lecture 37 - Advantages and Drawbacks of OFDM System
Lecture 38 - OFDM Standards
Lecture 39 - Multiple Access Schemes
Lecture 40 - Technologies for Wireless Cellular Standards

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NPTEL Video Course - Electrical Engineering - NOC:Sensor Technologies: Physics, Fabrication, and Circuits

Subject Co-ordinator - Prof.Mitradip Bhattacharjee

Co-ordinating Institute - IISER - Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sensors and Transducers - Basics
Lecture 2 - Introduction to Sensors
Lecture 3 - Materials for sensors
Lecture 4 - Multidisciplinary Aspects of Sensors
Lecture 5 - Introduction to Sensor Parameters
Lecture 6 - Sensor Parameters - II
Lecture 7 - Sensor Parameters - III
Lecture 8 - Sensor Parameters - IV
Lecture 9 - Sensor Parameters - V
Lecture 10 - Numerical Examples
Lecture 11 - Introduction: Physics of Sensors
Lecture 12 - Capacitive Sensor Architecture
Lecture 13 - Different Types of Capacitive Sensors
Lecture 14 - Thermal Sensors Basics
Lecture 15 - Dynamic Condition of Thermal Sensors
Lecture 16 - Classification of Thermal Sensors
Lecture 17 - Chemical Sensor Basics
Lecture 18 - Electrochemical Sensors
Lecture 19 - Impedimetric Sensors
Lecture 20 - Numerical Examples
Lecture 21 - Physics of Optical Sensors
Lecture 22 - Physics of Magnetic Sensors
Lecture 23 - Physics of Acoustic Sensors
Lecture 24 - Physics of Microfluidic Sensors
Lecture 25 - Various Sensor Geometries and Examples
Lecture 26 - Microfabrication Technologies
Lecture 27 - Deposition Techniques
Lecture 28 - Physical Vapor Deposition
Lecture 29 - Chemical Vapor Deposition

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Lecture 30 - Patterning Techniques
Lecture 31 - Lithography Techniques
Lecture 32 - Basics of Etching Techniques
Lecture 33 - Dry Etching Techniques
Lecture 34 - Optical and Electron Microscopy
Lecture 35 - Other Microscopy Techniques
Lecture 36 - Sensor System: Basic Circuits
Lecture 37 - Amplifier Circuits
Lecture 38 - Instrumentation Amplifier
Lecture 39 - Filter Circuits
Lecture 40 - Sensor System: Experimental Demonstration

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NPTEL Video Course - Electrical Engineering - NOC:Advanced topics in Wireless Communication (Hindi)

Subject Co-ordinator - Prof. Vivek Ashok Bohara

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Advanced Topics in Wireless Communication System - Part A
Lecture 2 - Overview of Advanced Topics in Wireless Communication System - Part B
Lecture 3 - Revision of Wireless Fundamentals - Part A
Lecture 4 - Revision of Wireless Fundamentals - Part B
Lecture 5 - Revision of Wireless Fundamentals - Part C
Lecture 6 - Revision of Wireless Fundamentals - Part D
Lecture 7 - Revision of Wireless Fundamentals - Part E
Lecture 8 - Channel Capacity in AWGN channel
Lecture 9 - Channel Capacity in flat fading channel
Lecture 10 - Channel Capacity with Optimal Power Adaptation
Lecture 11 - Tutorial 1 - MATLAB Tutorial: Channel Capacity
Lecture 12 - Introduction to Channel Coding
Lecture 13 - Channel Coding: Uncoded and Coded Performnace
Lecture 14 - Introduction to Linear Block Codes
Lecture 15 - Tutorial 2 - MATLAB Tutorial: Linear Block Codes
Lecture 16 - Linear Block Codes: Error Detection
Lecture 17 - Linear Block Codes: Error Correction
Lecture 18 - Examples of Linear Block Codes
Lecture 19 - Introduction to Convolution Codes
Lecture 20 - Convolution Code: Decoder-Viterbi Algorithm
Lecture 21 - Tutorial 3 - MATLAB Tutorial: Syndrome Identification and Correction
Lecture 22 - Convolution Codes: State Diagram and Transfer Function
Lecture 23 - Turbo codes
Lecture 24 - Low Density Parity Check (LDPC) Codes: Encoding
Lecture 25 - Low Density Parity Check (LDPC) Codes: Decoding
Lecture 26 - Introduction to Polar Codes
Lecture 27 - Polar Codes: Encoding and Decoding
Lecture 28 - Introduciton to MIMO systems
Lecture 29 - Spatial Diversity Techniques

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Lecture 30 - Introduction to Space Time Block Codes
Lecture 31 - Tutorial 4 - Convolution Codes: Hard and Soft Decoding
Lecture 32 - MIMO Zero-Forcing Receiver
Lecture 33 - MIMO MMSE Receiver
Lecture 34 - Introduction to MIMO SVD
Lecture 35 - Diagonalization of MIMO channel
Lecture 36 - Optimal Capacity of MIMO channel and MIMO Beamforming
Lecture 37 - Tutorial 5 - Random Access Technoques: ALOHA and CSMA
Lecture 38 - MIMO V-BLAST Receivers
Lecture 39 - Introduction to Adaptive Modulation and Coding
Lecture 40 - Modulation and Coding with Variable MQAM
Lecture 41 - Conventional Multiple Access Schemes
Lecture 42 - Next generation Multiple Access Schemes and Multi-User Channels
Lecture 43 - Overview of Cellular and Wi-Fi Standards
Lecture 44 - Evolution of Cellular and Wi-Fi Standards
Lecture 45 - Tutorial 6 - MIMO SVD Example
Lecture 46 - Tutorial 7 - Rate Splitting Multiple Access

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NPTEL Video Course - Electrical Engineering - NOC:State Space Approach to Control System Analysis and Design

Subject Co-ordinator - Prof A P Tiwari

Co-ordinating Institute - IIT - Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Standard State-space Representation of Physical Systems
Lecture 3 - Mathematical Modeling from First Principles
Lecture 4 - Mathematical Modeling from First Principles
Lecture 5 - State-space Representation of Transfer Functions
Lecture 6 - State-space Representation of Transfer Functions (Continued...)
Lecture 7 - Equivalent Dynamical Equations
Lecture 8 - Transformation of State Equations into Canonical forms
Lecture 9 - Solution of State Equations
Lecture 10 - Solution of State Equations: Methods to determine the STM
Lecture 11 - Simulation: An Overview
Lecture 12 - Numerical Solution of State Equations
Lecture 13 - Controllability
Lecture 14 - Controllability
Lecture 15 - Controllability
Lecture 16 - Observability
Lecture 17 - Lypunov's Stability - 1
Lecture 18 - Lypunov's Stability - 2
Lecture 19 - Lypunov's Stability - 3
Lecture 20 - Pole Placement Design-I: Concept of State feedback
Lecture 21 - Pole Placement Design-II: Properties of State Feedback
Lecture 22 - Pole Placement Design-III: Pole placement formulae, Selection of Closed loop pole locations
Lecture 23 - Linear Quadratic Optimal Control - Part 1
Lecture 24 - Linear Quadratic Optimal Control - Part 2
Lecture 25 - Linear Observers-Full Order Observer
Lecture 26 - Linear Observers-Reduced Order Observer
Lecture 27 - Separation Principle
Lecture 28 - Multirate Sampling Controllers-Relationship between System state, multirate output samples and i
Lecture 29 - Multirate Output Controller (MROC)

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Lecture 30 - Fast Output Sampling (FOS) Controller
Lecture 31 - Periodic Output Feedback (POF) Controller
Lecture 32 - Continuous-Time Kalman Filter
Lecture 33 - Discrete-Time Kalman Filter
Lecture 34 - Case Study of Nuclear Reactor: Nonlinear Model Development
Lecture 35 - Case Study of Nuclear Reactor: Model Linearization
Lecture 36 - Case Study of Nuclear Reactor: Output Feedback Control Design
Lecture 37 - Case Study of Nuclear Reactor: Periodic Output Feedback Design
Lecture 38 - Case Study of Nuclear Reactor: Fast Output Sampling based Control Design
Lecture 39 - Case Study of Nuclear Reactor: Application of Kalman Filtering to Response Improvement of Vanadi

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NPTEL Video Course - Electrical Engineering - NOC:Optimization Theory and Algorithms

Subject Co-ordinator - Prof. Uday K Khankhoje

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course - 1 - Prerequisites, key elements
Lecture 2 - Introduction to the course - 2 - Types of problems
Lecture 3 - Introduction to the course - 3 - An optimization example to live longer
Lecture 4 - Summary of background material - Linear Algebra - I
Lecture 5 - Summary of background material - Linear Algebra - II
Lecture 6 - Summary of background material - Analysis - I
Lecture 7 - Summary of background material - Analysis - II
Lecture 8 - Summary of background material - Analysis - III
Lecture 9 - Summary of background material - Calculus - I
Lecture 10 - Summary of background material - Calculus - II
Lecture 11 - Summary of background material - Calculus - III
Lecture 12 - Example of Multivariate Differentiation
Lecture 13 - Gradient of Quadratic form and product rule
Lecture 14 - Directional derivative, hessian, and mean value theorem
Lecture 15 - Unconstrained optimization - 1 - Roadmap of the course and Taylorâ s theorem
Lecture 16 - Unconstrained optimization - 2 - Identifying a local minima - 1st and 2nd order conditions
Lecture 17 - Unconstrained optimization - 3 - Proof of 1st Order Condition
Lecture 18 - Unconstrained optimization - 4 - overview of algorithms and choosing a descent direction
Lecture 19 - Unconstrained optimization - 5 - properties of descent directions steepest descent direction
Lecture 20 - Unconstrained optimization - 6 - properties of descent directions newton direction
Lecture 21 - Unconstrained optimization - 7 - Trust Region Methods
Lecture 22 - A MATLAB session
Lecture 23 - Introduction to Line Search
Lecture 24 - Wolfe Conditions
Lecture 25 - Strong Wolfe Conditions
Lecture 26 - Backtracking Line Search
Lecture 27 - Line Search - Analysis
Lecture 28 - Line Search - Convergence and Rate - 1
Lecture 29 - Line Search - Convergence and Rate - 2

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Lecture 30 - Convergence analysis of a descent algorithm - 1
Lecture 31 - Convergence analysis of a descent algorithm - 2
Lecture 32 - Implementation of an optimization algorithm in MATLAB
Lecture 33 - Conjugate Gradient Methods - Introduction and Proof
Lecture 34 - Visualizing Quadratic Forms
Lecture 35 - Orthogonality and Conjugacy
Lecture 36 - Conjugate Directions Method - Introduction and Proof
Lecture 37 - Discussion on doubts
Lecture 38 - More on Conjugate Directions Method
Lecture 39 - Ways of Generating Conjugate Directions
Lecture 40 - Expanding Subspace Theorem
Lecture 41 - Discussion on doubts
Lecture 42 - Conjugate Gradient Method
Lecture 43 - MATLAB implementation on CGM
Lecture 44 - Discussion on doubts
Lecture 45 - Preconditioned Conjugate Gradient - Part 1
Lecture 46 - Preconditioned Conjugate Gradient - Part 2
Lecture 47 - Preconditioned Conjugate Gradient - Part 3
Lecture 48 - Non Linear Conjugate Gradient method
Lecture 49 - Intro to Newton methods
Lecture 50 - Newton methods and convergence
Lecture 51 - Checks for positive definite matrices
Lecture 52 - Hessian Modification
Lecture 53 - Quasi newton methods
Lecture 54 - BFGS method
Lecture 55 - Least squares problems
Lecture 56 - Linear least squares - Part 1
Lecture 57 - Linear least squares - Part 2
Lecture 58 - Solving least squares using SVD
Lecture 59 - Non linear least squares
Lecture 60 - Constrained Optimisation
Lecture 61 - Single equality constraint
Lecture 62 - Single inequality constraint - Part 1
Lecture 63 - Single inequality constraint - Part 2
Lecture 64 - Two inequality constraints example
Lecture 65 - Linearised feasible directions
Lecture 66 - Feasible sequences and tangent cone
Lecture 67 - LICQ conditions
Lecture 68 - KKT conditions (First order necessary conditions)

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Lecture 69 - Proof sketch for KKT conditions - Part 1
Lecture 70 - Proof sketch for KKT conditions - Part 2
Lecture 71 - Introduction to Projected gradient descent
Lecture 72 - Projected gradient descent and proof of convergence
Lecture 73 - Proof of convergence - Part 2
Lecture 74 - Subgradients and Subdifferential
Lecture 75 - Projection onto l1 ball
Lecture 76 - Soft thresholding example
Lecture 77 - Recap of Projection onto l1 ball
Lecture 78 - KKT and duality introduction
Lecture 79 - Intuition of duality and dual problem
Lecture 80 - Proof of concavity of the dual problem - Part 1
Lecture 81 - Proof of concavity of the dual problem - Part 2
Lecture 82 - Proof of concavity of the dual problem - Part 3

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NPTEL Video Course - Electrical Engineering - NOC:Power Electronics with Wide Band Gap Devices

Subject Co-ordinator - Prof. Moumita Das

Co-ordinating Institute - IIT - Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Wide Bandgap Devices
Lecture 2 - Characterization Of Wide Bandgap Devices
Lecture 3 - Static Characterization Of Power Devices
Lecture 4 - Junction Capacitance Characterization Of Power Devices
Lecture 5 - Fundamentals Of Dynamic Characterization
Lecture 6 - Fundamentals Of Dynamic Characterization (Continued...)
Lecture 7 - Gate Drive For Dynamic Characterization
Lecture 8 - Gate Drive For Dynamic Characterization (Continued...)
Lecture 9 - Gate Drive For Dynamic Characterization (Continued...)
Lecture 10 - Gate Driver Protection
Lecture 11 - Dpt-Protection
Lecture 12 - Protection-Dpt
Lecture 13 - Cross Talk Consideration
Lecture 14 - Cross Talk Consideration (Continued...)
Lecture 15 - Layout Design And Parasitic Management
Lecture 16 - Layout Design And Parasitic Management (Continued...)
Lecture 17 - Layout
Lecture 18 - Heat Sink
Lecture 19 - Heat Sink (Continued...)
Lecture 20 - Electromagnetic Interference (EMI) - Part 1
Lecture 21 - Electromagnetic Interference (EMI) - Part 2
Lecture 22 - Electromagnetic Interference (EMI) - Part 3
Lecture 23 - Electromagnetic Interference (EMI) - Passive Filter
Lecture 24 - Electromagnetic Interference (EMI) - Active Filter
Lecture 25 - Getting Started With Ltspice
Lecture 26 - Getting Started With Ltspice - Part 1
Lecture 27 - Getting Started With Ltspice - Part 2
Lecture 28 - EMI Simulation with LTspice - Part 1
Lecture 29 - EMI Simulation with LTspice - Part 2

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Lecture 30 - Power Density - Part 1
Lecture 31 - Power Density - Part 2
Lecture 32 - Introduction to PCB Design
Lecture 33 - PCB Design
Lecture 34 - WBG Applications - IMD
Lecture 35 - WBG Applications - Renewable Energy Sources
Lecture 36 - WBG Applications - Reliability Analysis

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NPTEL Video Course - Electrical Engineering - NOC:Enabling Technologies for 6G Communications Networks (Hindi

Subject Co-ordinator - Prof. Vivek Ashok Bohara

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to 6G Communications Network
Lecture 2 - Fundamentals of Communication System
Lecture 3 - Revision of Multipath Fading Channels
Lecture 4 - Evolution of Cellular Standards - Part 1
Lecture 5 - Evolution of Cellular Standards - Part 2
Lecture 6 - Introduction to Diversity Techniques
Lecture 7 - Alamouti's Space Time Code
Lecture 8 - MIMO System
Lecture 9 - Single User MIMO and Multi User MIMO
Lecture 10 - Massive MIMO
Lecture 11 - Significance of the Shannon's Channel Capacity Theorem
Lecture 12 - Turbo Codes
Lecture 13 - LDPC Codes
Lecture 14 - Tutorial: Orbital Angular momentum
Lecture 15 - LDPC Decoding
Lecture 16 - Multiple Access Schemes
Lecture 17 - Non-Terrestrial Networks (NTN)
Lecture 18 - Advanced Networks Topologies for 6G

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NPTEL Video Course - Electrical Engineering - NOC:Sliding Mode Control and Applications

Subject Co-ordinator - Prof. Shyam Kamal

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Transition from PID to Nonsmooth PID
Lecture 2 - Newton's Law - Inspired Tuning of P controller - 1
Lecture 3 - Newton's Law - Inspired Tuning of PI Controllers - 2
Lecture 4 - Tuning of PID and High Gain Controllers
Lecture 5 - Newton's Inspired Tuning of ON OFF Controller - 1
Lecture 6 - Finite - Time Stability Using a Lyapunov Function
Lecture 7 - Sliding Mode Control for Nonlinear Systems
Lecture 8 - Regular Form Representation of Npnlinear Systems - Part I
Lecture 9 - Regular Form Representation of Npnlinear Systems - Part II
Lecture 10 - A Regular Form Approach to Sliding Mode Control of Nonlinear System
Lecture 11 - Input Output Linearization - Part I
Lecture 12 - Input Output Linearization - Part II
Lecture 13 - Tracing Problem based on Sliding Mode Control for Nonlinear Systems
Lecture 14 - State Feedback Unit Vector Control
Lecture 15 - Output Based Hyperplane Design in Sliding Mode Control
Lecture 16 - Terminal Sliding Mode Control
Lecture 17 - Integral Sliding Mode Control
Lecture 18 - Integral Sliding Mode Control Design in Presence of Unmatched Pertubations
Lecture 19 - Robot Control
Lecture 20 - Control of Robot manipulators using Integral Sliding Mode Control
Lecture 21 - Observer Design in Control Theory
Lecture 22 - Observer Design for Nonlinear systems
Lecture 23 - High Gain Observer for Nonlinear Systems
Lecture 24 - Sliding Mode Observer Design
Lecture 25 - Sliding Mode Observer Design for Nonlinear Systems Application to Fault Estimation
Lecture 26 - Observer for Linear Systems with Binary Output
Lecture 27 - Application of Sliding Mode Observer in DC Motor Control
Lecture 28 - Chattering Analysis
Lecture 29 - Chattering Suppression via Boundary Layers and Observer Design

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Lecture 30 - Hybrid Chattering Suppression Approach
Lecture 31 - Solution of Differential Equations with eDiscontinuous Right Hand Sides
Lecture 32 - Higher Order Sliding Mode Control Concepts and Definitions
Lecture 33 - Homogeneity and Stability of Differential Inclusion
Lecture 34 - Finite Time Stability and Accuracy of Differential Inclusion
Lecture 35 - Twisting Algorithm
Lecture 36 - Lyapunov Analysis of Twisting Algorithm - 1
Lecture 37 - Lyapunov Analysis of Super Twisting Algorithm - 1
Lecture 38 - Geometrical Proof of Convergence of Super Twisting Algorithm
Lecture 39 - Continuous Integral Sliding Mode Control - 1
Lecture 40 - Continuous Terminal Sliding Mode Control - 1
Lecture 41 - Homogeneous Sliding Modes
Lecture 42 - Higher Order Super Twisting Algorithm
Lecture 43 - An Introduction to Differentiator Design
Lecture 44 - First Order Differentiator and Output Feedback Control Based on Sliding Mode
Lecture 45 - Arbitrary Order Robust Exact Differentiation
Lecture 46 - How to Implement Super Twisting Controller Based on Sliding Mode Observer
Lecture 47 - Parameter Identification Using Sliding Mode Control
Lecture 48 - Robust Finite Time Continuous Super Twisting Controller Design for MIMO Systems
Lecture 49 - Adaptive Sliding Mode Control
Lecture 50 - Adaptive Sliding Mode Control for Industrial Emulator
Lecture 51 - Stability Notions for Dicrete Time Systems
Lecture 52 - Discrete Sliding Mode Control
Lecture 53 - Minimum Operator Based Discrete Sliding Mode
Lecture 54 - Difference Equation with Minima Based Discrete Time Twisting and Super Twisting Like Algori
Lecture 55 - Multirate Output Feedback Based Discrete Sliding Mode
Lecture 56 - An Introduction to Arbitrary Time Stability
Lecture 57 - Arbitrary Time Terminal Sliding Mode Control
Lecture 58 - Stabilization of Continuous Time Uncertain Systems with Predefined Upper Bound of Sttling Time
Lecture 59 - Artificial Delayed Output Twisting Algorithm
Lecture 60 - Sliding Mode Approach for the Design of Control Systems for Power Converters

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NPTEL Video Course - Electrical Engineering - NOC:Memory Device Technology for AI-ML Computing

Subject Co-ordinator - Prof. Shubhadeep Bhattacharjee

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolving Computing Paradigms
Lecture 2 - Von-Neumann Architecture
Lecture 3 - Hierarchy and Classifications
Lecture 4 - Evolution of Memory Hierarchy with Device Technology
Lecture 5 - Classifications within Memory Hierarchy
Lecture 6 - Practical Implementation of Memory Hierarchy
Lecture 7 - Trends in the Global Memory Market - Part 1
Lecture 8 - Trends in the Global Memory Market - Part 2
Lecture 9 - Memory Array Architecture - Part 1
Lecture 10 - Memory Array Architecture - Part 2
Lecture 11 - Memory Peripherals
Lecture 12 - Memory Footprint and Block Level Architecture
Lecture 13 - SRAM - Introduction
Lecture 14 - SRAM - Memory Effect and Hold Operation
Lecture 15 - SRAM - Read Operation - Part 1
Lecture 16 - SRAM - Read Operation - Part 2
Lecture 17 - SRAM - Write Operation
Lecture 18 - SRAM - Noise Margin Analysis
Lecture 19 - SRAM - Read, Write Conflict and Scaling
Lecture 20 - DRAM - Introduction
Lecture 21 - DRAM - Subsystem Architecture
Lecture 22 - DRAM - Cell Architecture and Hold Operation
Lecture 23 - DRAM - Refresh, Charge Transfer Ratio
Lecture 24 - DRAM - Read, Write and Restore
Lecture 25 - DRAM - Scaling Challenges and Solutions
Lecture 26 - NAND Flash - Introduction
Lecture 27 - NAND Flash - Flash Cell Architecture
Lecture 28 - NAND Flash - Array Architecture
Lecture 29 - NAND Flash - Program Operation

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Lecture 30 - NAND Flash - Erase and Read Operations
Lecture 31 - NAND Flash - Bit Scaling
Lecture 32 - NAND Flash - Scaling Challenges and Solutions
Lecture 33 - Recap of Part 1
Lecture 34 - eNVMs Fundamentals of two-terminal Memristors
Lecture 35 - eNVMs PCRAMs Fundamentals of Phase Change Memories
Lecture 36 - eNVMs PCRAMs Technology and commercialization
Lecture 37 - eNVMs RRAMs Fundamentals
Lecture 38 - eNVMs RRAMs VCRAM and CBRAM
Lecture 39 - eNVMs RRAMs - Performance Metrics and Commercialization
Lecture 40 - eNVMs MRAM spin GMR TMR
Lecture 41 - eNVM MRAMs Field and STT MRAM
Lecture 42 - eNVM MRAM SOT and Commercialization
Lecture 43 - AI/ML Computing: Introduction and History
Lecture 44 - AI/ML Computing: Artificial Neural Networks
Lecture 45 - AI/ML Computing: Working of ANNs
Lecture 46 - AI/ML Computing: Backpropagation, Inference and Architectures in ANNs
Lecture 47 - AI/ML Computing: Convolution
Lecture 48 - AI/ML Computing: Convolutional Neural Networks
Lecture 49 - AI/ML Computing: Bottlenecks of AI/ML Computing
Lecture 50 - Neuromorphic Computing: Introduction
Lecture 51 - Neuromorphic Computing: The Biological Insipration
Lecture 52 - Neuromorphic Computing: Implementation of Neurons in Hardware
Lecture 53 - Neuromorphic Computing: Synaptic Plasticity
Lecture 54 - Neuromorphic Computing: Hardware Implementation of Synapses
Lecture 55 - SNNs and IMC: Operations in a Spiking Neural Network
Lecture 56 - SNNs and IMC: Unsupervised and Supervised Training of SNNs
Lecture 57 - SNNs and IMC: Implementations of SNNs
Lecture 58 - SNNs and IMC: Digital In-Memory Computing
Lecture 59 - SNNs and IMC: Analog In-Memory Computing
Lecture 60 - Overview, Roadmap and Acknowledgements

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NPTEL Video Course - Electrical Engineering - NOC:IC Design for Wireless Systems

Subject Co-ordinator - Prof. Abhishek Kumar

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Wireless communication overview
Lecture 2 - Frequency Translation
Lecture 3 - Basic wireless transceiver
Lecture 4 - Channel selection - digital domain
Lecture 5 - Channel selection - analog domain
Lecture 6 - Image rejection
Lecture 7 - Basics of direct conversion receiver
Lecture 8 - Transmission Line Modeling
Lecture 9 - Input Impedance, Reflection Coefficient, and VSWR
Lecture 10 - Why 50 Ohm Matching?
Lecture 11 - Matching Networks Basics
Lecture 12 - Series - Parallel Impedance Transformation, L - Match
Lecture 13 - Cascaded L - Type Matching, Ï (Pi) Matching, T Matching
Lecture 14 - Understanding and Deriving S-Parameters
Lecture 15 - Introduction to the Smith Chart and How to Plot on It
Lecture 16 - Noise
Lecture 17 - Nonlinearity: Gain Compression
Lecture 18 - Nonlinearity: Intermodulation
Lecture 19 - On-Chip Inductor Design - Part 1
Lecture 20 - On-Chip Inductor Design - Part 2
Lecture 21 - On-Chip Capacitors and Resistors: Types and Design
Lecture 22 - MOSFET Noise Fundamentals and Analysis
Lecture 23 - LNA Architectures: Common-Source Amplifier
Lecture 24 - LNA Architectures: CSA with Shunt-Feedback, and Common-Gate
Lecture 25 - LNA Design: Common-Source with Inductive Degeneration
Lecture 26 - How to design a mixer?
Lecture 27 - Noise in the single balanced mixer
Lecture 28 - Effect of parasitics and Feed-through paths and their effects
Lecture 29 - Feeding LNA output to the mixer and architecture of passive current mode mixer

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Lecture 30 - How to calculate noise figure of the mixer?
Lecture 31 - Quadrature mixer for image rejection and Double Balanced Quadrature passive mixer
Lecture 32 - Channel-Selection
Lecture 33 - Variable Gain Amplifier: Linearity and Trade-Offs
Lecture 34 - N-Path Filters: Part 1 - Architecture
Lecture 35 - N-Path Filters: Part 2 - Operation
Lecture 36 - Noise-Cancelling LNA
Lecture 37 - Transmitter Design: Introduction
Lecture 38 - Transmitter Design: Complex modulation
Lecture 39 - Transmitter Design: Upconversion mixer
Lecture 40 - Class A amplifier
Lecture 41 - Class B amplifier
Lecture 42 - Comparison of Amplifier Classes
Lecture 43 - Significance of Linearity in Power Amplifier
Lecture 44 - Maximizing Output Power in Power Amplifiers
Lecture 45 - Driver Amplifier : Introduction
Lecture 46 - Driver Amplifier : Design
Lecture 47 - Driver Amplifier : Stability
Lecture 48 - Power Mixer
Lecture 49 - RF-DAC : Part 1
Lecture 50 - RF-DAC : Part 2
Lecture 51 - Digital PA : Introduction
Lecture 52 - Digital PA : Architecture and Digital Control
Lecture 53 - Out-Phasing
Lecture 54 - Oscillators : Basics
Lecture 55 - Cross-Coupled LC Oscillator
Lecture 56 - Amplitude Optimization in Cross-Coupled LC Oscillators
Lecture 57 - Cross-Coupled LC Oscillator: Feedback Perspective
Lecture 58 - Negative Resistance Using a Single Transistor
Lecture 59 - Single Transistor Oscillator
Lecture 60 - Phase noise
Lecture 61 - Impact of Phase Noise on Receiver
Lecture 62 - Impact of Phase Noise on Transmitter
Lecture 63 - Phase Noise Analysis of LC Oscillators
Lecture 64 - Leesonâ s Equation and the Role of Q in Phase Noise
Lecture 65 - LTI vs LPTV Modeling of LC Oscillators with ISF Insight
Lecture 66 - Introduction to Voltage-Controlled Oscillators and Tunable Inductance
Lecture 67 - Tunable Capacitors in VCOs
Lecture 68 - LC VCO with Varactors and Capacitor Bank Tuning

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Lecture 69 - Phase Noise in LC Cross-Coupled VCO
Lecture 70 - Complete LO Generation in RF Systems
Lecture 71 - VCO Case Study Part 1 - Phase-Noise Targets for IEEE 80211g
Lecture 72 - VCO Case Study Part 2 - Design and Simulation in 45nm CMOS Process
Lecture 73 - Rx Case Study Part 1 - Noise Figure and Linearity Targets for IEEE 80211g
Lecture 74 - Rx Case Study Part 2 - LNA Design and Simulation in 45nm CMOS Process
Lecture 75 - Tx Case Study Part 1 - Output Power and Compression Targets for IEEE 80211g
Lecture 76 - PA Case Study Part 2 - PA Design and Simulation in 45nm CMOS Process

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NPTEL Video Course - Electrical Engineering - NOC:Optimal Control

Subject Co-ordinator - Prof. Barjeev Tyagi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Performance Index
Lecture 2 - Basic Concepts of Calculus of Variation
Lecture 3 - The Basic Variational Problem
Lecture 4 - Fixed End Point Problem
Lecture 5 - Free End Point Problem
Lecture 6 - Free End Point Problem (Continued...)
Lecture 7 - Free End Point Problem (Continued...)
Lecture 8 - Free End Point Problem (Continued...)
Lecture 9 - Optimum of Functions with Conditions
Lecture 10 - Optimum of Functions with Conditions (Lagrange Multiplier Method)
Lecture 11 - Optimum of Functional with Conditions
Lecture 12 - Variational Approach to Optimal Control Systems
Lecture 13 - Variational Approach to Optimal Control Systems (Continued...)
Lecture 14 - Linear Quadratic Optimal Control Systems
Lecture 15 - Linear Quadratic Optimal Control Systems (Continued...)
Lecture 16 - Linear Quadratic Optimal Control Systems (Continued...)
Lecture 17 - Linear Quadratic Optimal Control Systems (Continued...)
Lecture 18 - Linear Quadratic Optimal Control Systems (Continued...)
Lecture 19 - Linear Quadratic Optimal Control Systems (Optimal Value of Performance Index)
Lecture 20 - Infinite Horizon Regulator Problem
Lecture 21 - Infinite Horizon Regulator Problem (Continued...)
Lecture 22 - Analytical Solution of MDRE - State Transition Matrix Approach
Lecture 23 - Analytical Solution of MDRE - Similarity Transformation Approach
Lecture 24 - Analytical Solution of MDRE - Similarity Transformation Approach (Continued...)
Lecture 25 - Frequency Domain Interpretation of LQR - Linear Time Invariant System
Lecture 26 - Frequency Domain Interpretation of LQR - Linear Time Invariant System (Continued...)
Lecture 27 - LQR with a Specified Degree of Stability
Lecture 28 - Inverse Matrix Riccati Equation
Lecture 29 - Linear Quadratic Tracking System

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Lecture 30 - Discrete-Time Optimal Control Systems
Lecture 31 - Discrete-Time Optimal Control Systems (Continued...)
Lecture 32 - Discrete-Time Optimal Control Systems (Continued...)
Lecture 33 - Matrix Discrete Riccati Equation
Lecture 34 - Analytical Solution of Matrix Difference Riccati Equation
Lecture 35 - Analytical Solution of Matrix Difference Riccati Equation (Continued...)
Lecture 36 - Optimal Control using Dynamic Programming
Lecture 37 - The Hamilton-Jacobi-Bellman (HJB) Equation
Lecture 38 - LQR System Using HJB Equation
Lecture 39 - Time Optimal Control System - Constrained Input
Lecture 40 - Time Optimal Control System (Continued...)

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Basics of Software Defined Radios and Pr

Subject Co-ordinator - Dr. Meenakshi Rawat

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Foundation for software defined radio
Lecture 2 - Components of a software defined radio
Lecture 3 - Software defined radio architectures - Part I
Lecture 4 - Software defined radio architectures - Part II
Lecture 5 - Software defined radio architectures - Part III
Lecture 6 - Software defined radio architectures - Part IV
Lecture 7 - Distortion Parameters - Part I
Lecture 8 - Distortion Parameters - Part II
Lecture 9 - Distortion Parameters
Lecture 10 - Distortion Parameters
Lecture 11 - Power Amplifiers
Lecture 12 - Power Amplifiers
Lecture 13 - Case study-I
Lecture 14 - Case study-II
Lecture 15 - Behavioral models for representing nonlinear distortions
Lecture 16 - Linearization Techniques for nonlinear distortion
Lecture 17 - Predistortion Techniques for nonlinearity distortion in SDR
Lecture 18 - Basic Digital Predistortion Techniques for nonlinear distortion in SDR
Lecture 19 - State-of-the-art Digital Predistortion Techniques for Nonlinear Distortion in SDR
Lecture 20 - Digital Predistortion Techniques for Linear as well as Nonlinear Distortion in SDR

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NPTEL Video Course - Electrical Engineering - NOC:Electrical Distribution System Analysis

Subject Co-ordinator - Prof. N P Padhy, Late Prof. G. B. Kumbhar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Electrical Distribution System
Lecture 2 - Components of Distribution System Substation and Busbar Layouts
Lecture 3 - Components of Distribution System and Feeder Configurations
Lecture 4 - Nature of Loads in a Distribution System
Lecture 5 - Load Allocation in a Distribution System
Lecture 6 - K Factors and Their Applications
Lecture 7 - Analysis of Uniformly Distributed Loads
Lecture 8 - Lumping Loads in Geometric Configurations: Rectangular
Lecture 9 - Lumping Loads in Geometric Configurations: Triangular
Lecture 10 - Impedance of Distribution Lines and Feeders - Part I
Lecture 11 - Series Impedance of Distribution Lines and Feeders - Part II
Lecture 12 - Models of Distribution Lines and Cables
Lecture 13 - Modelling of Single-Phase and Three-Phase Transformers
Lecture 14 - Modelling of Three-Phase Transformers - Part I
Lecture 15 - Modelling of Three-Phase Transformers - Part II
Lecture 16 - Modelling of Three-Phase Transformers - Part III
Lecture 17 - Modelling of Three-Phase Transformers - Part IV
Lecture 18 - Modelling of Step Voltage Regulators - Part I
Lecture 19 - Modelling of Step Voltage Regulators - Part II
Lecture 20 - Modelling of Step Voltage Regulators - Part III
Lecture 21 - Modelling of Step Voltage Regulators - Part IV
Lecture 22 - Load Models in Distribution System - Part I
Lecture 23 - Load Models in Distribution System - Part II
Lecture 24 - Modelling of Distributed Generation
Lecture 25 - Applications and Modeling of Capacitor Banks
Lecture 26 - Summary of Modelling of Distribution System Components
Lecture 27 - Backward/Forward Sweep Load Flow Analysis - Part I
Lecture 28 - Backward/Forward Sweep Load Flow Analysis - Part II
Lecture 29 - Direct Approach Based Load Flow Analysis - Part I

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Lecture 30 - Direct Approach Based Load Flow Analysis - Part II
Lecture 31 - Direct Approach Based Load Flow Analysis - Part III
Lecture 32 - Direct Approach Based Load Flow Analysis: Weakly Meshed System
Lecture 33 - Gauss Implicit Z-matrix Method
Lecture 34 - Sequence Component Based Short Circuit Analysis
Lecture 35 - Thevenin's Equivalent and Phase Variable Based Short Circuit Analysis
Lecture 36 - Direct Approach for Short-Circuit Analysis: Introduction and LG Fault
Lecture 37 - Direct Approach for Short-Circuit Analysis: LLG and LLLG Fault
Lecture 38 - Direct Approach for Short-Circuit Analysis: LL Fault and Examples
Lecture 39 - Direct Approach for Short-Circuit Analysis: Weakly Meshed System
Lecture 40 - Applications of Distribution System Analysis
Lecture 41 - Distributed Generation Integration Issues in Distribution System
Lecture 42 - Distribution System Protection Issues
Lecture 43 - Power Quality, Reliability and Availability
Lecture 44 - Design and Operation - Part I
Lecture 45 - Design and Operation - Part II
Lecture 46 - Definition and objective of Volt-var control (VVC)
Lecture 47 - Traditional approaches of VVC
Lecture 48 - Distribution Automation
Lecture 49 - SCADA-Based VVC and Integrated VVC
Lecture 50 - Advanced technologies for VVC - Part I
Lecture 51 - Advanced technologies for VVC - Part II
Lecture 52 - System Planning - Part I
Lecture 53 - System Planning - Part II
Lecture 54 - Electricity Forecasting
Lecture 55 - Case study: IIT Roorkee distribution system
Lecture 56 - Optimization techniques
Lecture 57 - Optimal location and sizing battery energy storage system (BESS)
Lecture 58 - Practical Insights into Electrical Distribution Systems
Lecture 59 - Field Deployment of BESS
Lecture 60 - Emerging Technologies and Future Trends

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NPTEL Video Course - Electrical Engineering - NOC:Introduction to Smart Grid

Subject Co-ordinator - Prof. Premalata Jena, Prof. N.P. Padhy

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Smart Grid - I
Lecture 2 - Introduction to Smart Grid - II
Lecture 3 - Architecture of smart grid system
Lecture 4 - Standards for smart grid system
Lecture 5 - Elements and Technologies of smart grid system - I
Lecture 6 - Elements and Technologies of smart grid system - II
Lecture 7 - Distributed Generation Resources - I
Lecture 8 - Distributed Generation Resources - II
Lecture 9 - Distributed Generation Resources - III
Lecture 10 - Distributed Generation Resources - IV
Lecture 11 - Wide Area Monitoring System - I
Lecture 12 - Wide Area Monitoring System - II
Lecture 13 - Phasor Estimation - I
Lecture 14 - Phasor Estimation - II
Lecture 15 - Digital Relays for Smart Grid Protection
Lecture 16 - Islanding Detection Techniques - I
Lecture 17 - Islanding Detection Techniques - II
Lecture 18 - Islanding Detection Techniques - III
Lecture 19 - Smart Grid Protection - I
Lecture 20 - Smart Grid Protection - II
Lecture 21 - Smart Grid Protection - III
Lecture 22 - Smart Grid Protection - IV
Lecture 23 - Modelling of Storage Devices
Lecture 24 - Modelling of DC Smart Grid Components
Lecture 25 - Operation and Control of AC Microgrid - I
Lecture 26 - Operation and Control of AC Microgrid - Il
Lecture 27 - Operation and Control of DC Microgrid - I
Lecture 28 - Operation and Control of DC Microgrid - II
Lecture 29 - Operation and Control of AC-DC hybrid Microgrid - I

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Lecture 30 - Operation and Control of AC-DC hybrid Microgrid - II
Lecture 31 - Simulation and Case Study of AC Microgrid
Lecture 32 - Simulation and Case Study of DC Microgrid
Lecture 33 - Simulation and Case Study of AC-DC Hybrid Microgrid
Lecture 34 - Demand Side Management in Smart Grid
Lecture 35 - Demand Response Analysis of Smart Grid
Lecture 36 - Energy Management
Lecture 37 - Design of Smart Grid and Practical Smart Grid Case Study - I
Lecture 38 - Design of Smart Grid and Practical Smart Grid Case Study - II
Lecture 39 - System Analysis of AC/DC Smart Grid
Lecture 40 - Conclusions

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NPTEL Video Course - Electrical Engineering - NOC:Facts Devices

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Switch Realization
Lecture 4 - PWM - I
Lecture 5 - PWM - II
Lecture 6 - Closed Loop Control
Lecture 7 - Multi Level Inverter - I
Lecture 8 - Multi Level Inverter - II
Lecture 9 - Multi Level Inverter - III
Lecture 10 - Shunt Compensator Analysis
Lecture 11 - Shunt Compensator TCR and TSC - I
Lecture 12 - Shunt Compensator TCR and TSC - II
Lecture 13 - Static Var Compensator - I
Lecture 14 - Static Var Compensator - II
Lecture 15 - STATCOM - I
Lecture 16 - STATCOM - II
Lecture 17 - STATCOM/SVC Comparisons
Lecture 18 - External Control Design of Static Var Compensator
Lecture 19 - DSTATCOM
Lecture 20 - Design of DSTATCOM
Lecture 21 - Series Compensator - I
Lecture 22 - Series Compensator - II
Lecture 23 - GCSC and SSSC
Lecture 24 - SSSC - II
Lecture 25 - SSSC - III and TSSC
Lecture 26 - TSSC - II and TCSC
Lecture 27 - TCSC Characteristics and Control
Lecture 28 - Voltage and Phase Angle Regulation
Lecture 29 - Voltage and Phase Angle Regulator Device - I

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Lecture 30 - Voltage and Phase Angle Regulator Device - II
Lecture 31 - UPQC Introduction and Classification
Lecture 32 - UPQC Classification - I
Lecture 33 - Operation and Control of UPQC - II
Lecture 34 - Operation and Control of UPQC - III
Lecture 35 - UPFC
Lecture 36 - Control Structure of UPFC
Lecture 37 - Comparison of UPFC with PAR and Series Compensators
Lecture 38 - Interline Power Flow Controller (IPFC) - I
Lecture 39 - Interline Power Flow Controller (IPFC) - II
Lecture 40 - Practical Application and Conclusion

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NPTEL Video Course - Electrical Engineering - NOC:Advanced Linear Continuous Control Systems: Applications wi

Subject Co-ordinator - Prof. Yogesh Vijay Hote

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to State Space
Lecture 2 - State Space Representation
Lecture 3 - State Space Representation
Lecture 4 - State Space Representation
Lecture 5 - State Space Representation
Lecture 6 - State Space Representation
Lecture 7 - State Space Representation
Lecture 8 - State Space Representation
Lecture 9 - State Space Representation
Lecture 10 - State Space Representation
Lecture 11 - Modelling of Mechanical Systems in State Space
Lecture 12 - Modelling of DC Servo Motor - Part I
Lecture 13 - Modelling of DC Servo Motor - Part II
Lecture 14 - Determination of Transfer Function from State Space Model - Part I
Lecture 15 - Determination of Transfer Function from State Space Model - Part II
Lecture 16 - Stability Analysis in State Space
Lecture 17 - Stability Analysis in State Space - Part II
Lecture 18 - Stability Analysis in State Space
Lecture 19 - Stability Analysis in State Space
Lecture 20 - Stability Analysis in State Space
Lecture 21 - Concept of Diagonalization
Lecture 22 - Solution of State Equation
Lecture 23 - Solution of State Equation (Forced System)
Lecture 24 - Steady State Error for State Space System
Lecture 25 - State Transition Matrix - Part I
Lecture 26 - State Transition Matrix - Part II
Lecture 27 - State Transition Matrix using Cayley-Hamilton Theorem - Part III
Lecture 28 - MATLAB Programming with State Space
Lecture 29 - Controllability in State Space - Part I

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Lecture 30 - Controllability in State Space - Part II
Lecture 31 - Observability in State Space - Part I
Lecture 32 - Observability in State Space - Part II
Lecture 33 - Pole Placement by State Feedback - Part I
Lecture 34 - Pole Placement by State Feedback - Part II
Lecture 35 - Pole Placement by State Feedback - Part III
Lecture 36 - Tracking Problem in State Feedback Design - Part I
Lecture 37 - Tracking Problem in State Feedback Design - Part II
Lecture 38 - State Observer Design - Part I
Lecture 39 - State Observer Design - Part II
Lecture 40 - State Observer Design - Part III

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NPTEL Video Course - Electrical Engineering - NOC:Computer Aided Power System Analysis

Subject Co-ordinator - Prof. Biswarup Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Modeling of Power System Components
Lecture 2 - Modeling of Power System Components (Continued...)
Lecture 3 - Bus Admittance Matrix
Lecture 4 - Bus Admittance Matrix with Mutual Impedance
Lecture 5 - Bus Admittance Matrix with mutual impedance (Continued...)
Lecture 6 - Power flow equations and classification of buses
Lecture 7 - Basic Gauss - Seidel Numerical Method
Lecture 8 - Gauss - Seidel Load Flow (GSLF)
Lecture 9 - GSLF with Multiple Generators
Lecture 10 - Example of GSLF
Lecture 11 - Basics of Newton Raphson Numerical Method
Lecture 12 - Newton - Raphson Load Flow (NRLF) in Polar Co-Ordinate
Lecture 13 - NRLF in polar co-ordinate (Continued...)
Lecture 14 - NRLF in polar co-ordinate (Continued...)
Lecture 15 - NRLF (Polar) Algorithm and Example
Lecture 16 - NRLF in rectangular coordinate
Lecture 17 - NRLF in rectangular coordinate (Continued...)
Lecture 18 - NRLF in rectangular coordinate (Continued...)
Lecture 19 - Example of NRLF (Rectangular) Method
Lecture 20 - Fast decoupled load flow (FDLF)
Lecture 21 - FDLF (Continued...)
Lecture 22 - FDLF (Continued...)
Lecture 23 - AC- DC Load Flow
Lecture 24 - AC- DC Load Flow (Continued...)
Lecture 25 - AC- DC Load Flow (Continued...)
Lecture 26 - Sparsity and Gaussian Elimination
Lecture 27 - Gaussian Elimination Method
Lecture 28 - Example of Gaussian Elimination Method
Lecture 29 - Gaussian Elimination and Optimal Ordering

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Lecture 30 - Triangular Factorization
Lecture 31 - LU Decomposition
Lecture 32 - Introduction to Contingency Analysis
Lecture 33 - Linear Sensitivity Factor
Lecture 34 - Linear Sensitivity Factors (Continued...)
Lecture 35 - Line outage sensitivity factor
Lecture 36 - Line outage sensitivity factor (Continued...)
Lecture 37 - Line outage sensitivity factor (Continued...)
Lecture 38 - State Estimation Technique
Lecture 39 - Weighted Least Square (WLS) Method
Lecture 40 - WLS (Continued...)
Lecture 41 - WLS Examples
Lecture 42 - Error Analysis
Lecture 43 - Error Analysis (Continued...)
Lecture 44 - Bad Data Detection
Lecture 45 - Power system state estimation
Lecture 46 - Power system state estimation (Continued...)
Lecture 47 - Power system state estimation (Continued...)
Lecture 48 - Power system state estimation (Continued...)
Lecture 49 - Fault Analysis
Lecture 50 - Fault Analysis (Continued...)
Lecture 51 - Fault Analysis (Continued...)
Lecture 52 - Fault Analysis (Continued...)
Lecture 53 - Fault Analysis (Continued...)
Lecture 54 - Fault Analysis (Continued...)
Lecture 55 - Fault Analysis (Continued...)
Lecture 56 - Fault Analysis (Continued...)
Lecture 57 - Fault Analysis (Continued...)
Lecture 58 - Fault Analysis (Continued...)
Lecture 59 - Fault Analysis (Continued...)
Lecture 60 - Fault Analysis (Continued...)

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NPTEL Video Course - Electrical Engineering - NOC:Advance Power Electronics and Control

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic Concept of Switches
Lecture 3 - Device Physics - I
Lecture 4 - Device Physics - II
Lecture 5 - Device Physics - III
Lecture 6 - Device Physics - IV
Lecture 7 - Application and Analysis of Switches - I
Lecture 8 - Application and Analysis of Switches - II
Lecture 9 - Single Phase Converter
Lecture 10 - Single Phase Converters - II
Lecture 11 - Single Phase Converters - III
Lecture 12 - Three Phase Converters - I
Lecture 13 - Three Phase Converters - II
Lecture 14 - Multipulse Converters II
Lecture 15 - Effect of Source Inductance and PWM Rectifiers
Lecture 16 - PWM Rectifiers - II
Lecture 17 - PWM Rectifiers - III and Power Factor Improvement Techniques
Lecture 18 - PWM Rectifiers - IV and Power Factor Improvement Techniques - II
Lecture 19 - Power Factor Improvement Techniques III and Non Isolated DC- DC Converters
Lecture 20 - Non Isolated DC- DC Converters - II
Lecture 21 - Non Isolated and Isolated DC- DC Converters and Choppers
Lecture 22 - Isolated DC-DC Converters and Choppers
Lecture 23 - Isolated DC-DC Converters - II
Lecture 24 - Isolated DC-DC Converters - III
Lecture 25 - Isolated DC-DC Converters - IV and VSI and CSI
Lecture 26 - VSI and CSI
Lecture 27 - VSI and CSI II and MLI
Lecture 28 - PWM Techniques II and MLI
Lecture 29 - MLI II and ZSI

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Lecture 30 - ZSI II and Space Vector Modulation (SVM)
Lecture 31 - SVM II and AC to AC Converters
Lecture 32 - SVM III and AC to AC Converters
Lecture 33 - Cycloconverters and Matrix Converters
Lecture 34 - Matrix Converter - II
Lecture 35 - Matrix Converter - III and Power Quality Mitigation Devices
Lecture 36 - Power Quality Mitigation Devices - II
Lecture 37 - Linear and Non Linear Control in Power Electronics - I
Lecture 38 - Linear and Non Linear Control in Power Electronics - II
Lecture 39 - Non-Linear Control in Power Electronics
Lecture 40 - Application and Conclusion

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NPTEL Video Course - Electrical Engineering - NOC:CMOS Digital VLSI Design

Subject Co-ordinator - Prof. Sudeb Dasgupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - MOS Transistor Basics - I
Lecture 2 - MOS Transistor Basics - II
Lecture 3 - MOS Transistor Basics - III
Lecture 4 - MOS Parasitics and SPICE Model
Lecture 5 - CMOS Inverter Basics - I
Lecture 6 - CMOS Inverter Basics - II
Lecture 7 - CMOS Inverter Basics - III
Lecture 8 - Power Analysis - I
Lecture 9 - Power Analysis - II
Lecture 10 - SPICE Simulation - I
Lecture 11 - SPICE Simulation - II
Lecture 12 - Combinational Logic Design - I
Lecture 13 - Combinational Logic Design - II
Lecture 14 - Combinational Logic Design - III
Lecture 15 - Combinational Logic Design - IV
Lecture 16 - Combinational Logic Design - V
Lecture 17 - Combinational Logic Design - VI
Lecture 18 - Combinational Logic Design - VII
Lecture 19 - Combinational Logic Design - VIII
Lecture 20 - Combinational Logic Design - IX
Lecture 21 - Combinational Logic Design - X
Lecture 22 - Logical Efforts - I
Lecture 23 - Logical Efforts - II
Lecture 24 - Logical Efforts - III
Lecture 25 - Sequential Logic Design - I
Lecture 26 - Sequential Logic Design - II
Lecture 27 - Sequential Logic Design - III
Lecture 28 - Sequential Logic Design - IV
Lecture 29 - Sequential Logic Design - V

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Lecture 30 - Sequential Logic Design - VI
Lecture 31 - Sequential Logic Design - VII
Lecture 32 - Sequential Logic Design - VIII
Lecture 33 - Clocking Strategies for Sequential Design - I
Lecture 34 - Clocking Strategies for Sequential Design - II
Lecture 35 - Clocking Strategies for Sequential Design - III
Lecture 36 - Clocking Strategies for Sequential Design - IV
Lecture 37 - Sequential Logic Design - IX
Lecture 38 - Clocking Strategies for Sequential Design - V
Lecture 39 - Concept of Memory and its Designing - I
Lecture 40 - Concept of Memory and its Designing - II

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NPTEL Video Course - Electrical Engineering - NOC:Microelectronics: Devices to Circuits

Subject Co-ordinator - Prof. Sudeb Dasgupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Bipolar Junction Transistor
Lecture 2 - Bipolar Junction Transistor
Lecture 3 - Bipolar Junction Transistor
Lecture 4 - BJT Operation in active mode Circuit symbol and conventions - I
Lecture 5 - BJT Operation in active mode Circuit symbol and conventions - II
Lecture 6 - BJT as an amplifier small circuit model - I
Lecture 7 - BJT as an amplifier small circuit model - II
Lecture 8 - BJT Small Signal Circuit Model - I
Lecture 9 - BJT Small Signal Circuit Model - II
Lecture 10 - BJT as a switch and Ebers Moll Model
Lecture 11 - Simple BJT Inverter and second order effects
Lecture 12 - BJT Second order effects - I
Lecture 13 - BJT Second order effects - II
Lecture 14 - MOS Transistor basics - I
Lecture 15 - MOS Transistor basics - II
Lecture 16 - MOS Transistor basics - III
Lecture 17 - MOS Parasitic and SPICE Model
Lecture 18 - CMOS Inverter Basics - I
Lecture 19 - CMOS Inverter Basics - II
Lecture 20 - CMOS Inverter Basics - III
Lecture 21 - Power Analysis - I
Lecture 22 - Logical Efforts - I
Lecture 23 - Fabrication-Process - I
Lecture 24 - Fabrication-Process - II
Lecture 25 - Biasing of Amplifier and its behaviour as an Analog switch - I
Lecture 26 - Biasing of Amplifier and its behaviour as an Analog switch - II
Lecture 27 - Biasing of Amplifier and its behaviour as an Analog switch - III
Lecture 28 - CMOS CS/CG/CD Amplifier Configuration
Lecture 29 - CMOS CG/CD Amplifier Configuration

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Lecture 30 - Internal CAP Models and high frequency Modelling - I
Lecture 31 - Internal CAP Models and high frequency Modelling - II
Lecture 32 - JFET, Structure and Operation
Lecture 33 - Multistage and Differential Amplifier - I
Lecture 34 - Multistage and Differential Amplifier - II
Lecture 35 - MOS Differential Amplifier - I
Lecture 36 - MOS Differential Amplifier - II
Lecture 37 - Small signal operation and Differential Amplifiers - I
Lecture 38 - Small signal operation and Differential Amplifiers - II
Lecture 39 - Multistage Amplifier with SPICE Simulation
Lecture 40 - S-Domain Analysis, Transfer Function, Poles and Zeros - I
Lecture 41 - S-Domain Analysis, Transfer Function, Poles and Zeros - II
Lecture 42 - High Frequency response of CS and CE Amplifier
Lecture 43 - High Frequency response of CC and SF Configuration
Lecture 44 - Frequency response of Differential Amplifier
Lecture 45 - General Feedback Structure and properties of negative Feedback
Lecture 46 - Basic Feedback Topologies
Lecture 47 - Design of feedback amplifier for all configuration
Lecture 48 - Stability and amplifier poles
Lecture 49 - Bode plots and Frequency Plot
Lecture 50 - Ideal Operational Amplifier and its terminal
Lecture 51 - Op-amp as a Integrator and Differentiator
Lecture 52 - Large Signal Operation of Op-amp and second order effects
Lecture 53 - Combinational logic design - I
Lecture 54 - Combinational logic design - II
Lecture 55 - Combinational logic design - III
Lecture 56 - Combinational logic design - IV
Lecture 57 - Sequential logic design - I
Lecture 58 - Clocking strategies For Sequential design - I
Lecture 59 - Clocking strategies For Sequential design - II
Lecture 60 - Memory Design

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NPTEL Video Course - Electrical Engineering - NOC:DC Microgrid

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Microgrids
Lecture 2 - Concept of Microgrids
Lecture 3 - Microgrid and distributed generation
Lecture 4 - Microgrid vs Conventional Power System
Lecture 5 - AC and DC Microgrid with Distributed Energy Resources (AC Microgrid Part)
Lecture 6 - AC and DC Microgrid with Distributed Energy Resources (AC Microgrid Part) (Continued...)
Lecture 7 - Power Electronics for Microgrid
Lecture 8 - Power Electronic Converters in Microgrid Applications
Lecture 9 - Power Electronic Converters in Microgrid Applications (Power Electronic for Interfacing)
Lecture 10 - Power Electronic Converters in Microgrid Applications (Converter Modulation Techniques)
Lecture 11 - Modeling of converters in microgrid power system (AC/DC and DC/AC Converters Modeling)
Lecture 12 - Modeling of Power Converters in Microgrid Power System (DC/DC Converter Modeling and Control)
Lecture 13 - Modeling of Renewable Energy Resources (Modeling of Wind Energy System)
Lecture 14 - Modeling of Renewable Energy Resources (Modeling of Photovoltaic System)
Lecture 15 - Modeling of Energy Storage System
Lecture 16 - Microgrid Dynamics and Modeling
Lecture 17 - Microgrid Dynamics and Modeling (Continued...)
Lecture 18 - Microgrid Operation Modes and Standards - Part I
Lecture 19 - Microgrid Operation Modes and Standards - Part II
Lecture 20 - Microgrid Control Architectures
Lecture 21 - Microgrid Control Architectures (Continued...)
Lecture 22 - Intelligent Microgrid Operation and Control
Lecture 23 - Intelligent Microgrid Operation and Control (Continued...)
Lecture 24 - Intelligent Microgrid Operation and Control (Continued...)
Lecture 25 - Energy Management in Microgrid System (Continued...)
Lecture 26 - DC Microgrid System Architecture and AC Interface
Lecture 27 - DC Microgrid System Architecture and AC Interface (Continued...)
Lecture 28 - DC Microgrid System Architecture and AC Interface (Continued...)
Lecture 29 - DC Microgrid Dynamics and Modeling

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Lecture 30 - DC Microgrid Dynamics and Modeling (Continued...)
Lecture 31 - Control of DC Microgrid System
Lecture 32 - Control of DC Microgrid System (Continued...)
Lecture 33 - Applications of DC Microgrids
Lecture 34 - Stability in Microgrid
Lecture 35 - Stability Analysis of DC Microgrid
Lecture 36 - Stability Analysis of DC Microgrid (Continued...)
Lecture 37 - DC Microgrid stabilization strategies (Passive damping method)
Lecture 38 - DC Microgrid Stabilization Strategies (Impedance/Admittance stability criteria)
Lecture 39 - DC microgrid stabilization using nonlinear Techniques
Lecture 40 - General Summary of DC Microgrids

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NPTEL Video Course - Electrical Engineering - NOC:Power Quality Improvement Technique

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Overview - I
Lecture 3 - Overview - II
Lecture 4 - Overview - III
Lecture 5 - Source of Poor Power Quality - I
Lecture 6 - Source of Poor Power Quality - II
Lecture 7 - AC Power Quality Standard
Lecture 8 - Improvement of Power Factor by Capacitor
Lecture 9 - Passive Filter - I
Lecture 10 - Passive Filter - II
Lecture 11 - Passive Filter Design - I
Lecture 12 - Passive Filter Design - II
Lecture 13 - PWM Rectifier - I
Lecture 14 - PWM Rectifier - II
Lecture 15 - PWM Rectifier - III
Lecture 16 - Three phase converters - I
Lecture 17 - Three Phase Converters - II and multi pulse Converters
Lecture 18 - Three Phase Converters - III and multi-pulse Converters
Lecture 19 - VSI and CSI
Lecture 20 - Multilevel Inverter - I
Lecture 21 - Multilevel Inverter - II
Lecture 22 - Multilevel Inverter - III
Lecture 23 - PWM for Voltage Source Inverter - I
Lecture 24 - PWM for Voltage Source Inverter - II
Lecture 25 - PWM for Voltage Source inverter - III
Lecture 26 - PWM for Voltage Source Inverter - IV
Lecture 27 - Operation and Control of Grid-Connected VSC
Lecture 28 - Grid Connected VSC with inner Current Control
Lecture 29 - Shunt Active Power Filter - I

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Lecture 30 - Shunt Active Power Filter - II
Lecture 31 - Shunt Active Power Filter - III
Lecture 32 - Shunt Active Power Filter - IV
Lecture 33 - Hybrid Active Power Filter - I
Lecture 34 - Hybrid Active power Filter - II
Lecture 35 - Hybrid Shunt Active Power Filter
Lecture 36 - UPQC Introduction and classification
Lecture 37 - UPQC Classification
Lecture 38 - Operation and Control of UPQC
Lecture 39 - Control of UPQC
Lecture 40 - Conclusion

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NPTEL Video Course - Electrical Engineering - NOC:Power System Protection and Switchgear

Subject Co-ordinator - Prof. Bhaveshkumar R. Bhalja

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Protective Relaying - I
Lecture 2 - Fundamentals of Protective Relaying - II
Lecture 3 - Fundamentals of Protective Relaying - III
Lecture 4 - Fundamentals of Protective Relaying - IV
Lecture 5 - Fundamentals of Protective Relaying - V
Lecture 6 - Current based Relaying Scheme - I
Lecture 7 - Current based Relaying Scheme - II
Lecture 8 - Current based Relaying Scheme - III
Lecture 9 - Current based Relaying Scheme - IV
Lecture 10 - Current based Relaying Scheme - V
Lecture 11 - Current based Relaying Scheme - VI
Lecture 12 - Current based Relaying Scheme - VII
Lecture 13 - Current based Relaying Scheme - VIII
Lecture 14 - Protection of Transmission Lines using Distance Relays - I
Lecture 15 - Protection of Transmission Lines using Distance Relays - II
Lecture 16 - Protection of Transmission Lines using Distance Relays - III
Lecture 17 - Protection of Transmission Lines using Distance Relays - IV
Lecture 18 - Protection of Transmission Lines using Distance Relays - V
Lecture 19 - Carrier Aided Schemes for Transmission Lines - I
Lecture 20 - Carrier Aided Schemes for Transmission Lines - II
Lecture 21 - Carrier Aided Schemes for Transmission Lines - III
Lecture 22 - Carrier Aided Schemes for Transmission Lines - IV
Lecture 23 - Auto-reclosing and Synchronizing - I
Lecture 24 - Auto-reclosing and Synchronizing - II
Lecture 25 - Auto-reclosing and Synchronizing - III
Lecture 26 - Protection of Transformers - I
Lecture 27 - Protection of Transformers - II
Lecture 28 - Protection of Generators - I
Lecture 29 - Protection of Generators - II

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Lecture 30 - Protection of Induction Motors
Lecture 31 - Protection of Busbars
Lecture 32 - Protection against Transients and Surges along with System Response to Severe Upsets - I
Lecture 33 - Protection against Transients and Surges along with System Response to Severe Upsets - II
Lecture 34 - Arc Interruption Theory in Circuit Breaker - I
Lecture 35 - Arc Interruption Theory in Circuit Breaker - II
Lecture 36 - Arc Interruption Theory in Circuit Breaker - III
Lecture 37 - Arc Interruption Theory in Circuit Breaker - IV
Lecture 38 - Types of Circuit Breakers
Lecture 39 - Testing, Commissioning and Maintenance of Relays - I
Lecture 40 - Testing, Commissioning and Maintenance of Relays - II

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NPTEL Video Course - Electrical Engineering - NOC:RF Transceiver of Design

Subject Co-ordinator - Prof. Darshak Bhatt

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic of Wireless Communication - I
Lecture 2 - Basic of Wireless Communication - II
Lecture 3 - Basic of Wireless Communication - III
Lecture 4 - Basic of Wireless Communication - IV
Lecture 5 - Basic of Wireless Communication - V
Lecture 6 - Basic of Wireless Communication - VI
Lecture 7 - Noise in RF Systems - I
Lecture 8 - Noise in RF Systems - II
Lecture 9 - Noise in RF Systems - III
Lecture 10 - Noise in RF Systems - IV
Lecture 11 - Non-Linearity in RF Systems - I
Lecture 12 - Non-Linearity in RF Systems - II
Lecture 13 - Non-Linearity in RF Systems - III
Lecture 14 - Transceiver Architecture - I
Lecture 15 - Transceiver Architecture - II
Lecture 16 - Transceiver Architecture - III
Lecture 17 - Transceiver Architecture - IV
Lecture 18 - Transceiver Architecture - V
Lecture 19 - Transceiver Architecture - VI
Lecture 20 - Transceiver Architecture - VII
Lecture 21 - Active Devices - I
Lecture 22 - Active Devices - II
Lecture 23 - Active Devices - III
Lecture 24 - Active Devices - IV
Lecture 25 - Passive Components and Impedance Matching - I
Lecture 26 - Passive Components and Impedance Matching - II
Lecture 27 - Passive Components and Impedance Matching - III
Lecture 28 - Passive Components and Impedance Matching - IV
Lecture 29 - Passive Components and Impedance Matching - V

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Lecture 30 - Passive Components and Impedance Matching - VI
Lecture 31 - Passive Components and Impedance Matching - VII
Lecture 32 - Stability and Amplifier Design - I
Lecture 33 - Stability and Amplifier Design - II
Lecture 34 - Stability and Amplifier Design - III
Lecture 35 - Stability and Amplifier Design - IV
Lecture 36 - Low Noise Amplifier Design - I
Lecture 37 - Low Noise Amplifier Design - II
Lecture 38 - Low Noise Amplifier Design - III
Lecture 39 - Low Noise Amplifier Design - IV
Lecture 40 - Low Noise Amplifier Design - V
Lecture 41 - Low Noise Amplifier Design - VI
Lecture 42 - Mixer Design - I
Lecture 43 - Mixer Design - II
Lecture 44 - Mixer Design - III
Lecture 45 - Mixer Design - IV
Lecture 46 - Mixer Design - V
Lecture 47 - Mixer Design - VI
Lecture 48 - Mixer Design - VII
Lecture 49 - Mixer Design - VIII
Lecture 50 - Mixer Design - IX
Lecture 51 - Oscillator Design - I
Lecture 52 - Oscillator Design - II
Lecture 53 - Oscillator Design - III
Lecture 54 - Oscillator Design - IV
Lecture 55 - Power Amplifier Design - I
Lecture 56 - Power Amplifier Design - II
Lecture 57 - Power Amplifier Design - III
Lecture 58 - Basics of Phase Locked Loop - I
Lecture 59 - Basics of Phase Locked Loop - II
Lecture 60 - System Level Considerations
Lecture 61 - RF Testing and Measurement Techniques

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NPTEL Video Course - Electrical Engineering - NOC:VLSI Physical Design with Timing Analysis

Subject Co-ordinator - Prof. Bishnu Prasad Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to VLSI Design
Lecture 2 - Introduction to VLSI Physical Design
Lecture 3 - Complexity Analysis for Algorithms
Lecture 4 - Graphs for Physical Design
Lecture 5 - Graph searching Algorithms
Lecture 6 - Spanning Tree and Shortest Path Algorithms
Lecture 7 - Overview of Timing Analysis
Lecture 8 - Timing Arcs and Unateness
Lecture 9 - Delay Parameters of a Combinational Circuit
Lecture 10 - Delay Parameters of a Sequential Circuit
Lecture 11 - Timing Analysis in a Sequential Circuit
Lecture 12 - STA in Sequential Circuit with Clock Skew - I
Lecture 13 - STA in Sequential Circuit with Clock Skew - II
Lecture 14 - STA in Sequential Circuit with Clock Jitter
Lecture 15 - STA considering OCV and CRPR (Setup check)
Lecture 16 - STA considering OCV and CRPR (Hold check)
Lecture 17 - STA for Combinational Circuits - I
Lecture 18 - STA for Combinational Circuits - II
Lecture 19 - Introduction to Partitioning - I
Lecture 20 - Introduction to Partitioning - II
Lecture 21 - Partitioning Algorithms
Lecture 22 - Kernighan-Lin (KL) Algorithm
Lecture 23 - Fidduccia-Mattheyeses (FM) Algorithm
Lecture 24 - Introduction to Floorplanning
Lecture 25 - Floorplanning Representations
Lecture 26 - Floorplanning Algorithms - 1
Lecture 27 - Floorplanning Algorithms - 2
Lecture 28 - Pin Assignment and Power - Ground Routing
Lecture 29 - Introduction to Placement

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Lecture 30 - Wirelength estimation techniques
Lecture 31 - Min-cut placement
Lecture 32 - Placement Algorithms
Lecture 33 - Placement algorithms and legalization
Lecture 34 - Introduction to Clock Tree Synthesis
Lecture 35 - Clock Routing Algorithms - I
Lecture 36 - Clock Routing Algorithms - II
Lecture 37 - Clock Routing Algorithms - III
Lecture 38 - Introduction and Optimization Goals - Global Routing
Lecture 39 - Single net routing (Rectilinear routing)
Lecture 40 - Global Routing in the connectivity graph
Lecture 41 - Finding Shortest Paths with Dijkstra's Algorithm
Lecture 42 - Full-Netlist Routing
Lecture 43 - Introduction: Detailed Routing
Lecture 44 - Channel Routing Algorithms - I
Lecture 45 - Channel Routing Algorithms - II
Lecture 46 - Switchbox and Over the cell routing
Lecture 47 - Timing Constraints in latch based system
Lecture 48 - Timing Constraints in Pulsed Latch-based System
Lecture 49 - Time Borrowing in Latch
Lecture 50 - Crosstalk Analysis
Lecture 51 - Standard Cell Library
Lecture 52 - Low Power Cells in Standard Cell Library
Lecture 53 - Sub-threshold Standard Cell Library
Lecture 54 - Timing Library for Standard Cells
Lecture 55 - PDK and Other files
Lecture 56 - Open-Source Tool Installation and Qflow
Lecture 57 - Open-Source tool - YOSYS
Lecture 58 - OpenSTA Static Timing Analyzer
Lecture 59 - OpenROAD Physical Synthesis Flow - I
Lecture 60 - OpenROAD Physical Synthesis Flow - II

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NPTEL Video Course - Electrical Engineering - NOC:Modeling, Analysis and Estimation of Three Phase Unbalanced

Subject Co-ordinator - Prof. Biswarup Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Carsonâ s Line
Lecture 3 - Carsonâ s Line (Continued...)
Lecture 4 - Three-phase Transmission Line - 1
Lecture 5 - Three-phase Transmission Line - 2
Lecture 6 - Three-phase Transmission Line (Continued...)
Lecture 7 - Three-phase Transmission Line (Continued...)
Lecture 8 - Three-phase Transmission Line (Continued...)
Lecture 9 - Transposition of Transmission Line
Lecture 10 - Transposition of Transmission Line (Continued...)
Lecture 11 - Sequence impedance of Transmission Line
Lecture 12 - Sequence impedance of Transmission Line (Continued...)
Lecture 13 - Impedance of Transmission Line
Lecture 14 - Impedance of Transmission Line (Continued...)
Lecture 15 - Impedance of Transmission Line (Continued...)
Lecture 16 - Impedance of Transmission Line (Continued...)
Lecture 17 - Impedance of Transmission Line (Continued...)
Lecture 18 - Impedance of Transmission Line (Continued...)
Lecture 19 - Impedance of Transmission Line (Continued...)
Lecture 20 - Impedance of Transmission Line (Continued...)
Lecture 21 - Capacitance of Transmission Line
Lecture 22 - Capacitance of Transmission Line (Continued...)
Lecture 23 - Capacitance of Transmission Line (Continued...)
Lecture 24 - Capacitance of Transmission Line (Continued...)
Lecture 25 - Transformer Modeling (Introduction, YgYg0)
Lecture 26 - Transformer Modeling (YgYg0, YgYg4)
Lecture 27 - Transformer Modeling (YgD1)
Lecture 28 - Transformer Modeling (YgD1, YD1)
Lecture 29 - Transformer Modeling (YD1) (Continued...)

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Lecture 30 - Transformer Modeling (YD1) (Continued...)
Lecture 31 - Transformer Modeling (YYg0, Dd0)
Lecture 32 - Transformer Modeling (Dd0, Overall Summary)
Lecture 33 - Three-Phase Load Flow (Network Modelling)
Lecture 34 - Three-Phase Load Flow (Formation of bus admittance matrix)
Lecture 35 - Three-Phase Load Flow (Formation of bus admittance matrix) (Continued...)
Lecture 36 - Three-Phase Load Flow (Formation of bus admittance matrix) (Continued...)
Lecture 37 - Three-Phase Load Flow (General expression of bus admittance matrix)
Lecture 38 - Three-Phase Load Flow (General expression of bus injected current)
Lecture 39 - Three-Phase Load Flow (Derivation of power flow equations)
Lecture 40 - Three-Phase Load Flow (Concept of Generator Internal Bus)
Lecture 41 - Three-Phase Load Flow (Unknown Quantities)
Lecture 42 - Three-Phase Load Flow (Classification of Unknown Quantities)
Lecture 43 - Three-Phase Load Flow (Classification of Known Quantities)
Lecture 44 - Three-Phase Load Flow (Equations Relating Known and Unknown Quantities)
Lecture 45 - Three-Phase Load Flow (NRLF Polar Method)
Lecture 46 - Three-Phase Load Flow (General Definitions and Dimensions of Jacobian Submatrices)
Lecture 47 - Three-Phase Load Flow (Derivation of J1)
Lecture 48 - Three-Phase Load Flow (Derivation of J1) (Continued...)
Lecture 49 - Three-Phase Load Flow (Derivation of J2)
Lecture 50 - Three-Phase Load Flow (Derivation of J3)
Lecture 51 - Three-Phase Load Flow (Derivation of J3) (Continued...)
Lecture 52 - Three-Phase Load Flow (Derivation of J4, J5, J6, J7, J8)
Lecture 53 - Three-Phase Load Flow (Derivation of J9)
Lecture 54 - Three-Phase Load Flow (Derivation of J9, J10)
Lecture 55 - Three-Phase Load Flow (Derivation of J11, J12)
Lecture 56 - Three-Phase Load Flow (Derivation of J13, J14, J15 and J16, Algorithm and Example)
Lecture 57 - Three-Phase State Estimation (Revision of WLS State Estimation Method for Balanced Systems)
Lecture 58 - Three-Phase State Estimation (Derivation of Measurement Functions for Unbalanced Systems)
Lecture 59 - Three-Phase State Estimation (Derivation of Measurement Functions for Unbalanced Systems)
Lecture 60 - Three-Phase State Estimation (General Structure of Jacobian Matrix, Example)

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NPTEL Video Course - Electrical Engineering - NOC:Semiconductor Devices for Next Generation Field Effect Tran

Subject Co-ordinator - Prof. Sudeb Dasgupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Subject
Lecture 2 - Introduction of MOS and Energy Band Diagram - I
Lecture 3 - Introduction of MOS and Energy Band Diagram - II
Lecture 4 - Introduction of MOS
Lecture 5 - Introduction of MOS (3 Terminal)
Lecture 6 - MOS Capacitor - I
Lecture 7 - MOS Capacitor - II
Lecture 8 - Introduction to MOSFET
Lecture 9 - I-V Characteristics of MOSFETs - I
Lecture 10 - I-V Characteristics of MOSFETs - II
Lecture 11 - Capacitance Modeling for High and Low Frequency - I
Lecture 12 - Capacitance Modeling for High and Low Frequency - II
Lecture 13 - Capacitance Modeling for High and Low Frequency - III
Lecture 14 - High Frequency Modeling of MOSFET
Lecture 15 - Application of MOSFET
Lecture 16 - MOSFET Switch and Amplifier
Lecture 17 - Introduction to Spice
Lecture 18 - Spice sub Circuit Models
Lecture 19 - Spice Installation Setup
Lecture 20 - Spice Model Equations - I
Lecture 21 - Spice Model Equations - II
Lecture 22 - Spice Model Equations - III
Lecture 23 - Spice Models Some Examples
Lecture 24 - Carriers and Transportation
Lecture 25 - Introduction to Semiconductor Heterostructures - I
Lecture 26 - Introduction to Semiconductor Heterostructures - II
Lecture 27 - Introduction to Semiconductor Heterostructures - III
Lecture 28 - Band Diagram of Heterostructure
Lecture 29 - P N Heterojunction Diode

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Lecture 30 - Leakage in MOSFET
Lecture 31 - DIBL, GIDL, Channel Length Modulation, Source/Drain Series Resistance - I
Lecture 32 - DIBL, GIDL, Channel Length Modulation, Source/Drain Series Resistance - II
Lecture 33 - Velocity Saturation Effect, Velocity Overshoot, Ballistic Transport
Lecture 34 - Mobility Effects and Self Heating Effects
Lecture 35 - Introduction to Double Gate MOSFET
Lecture 36 - SOI MOSFET, Partially and Fully Depleted MOSFET
Lecture 37 - Subthreshold Swing and Transconductance
Lecture 38 - Small and Large Signal Modeling and Juntionless Transistors
Lecture 39 - Introduction to FinFETs Structure
Lecture 40 - Fabrication of FinFETs and HF Modeling
Lecture 41 - High-Frequency Small Signal Modeling
Lecture 42 - RLC FinFET Modeling
Lecture 43 - Gate All Around FETs, Device-Design Perspective
Lecture 44 - Gate All Around FETs
Lecture 45 - Nanosheet FET
Lecture 46 - Process Variation in Nanosheet FET
Lecture 47 - Negative Capacitance: Improved Subthreshold Swing - I
Lecture 48 - Negative Capacitance: Improved Subthreshold Swing - II
Lecture 49 - Introduction to Forksheet FET
Lecture 50 - Challenges of Forksheet FET
Lecture 51 - CFET Advancements and Industry Adoption
Lecture 52 - Design Challenges and CFET Optimization for Semiconductor Scaling
Lecture 53 - Introduction to Compound Semiconductor Materials
Lecture 54 - III-V Materials and Their Role for High-Speed Devices
Lecture 55 - IIIâ V HEMT and its Modeling - I
Lecture 56 - IIIâ V HEMT and its Modeling - II
Lecture 57 - IIIâ V HEMT and its Modeling - III
Lecture 58 - Vertical High Electron Mobility Transistor
Lecture 59 - Introduction to 2D Semiconductor Materials
Lecture 60 - 2D Semiconductor Materials

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NPTEL Video Course - Electrical Engineering - NOC:Intelligent Control of Robotic Systems

Subject Co-ordinator - Prof. M. Felix Orlando

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Robotics: Primer-Robot Anatomy and Terminology
Lecture 2 - Robotics: Primer-Kinematics and Dynamics
Lecture 3 - Back Stepping Control
Lecture 4 - Feedback Linearization
Lecture 5 - Lyapunov Stability
Lecture 6 - Introduction to Fuzzy Logic
Lecture 7 - Fuzzy Relations and Rule Base
Lecture 8 - Fuzzy Logic Control - I
Lecture 9 - Fuzzy Logic Control - II
Lecture 10 - T-S Fuzzy
Lecture 11 - Neural Network based Robot Control
Lecture 12 - Neural Adaptive Control of Robotics Systems
Lecture 13 - Neural Network based Feedback Linearization
Lecture 14 - Robust RBFN
Lecture 15 - NN based Hybrid Force/Position Control of Robot Manipulator
Lecture 16 - Introduction to Reinforcement Learning
Lecture 17 - Introduction to Search Methods
Lecture 18 - Introduction to Path Planning
Lecture 19 - Sampling based Path Planning Methods
Lecture 20 - Path Planning of Robotic Needle

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NPTEL Video Course - Electrical Engineering - NOC:Charging Infrastructure

Subject Co-ordinator - Prof. Apurv Kumar Yadav

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the EV Charging System
Lecture 2 - Building Blocks of an AC EV Charger
Lecture 3 - Building Blocks of an DC EV Charger
Lecture 4 - Review of EV Charger Types and Nomenclatures
Lecture 5 - Revisiting Diode Bridge Rectifier - I
Lecture 6 - Revisiting Diode Bridge Rectifier - II
Lecture 7 - Revisiting Diode Bridge Rectifier with Capacitive Filter - I
Lecture 8 - Revisiting Diode Bridge Rectifier with Capacitive Filter - II
Lecture 9 - Single-phase Boost PFC Converter - I
Lecture 10 - Single-phase Boost PFC Converter - II
Lecture 11 - Single-phase Boost PFC Converter - III
Lecture 12 - Single-phase Boost PFC Converter - IV
Lecture 13 - Closed Loop Control of Single-phase Boost PFC Converter - I
Lecture 14 - Closed Loop Control of Single-phase Boost PFC Converter - II
Lecture 15 - Closed Loop Control of Single-phase Boost PFC Converter - III
Lecture 16 - Closed Loop Control of Single-phase Boost PFC Converter - IV
Lecture 17 - Bridgeless PFC Converter
Lecture 18 - Totem pole PFC Converter - I
Lecture 19 - Totem pole PFC Converter - II
Lecture 20 - DCM operation of Boost PFC Converter
Lecture 21 - Flyback Based PFC Converter
Lecture 22 - Pulse Width Modulation
Lecture 23 - Three Phase AC-DC Converter - I
Lecture 24 - Three Phase AC-DC Converter - II
Lecture 25 - Three Phase AC-DC Converter - III
Lecture 26 - Closed loop control of three-phase AC-DC converter - I
Lecture 27 - Closed loop control of three-phase AC-DC converter - II
Lecture 28 - Closed loop control of three-phase AC-DC converter - III
Lecture 29 - Closed loop control of three-phase AC-DC converter - IV

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Lecture 30 - Revisiting Isolated DC-DC converters - I
Lecture 31 - Revisiting Isolated DC-DC Converters - II
Lecture 32 - Revisiting Isolated DC-DC Converters - III
Lecture 33 - Switching Loss
Lecture 34 - Soft Switching In Half Bridge Configuration
Lecture 35 - Modulation Strategies for PWM Full Bridge Converter - I
Lecture 36 - Modulation Strategies for PWM Full Bridge Converter - II
Lecture 37 - Phase Shifted Full Bridge (PSFB) Converter - I
Lecture 38 - Phase Shifted Full Bridge (PSFB) Converter - II
Lecture 39 - Small Signal Modelling of PSFB - I
Lecture 40 - Small Signal Modelling of PSFB - II
Lecture 41 - Small Signal Modelling of PSFB - III
Lecture 42 - Dual Active Bridge Converter - I
Lecture 43 - Dual Active Bridge Converter - II
Lecture 44 - Transformer Design for Isolated DC-DC Converter - I
Lecture 45 - Transformer Design for Isolated DC-DC Converter - II
Lecture 46 - Transformer Design for Isolated DC-DC Converter - III
Lecture 47 - Filter Inductor Design
Lecture 48 - AC Type-2 Charging - I
Lecture 49 - AC Type-2 Charging - II
Lecture 50 - DC Charging (CCS2) - I
Lecture 51 - DC Charging (CCS2) - II
Lecture 52 - DC Charging (CCS2) - III
Lecture 53 - DC Charging (CCS2) - IV
Lecture 54 - DC Charging (CCS2) - V
Lecture 55 - DC Charging System (BEVC-DC001) - I
Lecture 56 - DC Charging System (BEVC-DC001) - II
Lecture 57 - DC Charging System (BEVC-DC001) - III
Lecture 58 - Charging Stations - I
Lecture 59 - Charging Stations - II
Lecture 60 - Charging Stations - III

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NPTEL Video Course - Electrical Engineering - NOC:Advanced Distribution System Analysis and Operation

Subject Co-ordinator - Prof. N. P. Padhy, Prof. Subho Paul

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Power Distribution Networks - I
Lecture 2 - Fundamentals of Power Distribution Networks - II
Lecture 3 - Fundamentals of Power Distribution Networks - III
Lecture 4 - Fundamentals of Power Distribution Networks - IV
Lecture 5 - Fundamentals of Power Distribution Networks - V
Lecture 6 - DER Integrated Distribution Network Modeling - I
Lecture 7 - DER Integrated Distribution Network Modeling - II
Lecture 8 - DER Integrated Distribution Network Modeling - III
Lecture 9 - DER Integrated Distribution Network Modeling - IV
Lecture 10 - DER Integrated Distribution Network Modeling - V
Lecture 11 - DER Integrated Distribution Network Modeling - VI
Lecture 12 - DER Integrated Distribution Network Modeling - VII
Lecture 13 - DER Integrated Distribution Network Modeling - VIII
Lecture 14 - DER Integrated Distribution Network Modeling - IX
Lecture 15 - DER Integrated Distribution Network Load Flow Analysis - I
Lecture 16 - DER Integrated Distribution Network Load Flow Analysis - II
Lecture 17 - DER Integrated Distribution Network Load Flow Analysis - III
Lecture 18 - DER Integrated Distribution Network Load Flow Analysis - IV
Lecture 19 - DER Integrated Distribution Network Load Flow Analysis - V
Lecture 20 - Distribution Network Optimal Power Flow (OPF) Analysis - I
Lecture 21 - Distribution Network Optimal Power Flow (OPF) Analysis - II
Lecture 22 - Distribution Network Optimal Power Flow (OPF) Analysis - III
Lecture 23 - Distribution Network Optimal Power Flow (OPF) Analysis - IV
Lecture 24 - Distribution Network Optimal Power Flow (OPF) Analysis - V
Lecture 25 - Distribution Network Optimal Power Flow (OPF) Analysis - VI
Lecture 26 - Distribution Network Optimal Power Flow (OPF) Analysis - VII
Lecture 27 - Distribution Network Reliability - I
Lecture 28 - Distribution Network Reliability - II
Lecture 29 - Distribution Network Reliability - III

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Lecture 30 - Distribution Network Reliability - IV
Lecture 31 - Distribution Network Reliability - V
Lecture 32 - Transmission-Distribution(TandD) Interaction - I
Lecture 33 - Transmission-Distribution(TandD) Interaction - II
Lecture 34 - Transmission-Distribution(TandD) Interaction - III
Lecture 35 - Transmission-Distribution(TandD) Interaction - IV
Lecture 36 - Transmission-Distribution(TandD) Interaction - V
Lecture 37 - Artificial Intelligence Enabled Control In Distribution Network - I
Lecture 38 - Artificial Intelligence Enabled Control In Distribution Network - II
Lecture 39 - Artificial Intelligence Enabled Control In Distribution Network - III
Lecture 40 - Artificial Intelligence Enabled Control In Distribution Network - IV
Lecture 41 - Artificial Intelligence Enabled Control In Distribution Network - V
Lecture 42 - DER Integrated Distribution Network Fault Analysis And Protection - I
Lecture 43 - DER Integrated Distribution Network Fault Analysis And Protection - II
Lecture 44 - DER Integrated Distribution Network Fault Analysis And Protection - III
Lecture 45 - DER Integrated Distribution Network Fault Analysis And Protection - IV
Lecture 46 - DER Integrated Distribution Network Fault Analysis And Protection - V
Lecture 47 - Distribution Network Resiliency - I
Lecture 48 - Distribution Network Resiliency - II
Lecture 49 - Distribution Network Resiliency - III
Lecture 50 - Distribution Network Resiliency - IV
Lecture 51 - Distribution Network Automation and Restoration Study - I
Lecture 52 - Distribution Network Automation and Restoration Study - II
Lecture 53 - Distribution Network Automation and Restoration Study - III
Lecture 54 - Distribution Network Automation and Restoration Study - IV
Lecture 55 - Distribution Network Automation and Restoration Study - V
Lecture 56 - Cyber-Physical Layers in Distribution Systems - I
Lecture 57 - Cyber-Physical Layers in Distribution Systems - II
Lecture 58 - Cyber-Physical Layers in Distribution Systems - III
Lecture 59 - Cyber-Physical Layers in Distribution Systems - IV
Lecture 60 - Cyber-Physical Layers in Distribution Systems - V

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NPTEL Video Course - Electrical Engineering - NOC:FPGA Based Signal Processing Systems

Subject Co-ordinator - Prof. P. Sumathi

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to FPGA
Lecture 2 - Technology Review - Part 1
Lecture 3 - Technology Review - Part 2
Lecture 4 - DSP and Integrated Design Suites
Lecture 5 - Introduction to Verilog
Lecture 6 - Verilog
Lecture 7 - Modelling of Digital Circuits
Lecture 8 - Modelling of Digital Circuits and Testbench - Part 1
Lecture 9 - Modelling of Digital Circuits and Testbench - Part 2
Lecture 10 - Testbench, Simulation, and Synthesis
Lecture 11 - Structural Modelling of Combinational Logic
Lecture 12 - Dataflow Modelling of Combinational Logic
Lecture 13 - Behavioral Modelling of Combinational Logic
Lecture 14 - Simulation of Combinational Logic Circuits - Part 1
Lecture 15 - Simulation of Combinational Logic Circuits - Part 2
Lecture 16 - Sequential Logic Circuits - Part 1
Lecture 17 - Sequential Logic Circuits - Part 2
Lecture 18 - Blocking and Non-Blocking Statements
Lecture 19 - Sequential Logic Circuits: Blocking and Non-Blocking Statements, Counters
Lecture 20 - Counters and Shift Registers
Lecture 21 - Finite State Machines - Part 1
Lecture 22 - Finite State Machines - Part 2
Lecture 23 - Finite State Machines: Sequence Detector
Lecture 24 - FSM: Verilog Modules of Sequence Detector
Lecture 25 - FSM: Counters
Lecture 26 - Memory Banks
Lecture 27 - FSM Modelling Styles
Lecture 28 - FSM Modelling Styles and Timing Control
Lecture 29 - Timing Controls - Part 1

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Lecture 30 - Timing Controls - Part 2
Lecture 31 - Synthesis of Combinational Logic Circuits
Lecture 32 - Synthesis of Sequential Logic Circuits - Part 1
Lecture 33 - Synthesis of Sequential Logic Circuits - Part 2
Lecture 34 - Synthesis of Sequential Logic Circuits - Part 3
Lecture 35 - Synthesis of Finite State Machines
Lecture 36 - Arithmetic Basics - Part 1
Lecture 37 - Arithmetic Basics - Part 2
Lecture 38 - Arithmetic Basics - Part 3
Lecture 39 - CORDIC
Lecture 40 - Timing Analysis
Lecture 41 - Finite Impulse Response Filters - Part 1
Lecture 42 - Finite Impulse Response Filters - Part 2
Lecture 43 - Finite Impulse Response Filters - Part 3
Lecture 44 - Finite Impulse Response Filters - Part 4
Lecture 45 - Digital FIR Filters - Verilog Codes
Lecture 46 - Infinite Impulse Response Filters - Part 1
Lecture 47 - Infinite Impulse Response Filters - Part 2
Lecture 48 - Infinite Impulse Response Filters - Part 3
Lecture 49 - Digital IIR Filters: Verilog Codes - Part 1
Lecture 50 - Digital IIR Filters: Verilog Codes - Part 2
Lecture 51 - DFT
Lecture 52 - Sliding DFT and its Variants - Part 1
Lecture 53 - Sliding DFT and its Variants - Part 2
Lecture 54 - DCT
Lecture 55 - FFT and DSP Builder Models
Lecture 56 - General Discrete-Signal Processing Network - Part 1
Lecture 57 - General Discrete-Signal Processing Network - Part 2
Lecture 58 - Adaptive Filtering - Part 1
Lecture 59 - Adaptive Filtering - Part 2
Lecture 60 - Adaptive Filtering - Part 3
Lecture 61 - Combinational Logic Circuits: Simulation
Lecture 62 - Sequential Logic Circuits: Simulation
Lecture 63 - Finite State Machines: Simulation
Lecture 64 - Timing Controls: Simulation
Lecture 65 - Lab 1 : Part 2 : Combinational Logic Circuits: Implementation
Lecture 66 - Lab 2 : Part 2 : Sequential Logic Circuits: Implementation
Lecture 67 - Lab 3 : Part 2 : Finite State Machines: Implementation

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NPTEL Video Course - Electrical Engineering - An Introduction to Electronics Systems Packaging

Subject Co-ordinator - Prof. G.V. Mahesh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Objectives of the course
Lecture 2 - Definition of a system and history of semiconductors
Lecture 3 - Products and levels of packaging
Lecture 4 - Packaging aspects of handheld products; Case studies in applications
Lecture 5 - Case Study (continued); Definition of PWB, summary and Questions for review
Lecture 6 - Basics of Semiconductor and Process flowchart; Video on â Sand-to-Siliconâ •
Lecture 7 - Wafer fabrication, inspection and testing
Lecture 8 - Wafer packaging; Packaging evolution; Chip connection choices
Lecture 9 - Wire bonding, TAB and flipchip-1
Lecture 10 - Wire bonding, TAB and flipchip-2; Tutorials
Lecture 11 - Why packaging? & Single chip packages or modules (SCM)
Lecture 12 - Commonly used packages and advanced packages; Materials in packages
Lecture 13 - Advances packages (continued); Thermal mismatch in packages; Current trends in packaging
Lecture 14 - Multichip modules (MCM)-types; System-in-package (SIP); Packaging roadmaps; Hybrid circuits; Qui
Lecture 15 - Electrical Issues â I; Resistive Parasitic
Lecture 16 - Electrical Issues â II; Capacitive and Inductive Parasitic
Lecture 17 - Electrical Issues â III; Layout guidelines and the Reflection problem
Lecture 18 - Electrical Issues â IV; Interconnection
Lecture 19 - Quick Tutorial on packages; Benefits from CAD; Introduction to DFM, DFR & DFT
Lecture 20 - Components of a CAD package and its highlights
Lecture 21 - Design Flow considerations; Beginning a circuit design with schematic work and component layout
Lecture 22 - Demo and examples of layout and routing; Technology file generation from CAD; DFM check list and
Lecture 23 - Review of CAD output files for PCB fabrication; Photo plotting and mask generation
Lecture 24 - Process flow-chart; Vias; PWB substrates
Lecture 25 - Substrates continued; Video highlights; Surface preparation
Lecture 26 - Photoresist and application methods; UV exposure and developing; Printing technologies for PWBs
Lecture 27 - PWB etching; Resist stripping; Screen-printing technology
Lecture 28 - Through-hole manufacture process steps; Panel and pattern plating methods
Lecture 29 - Video highlights on manufacturing; Solder mask for PWBs; Multilayer PWBs; Introduction to microv

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Lecture 30 - Microvia technology and Sequential build-up technology process flow for high-density interconnec
Lecture 31 - Conventional Vs HDI technologies; Flexible circuits; Tutorial session
Lecture 32 - SMD benefits; Design issues; Introduction to soldering
Lecture 33 - Reflow and Wave Soldering methods to attach SMDs
Lecture 34 - Solders; Wetting of solders; Flux and its properties; Defects in wave soldering
Lecture 35 - Vapour phase soldering, BGA soldering and Desoldering/Repair; SMT failures
Lecture 36 - SMT failure library and Tin Whiskers
Lecture 37 - Tin-lead and lead-free solders; Phase diagrams; Thermal profiles for reflow soldering; Lead-free
Lecture 38 - Lead-free solder considerations; Green electronics; RoHS compliance and e-waste recycling issues
Lecture 39 - Thermal Design considerations in systems packaging
Lecture 40 - Introduction to embedded passives; Need for embedded passives; Design Library; Embedded resistor
Lecture 41 - Embedded capacitors; Processes for embedding capacitors; Case study examples; Summary of materia
Lecture 42 - Chapter-wise summary

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NPTEL Video Course - Electrical Engineering - Power Electronics and Distributed Generation

Subject Co-ordinator - Dr. Vinod John

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course introduction and overview
Lecture 2 - Distributed generation technologies
Lecture 3 - Distributed storage technologies
Lecture 4 - Distribution system protection
Lecture 5 - Circuit breaker coordination
Lecture 6 - Symmetrical component analysis and sequence excitation
Lecture 7 - Modeling of distribution system components
Lecture 8 - Protection components
Lecture 9 - Impact of distributed generation of distribution protection
Lecture 10 - Consumption and distribution grounding
Lecture 11 - Islanding of distribution systems
Lecture 12 - Modeling of islanded distribution systems
Lecture 13 - Distribution system problems and examples
Lecture 14 - Distribution system problems and examples continued
Lecture 15 - Anti-islanding methods
Lecture 16 - Solid state circuit switching
Lecture 17 - Relaying for distributed generation
Lecture 18 - Feeder voltage regulation
Lecture 19 - Grounding, distribution protection coordination problems and examples
Lecture 20 - Ring and network distribution
Lecture 21 - Economic evaluation of DG systems
Lecture 22 - Design for effective initial cost
Lecture 23 - Single phase inverters
Lecture 24 - DC bus design in voltage source inverter
Lecture 25 - Electrolytic capacitor reliability and lifetime
Lecture 26 - Inverter switching and average model
Lecture 27 - Common mode and differential mode model of inverters
Lecture 28 - Two leg single phase inverter
Lecture 29 - Distribution system problems, and examples

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Lecture 30 - DG evaluation problems and examples
Lecture 31 - Switch selection in two level voltage source inverters and loss evaluation
Lecture 32 - Thermal model, management and cycling failure of IGBT modules
Lecture 33 - Semiconductor switch design reliability considerations
Lecture 34 - AC filters for grid connected inverters
Lecture 35 - AC inductor design and need for LCL filter
Lecture 36 - LCL filter design
Lecture 37 - Examples in power electronic design for DG systems
Lecture 38 - Examples in power electronic design for DG systems continued
Lecture 39 - Higher order passive damping design for LCL filters
Lecture 40 - Balance of hardware component for inverters in DG systems

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NPTEL Video Course - Electrical Engineering - Pulse width Modulation for Power Electronic Converters

Subject Co-ordinator - Dr. G. Narayanan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electronic switches
Lecture 2 - DC - DC converters
Lecture 3 - DC - AC converters
Lecture 4 - Multilevel converters - I
Lecture 5 - Multilevel converters - II
Lecture 6 - Applications of voltage source converter - I
Lecture 7 - Applications of voltage source converter - II
Lecture 8 - Applications of voltage source converter - III
Lecture 9 - Purpose of PWM - I
Lecture 10 - Purpose of PWM - II
Lecture 11 - Low switching frequency PWM - I
Lecture 12 - Low switching frequency PWM - II
Lecture 13 - Selective harmonic elimination
Lecture 14 - Off-line optimized pulsewidth modulation
Lecture 15 - Sine-triangle pulsewidth modulation
Lecture 16 - Harmonic injection pulsewidth modulation
Lecture 17 - Bus-clamping pulsewidth modulation
Lecture 18 - Triangle-comparison based PWM for three-phase inverter
Lecture 19 - Concept of space vector
Lecture 20 - Conventional space vector PWM
Lecture 21 - Space vector based bus-clamping PWM
Lecture 22 - Space vector based advanced bus-clamping PWM
Lecture 23 - Harmonic analysis of PWM techniques
Lecture 24 - Analysis of RMS line current ripple using the notion of stator flux ripple
Lecture 25 - Evaluation of RMS line current ripple using the notion of stator flux ripple
Lecture 26 - Analysis and design of PWM techniques from line current ripple perspective
Lecture 27 - Instantaneous and average dc link current in a voltage source inverter
Lecture 28 - DC link current and DC capacitor current in a voltage source inverter
Lecture 29 - Analysis of torque ripple in induction motor drives - I

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Lecture 30 - Analysis of torque ripple in induction motor drives - II
Lecture 31 - Evaluation of conduction loss in three-phase inverter
Lecture 32 - Evaluation of switching loss in three-phase inverter
Lecture 33 - Design of PWM for reduced switching loss in three-phase inverter
Lecture 34 - Effect of dead-time on inverter output voltage for continuous PWM schemes
Lecture 35 - Effect of dead-time on inverter output voltage for bus-clamping PWM schemes
Lecture 36 - Analysis of overmodulation in sine-triangle PWM from space vector perspective
Lecture 37 - Overmodulation in space vector modulated inverter
Lecture 38 - PWM for three-level neutral-point-clamped inverter - I
Lecture 39 - PWM for three-level neutral-point-clamped inverter - II
Lecture 40 - PWM for three-level neutral-point-clamped inverter - III

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NPTEL Video Course - Electrical Engineering - Switched Mode Power Conversion

Subject Co-ordinator - Prof. L. Umanand, Prof. V. Ramanarayanan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to DC-DC converter
Lecture 2 - Diode
Lecture 3 - Controlled Switches
Lecture 4 - Prior Art
Lecture 5 - Inductor
Lecture 6 - Transformer
Lecture 7 - Capacitor
Lecture 8 - Issues related to switches
Lecture 9 - Energy storage - Capacitor
Lecture 10 - Energy storage - Inductor
Lecture 11 - Primitive Converter
Lecture 12 - Non-Isolated converter - I
Lecture 13 - Non-Isolated converter - II
Lecture 14 - Isolated Converters - I
Lecture 15 - Isolated Converters - II
Lecture 16 - Conduction Mode
Lecture 17 - Problem set - I
Lecture 18 - Problem set - II
Lecture 19 - Modeling DC-DC converters
Lecture 20 - State space representation - I
Lecture 21 - State Space representation - II
Lecture 22 - Circuit Averaging - I
Lecture 23 - Circuit Averaging - II
Lecture 24 - State Space Model of Boost Converter
Lecture 25 - DC-DC converter controller
Lecture 26 - Controller Structure
Lecture 27 - PID Controller - I
Lecture 28 - PID Controller - II
Lecture 29 - PID Controller - III

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Lecture 30 - Implementation of PID controller
Lecture 31 - Pulse Width Modulator
Lecture 32 - Controller Design - I
Lecture 33 - Controller Design - II
Lecture 34 - Controllers and Sensing Circuit
Lecture 35 - Regulation of Multiple outputs - I
Lecture 36 - Regulation of Multiple outputs - II
Lecture 37 - Current Control
Lecture 38 - Unity Power Factor Converter
Lecture 39 - Magnetic Design
Lecture 40 - DC-DC Converter Design

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NPTEL Video Course - Electrical Engineering - Basic Electrical Technology

Subject Co-ordinator - Prof. L. Umanand

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Electrical Technology
Lecture 2 - Passive Components
Lecture 3 - Sources
Lecture 4 - Kirchoff's Law
Lecture 5 - Modelling of Circuit - Part 1
Lecture 6 - Modelling of Circuit - Part 2
Lecture 7 - Analysis Using MatLab
Lecture 8 - Sinusoidal steady state
Lecture 9 - Transfer Function and Pole Zero domain
Lecture 10 - Transfer function & pole zero
Lecture 11 - The Sinusoid
Lecture 12 - Phasor Analysis - Part 1
Lecture 13 - Phasor Analysis - Part 2
Lecture 14 - Power Factor
Lecture 15 - Power ports
Lecture 16 - Transformer Basics - Part 1
Lecture 17 - Transformer Basics - Part 2
Lecture 18 - Transformer Basics - Part 3
Lecture 19 - The Practical Transformer - Part 1
Lecture 20 - The Practical Transformer - Part 2
Lecture 21 - The Practical Transformer - Part 3
Lecture 22 - DC Machines - Part 1
Lecture 23 - DC Machines - Part 2
Lecture 24 - DC Generators - Part 1
Lecture 25 - DC Generators - Part 2
Lecture 26 - DC Motors - Part 1
Lecture 27 - DC Motors - Part 2
Lecture 28 - DC Motors - Part 3
Lecture 29 - Three Phase System - Part 1

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Lecture 30 - Three Phase System - Part 2
Lecture 31 - Three Phase System - Part 3
Lecture 32 - Three Phase System - Part 4
Lecture 33 - Three Phase Transformer - Part 1
Lecture 34 - Three Phase Transformer - Part 2
Lecture 35 - Induction Motor - Part 1
Lecture 36 - Induction Motor - Part 2
Lecture 37 - Induction Motor - Part 3
Lecture 38 - Induction Motor - Part 4
Lecture 39 - Synchronous Machine

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NPTEL Video Course - Electrical Engineering - Industrial Drives - Power Electronics

Subject Co-ordinator - Prof. K. Gopakumar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electric Drive
Lecture 2 - Controlled Rectifier - Part-1
Lecture 3 - Controlled Rectifier - Part-2 (Three phase)
Lecture 4 - Controlled Rectifier - Part-3 (Three phase)
Lecture 5 - Controlled Rectifier - Part-4 (Three Phase)
Lecture 6 - Controlled Rectifier - Part-5 (Three Phase)
Lecture 7 - Power Electronics Improvements
Lecture 8 - Four Quadrant Dc to Dc Converter
Lecture 9 - Sine Triangle PWM Control of Converter
Lecture 10 - Front-end Ac-Dc Converter with harmonic control
Lecture 11 - Ac to Dc Converter Close Loop Control Schematic
Lecture 12 - Ac-Dc Converter Close loop Control Block Diagram
Lecture 13 - Design of the Converter Controller & AC to DC
Lecture 14 - Front-End Ac to Dc Converter-Design
Lecture 15 - Front-End Ac to Dc Converter - Simulation study
Lecture 16 - Dc Motor Speed Control - Introduction
Lecture 17 - Dc Motor Speed Control - Block Diagram
Lecture 18 - Dc Motor Speed Control Current Control & S C L
Lecture 19 - Dc-Motor Speed Control Controller Design - Part-1
Lecture 20 - Dc Motor Speed Control Controller Design - Part-2
Lecture 21 - Dc Motor Speed Control Controller Design - Part-3
Lecture 22 - Basics of DC to AC Converter - Part-1
Lecture 23 - Basics of DC to AC Converter - Part-2
Lecture 24 - Inverter Sine Triangle PWM
Lecture 25 - Inverter - Current Hysteresis Controlled PWM
Lecture 26 - C H controlled & Basics of space vector PWM
Lecture 27 - Space Vector PWM - Part-2
Lecture 28 - Space Vector PWM - Part-3
Lecture 29 - Space Vector PWM Signal Generation

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Lecture 30 - Speed Control of Induction Motor - Part-1
Lecture 31 - Speed Control of Induction Motor - Part-2
Lecture 32 - High dynamic performance of I M Drive
Lecture 33 - Dynamic Model of Induction Motor - Part-1
Lecture 34 - Dynamic Model of Induction Motor - Part-2
Lecture 35 - Vector Control of Induction Motor
Lecture 36 - Effect of Switching Time lag in Inverter
Lecture 37 - Power Switch Protection - Snubbers

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NPTEL Video Course - Electrical Engineering - NOC:Design for Internet of Things

Subject Co-ordinator - Prof. T.V. Prabhakar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to IOTs - Part I
Lecture 2 - Introduction to IOTs - Part II
Lecture 3 - Introduction to IOTs - Examples
Lecture 4 - IOT applications - I
Lecture 5 - IOT applications - II
Lecture 6 - Power management in IOT device
Lecture 7 - Introduction to LDO
Lecture 8 - Design with an LDO
Lecture 9 - Introduction to switching regulators
Lecture 10 - Designing with LDO's, switching regulators and case studies - Part I
Lecture 11 - Designing with LDO's, switching regulators and case studies - Part II
Lecture 12 - Designing with LDO's, switching regulators and case studies - Part II
Lecture 13 - Designing with LDO's, switching regulators and case studies - Part IV
Lecture 14 - Power Conditioning with Energy Harvesters - I
Lecture 15 - Power Conditioning with Energy Harvesters - II
Lecture 16 - Power Conditioning with Energy Harvesters - III
Lecture 17 - Battery less power supply and battery life calculation for embedded devices - I
Lecture 18 - Battery less power supply and battery life calculation for embedded devices - II
Lecture 19 - Battery less power supply and battery life calculation for embedded devices - III
Lecture 20 - Introduction to MQTT
Lecture 21 - Quality of Service in MQTT
Lecture 22 - Standards and Security in MQTT
Lecture 23 - Introduction and Implementation of AMQP
Lecture 24 - Implementation of CoAP and MDNS
Lecture 25 - Basics of RFID
Lecture 26 - RFID protocol and applications
Lecture 27 - BLE Security
Lecture 28 - LPWAN technologies
Lecture 29 - Choice of Microcontrollers

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Lecture 30 - Case Study 1 - Joule Jotter
Lecture 31 - Case Study 2 - Cloud Based Systems

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NPTEL Video Course - Electrical Engineering - NOC:Advances in UHV Transmission and Distribution

Subject Co-ordinator - Prof Subba Reddy B

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Advantages of HVAC/DC Transmission, Introduction to Grid Management
Lecture 2 - Transmission system development, Important components of transmission system
Lecture 3 - Insulation coordination, over voltage in power systems
Lecture 4 - Design/selection of insulators, Importance of grading/cc rings
Lecture 5 - Non ceramic insulators performance-service experience
Lecture 6 - Failure of apparatus in the field, importance of reliability and testing
Lecture 7 - Pollution flashover phenomena, modeling etc
Lecture 8 - Planning of High Voltage laboratories
Lecture 9 - Importance of High Voltage testing and techniques employed
Lecture 10 - Basic philosophy of HV testing, tests for various HV apparatus
Lecture 11 - HV testing techniques for various apparatus
Lecture 12 - HV testing on Composite Insulators
Lecture 13 - Surface degradation studies on composite insulators
Lecture 14 - Surface morphological techniques for composite insulators
Lecture 15 - Conductors used for EHV/UHV transmission
Lecture 16 - Corona nad interference on transmission lines
Lecture 17 - Introduction of HTLS conductors and their advantages
Lecture 18 - Mechanical considerations for HV conductors
Lecture 19 - Introduction to Towers and importance of foundations
Lecture 20 - Selection/Design of clearances for HV towers
Lecture 21 - Design Optimization for UHV towers
Lecture 22 - Introduction to 1100kV HVDC
Lecture 23 - Introduction to HV Substations
Lecture 24 - Types of Substations, comparison
Lecture 25 - Insulation coordination, Components in a typical substation
Lecture 26 - Preventive maintenance of Substation
Lecture 27 - Electric and magnetic fields, mitigations techniques
Lecture 28 - Importance of Grounding, reducing Earthing resistance
Lecture 29 - Introduction to the use of Fiber optic cables, OPGW

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Lecture 30 - Introduction to communication and SCADA
Lecture 31 - Precautions and safety measures in substation
Lecture 32 - Electrical hazards, minimum clearances in substation
Lecture 33 - Importance of Generation of HVDC in the laboratory
Lecture 34 - Importance of Generation of HVAC, Impulse Voltage and Currents in the laboratory
Lecture 35 - Measurements of High Voltages
Lecture 36 - Measurements of High Voltages (Continued...)
Lecture 37 - Introduction to digital recorders, measurement
Lecture 38 - Upgradation/uprating of transmission lines- advantages
Lecture 39 - Upgradation/uprating of transmission lines- advantages (Continued...)
Lecture 40 - Summary of the course

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NPTEL Video Course - Electrical Engineering - NOC:Mathematical Methods and Techniques in Signal Processing

Subject Co-ordinator - Prof. Shayan Srinivasa Garani

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to signal processing
Lecture 2 - Basics of signals and systems
Lecture 3 - Linear time-invariant systems
Lecture 4 - Modes in a linear system
Lecture 5 - Introduction to state space representation
Lecture 6 - State space representation
Lecture 7 - Non-uniqueness of state space representation
Lecture 8 - Introduction to vector space
Lecture 9 - Linear independence and spanning set
Lecture 10 - Unique representation theorem
Lecture 11 - Basis and cardinality of basis
Lecture 12 - Norms and inner product spaces
Lecture 13 - Inner products and induced norm
Lecture 14 - Cauchy Schwartz inequality
Lecture 15 - Orthonormality
Lecture 16 - Problem on sum of subspaces
Lecture 17 - Linear independence of orthogonal vectors
Lecture 18 - Hilbert space and linear transformation
Lecture 19 - Gram Schmidt orthonormalization
Lecture 20 - Linear approximation of signal space
Lecture 21 - Gram Schmidt orthogonalization of signals
Lecture 22 - Problem on orthogonal complement
Lecture 23 - Problem on signal geometry (4-QAM)
Lecture 24 - Basics of probability and random variables
Lecture 25 - Mean and variance of a random variable
Lecture 26 - Introduction to random process
Lecture 27 - Statistical specification of random processes
Lecture 28 - Stationarity of random processes
Lecture 29 - Problem on mean and variance

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Lecture 30 - Problem on MAP Detection
Lecture 31 - Fourier transform of dirac comb sequence
Lecture 32 - Sampling theorem
Lecture 33 - Basics of multirate systems
Lecture 34 - Frequency representation of expanders and decimators
Lecture 35 - Decimation and interpolation filters
Lecture 36 - Fractional sampling rate alterations
Lecture 37 - Digital filter banks
Lecture 38 - DFT as filter bank
Lecture 39 - Noble Identities
Lecture 40 - Polyphase representation
Lecture 41 - Efficient architectures for interpolation and decimation filters
Lecture 42 - Problems on simplifying multirate systems using noble identities
Lecture 43 - Problem on designing synthesis bank filters
Lecture 44 - Efficient architecture for fractional decimator
Lecture 45 - Multistage filter design
Lecture 46 - Two-channel filter banks
Lecture 47 - Amplitude and phase distortion in signals
Lecture 48 - Polyphase representation of 2-channel filter banks, signal flow graphs and perfect reconstructio
Lecture 49 - M-channel filter banks
Lecture 50 - Polyphase representation of M-channel filter bank
Lecture 51 - Perfect reconstruction of signals
Lecture 52 - Nyquist and half band filters
Lecture 53 - Special filter banks for perfect reconstruction
Lecture 54 - Introduction to wavelets
Lecture 55 - Multiresolution analysis and properties
Lecture 56 - The Haar wavelet
Lecture 57 - Structure of subspaces in MRA
Lecture 58 - Haar decomposition - 1
Lecture 59 - Haar decomposition - 2
Lecture 60 - Wavelet Reconstruction
Lecture 61 - Haar wavelet and link to filter banks
Lecture 62 - Demo on wavelet decomposition
Lecture 63 - Problem on circular convolution
Lecture 64 - Time frequency localization
Lecture 65 - Basic analysis
Lecture 66 - Basic Analysis
Lecture 67 - Fourier series and notions of convergence
Lecture 68 - Convergence of Fourier series at a point of continuity

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Lecture 69 - Convergence of Fourier series for piecewise differentiable periodic functions
Lecture 70 - Uniform convergence of Fourier series of piecewise smooth periodic function
Lecture 71 - Convergence in norm of Fourier series
Lecture 72 - Convergence of Fourier series for all square integrable periodic functions
Lecture 73 - Problem on limits of integration of periodic functions
Lecture 74 - Matrix Calculus
Lecture 75 - KL transform
Lecture 76 - Applications of KL transform
Lecture 77 - Demo on KL Transform
Lecture 78 - Live Session
Lecture 79 - Live Session 2

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NPTEL Video Course - Electrical Engineering - NOC:Electronics Enclosures Thermal Issues

Subject Co-ordinator - Prof. N. V Chalapathi Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electronic Equipment Thermal issues
Lecture 2 - Practical Examples - 1
Lecture 3 - Practical Examples - 2
Lecture 4 - CEDT worked examples - 1
Lecture 5 - CEDT worked examples - 2
Lecture 6 - Text book theory
Lecture 7 - Sample heat sinks
Lecture 8 - Published correlations - 1
Lecture 9 - Published correlations - 2
Lecture 10 - Parallel combined effects
Lecture 11 - Mounting of packages
Lecture 12 - Combined Rth of devices
Lecture 13 - Schonholzer moduls
Lecture 14 - 1972 model paper
Lecture 15 - Jensen model
Lecture 16 - Thermal management - 1
Lecture 17 - Thermal management - 2
Lecture 18 - Round up of full model
Lecture 19 - Fan cooling
Lecture 20 - Thermo-electric cooling
Lecture 21 - On-the-net DIY work
Lecture 22 - Practical video
Lecture 23 - Lecture 23
Lecture 24 - Lecture 24
Lecture 25 - Lecture 25
Lecture 26 - Lecture 26
Lecture 27 - Real packages
Lecture 28 - Prior art
Lecture 29 - OTS standard profiles

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Lecture 30 - CAD detailed design of profiles
Lecture 31 - Round up
Lecture 32 - 4X Peltier Cooler
Lecture 33 - Manufacturing Video
Lecture 34 - Peltier heat sink

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NPTEL Video Course - Electrical Engineering - NOC:Integrated Circuits, MOSFETs, Op-Amps and their Applicatior

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Integrated Circuits (IC) Technology
Lecture 2 - Introduction to fabrication of IC
Lecture 3 - Introduction to IC fabrication
Lecture 4 - Introduction to IC fabrication (Continued...)
Lecture 5 - Introduction to the fabrication of sensors
Lecture 6 - Introduction to fabrication technology
Lecture 7 - Introduction to fabrication technology (Continued...)
Lecture 8 - Introduction to fabrication technology (Continued...)
Lecture 9 - Introduction to fabrication technology (Continued...)
Lecture 10 - Introduction to fabrication technology (Continued...)
Lecture 11 - Process flow for Fabrication of MOSFETs
Lecture 12 - Operation of Enhancement type MOSFET
Lecture 13 - Operation of Depletion type MOSFET
Lecture 14 - MOSFETs Characteristics and Applications (Current Mirrors)
Lecture 15 - Introduction to Operational Amplifiers
Lecture 16 - Operational Amplifier Characteristics
Lecture 17 - Operational Amplifier Characteristics (Continued...)
Lecture 18 - Characteristics of an op-amp (Continued...)
Lecture 19 - Operational Amplifier Configarations
Lecture 20 - Operational Amplifier Configarations (Continued...)
Lecture 21 - Applications of Operational Amplifier
Lecture 22 - Applications of Operational Amplifier
Lecture 23 - Applications of Operational Amplifier
Lecture 24 - Introduction to Passive and Active Filters and op-amp as Low Pass Filter
Lecture 25 - Operational Amplifier as a High Pass Filter
Lecture 26 - Operational Amplifier as a Band Pass and Band Reject Filter
Lecture 27 - Introduction to Oscillator
Lecture 28 - RC Phase Shift Oscillator using Op-amp
Lecture 29 - Wein Bridge Oscillator using Op-amp

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Lecture 30 - Hartley and Colpitts Oscillator using Op-amp
Lecture 31 - Working of Crystal Oscillators
Lecture 32 - Construction and Operation of UJT Relaxation Oscillators
Lecture 33 - Introduction to Noise and its Types
Lecture 34 - Analysis of Data Sheets of an Op-Amp
Lecture 35 - Analysis of Data Sheets of an Op-Amp (Continued...)
Lecture 36 - Analysis of Data Sheets of an Op-Amp (Continued...)
Lecture 37 - Experiment - Introduction to Laboratory Equipment
Lecture 38 - Experiment - Measurement of Active and Passive elements using Multimeter
Lecture 39 - Experiment - Working with Laboratory Equipment
Lecture 40 - Experiment - Working with Laboratory Equipment
Lecture 41 - Experiment - Op-Amp Characteristics
Lecture 42 - Experiment - Op-Amp Characteristics
Lecture 43 - Experiment - Op-Amp Characteristics
Lecture 44 - Experiment - Op-Amp as Inverting Amplifier
Lecture 45 - Experiment - Op-Amp as Non-Inverting Amplifier
Lecture 46 - Experiment - To study input and output voltage range of an Op-Amp
Lecture 47 - Experiment - Differential amplifier using op-amp
Lecture 48 - Experiment - To study the gain of instrumentation amplifier
Lecture 49 - Experiment - Summing amplifier using op-amp
Lecture 50 - Experiment - To study op-amp based comparator
Lecture 51 - Experiment - To study op-amp based integrator and differentiator
Lecture 52 - Experiment - Study of passive low pass filter
Lecture 53 - Experiment - Op-amp based active low pass filter
Lecture 54 - Experiment - Passive and active high pass filter
Lecture 55 - Experiment - Introduction to experimental set-up of band pass filter
Lecture 56 - Experiment - Passive and active band pass filter
Lecture 57 - Experiment - Introduction to experimental set-up for band reject filter
Lecture 58 - Experiment - Active band reject filter
Lecture 59 - Experiment - Peak detector circuit using Op-Amp

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NPTEL Video Course - Electrical Engineering - NOC:Semiconductor Devices and Circuits

Subject Co-ordinator - Prof. Sanjiv Sambandan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quantum Mechanics
Lecture 2 - Quantum Mechanics
Lecture 3 - Quantum Mechanics
Lecture 4 - Solids
Lecture 5 - Solids
Lecture 6 - Solids
Lecture 7 - Solids
Lecture 8 - Solids
Lecture 9 - Density of States
Lecture 10 - Density of States (Continued...), Fermi Function
Lecture 11 - Fermi Function - Carrier Concentration
Lecture 12 - Doping
Lecture 13 - Doping (Continued...)
Lecture 14 - Recombination and Generation
Lecture 15 - Recombination and Generation (Continued...)
Lecture 16 - Recombination and Generation (Continued...), Charge Transport
Lecture 17 - Charge Transport (Continued...)
Lecture 18 - Continuity Equation
Lecture 19 - Junctions
Lecture 20 - Metal Semiconductor Junctions
Lecture 21 - Schottky Contact
Lecture 22 - Schottky Contact
Lecture 23 - Schottky Contact
Lecture 24 - Schottky Contact
Lecture 25 - PN Junctions
Lecture 26 - PN Junctions
Lecture 27 - PN Junctions
Lecture 28 - PN Junctions
Lecture 29 - Bipolar Junction Transistors (BJT)

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Lecture 30 - BJT
Lecture 31 - BJT
Lecture 32 - Metal Oxide Semiconductor Capacitor (MOSCAP)
Lecture 33 - MOSCAP (Continued...)
Lecture 34 - MOSCAP
Lecture 35 - MOSCAP
Lecture 36 - MOSFET
Lecture 37 - MOSFET
Lecture 38 - MOSFET
Lecture 39 - MOSFET
Lecture 40 - Subthreshold swing, Additional concepts
Lecture 41 - Trapped charge, Body-bias
Lecture 42 - Scaling of MOSFETs
Lecture 43 - Scaling of MOSFETs (Continued...), Leakage currents in MOSFETs
Lecture 44 - MOSFET characterization
Lecture 45 - MOSFET characterization
Lecture 46 - MOSFET as a switch
Lecture 47 - MOSFET as a switch (Continued...)
Lecture 48 - Amplifiers using MOSFET
Lecture 49 - Amplifiers using MOSFET (Continued...)
Lecture 50 - Circuits
Lecture 51 - Introduction
Lecture 52 - Thin Film Transistors
Lecture 53 - Tutorials Session - 1
Lecture 54 - Tutorials Session - 2
Lecture 55 - Tutorials Session - 3

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NPTEL Video Course - Electrical Engineering - NOC:Fabrication Techniques for MEMs-based Sensors: Clinical Per

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microengineering Devices
Lecture 2 - Introduction to Microengineering Devices (Continued...)
Lecture 3 - Introduction to Microengineering Devices (Continued...)
Lecture 4 - Silicon, silicon di-oxide and photolithography
Lecture 5 - Silicon, silicon di-oxide and photolithography (Continued...)
Lecture 6 - Physical Vapour Deposition
Lecture 7 - Physical Vapour Deposition (Continued...)
Lecture 8 - Photolithography
Lecture 9 - Mask Aligner
Lecture 10 - Mask Aligner (Continued...)
Lecture 11 - Micromachining
Lecture 12 - Micromachining
Lecture 13 - Micromachining
Lecture 14 - Micromachining
Lecture 15 - Chemical Vapour Deposition
Lecture 16 - Typical Microfabricated Devices for Biomedical Applications
Lecture 17 - Cancer Diagnostic Tool
Lecture 18 - Process flow for Fabrication of Micro Heater
Lecture 19 - Process flow for Fabrication of Interdigited Electrodes
Lecture 20 - Process flow for Fabrication of Interdigited Electrodes (Continued...)
Lecture 21 - Process flow for Fabrication of ETM phenotyping
Lecture 22 - Process flow for Fabrication of Piezo canteliver
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27 - Microchip for Rapid Drug Screening
Lecture 28 - Microchip for Rapid Drug Screening (Continued...)
Lecture 29 - A Microfluidic chip for rapid bacterial antibiotic Susceptibility testing

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Lecture 30 - Smart Catheter
Lecture 31 - Smart Catheter
Lecture 32 - Smart Catheter
Lecture 33 - Tissue and Cell Culture Techniques
Lecture 34 - Clean Room
Lecture 35 - GLP
Lecture 36 - Introduction to Equipments
Lecture 37 - Gowning Procedure for using Biological Lab Setup
Lecture 38 - Introduction to Equipments
Lecture 39 - Introduction to Equipments
Lecture 40 - Introduction to Equipments
Lecture 41 - Function generator, Multimeter, Sampling, LabVIEW, NI-CDAQ
Lecture 42 - Introduction to Equipments
Lecture 43 - Introduction to Equipments
Lecture 44 - Introduction to Equipments
Lecture 45 - Introduction to Equipments
Lecture 46 - Introduction to Equipments
Lecture 47 - Introduction to Equipments
Lecture 48 - Introduction to Equipments
Lecture 49 - Introduction to Equipments
Lecture 50 - Introduction to Equipments
Lecture 51 - PDMS Moulding
Lecture 52 - 3D Printing
Lecture 53 - Introduction to Fabricated Sensors
Lecture 54 - Simulation
Lecture 55 - Simulation

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NPTEL Video Course - Electrical Engineering - NOC:Op-Amp Practical Applications: Design, Simulation and Imple

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction/Summary on Op-amps
Lecture 2 - Introduction/Summary on Op-amps (Continued...)
Lecture 3 - Introduction/Summary on Op-amps (Continued...)
Lecture 4 - Effect of Loading and Input Impedance - Part 1
Lecture 5 - Effect of Loading and Input Impedance - Part 2
Lecture 6 - Effect of Loading and Input Impedance - Part 3
Lecture 7 - Effect of Loading and Input Impedance - Part 4
Lecture 8 - Introduction to an Analog Circuit Development Board (TI ASLK Pro)
Lecture 9 - Op-amp Applications
Lecture 10 - Op-amp Applications
Lecture 11 - Op-amp Applications
Lecture 12 - Op-amp Circuits using Diodes
Lecture 13 - Understanding the Range of Feedback Amplifiers
Lecture 14 - Op-amps as Phase Shift Oscillator
Lecture 15 - Op-amp as Wein Bridge Oscillator
Lecture 16 - Op-amp as Hartley Oscillator
Lecture 17 - Op-amp as Colpitts Oscillator
Lecture 18 - Op-amps as Comparator
Lecture 19 - Op-amp with Positive Feedback
Lecture 20 - Op-amp with Positive Feedback
Lecture 21 - Op-amp with Positive Feedback
Lecture 22 - Op-amp with Positive Feedback
Lecture 23 - Op-amp based Voltage Controlled Current Source
Lecture 24 - Measure of Unknown Resistance by Constant Current Drive Circuit Implemented using Op-amp
Lecture 25 - Design and Development of Temperature Controlled Circuit using Op-amp as ON-OFF, Proportional ar
Lecture 26 - Implemetation of Error Detector Cirucit and Signal Conditioning Circuit for Temperature Control
Lecture 27 - Implementation of Plant/Heating Circuit and ON-OFF Controller
Lecture 28 - Implementation of P and PI Controllers
Lecture 29 - Experiment on Controlling the Temperature on the Plant using different Controllers

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Lecture 30 - Experiment
Lecture 31 - Introduction to ECG Experiment
Lecture 32 - Desing and Implementation of ECG Preprocessing Stage - Part 1
Lecture 33 - Desing and Implementation of ECG Preprocessing Stage - Part 2
Lecture 34 - Desing and Implementation of ECG Preprocessing Stage - Part 3
Lecture 35 - Desing and Implementation of ECG Preprocessing Stage - Part 4
Lecture 36 - Desing and Implementation of Peak Detetor and Thresholding Circuit for ECG Signal Conditioning
Lecture 37 - Live Demonstration on ECG Signal Acquistion, Conditioning and Measurement of BPM
Lecture 38 - Understanding Analog Multipliers using Development Board
Lecture 39 - Application
Lecture 40 - Introdution to Data-Acquisition
Lecture 41 - Analog to Digital Conversion Circuits and Experiment on 2-bit Flash Type ADC
Lecture 42 - Digital to Analog Conversion Circuits and Experiment on 4-bit R-2R DAC
Lecture 43 - DAC Basics using Development Board - Introduction
Lecture 44 - Understanding DAC 7821 Datasheet
Lecture 45 - Basic DAC Experiment on Variable Gain Amplifier
Lecture 46 - Understanding DAC
Lecture 47 - Introduction to CDAQ (Compact DAQ)
Lecture 48 - Software-in-Loop based Temperature Controller using CDAQ and LabVIEW

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NPTEL Video Course - Electrical Engineering - NOC:Physical Modelling for Electronics Enclosures using Rapid p

Subject Co-ordinator - Prof. N. V Chalapathi Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Products prototyping
Lecture 2 - Prototype concepts
Lecture 3 - Physical simulation
Lecture 4 - Rapid Prototyping
Lecture 5 - Products detailing
Lecture 6 - Advantages of Design Modelling
Lecture 7 - Sample product concept
Lecture 8 - Product sample exercise 1
Lecture 9 - Exercise in product sample 2
Lecture 10 - Integration of components 1
Lecture 11 - Components integration in models
Lecture 12 - 3D printing detail 1
Lecture 13 - 3D printing detail 2
Lecture 14 - 3D print assembly design
Lecture 15 - Heat spreader to 3D print
Lecture 16 - Metallic, 3D, build up 1
Lecture 17 - 3D build up 2
Lecture 18 - 3D design 1 from Photo snap
Lecture 19 - 3D design 2 from Photo snap
Lecture 20 - 3D Laser cuts 1, prints
Lecture 21 - 3D Laser cuts 2, open source public prints
Lecture 22 - Demo of 3D Part print
Lecture 23 - Building a model 1
Lecture 24 - Building a model 2
Lecture 25 - Common place objects
Lecture 26 - Materials
Lecture 27 - Future 3D In biology
Lecture 28 - Product clamp variants
Lecture 29 - Product clamp build up

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Lecture 30 - Multi direction features
Lecture 31 - Multi direction features (Continued...)
Lecture 32 - Fastening detail
Lecture 33 - Flat objects
Lecture 34 - Modularity
Lecture 35 - Creative design work
Lecture 36 - Creative designs
Lecture 37 - Using flat features
Lecture 38 - Organic shapes
Lecture 39 - Simulation for alternate use

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NPTEL Video Course - Electrical Engineering - NOC:Recent Advances in Transmission Insulators

Subject Co-ordinator - Prof Subba Reddy B

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Transmission and distribution Insulators
Lecture 2 - Manufacturing process for Ceramic/glass Insulators
Lecture 3 - Manufacturing process for Polymeric Insulators
Lecture 4 - Design Considerations of Transmission Insulators
Lecture 5 - Field experience of Ceramic/Glass and Polymeric Insulators
Lecture 6 - Comparison of Transmission Insulators
Lecture 7 - Environmental issues with transmission Insulators
Lecture 8 - Reliability and Philosophy of Testing
Lecture 9 - Testing of Ceramic, Glass and Composite Insulators
Lecture 10 - Cleaning methods adopted for Insulators
Lecture 11 - Cleaning methods adopted for Insulators (Continued...)
Lecture 12 - Coating techniques for Insulators
Lecture 13 - Introduction to Hybrid Insulators

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NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Semiconductor Devices

Subject Co-ordinator - Prof. Digbijoy N. Nath

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to semiconductors
Lecture 2 - Introduction to energy bands
Lecture 3 - Fundamentals of band structure
Lecture 4 - Band structure (Continued...) and Fermi-Dirac distribution
Lecture 5 - Density of states
Lecture 6 - Doping and intrinsic carrier concentration
Lecture 7 - Equilibrium carrier concentration
Lecture 8 - Temperature-dependence of carrier concentration
Lecture 9 - High doping effects and incomplete ionization
Lecture 10 - Carrier scattering and mobility
Lecture 11 - Low-field and high-field transport, introduction to diffusion
Lecture 12 - Drift-diffusion and trap statistics
Lecture 13 - Current continuity equation
Lecture 14 - Continuity equation (Continued...) and introduction to p-n junction
Lecture 15 - p-n junction under equilibrium
Lecture 16 - p-n junction under equilibrium (Continued...)
Lecture 17 - p-n junction under bias
Lecture 18 - p-n junction under bias (Continued...)
Lecture 19 - p-n junction
Lecture 20 - Application of p-n junctions
Lecture 21 - Breakdown of junction and C-V profiling
Lecture 22 - Introduction to Schottky junction
Lecture 23 - Schottky junction under equilibrium
Lecture 24 - Schottky junction under bias
Lecture 25 - Introduction to transistors
Lecture 26 - Basics of BJT
Lecture 27 - Working of BJT
Lecture 28 - Working of BJT (Continued...)
Lecture 29 - Delays in BJT

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Lecture 30 - MOS
Lecture 31 - MOS
Lecture 32 - Ideal MOS system
Lecture 33 - MOS C-V in more details
Lecture 34 - MOSFET - An introduction
Lecture 35 - Gradual Channel Approximation
Lecture 36 - Substrate bias effect and subthreshold conduction in MOSFET
Lecture 37 - Short Channel Effects in MOSFET
Lecture 38 - Introduction to compound semiconductors
Lecture 39 - Basics of heterojunctions
Lecture 40 - Band diagram of heterojunctions
Lecture 41 - Heterojunctions (Continued....)
Lecture 42 - Heterojunction transistors
Lecture 43 - III-nitrides
Lecture 44 - Solar cell basics
Lecture 45 - Solar cell (Continued...)
Lecture 46 - Solar cell
Lecture 47 - Basics of photodetectors
Lecture 48 - Photodetectors
Lecture 49 - Junction photodetectors
Lecture 50 - Basics of recombination
Lecture 51 - Basics of LED
Lecture 52 - LED
Lecture 53 - Visible LED
Lecture 54 - Transistors for power electronics
Lecture 55 - Transistors for power electronics (Continued...) and for RF electronics
Lecture 56 - Transistors for RF (Continued...) and transistors for Memory
Lecture 57 - Basics of microelectronic fabrication
Lecture 58 - Microelectronic fabrication (Continued...)
Lecture 59 - Summary

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NPTEL Video Course - Electrical Engineering - NOC:Advanced IOT Applications

Subject Co-ordinator - Prof. T V Prabhakar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of localization using IoT sensors
Lecture 2 - Outdoor localization without GPS - I
Lecture 3 - Outdoor localization without GPS - II
Lecture 4 - Outdoor localization using elevation - pressure mapping
Lecture 5 - Localization using IMU sensors - I
Lecture 6 - Localization using IMU sensors - II
Lecture 7 - Localization using IMU sensors - III
Lecture 8 - RFID based localization - I
Lecture 9 - RFID based localization - II
Lecture 10 - Simulation of simple algorithms for object detection
Lecture 11 - Building smart vehicle for collision avoidance
Lecture 12 - Basic computer vision algorithms - Part 1
Lecture 13 - Basic computer vision algorithms - Part 2
Lecture 14 - Code walkthrough of computer vision algorithm
Lecture 15 - Introduction to LiDAR
Lecture 16 - Range estimation and Obstacle avoidance
Lecture 17 - Introduction to vehicle platooning
Lecture 18 - Building blocks for autonomous vehicles - 1
Lecture 19 - Building blocks for autonomous vehicles - 2
Lecture 20 - On Board Diagnostics and protocols
Lecture 21 - Diagnostic services and fuel-injection ratio control unit
Lecture 22 - Real time event processing and Anomaly detection
Lecture 23 - OBD-II and stream processing demonstration
Lecture 24 - Speech recognition - Part 1
Lecture 25 - Speech recognition - Part 2
Lecture 26 - Speech recognition - Part 3
Lecture 27 - Speech recognition - Part 4
Lecture 28 - Device Security - Part 1
Lecture 29 - Device Security - Part 2

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Lecture 30 - Device Security - Part 3
Lecture 31 - Need for air quality monitoring
Lecture 32 - Air quality
Lecture 33 - Introduction to air quality sensors
Lecture 34 - Calibration techniques for IoT air quality sensors
Lecture 35 - Sensor types
Lecture 36 - Air quality
Lecture 37 - Air quality
Lecture 38 - Air quality
Lecture 39 - Air quality
Lecture 40 - Introduction to First Responder networks
Lecture 41 - First Responders - Applications - Part 1
Lecture 42 - First Responders - Applications - Part 2
Lecture 43 - Cargo monitoring for tamper detection - Part 1
Lecture 44 - Cargo monitoring for tamper detection - Part 2

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NPTEL Video Course - Electrical Engineering - NOC:Electronic Systems for Cancer Diagnosis

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Tissue and Cell Culture Techniques
Lecture 2 - Tissue and Cell Culture Techniques
Lecture 3 - Tissue and Cell Culture Techniques
Lecture 4 - Cleanroom Equipments
Lecture 5 - Cleanroom Equipments (Continued...)
Lecture 6 - Introduction to photolithography
Lecture 7 - Photolithography
Lecture 8 - Photolithography
Lecture 9 - Micromachining Techniques
Lecture 10 - Breast Cancer and Oral Cancer Statistics
Lecture 11 - Fabrication of MEMs-based Biochip for cancer diagnosis
Lecture 12 - Fabrication of MEMs-based Biochip for cancer diagnosis (Continued...)
Lecture 13 - Fabrication of Piezoresistive Sensor
Lecture 14 - Fabrication of Piezoresistive Sensor (Continued...)
Lecture 15 - Fabrication of SU-8 pillar on piezoresistive Sensor
Lecture 16 - Portable Cancer Diagnostic Tool Using a Disposable MEMS-Based Biochip
Lecture 17 - Mechanical Phenotyping of Breast Cancer using MEMS
Lecture 18 - Electrical characterization of Breast Tissue Cores
Lecture 19 - Fabrication of MEMS-based sensor for electro-mechanical phenotyping of breast cancer
Lecture 20 - Fabrication of electro-mechanical sensor (Continued...)
Lecture 21 - Assemby of the electro-mechanical sensor
Lecture 22 - Silicon substrate devices for breast cancer diagnosis
Lecture 23 - Understanding the methods and mechanism to study cell morphology
Lecture 24 - Cytology - A detail study on Spin Coater and Cytospin
Lecture 25 - Techniques in oral cytology studies
Lecture 26 - Techniques in cell morphology analysis
Lecture 27 - Comparitive study on diagnostic tools for oral cancer screening
Lecture 28 - Basic building blocks of Electronics System
Lecture 29 - Basic building blocks of Electronics System

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Lecture 30 - Basic building blocks of Electronics System
Lecture 31 - Basic building blocks of Electronics System
Lecture 32 - Basic building blocks of Electronics System
Lecture 33 - Basic building blocks of Electronics System
Lecture 34 - Basic building blocks of Electronics System
Lecture 35 - Basic building blocks of Electronics System
Lecture 36 - Basic building blocks of Electronics System
Lecture 37 - Etching Process and Figure of Merits
Lecture 38 - ECG Signal Processing to calculate BPM
Lecture 39 - ECG Signal Processing to calculate BPM (Continued...)
Lecture 40 - ECG Signal Processing to calculate BPM (Continued...)
Lecture 41 - ECG Signal Processing to calculate BPM (Continued...)
Lecture 42 - ECG Signal Processing to calculate BPM (Continued...)
Lecture 43 - ECG Signal Processing to calculate BPM [Continued...)
Lecture 44 - MEMS based Force Sensor for Catheter Contact Force Measurement
Lecture 45 - 3D Printing
Lecture 46 - 3D Fabrication Techniques
Lecture 47 - Gowning Procedure in Clean Room
Lecture 48 - Introduction to Equipments
Lecture 49 - PDMS Moulding procedure
Lecture 50 - Introduction to Equipments
Lecture 51 - Introduction to Equipments
Lecture 52 - Micromanipulator
Lecture 53 - Biosafety Cabinet and Ultrasonicbath
Lecture 54 - Incubator Shaker
Lecture 55 - Hotplate and Microcentrifuge
Lecture 56 - Autoclave
Lecture 57 - Impedance Analyser
Lecture 58 - Rapid Prototyping using 3D Printer
Lecture 59 - Etching Process
Lecture 60 - Electronic System for Drug Screening
Lecture 61 - Introduction to Equipments
Lecture 62 - Introduction to Equipments
Lecture 63 - Electronic Module for Gas sensor
Lecture 64 - Fabrication process flow for a metal oxide gas sensor
Lecture 65 - MEMS Simulation using Comsol Multiphysics
Lecture 66 - Introduction to COMSOL Multiphysics
Lecture 67 - COMSOL Examples for MEMS Applications
Lecture 68 - COMSOL Examples for MEMS Applications (Continued...)

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Lecture 69 - Demonstration of Thermal Acutator and Understanding of Application Builder
Lecture 70 - Closed loop control of temperature sensor
Lecture 71 - Experimental Set-up of closed loop control of temperature sensor

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NPTEL Video Course - Electrical Engineering - NOC:Electronic Modules for Industrial Applications using Op-Amp

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Op-amp
Lecture 2 - Introduction Wafer Manufacturing Process and Clean room Protocols
Lecture 3 - Introduction to Fabrication Process Technology and Op-amp
Lecture 4 - Op-amp Characteristics and Datasheet Parameters
Lecture 5 - Overview of Active Filters and Oscillators
Lecture 6 - Overview of Op-amp Oscillators
Lecture 7 - Introduction to ECG Experiment
Lecture 8 - Design and Implementation of ECG Preprocessing Stage - Part 1
Lecture 9 - Design and Implementation of ECG Preprocessing Stage - Part 2
Lecture 10 - Design and Implementation of ECG Preprocessing Stage - Part 3
Lecture 11 - Design and Implementation of ECG Preprocessing Stage - Part 4
Lecture 12 - Design and Implementation of Peak Detector and Thresholding Circuit for ECG Signal Conditioning
Lecture 13 - Experiment
Lecture 14 - Application
Lecture 15 - Photolithography
Lecture 16 - Understanding the process of photolithography
Lecture 17 - Photolithography
Lecture 18 - Photolithography
Lecture 19 - Fabrication of Piezoresistive Sensor
Lecture 20 - Fabrication of MEMS based Catheter Contact Force Sensor
Lecture 21 - Design of Speed Control of DC Motor
Lecture 22 - Design of Speed Control of DC Motor
Lecture 23 - Design of Speed Control of DC Motor
Lecture 24 - Design of Speed Control of DC Motor
Lecture 25 - Design of Speed Control of DC Motor
Lecture 26 - Design of Speed Control of DC Motor
Lecture 27 - Design of Speed Control of DC Motor
Lecture 28 - Design of Speed Control of DC Motor
Lecture 29 - Design of Speed Control of a DC Motor using Op-amp

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Lecture 30 - Design of Speed Control of a DC Motor using Op-amp
Lecture 31 - Design of Speed Control of a DC Motor using DAQ - Part 1
Lecture 32 - Design of Speed Control of a DC Motor using DAQ - Part 2
Lecture 33 - Design of Speed Control of a DC Motor using DAQ - Part 3
Lecture 34 - Introduction to Hot-Wire Anemometer
Lecture 35 - Signal-conditioning Circuit for Hot-Wire Anemometer
Lecture 36 - Signal-conditioning Circuit for Hot-Wire Anemometer Part 2
Lecture 37 - Signal-conditioning Circuit for Hot-Wire Anemometer
Lecture 38 - Signal-conditioning Circuit for Hot-Wire Anemometer
Lecture 39 - Introduction to Gas Sensors
Lecture 40 - Fabrication Process for Gas Sensor
Lecture 41 - Signalconditioning Circuit for Operating Heater Voltage of MQ-7 Gas Sensor - Part 1
Lecture 42 - Signalconditioning Circuit for Operating Heater Voltage of MQ-7 Gas Sensor - Part 2
Lecture 43 - Signalconditioning Circuit for Operating Heater Voltage of MQ-7 Gas Sensor - Part 3
Lecture 44 - Fundamentals of Electrophysiological signals
Lecture 45 - Fundamentals of EEG Signal
Lecture 46 - Application of EEG Signal for Detection of Hearing Loss
Lecture 47 - Closed loop control of temperature using DAQ and LabVIEW
Lecture 48 - Experimental Set-up of closed loop control of temperature sensor
Lecture 49 - Introduction to MEMS Simulation using Comsol Multiphysics
Lecture 50 - Introduction to COMSOL Multiphysics
Lecture 51 - COMSOL Examples for MEMS Applications
Lecture 52 - COMSOL Examples for MEMS Applications (Continued...)
Lecture 53 - Demonstration of Thermal Acutator and Understanding of Application Builder

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NPTEL Video Course - Electrical Engineering - NOC:Sensors and Actuators

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sensors - Part 1
Lecture 2 - Sensors - Part 2
Lecture 3 - Sensors - Part 3
Lecture 4 - Sensors - Part 4
Lecture 5 - Sensors - Part 5
Lecture 6 - Recent Microsensors based system
Lecture 7 - Recent Microsensors based system
Lecture 8 - Microfabrication Basics
Lecture 9 - Introduction to cleanroom
Lecture 10 - Cleanroom Protocols
Lecture 11 - Introduction to Cleanroom Equipments
Lecture 12 - Fabrication Process Flow of Microheater and Micromachining
Lecture 13 - Wafer Bonding and PDMS moulding
Lecture 14 - Overview of MEMS based sensors
Lecture 15 - Introduction to Cleanroom Equipments
Lecture 16 - Introduction to Cleanroom Equipments
Lecture 17 - Process Sensor Process Flow, Cell based Diagnosis Device
Lecture 18 - Basics of Patterning and Drug Screening Device
Lecture 19 - MEMS applications in automobile system
Lecture 20 - Arduino Interfacing for Sensors and Actuators
Lecture 21 - Demonstration of DC Motor as an actuator
Lecture 22 - Demonstration of peristaltic pump using Arduino
Lecture 23 - Demonstration of PDMS Patterning
Lecture 24 - Crystal Orientation and Si-SiO2 interface
Lecture 25 - Surface Profilometry and Physical Vapour Deposition Techniques
Lecture 26 - Introduction to COMSOL Multiphysics and Modelling Examples
Lecture 27 - Demonstration of Thermal Actuators using COMSOL
Lecture 28 - Demonstration of MQ3 Gas sensor using Arduino
Lecture 29 - Photolithography - Part 1

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Lecture 30 - Signal Conditioning Circuit for Temperature Sensors
Lecture 31 - Demonstration of Microheaters in COMSOL Multiphysics
Lecture 32 - Introduction to Cleanroom facilities for biomedical applications
Lecture 33 - Physical Deposition Techniques
Lecture 34 - Demonstration on peristaltic pump in cleanroom
Lecture 35 - Installation of Oxygen Plasma System
Lecture 36 - Demonstration of IR Based Sensor using Arduino
Lecture 37 - Illustration of fabricated Microfluidic Device for biochips with PDMS moulding
Lecture 38 - Photolithography - Part 2
Lecture 39 - Photolithography - Part 3
Lecture 40 - Introduction and Demonstration of Shape Memory Alloy
Lecture 41 - Applications of Shape Memory Alloy as a light weight actuators
Lecture 42 - Discussion on Fabricated Sensor with Silicon as Substrate
Lecture 43 - Discussion and Microscopic Inspection of Fabricated Sensor with Silicon as a Substrate
Lecture 44 - Tissue Deparaffinization for Biosensors
Lecture 45 - Clean room guidelines and Cancer Dianostic tool
Lecture 46 - Basics of Pressure Sensor and Demonstration using Arduino Microcontroller
Lecture 47 - Basics of Stepper Motor and Demonstration using Arduino Microcontroller
Lecture 48 - Microscopic Inspection of Diced wafers and CNT Sensing Layer for fabricated sensor
Lecture 49 - Process flow for Microcantilever for Mechanical Phenotyping of breast cancer tissues
Lecture 50 - Applications of microcantilever for Mechanical Phenotyping of breast cancer tissues
Lecture 51 - Installation and Introduction to Physical Vapour Deposition System
Lecture 52 - Human Machine Interface for Controlling Deposition System
Lecture 53 - Flexible MEMS for phenotyping tissue properties - I
Lecture 54 - Flexible MEMS for phenotyping tissue properties - II
Lecture 55 - System Demonstration for Physical Vapor Deposition
Lecture 56 - Introduction to CAD Modelling - I
Lecture 57 - Introduction to CAD Modelling - II
Lecture 58 - Biosensors for ETM Phenotyping of breast cancer tissues for better prognosis
Lecture 59 - Biosensors for Electrothermal sensor
Lecture 60 - MEMS based sensor for catheter contact force measurement
Lecture 61 - Microfluidics based Drug Screening
Lecture 62 - Basic aspects of 3D Printing
Lecture 63 - 3D Printing Materials and Demonstration of Remote 3D Printing

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NPTEL Video Course - Electrical Engineering - NOC:Neural Networks for Signal Processing-I

Subject Co-ordinator - Prof. Shayan Srinivasa Garani

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The human brain
Lecture 2 - Introduction to Neural Networks
Lecture 3 - Models of a neuron
Lecture 4 - Feedback and network architectures
Lecture 5 - Knowledge representation
Lecture 6 - Prior information and invariances
Lecture 7 - Learning processes
Lecture 8 - Perceptron - 1
Lecture 9 - Perceptron - 2
Lecture 10 - Batch perceptron algorithm
Lecture 11 - Perceptron and Bayes classifier
Lecture 12 - Linear regression - 1
Lecture 13 - Linear regression - 2
Lecture 14 - Linear regression - 3
Lecture 15 - Logistic regression
Lecture 16 - Multi-layer perceptron - 1
Lecture 17 - Multi-layer perceptron - 2
Lecture 18 - Back propagation - 1
Lecture 19 - Back propagation - 2
Lecture 20 - XOR problem
Lecture 21 - Universal approximation function
Lecture 22 - Complexity Regularization and Cross validation
Lecture 23 - Convolutional Neural Networks (CNN)
Lecture 24 - Coverâ s Theorem
Lecture 25 - Multivariate interpolation problem
Lecture 26 - Radial basis functions (RBF)
Lecture 27 - Recursive least squares algorithm
Lecture 28 - Comparison of RBF with MLP
Lecture 29 - Kernel regression using RBFs

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Lecture 30 - Kernel Functions
Lecture 31 - Basics of constrained optimization
Lecture 32 - Optimization with equality constraint
Lecture 33 - Optimization with inequality constraint
Lecture 34 - Support Vector Machines (SVM)
Lecture 35 - Optimal hyperplane for linearly separable patterns
Lecture 36 - Quadratic optimization for finding optimal hyperplane
Lecture 37 - Optimal hyperplane for non-linearly separable patterns
Lecture 38 - Inner product kernel and Mercerâ s theorem
Lecture 39 - Optimal design of an SVM
Lecture 40 - Îµ-insensitive loss function
Lecture 41 - XOR problem revisited using SVMs
Lecture 42 - Hilbert Space
Lecture 43 - Reproducing Kernel Hilbert Space
Lecture 44 - Representer Theorem
Lecture 45 - Generalized applicability of the representer theorem
Lecture 46 - Regularization Theory
Lecture 47 - Euler-Lagrange Equation
Lecture 48 - Regularization Networks
Lecture 49 - Generalized RBF networks
Lecture 50 - XOR problem revisited using RBF
Lecture 51 - Structural Risk Minimization
Lecture 52 - Bias-Variance Dilemma
Lecture 53 - Estimation of regularization parameters
Lecture 54 - Basics of L1 regularization
Lecture 55 - Grafting
Lecture 56 - Kernel PCA
Lecture 57 - Hebbian based maximum eigen filter - 1
Lecture 58 - Hebbian based maximum eigen filter - 2
Lecture 59 - Hebbian based maximum eigen filter - 3
Lecture 60 - VC dimension
Lecture 61 - Autoencoders
Lecture 62 - Denoising Autoencoders
Lecture 63 - Demo - Perceptron
Lecture 64 - Demo - Motivation for CNN
Lecture 65 - Back propagation in Convolutional Neural Network
Lecture 66 - Ethics in AI research and coverage summary

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NPTEL Video Course - Electrical Engineering - NOC:Electronics Equipment Integration and Prototype Building

Subject Co-ordinator - Prof. N.V.Chalapathi Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to electronics products
Lecture 2 - Examples from real life
Lecture 3 - Common Simulation of flat prismatic parts
Lecture 4 - Common flat parts enclosures
Lecture 5 - Real life parts to scale on a graph
Lecture 6 - Early First steps
Lecture 7 - Top down, outside to internals
Lecture 8 - Using a print and fabrication video
Lecture 9 - Details of displays and keys
Lecture 10 - Improvement on marking and skill
Lecture 11 - Mass production in sheet metal
Lecture 12 - Prototyping of user interfaces for concepts
Lecture 13 - Stacking of equipment to make a system
Lecture 14 - Recapitualising a sub system
Lecture 15 - Off the shelf enclosures and making a user interface
Lecture 16 - Looking around for concepts and integration
Lecture 17 - Representation on paper
Lecture 18 - Example features of surfaces and solids
Lecture 19 - Simple and curved surfaces
Lecture 20 - Describing inclined surfaces
Lecture 21 - Basics of engineering Drawing
Lecture 22 - Introduction to sizing and fits
Lecture 23 - Practical mechanical assemblies
Lecture 24 - Analogous Mechanical - Electronics detailing
Lecture 25 - Solid modelling
Lecture 26 - Importance of dimensioning
Lecture 27 - Ease of editing redesign
Lecture 28 - Dimensioning of electronics components
Lecture 29 - 2D flat representation

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Lecture 30 - Electronics to Mechanical interfacing
Lecture 31 - Complexity of 3D assemblies with wiring
Lecture 32 - Illustrative simple design
Lecture 33 - Practical detailing
Lecture 34 - Rendered on screen
Lecture 35 - Fastenings and hardware
Lecture 36 - Fastener representation, deatiling
Lecture 37 - Practical detailing.
Lecture 38 - Recapitulation, context of course
Lecture 39 - Low cost is the key

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NPTEL Video Course - Electrical Engineering - NOC:Design and Simulation of Power Conversion using Open Source

Subject Co-ordinator - Prof. L. Umanand

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Getting started with NgSpice
Lecture 2 - Refractoring the .cir
Lecture 3 - Sub-circuits
Lecture 4 - gschem and netlist generation
Lecture 5 - Setting up for simulation with Octave
Lecture 6 - Getting started with equation based simulation
Lecture 7 - Resuming a simulation in Octave
Lecture 8 - PV cell model - review
Lecture 9 - PV cell characteristic - review
Lecture 10 - PV cell - symbol and subcircuit
Lecture 11 - Rectifier-capacitor filter - operation review
Lecture 12 - Rectifier-capacitor filter - NgSpice simulation
Lecture 13 - Rectifier-capacitor filter with non-idealities
Lecture 14 - 3 phase Rectifier-capacitor filter
Lecture 15 - Equation based simulation in Octave
Lecture 16 - Passive power factor improvement - review
Lecture 17 - Passive power factor circuit in NgSpice
Lecture 18 - Buck converter - review
Lecture 19 - Buck converter - NgSpice
Lecture 20 - Boost converter - review
Lecture 21 - Boost converter - NgSpice
Lecture 22 - Buck-boost converter - review
Lecture 23 - Buck-boost converter - NgSpice
Lecture 24 - Equation based simulation of converters
Lecture 25 - Forward Converter - review
Lecture 26 - Forward Converter simulation
Lecture 27 - Understanding Core flux reset
Lecture 28 - Core flux reset - simulation
Lecture 29 - Flyback converter - review

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Lecture 30 - Flyback converter - simulation
Lecture 31 - Pushpull converter - review
Lecture 32 - Pushpull converter - simulation
Lecture 33 - Half bridge converter - review
Lecture 34 - Half bridge converter - simulation
Lecture 35 - Full bridge converter - review
Lecture 36 - Full bridge converter - simulation
Lecture 37 - Close loop operation
Lecture 38 - Close loop with feed forward control
Lecture 39 - NgSpice simulation of close loop control
Lecture 40 - Battery charging with current control
Lecture 41 - Slope compensation for current control
Lecture 42 - NgSpice simulation of battery charging
Lecture 43 - Single phase PWM for single phase inverter
Lecture 44 - NgSpice simulation of single phase PWM
Lecture 45 - 2-axes theory for 3-phase systems
Lecture 46 - Transformations for 2 and 3 axes systems
Lecture 47 - Maximum power point tracking - NgSpice
Lecture 48 - Space vector PWM - digital
Lecture 49 - Space vector PWM - analog
Lecture 50 - SVPWM analog - NgSpice simulation
Lecture 51 - Induction motor model
Lecture 52 - Induction motor simulation in Octave
Lecture 53 - V/F control of induction motor - NgSpice

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NPTEL Video Course - Electrical Engineering - NOC:Introductory Neuroscience and Neuro-Instrumentation

Subject Co-ordinator - Prof. Mahesh Jayachandra

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Cellular (Microscopic) Structure of the Central Nervous System (CNS)
Lecture 2 - Anatomical (Macroscopic) structure of the CNS
Lecture 3 - Introduction to Cleanroom and IC Fabrication Techniques
Lecture 4 - Introduction to EEG applications for Hearing Loss
Lecture 5 - Electrophysiological Recordings
Lecture 6 - Neocortical Circuits
Lecture 7 - The resting Membrane Potential
Lecture 8 - Applications of MEMS Fabrication Technologies
Lecture 9 - Fundamentals of biopotentials and applications
Lecture 10 - Fundamentals of EEG and applications
Lecture 11 - The Action Potential (1)
Lecture 12 - The Action Potential (2)
Lecture 13 - Axonology, Neuronal Biophysics (1)
Lecture 14 - Axonology, Neuronal Biophysics (2)
Lecture 15 - Experimental Setup for EEG Recording
Lecture 16 - Introduction to Cleanroom Protocols and Demonstration of Gowning Procedure
Lecture 17 - Electromagnetic Stimulation of the Brain (1)
Lecture 18 - Electromagnetic Stimulation of the Brain (2)
Lecture 19 - Introduction to Event Related Potentials
Lecture 20 - Introduction to 3D Printing
Lecture 21 - 3D Printing
Lecture 22 - Introduction to Event Related Potentials (2)
Lecture 23 - Different Event Related Potentials (1)
Lecture 24 - Different Event Related Potentials (2)
Lecture 25 - Introduction to Silicone Wafer Processing Techniques
Lecture 26 - Basics of Silicone Dioxide
Lecture 27 - Inverse Problem, EEG source localization (1)
Lecture 28 - Inverse Problem, EEG source localization (2)
Lecture 29 - Introduction to Brain Computer Interfaces

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Lecture 30 - Signal Conditioning Circuit for EEG Bioamplifiers
Lecture 31 - Basics of BCI Experimentation
Lecture 32 - Different Brain Computer Interfaces
Lecture 33 - Introduction to EEGLAB, ERPLAB and AEP Demonstration (1)
Lecture 34 - Introduction to EEGLAB, ERPLAB and AEP Demonstration (2)
Lecture 35 - Introduction to Photolithography
Lecture 36 - Basics of BCI Experimentation
Lecture 37 - MMN Demonstration with EEGLAB and ERPLAB (1)
Lecture 38 - MMN Demonstration with EEGLAB and ERPLAB (2)
Lecture 39 - Introduction to Photolithography (2)
Lecture 40 - Basics of Instrumentation Amplifier and Online Simulation
Lecture 41 - Basics of BCI Experimentation
Lecture 42 - P300 Demonstration with EEGLAB/ERPLAB (1)
Lecture 43 - P300 Demonstration with EEGLAB/ERPLAB (2)
Lecture 44 - Wavelet Analysis with VEP (1)
Lecture 45 - Details of Lithography, E-beam Lithography and Mask Aligner
Lecture 46 - Basics of BCI Experimentation
Lecture 47 - Wavelet Analysis with VEP (2)
Lecture 48 - Demonstration
Lecture 49 - Demonstration
Lecture 50 - Photoresist (SU-8) and soft lithography
Lecture 51 - Physical Vapour Deposition
Lecture 52 - Introduction to Epilepsy and Classification
Lecture 53 - Epileptogenisis
Lecture 54 - Demonstration
Lecture 55 - Demonstration
Lecture 56 - Demonstration
Lecture 57 - Demonstration
Lecture 58 - Physical Vapour Deposition
Lecture 59 - Physical Vapour Deposition
Lecture 60 - Recent Trends
Lecture 61 - Demonstration
Lecture 62 - Basics of EEG, ERP and acquisition
Lecture 63 - Photolithography with example
Lecture 64 - Stress Tissue Analysis using COMSOL Multiphysics
Lecture 65 - Recent Trends

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NPTEL Video Course - Electrical Engineering - NOC:Information Theory

Subject Co-ordinator - Prof. Himanshu Tyagi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is information?
Lecture 2 - How to model uncertainty?
Lecture 3 - Basic concepts of probability
Lecture 4 - Estimates of random variables
Lecture 5 - Limit theorems
Lecture 6 - Review
Lecture 7 - Source model
Lecture 8 - Motivating examples
Lecture 9 - A compression problem
Lecture 10 - Shannon entropy
Lecture 11 - Random hash
Lecture 12 - Review 2
Lecture 13 - Uncertainty and randomness
Lecture 14 - Total variation distance
Lecture 15 - Generating almost random bits
Lecture 16 - Generating samples from a distribution using uniform randomness
Lecture 17 - Typical sets and entropy
Lecture 18 - Review 3
Lecture 19 - Hypothesis testing and estimation
Lecture 20 - Examples
Lecture 21 - The log-likelihood ratio test
Lecture 22 - Kullback-Leibler divergence and Stein's lemma
Lecture 23 - Properties of KL divergence
Lecture 24 - Review 4
Lecture 25 - Information per coin-toss
Lecture 26 - Multiple hypothesis testing
Lecture 27 - Error analysis of multiple hypothesis testing
Lecture 28 - Mutual information
Lecture 29 - Fano's inequality

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Lecture 30 - Measures of information
Lecture 31 - Chain rules
Lecture 32 - Shape of measures of information
Lecture 33 - Data processing inequality
Lecture 34 - Midyear Review
Lecture 35 - Proof of Fano's inequality
Lecture 36 - Variational formulae
Lecture 37 - Capacity as information radius
Lecture 38 - Proof of Pinsker's inequality
Lecture 39 - Continuity of entropy
Lecture 40 - Lower bound for compression
Lecture 41 - Lower bound for hypothesis testing
Lecture 42 - Review 7
Lecture 43 - Lower bound for random number generation
Lecture 44 - Strong converse
Lecture 45 - Lower bound for minmax statistical estimation
Lecture 46 - Variable length source codes
Lecture 47 - Review 8
Lecture 48 - Kraft's inequality
Lecture 49 - Shannon code
Lecture 50 - Huffman code
Lecture 51 - Minmax Redundancy
Lecture 52 - Type based universal compression
Lecture 53 - Review 9
Lecture 54 - Arithmetic code
Lecture 55 - Online probability assignment
Lecture 56 - Compression of databases
Lecture 57 - Compression of databases
Lecture 58 - Repetition code
Lecture 59 - Channel capacity
Lecture 60 - Sphere packing bound for BSC
Lecture 61 - Random coding bound for BSC
Lecture 62 - Random coding bound for general channel
Lecture 63 - Review 11
Lecture 64 - Converse proof for channel coding theorem
Lecture 65 - Additive Gaussian Noise channel
Lecture 66 - Mutual information and differential entropy
Lecture 67 - Channel coding theorem for Gaussan channel
Lecture 68 - Parallel channels and water-filling

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NPTEL Video Course - Electrical Engineering - NOC:Photonic Integrated Circuit

Subject Co-ordinator - Prof. Shankar Kumar Selvaraja

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Photonic integrated circuits course introduction
Lecture 2 - Wave optics review
Lecture 3 - Electromagnetic theory review - 1
Lecture 4 - Electromagnetic theory review - 2
Lecture 5 - Photonic integrated circuits: an introduction
Lecture 6 - Photonic integrated circuits evolution
Lecture 7 - Photonic integrated circuit components - 1
Lecture 8 - Photonic integrated circuit components - 2
Lecture 9 - Dispersion
Lecture 10 - Phase velocity and Group velocity
Lecture 11 - Anisotropic medium and reciprocity
Lecture 12 - Polarisation in anisotropic medium
Lecture 13 - Optical axes
Lecture 14 - Waveguide structure
Lecture 15 - Waveguide modes - 1
Lecture 16 - Waveguide modes - 2
Lecture 17 - Field Equation
Lecture 18 - Guided modes in symmetric slab waveguides
Lecture 19 - Waveguide design - Boundary value formulation
Lecture 20 - Waveguide design - BVP solution
Lecture 21 - Waveguide design - Perturbation approach
Lecture 22 - Waveguide design - Effective Index method
Lecture 23 - Coupled mode theory - 1
Lecture 24 - Coupled mode theory - 2
Lecture 25 - Two-mode coupling
Lecture 26 - Co and counter propagating mode coupling
Lecture 27 - Phase matching
Lecture 28 - Directional coupler
Lecture 29 - Y-splitter

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Lecture 30 - Multi-Mode Interference coupler
Lecture 31 - MZI
Lecture 32 - Micro-Ring Resonators
Lecture 33 - Light-chip coupling
Lecture 34 - End-fire coupling
Lecture 35 - Light Modulator introduction
Lecture 36 - Electro-Optic effect
Lecture 37 - Waveguide modulator
Lecture 38 - Optical transition in semiconductors
Lecture 39 - Transition rates
Lecture 40 - Absorption and gain in semiconductors
Lecture 41 - Semiconductor Light Emitting Diodes
Lecture 42 - Semiconductor Light Emitting Diodes (Continued...)
Lecture 43 - Semiconductor Lasers
Lecture 44 - Semiconductor photodetector
Lecture 45 - Semiconductor photodetector noise
Lecture 46 - Fabrication process - 1
Lecture 47 - Fabrication process - 2
Lecture 48 - PIC technology - Building a simple circuit
Lecture 49 - PIC for communication
Lecture 50 - PIC for sensing - 1
Lecture 51 - PIC for sensing - 2

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NPTEL Video Course - Electrical Engineering - NOC:Design for Internet of Things (2021)

Subject Co-ordinator - Prof. T V Prabhakar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Definition of IoT
Lecture 2 - Location, Applications, and Power
Lecture 3 - Challenges - Part 1
Lecture 4 - Challenges - Part 2
Lecture 5 - Challenges - Part 3
Lecture 6 - Challenges - Part 4
Lecture 7 - Unique ID
Lecture 8 - Introduction to RFID
Lecture 9 - RFID DEMO
Lecture 10 - RFID Theory - 1
Lecture 11 - RFID Theory - 2
Lecture 12 - RFID Theory - 3
Lecture 13 - Energy harvesting - 1
Lecture 14 - Energy harvesting - 2
Lecture 15 - Energy harvesting - 3
Lecture 16 - Power management systems - 1
Lecture 17 - Power management systems - 2
Lecture 18 - Battery life calculation
Lecture 19 - Introduction to System Design for low power
Lecture 20 - LDO - 1
Lecture 21 - LDO - 2
Lecture 22 - LDO - 3
Lecture 23 - Buck converter - 1
Lecture 24 - Buck converter - 2
Lecture 25 - Lab experiment
Lecture 26 - Introduction to Sensors and Actuators
Lecture 27 - Sensors
Lecture 28 - Actuators
Lecture 29 - Case study on Sensing and Actuation

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Lecture 30 - Introduction to low power software
Lecture 31 - ADC driver design and development
Lecture 32 - Power optimization
Lecture 33 - Introduction to protocols
Lecture 34 - MQTT - 1
Lecture 35 - MQTT - 2
Lecture 36 - COAP - 1
Lecture 37 - COAP - 2
Lecture 38 - Websockets
Lecture 39 - Introduction to low power wireless - 1
Lecture 40 - Introduction to low power wireless - 2
Lecture 41 - Bluetooth low energy (BLE) - 1
Lecture 42 - Bluetooth low energy (BLE) - 2
Lecture 43 - IEEE 802.15.4e - 1
Lecture 44 - IEEE 802.15.4e - 2
Lecture 45 - IEEE 802.15.4e - 3
Lecture 46 - Wi-Fi
Lecture 47 - Introduction to Wide area technologies
Lecture 48 - LoRa - 1
Lecture 49 - LoRa - 2
Lecture 50 - NBIoT, LTEM1
Lecture 51 - BLE mesh technology
Lecture 52 - Course conclusion

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NPTEL Video Course - Electrical Engineering - NOC:Mathematical Aspects of Biomedical Electronic System Desigr

Subject Co-ordinator - Prof. Chandramani Singh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Signals and Systems
Lecture 2 - MATLAB Demo on Signal Types and Moving Average System
Lecture 3 - Microfabrication Basics for Biomedical Systems
Lecture 4 - Fluid Flow in Body Lumen
Lecture 5 - Fourier Series
Lecture 6 - Continuous Time Fourier Transform
Lecture 7 - Biological Tissues as disordered systems
Lecture 8 - Introduction to electrical equivalent circuit models for biological systems
Lecture 9 - Discrete Time Fourier Transform and Sampling
Lecture 10 - Percolation Theory and applications in biological tissues
Lecture 11 - Electrical properties of cells and tissues revisited: Examples and Applications
Lecture 12 - Linear Algebra - I
Lecture 13 - MATLAB Live Demo on Moving average and signal acquisition
Lecture 14 - Oxidation and Thickness Characterization
Lecture 15 - Basics of Photolithography with Process flow examples
Lecture 16 - Linear Algebra - II
Lecture 17 - Introduction to Biomedical Optics
Lecture 18 - Optical Properties of Tissues and Mathematical modelling
Lecture 19 - System of Linear Equations
Lecture 20 - Scaling Laws
Lecture 21 - Thermal Properties of a tissue
Lecture 22 - Introduction to Probability
Lecture 23 - Tissue Electrode Interface
Lecture 24 - Thermal Properties of a tissue and cells
Lecture 25 - Probability: Random Variables and CDF
Lecture 26 - Basics of Silicon, Silicon Dioxide for Microfabrication Process
Lecture 27 - Mechanical Properties of human brain tissues and modelling
Lecture 28 - Probability: Important measures and generating functions
Lecture 29 - Near Infrared Spectroscopy and Ultrasound Techniques

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Lecture 30 - Thermal Properties of Tissues and Modelling
Lecture 31 - Multisim Simulations for Biomedical Signal Conditioning Circuit
Lecture 32 - Cleanroom Entry Demonstration
Lecture 33 - Spin Coating Demonstration
Lecture 34 - Common Random Variables
Lecture 35 - Introduction to signal Conditioning circuits for biomedical devices
Lecture 36 - Siganl Conditioning circuits units and design
Lecture 37 - E Beam Evaporation System Demonstration
Lecture 38 - Joint and Marginal Probability Distribution
Lecture 39 - Temprature Sensor Interfacing Analysis
Lecture 40 - Demo of Temprature data acqusitio system using LabVIEW
Lecture 41 - Recent Trends in Biomedical Electronic System Design
Lecture 42 - Aspects of Biomedical Electronics System Design

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NPTEL Video Course - Electrical Engineering - NOC:Concentration Inequalities

Subject Co-ordinator - Prof. Himanshu Tyagi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why study concentration inequalities?
Lecture 2 - Chernoff bound
Lecture 3 - Examples of Chernoff bound for common distributions
Lecture 4 - Hoeffding and Bernstein inequalities
Lecture 5 - Azuma and McDiarmid inequalities
Lecture 6 - Bounding variance using the Efron-Stein inequality
Lecture 7 - The Gaussian-Poincare inequality
Lecture 8 - Tail bounds using the Efron-Stein inequality
Lecture 9 - Herbst's argument and the entropy method
Lecture 10 - Log-Sobolev inequalities
Lecture 11 - Binary and Gaussian Log-Sobolev inequalities and concentration
Lecture 12 - Variational formulae forKullback-Leibler and Bregman Divergence
Lecture 13 - A modified log-Sobolev inequality and concentration
Lecture 14 - Introduction to the transportation method for showing concentration bounds
Lecture 15 - Transportation lemma and a proof of McDiarmid's inequality using the transportation method
Lecture 16 - Concentration bounds for functions beyond bounded difference using transportation method
Lecture 17 - Marton's conditional transportation cost inequality
Lecture 18 - Isoperimetry and concentration of measure
Lecture 19 - Isoperimetry and bounded difference
Lecture 20 - Equivalence of Stam's inequality and log Sobolev inequality
Lecture 21 - An information theoretic proof of log Sobolev inequality
Lecture 22 - Hypercontractivity and strong data processing inequality for RÃ©nyi divergence
Lecture 23 - An information theoretic characterization of hypercontractivity
Lecture 24 - Equivalence of Gaussian hypercontractivity and Gaussian log Sobolev inequality
Lecture 25 - Uniform deviation bounds for random walks and the law of the iterated logarithm
Lecture 26 - Self normalized concentration inequalities and application to online regression

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NPTEL Video Course - Electrical Engineering - NOC:Real-Time Digital Signal Processing

Subject Co-ordinator - Prof. Rathna G N

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics of Signal Processing
Lecture 3 - Lab - CCS
Lecture 4 - Number System
Lecture 5 - Architecture - 1
Lecture 6 - Architecture - 2
Lecture 7 - Real-time Constraints
Lecture 8 - FIR - Filters
Lecture 9 - Pipelining and Parallel Processing for Low Power Applications - I
Lecture 10 - Pipelining and Parallel Processing for Low Power Applications - II
Lecture 11 - Lab: Sine Generation
Lecture 12 - IIR Filters - 1
Lecture 13 - IIR Filters - 2
Lecture 14 - Lab: Sine Generatioon, FIR and IIR
Lecture 15 - Lab 3 IIR Filter as Resonator
Lecture 16 - Lab 4 Use of FDA tool box to generate co-efficients
Lecture 17 - Lab: Real-Time Audio Output through Sine Generation
Lecture 18 - IIR Filters 4
Lecture 19 - Lab: FIR Filter in generation of music
Lecture 20 - Lab: Real-Time Audio Output through FIR Filter
Lecture 21 - DFT, DTFT, twiddle factors, properties, circular convolution and examples
Lecture 22 - Complexity of Filtering and the FFT
Lecture 23 - Lab: Filtering Using FFT
Lecture 24 - Lab: FFT in CCS
Lecture 25 - FFT - 1
Lecture 26 - FFT - 2
Lecture 27 - FFT - 3
Lecture 28 - Overlap - Add
Lecture 29 - Overlap Save Method

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Lecture 30 - Lab: Overlap Add and Save Method using MATLAB
Lecture 31 - Correlation
Lecture 32 - Lab: Different ways of implementing FFT in CCS
Lecture 33 - Adaptive Filter
Lecture 34 - Lab: LMS Algorith in MATLAB
Lecture 35 - LMS Algorithm
Lecture 36 - Lab: Error surface and error contour
Lecture 37 - Adaptive Filter Applications
Lecture 38 - Lab: Application of adaptive filter in MATLAB
Lecture 39 - Adaptive Echo Cancellation
Lecture 40 - Lab: Application of adaptive filter in CCS, Echo, scrambling and graphic equilizer in MATLAB
Lecture 41 - Graphic Equalizer
Lecture 42 - Lab: Adaptive filters (MATLAB)
Lecture 43 - Speech Coding - I
Lecture 44 - Speech Coding - II
Lecture 45 - Speech Coding - III
Lecture 46 - Lab: LPC for speech synthesis
Lecture 47 - Discrete Cosine Transform - 1
Lecture 48 - Discrete Cosine Transform - 2
Lecture 49 - Discrete Cosine Transform - 3
Lecture 50 - Discrete Cosine Transform - 4
Lecture 51 - Lab: Adaptive filters (CCS) - 1
Lecture 52 - Lab: Adaptive filters (CCS) - 2
Lecture 53 - Lab: Discrete Cosine Transformation
Lecture 54 - Lab: Echogeneration
Lecture 55 - Lab: Using JiDSP
Lecture 56 - Summary

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NPTEL Video Course - Electrical Engineering - NOC:Advanced Neural Science for Engineers

Subject Co-ordinator - Prof. Vikas V

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biomedical Research
Lecture 2 - Fabricated Biosensors and Systems
Lecture 3 - Lab 1 - Introduction to the Fabrication lab
Lecture 4 - Lab 2 - Cleanroom and Gowning Protocol
Lecture 5 - Developed Systems at a glance
Lecture 6 - Silicon and Silicon Dioxide
Lecture 7 - Piranha Cleaning of Silicon Wafer
Lecture 8 - Polyimide Coating on Silicon Wafer
Lecture 9 - Thermal Oxidation of Silicon and Thickness measurement
Lecture 10 - Fundamental of Physical Vapour Deposition
Lecture 11 - Lab 3 - Lithography: Demonstration
Lecture 12 - Sputtering
Lecture 13 - Basics of Photolithography
Lecture 14 - Lab 4 - E-Beam Evaporation: Demo
Lecture 15 - Photolithography - II
Lecture 16 - Photolithography - III
Lecture 17 - Lab 5 - E-Beam Evaporation: Demo - II
Lecture 18 - Lab 6 - Liftoff Demonstration
Lecture 19 - Lithography Optics - I
Lecture 20 - Soft Lithography - I
Lecture 21 - Soft Lithography - II
Lecture 22 - Lab 7 - Sputtering Demonstration - I
Lecture 23 - Lab 8 - Sputtering Demonstration - II
Lecture 24 - Thin Film Deposition: CVD - I
Lecture 25 - Thin Film Deposition: CVD - II
Lecture 26 - Lithography Optics - II
Lecture 27 - Role of Fabrication in Neural Engineering
Lecture 28 - Micromachining
Lecture 29 - Overview of Experimental Neurophysiology

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Lecture 30 - Fabrication of Neural Implants
Lecture 31 - Introduction to Packaging for Neural Systems
Lecture 32 - Lab 9 - 3D Printing for neural devices
Lecture 33 - Introduction to Biopotentials
Lecture 34 - EEG: Introduction, Demonstration and Applications
Lecture 35 - Neural Implants: Fabrication and Characterization
Lecture 36 - Design of Wireless Biphasic Pulse Generator
Lecture 37 - Basics of EEG/ERP Experimental Desing
Lecture 38 - Micromachining and Etching
Lecture 39 - Epileptic Seizure Detection and Classification
Lecture 40 - Newborn Hearing Screening - I
Lecture 41 - Newborn Hearing Screening - II
Lecture 42 - Applications of EEG/ERP Experimental Design
Lecture 43 - Flexible MEA for Electrocorticography Signal Acquisition
Lecture 44 - Flexible biodegradable MEAs
Lecture 45 - Microneedle Electrode Array
Lecture 46 - Neurosurgery-based MEA Implantation - I
Lecture 47 - Neurosurgery-based MEA Implantation - II
Lecture 48 - Neurosurgery-based MEA Implantation - III
Lecture 49 - Neurosurgery-based MEA Implantation - IV
Lecture 50 - Deep Brain Stimulation/Recording for Parkinson's - I
Lecture 51 - Deep Brain Stimulation/Recording for Parkinson's - II
Lecture 52 - Computational Neuroscience Fundamentals
Lecture 53 - Mathematical Analysis in Neural Science
Lecture 54 - Neuroanatomy for Neural Engineering

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NPTEL Video Course - Electrical Engineering - NOC:Design of Electric Motors

Subject Co-ordinator - Dr. Prathap Reddy

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History Prospect of Electrical Machines
Lecture 2 - Electric Fields
Lecture 3 - Magnetic Fields - 1
Lecture 4 - Magnetic Fields - 2
Lecture 5 - Electric and Magnetic Circuits Interface
Lecture 6 - Magnetic Materials and Concepts of BH Curves
Lecture 7 - Analysis of Magnetic Circuits With and Without Air Gaps
Lecture 8 - Example Problems of Magnetic Circuits
Lecture 9 - Magnetic Circuits with Multiple Windings and Permanent Magnets
Lecture 10 - Force Equations in Electromechanical Systems - 1
Lecture 11 - Force Equations in Electromechanical Systems - 2
Lecture 12 - Design of Electromagnetic Systems
Lecture 13 - Realization of Electrical Machines - 1
Lecture 14 - Realization of Electrical Machines - 2
Lecture 15 - Magnetic Fields in DC Machines - 1
Lecture 16 - Magnetic Fields in AC Machines - 1
Lecture 17 - Magnetic Fields in AC Machines - 2
Lecture 18 - Magnetic Fields in AC Machines - 3
Lecture 19 - MMFDistribution ofAC Machines
Lecture 20 - Basics of Electrical Machine Windings
Lecture 21 - Stator winding design-single layer winding
Lecture 22 - Stator winding design-double layer winding
Lecture 23 - Stator Winding Design-Fractional Slot Double Layer Winding
Lecture 24 - Variable Pole Machine Stator Winding Design (Pole-Phase Modulation) - 1
Lecture 25 - Variable Pole Machine Stator Winding Design (Pole-Phase Modulation) - 2
Lecture 26 - Importance of Motor Design and Standards of Electric Motors
Lecture 27 - Electric Machine Sizing Equations-Output Power and Volume (D2L) Product Equation
Lecture 28 - Lab Session on Re-winding of Induction Motor (Example: Double Layer Winding)
Lecture 29 - The Figure of Merits for Electric Motors and Aspect Ratio to Decouple the D2L Product

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Lecture 30 - Electric Machine Sizing Equations-Output Power Equation in terms of D3L Product - 1
Lecture 31 - Electric Machine Sizing Equations-Output Power Equation in terms of D3L Product - 2
Lecture 32 - Analysis of Copper Function and Output Function w r t the Electric Machine D3L Product Eqn
Lecture 33 - Example Problems on Output Power Equation in terms of D3L Product
Lecture 34 - Electric Machine Sizing Equations-Output Power Equation in terms of D the power 2.5 L Product
Lecture 35 - Design Procedure of an Electric Machine
Lecture 36 - Name Plate Details and Datasheets of Induction Motor
Lecture 37 - Design of Induction Machine- Stator Design - 1 (Stator Core design)
Lecture 38 - Design of Induction Machine- Stator Design - 2 (Stator Winding Design)
Lecture 39 - Design of Induction Machine- Stator Design - 3 (Stator Slot Geometry)
Lecture 40 - Design of Induction Machine- Rotor Design - 1 (Rotor Slots Selection)
Lecture 41 - Design of Induction Machine- Rotor Design - 2 (Rotor MMF and Bar Currents)
Lecture 42 - Design of Induction Machine- Rotor Design - 3 (Rotor Slot Geometry)
Lecture 43 - Design of Induction Machine- Rotor Design - 4 (Skewing of Rotor)
Lecture 44 - Design of Induction Machine- Rotor Design - 4 (Resistance of Rotor Winding)
Lecture 45 - Carter's Coefficient of Electrical Machines
Lecture 46 - Effective Length Equations of the Machine Core with Different Stator and Rotor Lengths
Lecture 47 - Stator MMF and Magnetizing Current Equations of Induction Machine
Lecture 48 - Magnetizing Inductance of Induction Machine
Lecture 49 - Stator and Rotor Leakage Inductances of Induction Machine
Lecture 50 - Equivalent Circuit Parameters of Induction Machine
Lecture 51 - Loss Calculation of Induction Machine - 1
Lecture 52 - Loss Calculation of Induction Machine - 2 and Performance Parameters of Induction Motor
Lecture 53 - Switched Reluctance Machine Sizing Equations-Output Power and Volume (D2L) Product Equation
Lecture 54 - The Figure of Merits for SRM and Example Problem on Output Power Equation i t f D2L Product
Lecture 55 - Design of Switched Reluctance Machine: Stator Design - 1
Lecture 56 - Design of Switched Reluctance Machine: Stator Design - 2 and Rotor Design
Lecture 57 - Procedure for Calculation of SRM Inductance: Aligned Inductance - 1
Lecture 58 - Calculation of SRM Inductance: Aligned Inductance - 2
Lecture 59 - Efficiency and Loss Calculation of SRM
Lecture 60 - Importance of Thermal Design and Thermal Limits for Electrical Machines
Lecture 61 - Electric and Thermal Circuits Interface
Lecture 62 - Heat Transfer Methods and Basic Equations for Thermal Resistance
Lecture 63 - Heat Flow in Electrical Machines
Lecture 64 - Cooling Methods and Standards for Electrical Machines
Lecture 65 - Basics of Thermal Equivalent Circuits
Lecture 66 - Thermal Equivalent Circuit - 1
Lecture 67 - Thermal Equivalent Circuit - 2

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NPTEL Video Course - Electrical Engineering - NOC:Basics of Semiconductor Microwave Devices

Subject Co-ordinator - Prof Digbijoy N Nath

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to the course and outline of the course
Lecture 2 - Historical overview of the development of microwave devices
Lecture 3 - Applications of semiconductor microwave devices
Lecture 4 - Applications of semiconductor microwave devices (Continued...)
Lecture 5 - Heterojunction device physics
Lecture 6 - Heterojunction device physics (Continued...) and III-nitrides
Lecture 7 - III-nitrides and polarization
Lecture 8 - III-nitride high electron mobility transistors
Lecture 9 - Varactors and Schottky multipliers
Lecture 10 - Varactors and Schottky multipliers (Continued...)
Lecture 11 - Diodes for microwave applications
Lecture 12 - IMPATT diode
Lecture 13 - Tunnel diodes and Introduction to Gunn diodes
Lecture 14 - Gunn diode and its modes
Lecture 15 - Introduction to MESFETs
Lecture 16 - Advanced concepts of GaAs MESFETs
Lecture 17 - GaAs MESFET fabrication and practical aspects
Lecture 18 - Practical aspects of FET design and small-signal model
Lecture 19 - GaAs MESFETs: cut-off frequency and aspects of power devices
Lecture 20 - GaAs MESFETs for power amplifiers
Lecture 21 - Modulation doping in compound semiconductors
Lecture 22 - Band diagram of MODFETs/HEMTs
Lecture 23 - Design issues and methodology for microwave HEMTs
Lecture 24 - Small-signal model and noise in HEMTs
Lecture 25 - The concept of pseudomorphic or pHEMTs
Lecture 26 - Multi-finger HEMTs
Lecture 27 - pHEMTs for low noise and introduction to InP HEMT
Lecture 28 - InP HEMTs for power and the concept of metamorphic HEMTs
Lecture 29 - AlGaN/GaN HEMT: applications, structure, substrates and FOM

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Lecture 30 - AlGaN/GaN HEMT: device basics, current collapse and passivation
Lecture 31 - AlGaN/GaN HEMT: gate process, field-plate and trade-offs in design
Lecture 32 - AlGaN/GaN HEMT: Practical aspects and commercial HEMTs
Lecture 33 - GaN RF HEMT on eval board, and emerging topics of research
Lecture 34 - Linearity in GaN HEMTs - A device perspective
Lecture 35 - Nanoscale MOSFETs and short channel effects
Lecture 36 - Parasitic resistances and capacitances in nanoscale MOSFETs
Lecture 37 - RF MOSFET Layout and RF Silicon-on-insulator
Lecture 38 - Noise in MOSFETs and Introduction to LDMOS
Lecture 39 - Working of LDMOS and VDMOS
Lecture 40 - LDMOS: Parasitics, and the concept of RESURF
Lecture 41 - LDMOS: HCI, snapback, finger layout and some aspects of commercial devices
Lecture 42 - BJT: common base and common emitter from the device point of view
Lecture 43 - BJT: Kirk effect, Ebers-Moll model and base transit time
Lecture 44 - BJT: small-signal model, gain and cut-off frequency
Lecture 45 - BJT: Emitter and base designs and drift transistor
Lecture 46 - Collector design in modern BJT and Introduction to HBTs
Lecture 47 - HBT: base current and collapse of the current gain
Lecture 48 - High-frequency HBT and Introduction to SiGe HBT
Lecture 49 - SiGe HBT: various resistances and capacitances, scaling and aspects of BiCMOS
Lecture 50 - Basics of microwave: transmission line theory
Lecture 51 - Waveguides, T-lines and introduction to 2-port networks
Lecture 52 - S-parameters and the basics of Smith Chart
Lecture 53 - Smith chart and matching
Lecture 54 - Impedance matching using Smith Chart and stub line
Lecture 55 - Passives in microwave circuits
Lecture 56 - Inductors in microwave circuits
Lecture 57 - More on passive elements in microwave circuits
Lecture 58 - On-wafer measurement and S-parameters
Lecture 59 - On-wafer de-embedding
Lecture 60 - On-wafer and fixture-based measurements and calibration
Lecture 61 - More on fixtures and basic transistor concepts for power amplifiers

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NPTEL Video Course - Electronics and Communication Engineering - Adv. Digital Signal Processing - Multirate a

Subject Co-ordinator - Prof. V.M. Gadre

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - The Haar Wavelet
Lecture 3 - The Haar Multiresolution Analysis
Lecture 4 - Wavelets And Multirate Digital Signal Processing
Lecture 5 - Equivalence - Functions And Sequences
Lecture 6 - The Haar Filter Bank
Lecture 7 - Haar Filter Bank Analysis And Synthesis
Lecture 8 - Relating psi, phi and the Filters
Lecture 9 - Iterating the filter bank from Psi, Phi
Lecture 10 - Z-Domain Analysis Of Multirate Filter Bank
Lecture 11 - Two Channel Filter Bank
Lecture 12 - Perfect Reconstruction - Conjugate Quadrature
Lecture 13 - Conjugate Quadrature Filters - Daubechies Family of MRA
Lecture 14 - Daubechies' Filter Banks - Conjugate Quadrature Filters
Lecture 15 - Time And Frequency Joint Perspective
Lecture 16 - Ideal Time Frequency Behaviour
Lecture 17 - The Uncertainty Principle
Lecture 18 - Time Bandwidth Product Uncertainty
Lecture 19 - Evaluating and Bounding squareroot t.squareroot omega
Lecture 20 - The Time Frequency Plane & its Tilings
Lecture 21 - Short time Fourier Transform & Wavelet Transform in General
Lecture 22 - Reconstruction & Admissibility
Lecture 23 - Admissibility in Detail Discretization of Scale
Lecture 24 - Logarithmic Scale Discretization, Dyadic Discretization
Lecture 25 - The Theorem of (DYADIC) Multiresolution Analysis
Lecture 26 - Proof of the Theorem of (DYADIC) Multiresolution Analysis
Lecture 27 - Introducing Variants of The Multiresolution Analysis Concept
Lecture 28 - JPEG 2000 5/3 FilterBank & Spline MRA
Lecture 29 - Orthogonal Multiresolution Analysis with Splines

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Lecture 30 - Building Piecewise Linear Scaling Function, Wavelet
Lecture 31 - The Wave Packet Transform
Lecture 32 - Nobel Identities & The Haar Wave Packet Transform
Lecture 33 - The Lattice Structure for Orthogonal Filter Banks
Lecture 34 - Constructing the Lattice & its Variants
Lecture 35 - The Lifting Structure & Polyphase Matrices
Lecture 36 - The Polyphase Approach - The Modulation Approach
Lecture 37 - Modulation Analysis and The 3-Band Filter Bank, Applications
Lecture 38 - The Applications *Data Mining, *Face Recognition
Lecture 39 - Proof that a non-zero function can not be both time and band-limited
Lecture 40 - M-Band Filter Banks and Looking Ahead
Lecture 41 - Tutorial -Session 1
Lecture 42 - Student's Presentation
Lecture 43 - Tutorial on Uncertainty Product
Lecture 44 - Tutorial on Two band Filter Bank
Lecture 45 - Tutorial -Frequency Domain Analysis of Two band Filter Bank
Lecture 46 - Zoom in and Zoom out using Wavelet Transform
Lecture 47 - More Thoughts on Wavelets
Lecture 48 - Towards selecting Wavelets through vanishing moments
Lecture 49 - In Search of Scaling Coefficients
Lecture 50 - Wavelet Applications

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NPTEL Video Course - Electronics and Communication Engineering - Advanced Optical Communication

Subject Co-ordinator - Prof. R.K. Shevgaonkar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics of Light
Lecture 3 - Ray Model - I
Lecture 4 - Ray Model - II
Lecture 5 - Wave Model - I
Lecture 6 - Wave Model - II
Lecture 7 - Wave Model - III
Lecture 8 - Signal Distortion - I
Lecture 9 - Signal Distortion - II
Lecture 10 - Signal Distortion - III
Lecture 11 - Practical issues in Implementation of Fiber link
Lecture 12 - Optical Sources
Lecture 13 - Light Emitting Diodes - I
Lecture 14 - Light Emitting Diodes - II
Lecture 15 - Laser - I
Lecture 16 - Laser - II
Lecture 17 - Laser - III
Lecture 18 - Laser - IV
Lecture 19 - Laser - V + Photon Detector
Lecture 20 - Photo Diodes and Detector Noise
Lecture 21 - Photo Detector
Lecture 22 - Optical Receivers - I
Lecture 23 - Optical Receivers - II
Lecture 24 - Receiver Sensitivity Degradation
Lecture 25 - Fiber Optic Link Design
Lecture 26 - Wavelength Division Multiplexed Systems
Lecture 27 - EDFA
Lecture 28 - Integrated Optics - I
Lecture 29 - Integrated Optics - II

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Lecture 30 - Tutorials - I
Lecture 31 - Tutorials - II
Lecture 32 - Introduction to Non-Linear Fiber Optics
Lecture 33 - Non-linear Schrodinger Equation
Lecture 34 - Group Velocity Dispersion (GVD)
Lecture 35 - Self Phase Modulation (SPM)
Lecture 36 - Solitonic Communication
Lecture 37 - Raman Amplifier
Lecture 38 - Cross Phase Modulation and four wave mixing
Lecture 39 - Laboratory Experiments - I
Lecture 40 - Laboratory Experiments - II
Lecture 41 - Laboratory Experiments - III

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NPTEL Video Course - Electronics and Communication Engineering - Advanced VLSI Design

Subject Co-ordinator - Prof. A.N. Chandorkar, Prof. D.K. Sharma, Prof. Sachin Patkar, Prof. Virendra Singh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical Perspective and Future Trends in CMOS VLSI Circuit and System Design - Part I
Lecture 2 - Historical Perspective and Future Trends in CMOS VLSI Circuit and System Design - Part II
Lecture 3 - Logical Effort - A way of Designing Fast CMOS Circuits - Part I
Lecture 4 - Logical Effort - A way of Designing Fast CMOS Circuits - Part II
Lecture 5 - Logical Effort - A way of Designing Fast CMOS Circuits - Part III
Lecture 6 - Power Estimation and Control in CMOS VLSI circuits - Part I
Lecture 7 - Power Estimation and Control in CMOS VLSI circuits - Part II
Lecture 8 - Low Power Design Techniques - Part I
Lecture 9 - Low Power Design Techniques - Part II
Lecture 10 - Arithmetic Implementation Strategies for VLSI - Part I
Lecture 11 - Arithmetic Implementation Strategies for VLSI - Part II
Lecture 12 - Arithmetic Implementation Strategies for VLSI - Part III
Lecture 13 - Arithmetic Implementation Strategies for VLSI - Part IV
Lecture 14 - Interconnect aware design
Lecture 15 - Interconnect aware design
Lecture 16 - Interconnect aware design
Lecture 17 - Introduction to Hardware Description Languages
Lecture 18 - Managing concurrency and time in Hardware Description Languages
Lecture 19 - Introduction to VHDL
Lecture 20 - Basic Components in VHDL
Lecture 21 - Structural Description in VHDL
Lecture 22 - Behavioral Description in VHDL
Lecture 23 - Introduction to Verilog
Lecture 24 - FSM + datapath (GCD example)
Lecture 25 - FSM + datapath (Continued...)
Lecture 26 - Single Cycle MMIPS
Lecture 27 - Multicycle MMIPS
Lecture 28 - Multicycle MMIPS Â FSM
Lecture 29 - Brief Overview of Basic VLSI Design Automation Concepts

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Lecture 30 - Netlist and System Partitioning
Lecture 31 - Timing Analysis in the context of Physical Design Automation
Lecture 32 - Placement algorithm
Lecture 33 - Introduction to VLSI Testing
Lecture 34 - VLSI Test Basics - I
Lecture 35 - VLSI Test Basics - II
Lecture 36 - VLSI Testing
Lecture 37 - VLSI Testing
Lecture 38 - VLSI Testing
Lecture 39 - VLSI Design Verification
Lecture 40 - VLSI Design Verification
Lecture 41 - VLSI Design Verification
Lecture 42 - VLSI Design Verification

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NPTEL Video Course - Electronics and Communication Engineering - Broadband Networks: Concepts and Technology

Subject Co-ordinator - Prof. Abhay Karandikar

Co-ordinating Institute - IIT - Bombay

Lecture 1 - Introduction to Broadband Networks
Lecture 2 - Qos in Packet Switching and ATM
Lecture 3 - ATM Networks
Lecture 4 - Effective Bandwidth - I
Lecture 5 - Effective Bandwidth - II
Lecture 6 - Traffic Descriptor in ATM
Lecture 7 - Calculus for QOS - I
Lecture 8 - Calculus For Qos - II
Lecture 9 - Packet Scheduling Algorithm Introduction
Lecture 10 - Fluid Fair Queueing and Weighted Fair Queueing
Lecture 11 - Virtual Time In Scheduling
Lecture 12 - Fairness of WFO and SCFO Scheduling Algorithms
Lecture 13 - Rate Proportional Servers
Lecture 14 - Latency Rate Servers - I
Lecture 15 - Latency Rate Servers - II And Delay Bounds
Lecture 16 - QOS In Best Effort Internet
Lecture 17 - TCP Congestion Control
Lecture 18 - Analysis of TCP
Lecture 19 - TCP Throughput
Lecture 20 - Buffer Management
Lecture 21 - IP Addressing Scheme
Lecture 22 - IP Addressing Lookup And Packet Classification
Lecture 23 - IP Over ATM
Lecture 24 - Multiple Label Switching (MPLS)
Lecture 25 - MPLS and Traffic Engineering
Lecture 26 - Optical Network and MPLS
Lecture 27 - Integrated Service Internet (IntServ) and RSVP
Lecture 28 - Differentiated Services Internet
Lecture 29 - Voice over IP
Lecture 30 - RTP
Lecture 31 - Metro Ethernet Access Networks
Lecture 32 - Metro Ethernet Access Networks

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NPTEL Video Course - Electronics and Communication Engineering - Digital Communication

Subject Co-ordinator - Prof. Bikash Kumar Dey

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Communication
Lecture 2 - Sampling
Lecture 3 - Quantization, PCM and Delta Modulation
Lecture 4 - Probability and Random Processes (Part-1)
Lecture 5 - Probability and Random Processes (Part-2)
Lecture 6 - Channels and their Models (Part-1)
Lecture 7 - Channels and their Models (Part-2)
Lecture 8 - Information Theory (Part-1)
Lecture 9 - Information Theory (Part-2)
Lecture 10 - Bandpass Signal Representation (Part-1)
Lecture 11 - Bandpass Signal Representation (Part-2)
Lecture 12 - Digital Modulation Techniques (Part-1)
Lecture 13 - Digital Modulation Techniques (Part-2)
Lecture 14 - Digital Modulation Techniques (Part-3)
Lecture 15 - Digital Modulation Techniques (Part-4)
Lecture 16 - Digital Modulation Techniques (Part-5)
Lecture 17 - Digital Modulation Techniques (Part-6)
Lecture 18 - Digital Modulation Techniques (Part-7)
Lecture 19 - Digital Modulation Techniques (Part-8)
Lecture 20 - Digital Modulation Techniques (Part-9)
Lecture 21 - Digital Modulation Techniques (Part-10)
Lecture 22 - Probability of Error Calculation
Lecture 23 - Calculation of Probability of Error
Lecture 24 - Calculation of Probability of Error
Lecture 25 - Equalizers
Lecture 26 - Source Coding (Part-1)
Lecture 27 - Source Coding (Part-2)
Lecture 28 - Source Coding (Part-3)
Lecture 29 - Source Coding (Part-4)

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Lecture 30 - Channel Coding
Lecture 31 - Fundamentals of OFDM
Lecture 32 - Conclusion

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NPTEL Video Course - Electronics and Communication Engineering - Information Theory and Coding

Subject Co-ordinator - Prof. S.N. Merchant

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Information Theory and Coding
Lecture 2 - Definition of Information Measure and Entropy
Lecture 3 - Extention of An Information Source and Markov Source
Lecture 4 - Adjoint of An Information Source, Joint and Conditional Information Measure
Lecture 5 - Properties of Joint and Conditional Information Measures and A Morkov Source
Lecture 6 - Asymptotic Properties of Entropy and Problem Solving in Entropy
Lecture 7 - Block Code and its Properties
Lecture 8 - Instantaneous Code and Its Properties
Lecture 9 - Kraft-Mcmillan Equality and Compact Codes
Lecture 10 - Shannon's First Theorem
Lecture 11 - Coding Strategies and Introduction to Huffman Coding
Lecture 12 - Huffman Coding and Proof of Its Optamality
Lecture 13 - Competitive Optamality of The Shannon Code
Lecture 14 - Non-Binary Huffman Code and Other Codes
Lecture 15 - Adaptive Huffman Coding - Part-I
Lecture 16 - Adaptive Huffman Coding - Part-II
Lecture 17 - Shannon-Fano-Elias Coding and Introduction to Arithmetic Coding
Lecture 18 - Arithmetic Coding - Part-I
Lecture 19 - Arithmetic Coding - Part-II
Lecture 20 - Introdution to Information Channels
Lecture 21 - Equivocation and Mutual Information
Lecture 22 - Properties of Different Information Channels
Lecture 23 - Reduction of Information Channels
Lecture 24 - Properties of Mutual Information and Introdution to Channel Capacity
Lecture 25 - Calculation of Channel Capacity for Different Information Channels
Lecture 26 - Shannon's Second Theorem
Lecture 27 - Discussion On Error Free Communication Over Noisy Channel
Lecture 28 - Error Free Communication Over A Binary Symmetric Channel and Introdution to Continous Sources ar
Lecture 29 - Differential Entropy and Evaluation of Mutual Information for Continuous Sources and Channels

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Lecture 30 - Channel Capacity of A BandLimited Continuous Channel
Lecture 31 - Introduction to Rate-Distortion Theory
Lecture 32 - Definition and Properties of Rate-Distortion Functions
Lecture 33 - Calculation of Rate-Distortion Functions
Lecture 34 - Computational Approach for Calculation of Rate-Distortion Functions
Lecture 35 - Introdution to Quantization
Lecture 36 - Lloyd-Max Quantizer
Lecture 37 - Companded Quantization
Lecture 38 - Variable Length Coding and Problem Solving in Quantizer Design
Lecture 39 - Vector Quantization
Lecture 40 - Transform Coding - Part-I
Lecture 41 - Transform Coding - Part-II

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NPTEL Video Course - Electronics and Communication Engineering - Transmission Lines and EM Waves

Subject Co-ordinator - Prof. R.K. Shevgaonkar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to EM waves and various techniques of communication
Lecture 2 - Equations of Voltage and Current on TX line
Lecture 3 - Propagation constant, Characteristic impedance and reflection coefficient
Lecture 4 - Impedance Transformation
Lecture 5 - Loss-less and Low loss Transmission line and VSWR
Lecture 6 - Power transfer on TX line
Lecture 7 - Smith Chart
Lecture 8 - Admittance Smith Chart
Lecture 9 - Experimental setup for transmission line measurements
Lecture 10 - Applications of transmission lines
Lecture 11 - Applications of transmission lines-II
Lecture 12 - Impedance Matching
Lecture 13 - Lossy Transmission Line
Lecture 14 - Problems on Transmission line
Lecture 15 - Types of transmission line
Lecture 16 - Basics of Vectors
Lecture 17 - Vector calculus
Lecture 18 - Basic laws of Electromagnetics
Lecture 19 - Maxwell\\\'s Equations
Lecture 20 - Boundary conditions at Media Interface
Lecture 21 - Uniform plane wave
Lecture 22 - Propagation of wave
Lecture 23 - Wave polarization
Lecture 24 - Pioncere\\\'s Sphere
Lecture 25 - Wave propagation in conducting medium
Lecture 26 - Wave propagation and phase velocity
Lecture 27 - Power flow and Poynting vector
Lecture 28 - Surface current and power loss in a conductor
Lecture 29 - Plane wave in arbitary direction

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Lecture 30 - Plane wave at dielectric interface
Lecture 31 - Reflection and refraction at media interface
Lecture 32 - Total internal reflection
Lecture 33 - Polarization at media interface
Lecture 34 - Reflection from a conducting boundary
Lecture 35 - Parallel plane waveguide
Lecture 36 - Wave propagation in parallel plane waveguide
Lecture 37 - Analysis of waveguide general approach
Lecture 38 - Rectangular waveguide
Lecture 39 - Modal propagation in rectangular waveguide
Lecture 40 - Surface currents on the waveguide walls
Lecture 41 - Field visualization and Attenuation in waveguide
Lecture 42 - Attenuation in waveguide continued
Lecture 43 - Radiation (Antenna)
Lecture 44 - Solution for potential function
Lecture 45 - Radiation form the Hertz dipole
Lecture 46 - Power radiated by hertz dipole
Lecture 47 - Thin linear antenna
Lecture 48 - Radiation Parameters of antenna
Lecture 49 - Receiving antenna
Lecture 50 - Monopole and Dipole antenna
Lecture 51 - Fourier transform relation between current and radiation pattern
Lecture 52 - Antenna arrays
Lecture 53 - Uniform Linear array
Lecture 54 - Uniform Linear array continued
Lecture 55 - Synthesis of array
Lecture 56 - Binomial array and general array synthesis
Lecture 57 - Problems on uniform plane wave
Lecture 58 - Problems on uniform plane wave in a meduim
Lecture 59 - Problems on waveguides
Lecture 60 - Problems on Antennas and radiation

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NPTEL Video Course - Electronics and Communication Engineering - CMOS Analog VLSI Design

Subject Co-ordinator - Prof. A.N. Chandorkar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to CMOS Analog VLSI Design
Lecture 2 - Introduction to CMOS Analog VLSI Design (Continued...)
Lecture 3 - MOS Fundamentals
Lecture 4 - MOS Fundamentals (Continued...)
Lecture 5 - Basic of MOS Amplifier (Part-1)
Lecture 6 - Basic of MOS Amplifier (Part-2)
Lecture 7 - Basic of MOS Amplifier (Part-3)
Lecture 8 - Cascode Amplifier
Lecture 9 - Types of MOSFET Amplifier
Lecture 10 - Types of MOSFET Amplifier
Lecture 11 - Differential Amplifier
Lecture 12 - Differential Amplifier
Lecture 13 - Current Sources
Lecture 14 - Current Sources
Lecture 15 - Current Sources
Lecture 16 - Frequency Response of Amplifier
Lecture 17 - Basic of CMOS OPAMP
Lecture 18 - OPAMP Design Issues
Lecture 19 - OPAMP Design
Lecture 20 - OPMAP Design
Lecture 21 - Operational Transconductance Amplifier
Lecture 22 - OTA Operation Transconductance Amplifier and Application
Lecture 23 - Fully Differential Amplifier and Noise
Lecture 24 - Noise
Lecture 25 - Noise (Continued...)
Lecture 26 - Layout of Analog Circuit
Lecture 27 - Oscillators
Lecture 28 - Oscillators (Continued...)
Lecture 29 - Oscillators (Continued...)

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NPTEL Video Course - Electronics and Communication Engineering - Analog Circuits

Subject Co-ordinator - Prof. A.N. Chandorkar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Analog Circuits - An Overview
Lecture 2 - Two Parts of Review of Analog Filter Approximation
Lecture 3 - BJT Small Signal Model
Lecture 4 - BJT Small Signal Model [Continuation from Lecture 3]
Lecture 5 - MOS Circuit Model
Lecture 6 - Biasing of Circuits
Lecture 7 - Amplifiers
Lecture 8 - MOS Amplifiers
Lecture 9 - Cascode Amplifier
Lecture 10 - Frequency Response of Amplifier
Lecture 11 - Frequency Response of Amplifier
Lecture 12 - Frequency Response of Amplifier
Lecture 13 - Frequency Response of Amplifier
Lecture 14 - Differential Amplifier
Lecture 15 - Differential Amplifier
Lecture 16 - Differential Amplifier
Lecture 17 - Feedback Theory
Lecture 18 - Feedback Theory
Lecture 19 - OPAMP Circuits
Lecture 20 - OPAMP Circuits
Lecture 21 - Active RC Filters
Lecture 22 - Active Filters
Lecture 23 - Oscillators
Lecture 24 - Oscillators
Lecture 25 - DAC/ADC

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Microwave Integrated Circuits

Subject Co-ordinator - Prof. Jayanta Mukherjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Reflection Coefficient, VSWR, Smith Chart
Lecture 3 - Reflection Coefficient, VSWR
Lecture 4 - Smith Chart
Lecture 5 - Application of the Smith Chart
Lecture 6 - Microwave Components
Lecture 7 - Broadband Impedance Matching
Lecture 8 - Multi-section transformer
Lecture 9 - Maximally flat (binomial) transformer, Chebyshev transformer
Lecture 10 - Non-uniform transmission line (Tapers)
Lecture 11 - Scattering Parameters
Lecture 12 - Properties of Scattering Parameters
Lecture 13 - Properties of Scattering Parameters (Continued...)
Lecture 14 - Signal flow graph, ABCD parameters
Lecture 15 - 1 and 2 Port passive Components
Lecture 16 - 3 Port Microwave Components
Lecture 17 - Couplers
Lecture 18 - Coupled Line Couplers
Lecture 19 - Resonators and narrow band filters
Lecture 20 - Narrow-band filters
Lecture 21 - Filter design
Lecture 22 - Filter synthesis, KurodaÂ s Identity
Lecture 23 - Impedance Matching Circuits for Amplifiers
Lecture 24 - Microstrip Matching (Continued...), Masons Rule, Power Gain Equations
Lecture 25 - Amplifier Gain Stability
Lecture 26 - Amplifier Gain Stability (Continued...)
Lecture 27 - Gain Circles
Lecture 28 - Gain Circles (Continued...)
Lecture 29 - Noise

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Lecture 30 - Noise Figure Circles (Continued...)
Lecture 31 - DC Bias
Lecture 32 - Amplifier Classes, Frequency Compensation
Lecture 33 - Linearity
Lecture 34 - Oscillator Design

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Foundations of Wavelets and Multirate Di

Subject Co-ordinator - Prof. V.M. Gadre

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Origin of wavelets
Lecture 3 - Haar wavelet
Lecture 4 - Dyadic wavelet
Lecture 5 - Dilates and translates of Haar wavelet
Lecture 6 - L2 norm of a function
Lecture 7 - Piecewise constant representation of a function
Lecture 8 - Ladder of subspaces
Lecture 9 - Scaling function of Haar wavelet
Lecture 10 - Demonstration
Lecture 11 - Vector representation of sequences
Lecture 12 - Properties of norm
Lecture 13 - Parsevals theorem
Lecture 14 - Equivalence of functions and sequences
Lecture 15 - Angle between Functions and their Decomposition
Lecture 16 - Additional Information on Direct-Sum
Lecture 17 - Introduction to filter banks
Lecture 18 - Haar Analysis filter bank in Z-domain
Lecture 19 - Haar Synthesis filter bank in Z-domain
Lecture 20 - Moving from Z-domain to frequency domain
Lecture 21 - Frequency Response of Haar Analysis Low pass Filter bank
Lecture 22 - Frequency Response of Haar Analysis High pass Filter bank
Lecture 23 - Ideal Two-band Filter bank
Lecture 24 - Disqualification of Ideal Filter bank
Lecture 25 - Realizable Two-band Filter bank
Lecture 26 - Demonstration
Lecture 27 - Relating Fourier transform of scaling function to filter bank
Lecture 28 - Fourier transform of scaling function
Lecture 29 - Construction of scaling and wavelet functions from filter bank

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Lecture 30 - Demonstration
Lecture 31 - Conclusive Remarks and Future Prospects

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NPTEL Video Course - Electronics and Communication Engineering - RF Integrated Circuits

Subject Co-ordinator - Dr. Shouribrata Chatterjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - RF system basic architectures
Lecture 2 - Transmission media reflection
Lecture 3 - Maximum power transfer
Lecture 4 - Parallel RLC tank
Lecture 5 - Matching
Lecture 6 - Other matching networks
Lecture 7 - Resistors capacitors
Lecture 8 - Inductors
Lecture 9 - Inductors and wires
Lecture 10 - Wires
Lecture 11 - Transmission lines
Lecture 12 - Device review
Lecture 13 - MOS capacitances
Lecture 14 - Bandwidth estimation constants
Lecture 15 - Bandwidth estimation constants (Continued.)
Lecture 16 - Bandwidth estimation using short circuit
Lecture 17 - Bandwidth groupdelay and peaking
Lecture 18 - Shunt series amplifier
Lecture 19 - Shunt series amplifier (Continued.)
Lecture 20 - Various noise sources
Lecture 21 - Noise in a mosfet
Lecture 22 - Motivation first cut design
Lecture 23 - Motivation first cut design (Continued.)
Lecture 24 - Noise other possible topologies
Lecture 25 - Multiplier Fundamentals
Lecture 26 - Mixer non idealties
Lecture 27 - Mixer non idealties (Continued.)
Lecture 28 - A tank based oscillators
Lecture 29 - Phase noise in oscillators

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Lecture 30 - Other oscillators topologies
Lecture 31 - Phase locked loop basics
Lecture 32 - Charge pump
Lecture 33 - Pll dynamics integer
Lecture 34 - Spurious frequencies fractional and synthesis
Lecture 35 - Fractional spurs
Lecture 36 - Delta and sigma modulation
Lecture 37 - Class abc power amplifiers
Lecture 38 - Class bcd power amplifiers
Lecture 39 - Class cd pwm amplifiers
Lecture 40 - Course summary and conclusion

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NPTEL Video Course - Electronics and Communication Engineering - Communication Engineering

Subject Co-ordinator - Prof. Surendra Prasad

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Communication Engineering
Lecture 2 - Communication channel
Lecture 3 - Brief Review of Signal and Systems
Lecture 4 - The Hilbert Transform
Lecture 5 - Analytic Representation of band pass Signals
Lecture 6 - Fundamentals of Analog Signal Transmission
Lecture 7 - Analog Modulation of Carriers
Lecture 8 - Amplitude Modulation
Lecture 9 - Amplitude Modulation
Lecture 10 - Single Sideband Modulation
Lecture 11 - Suppressed Sideband Modulation
Lecture 12 - VSB Modulation - Superhet Receiver
Lecture 13 - Superhet Receiver etc
Lecture 14 - Practical Mixers-Effects of Tonal
Lecture 15 - Angle Modulation
Lecture 16 - Angle Modulation
Lecture 17 - Generation of FM Signals
Lecture 18 - FM Generation and Detection
Lecture 19 - Demodulation of Angle Modulated Signals
Lecture 20 - Demodulation of Angle Modulated Signals
Lecture 21 - Demodulation of Angle Modulated Signals
Lecture 22 - Feedback Demodulators - phase locked loop
Lecture 23 - The Phase Locked Loop
Lecture 24 - Frequency Compressive Feedback Demodulator
Lecture 25 - FM Receivers
Lecture 26 - TV Transmission
Lecture 27 - Review of Probability Theory and Random Process
Lecture 28 - Review of Probability Theory and Random Variables
Lecture 29 - Random Processes

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Lecture 30 - Random Processes
Lecture 31 - Random Processes
Lecture 32 - Gaussian Random Processes
Lecture 33 - Behaviour of Communication System
Lecture 34 - Performance of AM Systems in Noise
Lecture 35 - Noise in AM and Angle Modulation Systems
Lecture 36 - Noise in Phase and Frequency Modulation systems
Lecture 37 - Noise in Angle Modulation
Lecture 38 - Pre emphasis - De emphasis
Lecture 39 - Pulse Modulation Schemes - PWM and PPM
Lecture 40 - Data Modulation
Lecture 41 - Pulse Code Modulation

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NPTEL Video Course - Electronics and Communication Engineering - Digital Signal Processing

Subject Co-ordinator - Prof. S.C. Dutta Roy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Digital Signal Processing Introduction
Lecture 2 - Digital Signal Processing Introduction (Continued.)
Lecture 3 - Digital Systems
Lecture 4 - Characterization Description, Testing of Digital Systems
Lecture 5 - LTI Systems Step & Impulse Responses, Convolution
Lecture 6 - Inverse Systems, Stability, FIR & IIR
Lecture 7 - FIR & IIR; Recursive & Non Recursive
Lecture 8 - Discrete Time Fourier Transform
Lecture 9 - Discrete Fourier Transform (DFT)
Lecture 10 - DFT (Continued.)
Lecture 11 - DFT (Continued.) Introduction to Z Transform
Lecture 12 - Z Transform
Lecture 13 - Z Transform (Continued.)
Lecture 14 - Discrete Time Systems in the Frequency Domain
Lecture 15 - Simple Digital Filters
Lecture 16 - All Pass Filters, Com.Filters
Lecture 17 - Linear Phase filters, Complementary Transfer Fn
Lecture 18 - Compensatory Transfer Functions, (Continued.)
Lecture 19 - Test for Stability using All Pass Functions
Lecture 20 - Digital Processing of Continuous Time Signals
Lecture 21 - Problem Solving Session
Lecture 22 - Problem Solving Session
Lecture 23 - Analog Filter Design
Lecture 24 - Analog Chebyshev LPF Design
Lecture 25 - Analog Filter Design (Continued.)
Lecture 26 - Analog frequency Transformation
Lecture 27 - Problem Solving Session on Discrete Time System
Lecture 28 - Digital Filter Structures
Lecture 29 - IIR Realizations

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Lecture 30 - All Pass Realizations
Lecture 31 - Lattice Synthesis (Continued.)
Lecture 32 - FIR Lattice Synthesis
Lecture 33 - FIR Lattice (Continued.) and Digital Filter Design
Lecture 34 - IIR Filter Design
Lecture 35 - IIR Design by Bilinear Transformation
Lecture 36 - IIR Design Examples
Lecture 37 - Digital to Digital Frequency Transformation
Lecture 38 - FIR Design
Lecture 39 - FIR Digital Filter Design by Windowing
Lecture 40 - FIR Design by Windowing & Frequency Sampling
Lecture 41 - Solving Problems on DSP Structures
Lecture 42 - FIR Design by Frequency Sampling
Lecture 43 - FIR Design by Frequency Sampling (Continued.)

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NPTEL Video Course - Electronics and Communication Engineering - Wireless Communication

Subject Co-ordinator - Prof. Ranjan Bose

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation and Introduction
Lecture 2 - Types of Wireless communication
Lecture 3 - The modern wireless Communication Systems
Lecture 4 - The cellular concept - System Design issues
Lecture 5 - Cell capacity and reuse
Lecture 6 - Interference and System capacity
Lecture 7 - Improving coverage and system capacity
Lecture 8 - Mobile Radio Propagation
Lecture 9 - Mobile Radio Propagation (Continued.)
Lecture 10 - Mobile Radio Propagation (Continued.)
Lecture 11 - Mobile Radio Propagation (Continued.)
Lecture 12 - Mobile Radio Propagation (Continued.)
Lecture 13 - Mobile Radio Propagation (Continued.)
Lecture 14 - Mobile Radio Propagation II
Lecture 15 - Mobile Radio Propagation II (Continued.)
Lecture 16 - Mobile Radio Propagation II (Continued.)
Lecture 17 - Mobile Radio Propagation II (Continued.)
Lecture 18 - Mobile Radio Propagation II (Continued.)
Lecture 19 - Mobile Radio Propagation II (Continued.)
Lecture 20 - Mobile Radio Propagation II (Continued.)
Lecture 21 - Modulation Techniques for Mobile Communication
Lecture 22 - Modulation Techniques (Continued.)
Lecture 23 - Modulation Techniques (Continued.)
Lecture 24 - Modulation Techniques (Continued.)
Lecture 25 - Modulation Techniques (Continued.)
Lecture 26 - Modulation Techniques (Continued.)
Lecture 27 - Modulation Techniques (Continued.)
Lecture 28 - Equalization and Diversity Techniques
Lecture 29 - Equalization and Diversity Techniques (Continued.)

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Lecture 30 - Equalization and Diversity Techniques (Continued.)
Lecture 31 - Equalization and Diversity Techniques (Continued.)
Lecture 32 - Coding Techniques for Mobile Communications
Lecture 33 - Coding Techniques for Mobile Communications (Continued.)
Lecture 34 - Coding Techniques for Mobile Communications (Continued.)
Lecture 35 - Coding Techniques for Mobile Communications (Continued.)
Lecture 36 - Wireless Networks
Lecture 37 - GSM and CDMA
Lecture 38 - GSM and CDMA (Continued.)

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NPTEL Video Course - Electronics and Communication Engineering - Basic Electronics

Subject Co-ordinator - Prof. Chitralekha Mahanta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Semiconductor materials
Lecture 2 - PN Junction Diodes
Lecture 3 - Diode Equivalent Circuits
Lecture 4 - Diode Rectifier Circuits
Lecture 5 - Zener Diode and Applications
Lecture 6 - Clipping and Clamping Circuits
Lecture 7 - Transistor Operation - Part-1
Lecture 8 - Transistor Operation - Part-2
Lecture 9 - Biasing the BJT - Part-1
Lecture 10 - Biasing the BJT - Part-2
Lecture 11 - BJT Small Signal Analysis
Lecture 12 - BJT Amplifier - Part-1
Lecture 13 - BJT Amplifier - Part-2
Lecture 14 - Frequency Response of BJT Analysis - Part-1
Lecture 15 - Bipolar Junction Transistors
Lecture 16 - Transistor as a Switch
Lecture 17 - MOSFET - Part-1
Lecture 18 - MOSFET - Part-2
Lecture 19 - MOSFET under dc operation
Lecture 20 - Mosfet as an Amplifier
Lecture 21 - Small signal model of MOSFET - Part-1
Lecture 22 - Small signal model of MOSFET - Part-2
Lecture 23 - High Frequency model of mosfet
Lecture 24 - Junction Field Effect Transistor
Lecture 25 - Operational Amplifier Introduction
Lecture 26 - Ideal Op-Amp
Lecture 27 - Op-Amp applications Part-1
Lecture 28 - Op-Amp Applications Part-2
Lecture 29 - Op-Amp Applications Part-3

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Lecture 30 - The practical Op-Amp
Lecture 31 - Positive feedback and oscillation
Lecture 32 - Comparator
Lecture 33 - Large Signal Amplifiers
Lecture 34 - Transformer Couple Power Amplifier
Lecture 35 - Class AB Operations of Power Amplifier
Lecture 36 - Power BJTs
Lecture 37 - Regulated Power Supply
Lecture 38 - Four Layered Diode
Lecture 39 - Silicon Control Rectifier
Lecture 40 - SCR Applications

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NPTEL Video Course - Electronics and Communication Engineering - NOC:VLSI Design Verification and Test

Subject Co-ordinator - Dr. Santosh Biswas, Jatindra Kumar Deka, Prof.Arnab sarkar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Overview of VLSI Design Flow
Lecture 4 - High Level Synthesis Overview - Part 1
Lecture 5 - High Level Synthesis Overview - Part 2
Lecture 6 - Scheduling in HLS - Part 1
Lecture 7 - Scheduling in HLS - Part 2
Lecture 8 - Scheduling in HLS - Part 3
Lecture 9 - Scheduling in HLS - Part 4
Lecture 10 - Scheduling in HLS - Part 5
Lecture 11 - Scheduling in HLS - Part 6
Lecture 12 - Scheduling in HLS - Part 7
Lecture 13 - Resource Sharing and Binding in HLS - Part 1
Lecture 14 - Resource Sharing and Binding in HLS - Part 2
Lecture 15 - Resource Sharing and Binding in HLS - Part 3
Lecture 16 - Resource Sharing and Binding in HLS - Part 4
Lecture 17 - Resource Sharing and Binding in HLS - Part 5
Lecture 18 - Resource Sharing and Binding in HLS - Part 6
Lecture 19 - Resource Sharing and Binding in HLS - Part 7
Lecture 20 - Logic Synthesis - Part 1
Lecture 21 - Logic Synthesis - Part 2
Lecture 22 - Logic Synthesis - Part 3
Lecture 23 - Physical Design - Part 1
Lecture 24 - Physical Design - Part 2
Lecture 25 - Physical Design - Part 3
Lecture 26 - Introduction to formal methods for design verification
Lecture 27 - Temporal Logic
Lecture 28 - Syntax and Semantics of CLT
Lecture 29 - Syntax and semantics of CTL (Continued...)

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Lecture 30 - Equivalences between CTL Formulas
Lecture 31 - Introduction to Model Checking
Lecture 32 - Model checking Algorithms
Lecture 33 - Model checking Algorithms (Continued...)
Lecture 34 - Model Checking with Fairness
Lecture 35 - Binary Decision Diagram
Lecture 36 - Ordered Binary Decision Diagram (OBDD)
Lecture 37 - Operation On OBDD
Lecture 38 - OBDD for State Transition Systems E
Lecture 39 - Symbolic Model Checking
Lecture 40 - Introduction to Digital VLSI Testing
Lecture 41 - Functional and Structural Testing
Lecture 42 - Fault Equivalence
Lecture 43 - Fault Simulation - I
Lecture 44 - Fault Simulation - II
Lecture 45 - Fault Simulation - III
Lecture 46 - Testability Measures (SCOAP)
Lecture 47 - Introduction to Automatic Test Pattern Generation (ATPG) and ATPG Algebras
Lecture 48 - D-Algorithm - I
Lecture 49 - D-Algorithm - II
Lecture 50 - ATPG for Synchronous Sequential Circuits
Lecture 51 - Scan Chain based Sequential Circuit Testing - I
Lecture 52 - Scan Chain based Sequential Circuit Testing - II
Lecture 53 - BIST - I
Lecture 54 - BIST - II

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Design of Power Electronic Converters

Subject Co-ordinator - Prof. Shabari Nath

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Analysis of Buck Converter
Lecture 3 - Choosing L and C
Lecture 4 - Design Example of Buck Converter
Lecture 5 - Analysis of H Bridge
Lecture 6 - Bipolar PWM
Lecture 7 - Unipolar PWM
Lecture 8 - Bipolar vs Unipolar PWM
Lecture 9 - Different types of power diode
Lecture 10 - Diode characteristics
Lecture 11 - Diode Datasheets
Lecture 12 - Diode Datasheet Examples
Lecture 13 - MOSFET
Lecture 14 - Switching characteristics of MOSFET
Lecture 15 - MOSFET Datasheets - I
Lecture 16 - MOSFET Datasheets - II
Lecture 17 - MOSFET Datasheet example
Lecture 18 - IGBT
Lecture 19 - IGBT Datasheets - I
Lecture 20 - IGBT Datasheets - II
Lecture 21 - IGBT Datasheet Example
Lecture 22 - Introduction to Gate Drivers
Lecture 23 - Gate Driver Requirements
Lecture 24 - Optocouplers based Gate Drivers - I
Lecture 25 - Optocouplers based Gate Drivers - II
Lecture 26 - Desat Protection
Lecture 27 - Bootstrapping
Lecture 28 - Pulse Transformer based Gate Drivers
Lecture 29 - Gate Drivers - Few Other Requirements

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Lecture 30 - Introduction to Snubbers
Lecture 31 - RC Snubber Analysis - I
Lecture 32 - RC Snubber Analysis - II : Underdamped Case
Lecture 33 - RC Snubber Analysis - III : Overdamped and Critically Damped Case
Lecture 34 - RC Snubber Design - I
Lecture 35 - RC Snubber Design - II
Lecture 36 - RCD Snubbers - I
Lecture 37 - RCD Snubbers - II
Lecture 38 - Power Loss - I
Lecture 39 - Power Loss - II
Lecture 40 - Thermal Modelling - I
Lecture 41 - Thermal Modelling - II
Lecture 42 - Thermal Modelling - III
Lecture 43 - Choosing Heat Sinks
Lecture 44 - Fundamentals
Lecture 45 - Magnetic Losses
Lecture 46 - Conductors
Lecture 47 - Magnetic Materials
Lecture 48 - Magnetic Core
Lecture 49 - Inductor Design - I
Lecture 50 - Inductor Design - II
Lecture 51 - Transformer Design
Lecture 52 - Inductor Design Example
Lecture 53 - Example of Transformer Design
Lecture 54 - Introduction to EMI
Lecture 55 - EMI Measurements
Lecture 56 - EMI in Power Electronics
Lecture 57 - CM and DM noise
Lecture 58 - Design Solutions of EMI
Lecture 59 - EMI Filter - I
Lecture 60 - EMI Filter - II
Lecture 61 - Sections of Power Converters
Lecture 62 - Capacitors
Lecture 63 - Familiarity with Components - I
Lecture 64 - Familiarity with Components - II
Lecture 65 - PCB - I
Lecture 66 - PCB - II
Lecture 67 - PCB - III
Lecture 68 - Grounds

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Lecture 69 - Lab Demo of Hardware Design
Lecture 70 - Tutorial: PCB Designing

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Operation and Planning of Power Distribu

Subject Co-ordinator - Prof. Sanjib Ganguly

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Power systems: Overview and historical developments
Lecture 2 - Introduction to power delivery systems
Lecture 3 - Introduction to electrical loads
Lecture 4 - Load diversity
Lecture 5 - Different load indices
Lecture 6 - Loss factor
Lecture 7 - Load management
Lecture 8 - Brief overview of power distribution substation
Lecture 9 - Substation bus schemes and primary distribution network topology
Lecture 10 - Voltage drop and power loss computations for typical radial distribution feeders
Lecture 11 - Genaralized expression for voltage drop for radial distribution feeder
Lecture 12 - Derivation of K-constant for voltage drop computation
Lecture 13 - Different reliability indices used in distribution networks
Lecture 14 - Different reliability indices with numerical examples
Lecture 15 - Mathematical concept of reliability
Lecture 16 - Reliability evaluation of multiple units connected to series and/or parallel
Lecture 17 - Numerical problems on reliability evaluation
Lecture 18 - Power quality problems in distribution systems
Lecture 19 - Forward backward load flow approach for power distribution systems
Lecture 20 - Forward backward load flow approach for power distribution systems
Lecture 21 - Reactive power compensation: Basic idea
Lecture 22 - Reactive power compensation: Numerical examples
Lecture 23 - Capacitor placement at distribution feeder: Analytical approach
Lecture 24 - Power distribution system planning: Economic aspects
Lecture 25 - Power distribution system planning: Different models and solution strategies
Lecture 26 - Mono-objective power distribution system planning approach
Lecture 27 - Multi-objective power distribution system planning approach
Lecture 28 - Multi-objective planning incorporating sectionalizing switches and tie-lines
Lecture 29 - Reconfiguration of power distribution networks

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Lecture 30 - Distribution networks with the integration of Distributed Generation
Lecture 31 - Concept of microgrids
Lecture 32 - Wind and solar energy conversion systems
Lecture 33 - Energy storage systems
Lecture 34 - Distribution system automation and smart grid - Part I
Lecture 35 - Distribution system automation and smart grid - Part II

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Nanophotonics, Plasmonics, and Metamater

Subject Co-ordinator - Dr. Debabrata Sikdar, Dr. Debabrata Sikdar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Nanophotonics and Plasmonics
Lecture 2 - Introduction to Metamaterials and Metasurfaces
Lecture 3 - Overview and current status
Lecture 4 - Electromagnetic theory of light
Lecture 5 - Electromagnetic properties of material
Lecture 6 - Electromagnetic waves in dielectric media
Lecture 7 - Polarization of light
Lecture 8 - Reflection and refraction: Fresnel equations
Lecture 9 - Absorption, dispersion and scattering of light
Lecture 10 - Matrix theory of dielectric layered media
Lecture 11 - 1D Photonic crystals
Lecture 12 - Dispersion relation and photonic band structure
Lecture 13 - Real and reciprocal lattices
Lecture 14 - 2D and 3D Photonic crystals
Lecture 15 - Emerging Applications of Photonic Crystals
Lecture 16 - Optical properties of metals
Lecture 17 - Surface Plasmon Polaritons (SPP): Fundamentals
Lecture 18 - Applications of SPPs
Lecture 19 - Localized surface plasmon resonance (LSPR)
Lecture 20 - Plasmonic nanoparticles: Antenna and Waveguides
Lecture 21 - Applications of LSPR
Lecture 22 - Fundamentals of metamaterials
Lecture 23 - Effective medium theories
Lecture 24 - Single and Double-Negative Metamaterials
Lecture 25 - Metamaterial Perfect absorbers
Lecture 26 - Super lens, Hyperbolic Metamaterials and Hyper lens
Lecture 27 - Tunable photonic metamaterial based devices
Lecture 28 - Metasurfaces and Frequency selective surfaces
Lecture 29 - Guided mode resonances (GMR)

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Lecture 30 - Applications of metasurfaces and GMR devices
Lecture 31 - Transformation Optics (TO) and Invisibility Cloaks
Lecture 32 - Carpet cloaking and TO metamaterials
Lecture 33 - Introduction to alternative materials
Lecture 34 - Nanofabrication: Physical and Chemical methods
Lecture 35 - Lithography and Pattern transfer
Lecture 36 - Nanophotonic characterization methods

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Power Electronics Applications in Power

Subject Co-ordinator - Prof. Sanjib Ganguly

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts of active and reactive power
Lecture 2 - Basic Concepts of reactive power compensation
Lecture 3 - Basic mathematical modelling of power transmission systems
Lecture 4 - Derivation of the relation of sending and receiving end voltages and currents - Part A
Lecture 5 - Derivation of the relation of sending and receiving end voltages and currents - Part B
Lecture 6 - Derivations of power flow expressions
Lecture 7 - Numerical example showing determination of power flow
Lecture 8 - Generalized expression for active and reactive power at any point of a long line
Lecture 9 - Mid-point voltage and current for long, lossless transmission lines
Lecture 10 - Plot of mid-point voltage vs line loading
Lecture 11 - Numerical example of mid-point compensation - Part A
Lecture 12 - Numerical example of mid-point compensation - Part B
Lecture 13 - Effect of Mid-point compensation on power flow of transmission lines
Lecture 14 - Thyristor controlled reactor (TCR)
Lecture 15 - Harmonics in TCR and Three-phase TCR configuration
Lecture 16 - Operating Characteristics of TCR
Lecture 17 - Categorization of different types of SVC and Fixed capacitor TCR (FC-TCR)
Lecture 18 - Mechanically Switched Capacitor TCR (MSC-TCR) and Thyrisor Switch Capacitor (TSC)
Lecture 19 - Thyristor Switch Capacitor (TSC)
Lecture 20 - Design of TSC-TCR: Numerical Example
Lecture 21 - SVC in enhancement of steady-state power transmission capacity
Lecture 22 - SVC in enhancement of transient stability of power systems
Lecture 23 - SVC in enhancement of synchronizing power coefficient
Lecture 24 - SVC in and power system oscillation damping
Lecture 25 - SVC in voltage control of power systems: Modelling
Lecture 26 - SVC in voltage control of power systems: Control characteristics
Lecture 27 - SVC in voltage control of power systems: Numerical example
Lecture 28 - Basic operating principle of TCSC
Lecture 29 - Basic mathematical modelling of TCSC - Part 1

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Lecture 30 - Basic mathematical modelling of TCSC - Part 2
Lecture 31 - TCSC reactance and hamomics analysis
Lecture 32 - Applications of TCSC in power systems
Lecture 33 - Basic mathematical modelling of STATCOM
Lecture 34 - Applications of STATCOM in power systems
Lecture 35 - Basic mathematical modelling of SSSC
Lecture 36 - Applications of SSSC in power systems

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Introduction to Microwave and Optical Me

Subject Co-ordinator - Prof. Debabrata Sikdar

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microwave and Optical Metamaterials - I
Lecture 2 - Introduction to Microwave and Optical Metamaterials - II
Lecture 3 - Applications of Optical Metamaterials and Classifications of Metamaterials
Lecture 4 - Classifications of Metamaterials - II
Lecture 5 - Overview of Metamaterials Technology
Lecture 6 - Basic Electromagnetic Theory - I
Lecture 7 - Basic Electromagnetic Theory - II
Lecture 8 - Electromagnetic Properties of Materials
Lecture 9 - Electromagnetic Waves in Materials
Lecture 10 - Electromagnetic Waves in Periodic Medium
Lecture 11 - Polarization of Electromagnetic Waves
Lecture 12 - Fresnel Equations
Lecture 13 - Absorption and Dispersion of Electromagnetic Waves
Lecture 14 - Scattering of Electromagnetic Waves
Lecture 15 - Concept Behind Metamaterials
Lecture 16 - Opical Properties of Metals - I
Lecture 17 - Opical Properties of Metal and Dielectrics
Lecture 18 - Opical Properties of Dielectrics
Lecture 19 - Mixing Rules and Effective Medium Theories
Lecture 20 - Effective Medium Theory - II
Lecture 21 - Overview of Electric Metamaterials
Lecture 22 - Periodic Array of Metallic Wires - I
Lecture 23 - Periodic Array of Metallic Wires - II
Lecture 24 - Inhomogeneous and Chiral Metamaterials
Lecture 25 - Types of Engineered Metamaterials and Applications
Lecture 26 - Split Ring Resonators
Lecture 27 - Optical Magnetic Elements
Lecture 28 - Analytical model of magnetic nanostrips
Lecture 29 - High-Permittivity Route to Artificial Magnetism

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Lecture 30 - Modelling of Microwave devices using metamaterials
Lecture 31 - 2D Model of Microwave Antenna with One Layer Metamaterial
Lecture 32 - Miniaturized Design of Microwave Antenna
Lecture 33 - Far-field Focusing for Microwave Antennas
Lecture 34 - Metamaterial-Inspired Antennas - I
Lecture 35 - Metamaterial-Inspired Antennas - II
Lecture 36 - Brief Overview of Negative Index Metamaterials
Lecture 37 - Negative Index Metamaterials - I
Lecture 38 - Negative Index Metamaterials - II
Lecture 39 - Super Resolution with Meta-Lenses
Lecture 40 - Applications of Composite Near-Field Superlens
Lecture 41 - Fundamentals of Hyperbolic Metamaterials
Lecture 42 - Hyberbolic Metamaterials for Super-resolution Hyperlens Imaging
Lecture 43 - Hyperbolic metamaterials for nanoscale optical cavities
Lecture 44 - Metamaterials Based Nanoscale Optical Cavities and Active Hyperbolic Metamaterials
Lecture 45 - Applications of Active Hyperbolic Metamaterials
Lecture 46 - Active Hyperbolic Metamaterials for Various Spectral Band
Lecture 47 - Principles of Transformational Electromagnetics
Lecture 48 - Examples and Applications of Transformational Electromagnetics
Lecture 49 - Invisibility Cloaks
Lecture 50 - Carpet Cloaking
Lecture 51 - Realizing Electromagnetic Cloaking using Metamaterials
Lecture 52 - Transformation Electromagnetics for Antenna Applications and Stealth Technology
Lecture 53 - Tunable metamaterials and Magnetically tunable metamaterials
Lecture 54 - Electrically Tunable Metamaterials
Lecture 55 - Thermally Tunable Metamaterials
Lecture 56 - Tunable Metamaterials-based Sensors
Lecture 57 - Metamaterial Fabrication Techniques
Lecture 58 - Microwave Metamaterial Patterning Methods
Lecture 59 - Optical Metamaterial Patterning Methods
Lecture 60 - Metamaterial Fabrication Technique: Pattern Transfer
Lecture 61 - Characterization Methods of Metamaterials

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Signal Processing Algorithms and Archite

Subject Co-ordinator - Prof. Anirban Dasgupta

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Time-Domain Signal Processing
Lecture 2 - Correlation and Convolution
Lecture 3 - Zero-crossing Detection
Lecture 4 - Peak Detection
Lecture 5 - Envelope Detection and Smoothing
Lecture 6 - Pattern Matching
Lecture 7 - Introduction to Frequency-Domain Signal Processing
Lecture 8 - Fourier Analysis
Lecture 9 - Fast Fourier Transforms
Lecture 10 - Applications of FFT
Lecture 11 - Z-transform
Lecture 12 - Coherence Analysis
Lecture 13 - Introduction to Time-Frequency Analysis
Lecture 14 - Multirate Signal Processing - I
Lecture 15 - Multirate Signal Processing - II
Lecture 16 - Short-Time Fourier Transform (STFT)
Lecture 17 - Wavelet Transform - I
Lecture 18 - Wavelet Transform - II
Lecture 19 - Introduction to Signal Processing Architectures
Lecture 20 - Signal Processor Components
Lecture 21 - Interfacing, Pipelining and Parallelism
Lecture 22 - Filter Structures - I
Lecture 23 - Filter Structures - II
Lecture 24 - Filter Design

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Microsensors and Nanosensors

Subject Co-ordinator - Prof. Ravindra Kumar Jha

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Sensor and its Classification
Lecture 2 - Sensor's Classification, Application and Fabrication Process - I
Lecture 3 - Fabrication Process - II
Lecture 4 - Fabrication Process - III
Lecture 5 - Fabrication Process - IV
Lecture 6 - Sensor Characterstics - I
Lecture 7 - Sensor Characterstics - II
Lecture 8 - Sensor Characterstics - III
Lecture 9 - Sensor Characterstics - IV
Lecture 10 - Sensor Characterstics - V
Lecture 11 - Principle of Sensing - Capacitance
Lecture 12 - Principle of Sensing - Inductor
Lecture 13 - Principle of Sensing - Resistance
Lecture 14 - Principle of Sensing - Piezoelectric
Lecture 15 - Principle of Sensing - Pyroelectric
Lecture 16 - Interface Circuit - I
Lecture 17 - Interface Circuit - II
Lecture 18 - Interface Circuit - III
Lecture 19 - Interface Circuit - IV
Lecture 20 - Interface Circuit - V
Lecture 21 - Humidity Sensors - I
Lecture 22 - Humidity Sensors - II
Lecture 23 - Humidity Sensors - III and Gas Sensor - I
Lecture 24 - Gas Sensor - II
Lecture 25 - Gas Sensor - III
Lecture 26 - Temperature Sensors - RTD
Lecture 27 - Temperature Sensors - Thermistors - I
Lecture 28 - Temperature Sensors - Thermistors - II
Lecture 29 - Temperature Sensors - Thermocouple

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Lecture 30 - Temperature Sensors - PN Junction, IC and IR
Lecture 31 - Force Sensors - Strain Gauge
Lecture 32 - Force Sensors - Capactive
Lecture 33 - Force Sensors - Piezoresistive
Lecture 34 - Force Sensors - Piezomagnetic and Electroactive
Lecture 35 - Force Sensors - Optical
Lecture 36 - Tactile Sensors - I
Lecture 37 - Tactile Sensors - II
Lecture 38 - Pressure Sensors - I
Lecture 39 - Pressure Sensors - II
Lecture 40 - Pressure Sensors - III
Lecture 41 - Occupancy and Motion Sensors - Ultrasonic and Microwave - I
Lecture 42 - Occupancy and Motion Sensors - Microwave - II and Capacitive
Lecture 43 - Occupancy and Motion Sensors - Triboelectric and Optoelectronic - I
Lecture 44 - Occupancy and Motion Sensors - Optoelectronic - II, Visible, IR and Heat Transfer - I
Lecture 45 - Occupancy and Motion Sensors - Heat Transfer - II and PIR
Lecture 46 - Position and Displacement Sensors - I
Lecture 47 - Displacement Sensors - II
Lecture 48 - Optical Displacement Sensors and Accelerometers - I
Lecture 49 - Accelerometers - II
Lecture 50 - Accelerometers - III
Lecture 51 - Smart Building Sensors - I
Lecture 52 - Smart Building Sensors - II
Lecture 53 - Smart Building Sensors - III
Lecture 54 - Smart Building Sensors - IV
Lecture 55 - Smart Building Sensors - V
Lecture 56 - Sensors for Healthcare - I
Lecture 57 - Sensors for Healthcare - II
Lecture 58 - Sensors for Healthcare - III
Lecture 59 - Sensors for Healthcare - IV
Lecture 60 - Sensors for Healthcare - V

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NPTEL Video Course - Electronics and Communication Engineering - Signals and Systems

Subject Co-ordinator - Prof. K.S. Venkatesh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Electronics and Communication Engineering - Advanced 3G and 4G Wireless Mobile Communica

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to 3G/4G Standards
Lecture 2 - Wireless Channel and Fading
Lecture 3 - Rayleigh Fading and BER of Wired Communication
Lecture 4 - BER for Wireless Communication
Lecture 5 - Introduction to Diversity
Lecture 6 - Multi-antenna Maximal Ratio Combiner
Lecture 7 - BER with Diversity
Lecture 8 - Spatial Diversity and Diversity Order
Lecture 9 - Wireless Channel and Delay Spread
Lecture 10 - Coherence Bandwidth of the Wireless Channel
Lecture 11 - ISI and Doppler in Wireless Communications
Lecture 12 - Doppler Spectrum and Jakes Model
Lecture 13 - Introduction to CDMA, Spread Spectrum and LFSR
Lecture 14 - Generation and Properties of PN Sequences
Lecture 15 - Correlation of PN Sequences and Jammer Margin
Lecture 16 - CDMA Advantages and RAKE Receiver
Lecture 17 - Multi-User CDMA Downlink Part I
Lecture 18 - Multi-User CDMA Downlink Part II
Lecture 19 - Multi-User CDMA Uplink and Asynchronous CDMA
Lecture 20 - CDMA Near-Far Problem and Introduction to MIMO
Lecture 21 - MIMO System Model and Zero-Forcing Receiver
Lecture 22 - MIMO MMSE Receiver and Introduction to SVD
Lecture 23 - SVD Based Optimal MIMO Transmission and Capacity
Lecture 24 - SVD Based Optimal MIMO Transmission and Capacity
Lecture 25 - OSTBCs and Introduction to V-BLAST Receiver
Lecture 26 - V-BLAST (Continued) and MIMO Beamforming
Lecture 27 - Introduction to OFDM and Multi-Carrier Modulation
Lecture 28 - IFFT Sampling for OFDM
Lecture 29 - OFDM Schematic and Cyclic Prefix

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Lecture 30 - OFDM Based Parallelization and OFDM Example
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Lecture 32 - MIMO-OFDM (Continued)
Lecture 33 - Impact of Carrier Frequency Offset (CFO) in OFDM
Lecture 34 - PAPR in OFDM Systems and Introduction to SC-FDMA
Lecture 35 - SC-FDMA (Continued) and Introduction of Wireless Propagation Models
Lecture 36 - Ground Reflection and Okumura Models
Lecture 37 - Hata Model and Log Normal Shadowing
Lecture 38 - Link Budget Analysis
Lecture 39 - Introduction to Teletraffic Theory
Lecture 40 - Cellular Traffic Modeling and Blocking Probability

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NPTEL Video Course - Electronics and Communication Engineering - Digital Switching

Subject Co-ordinator - Prof. Yatindra N Singh

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Principles of Modern CDMA-MIMO-OFDM Wire

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Evolution of Wireless Communication Technologies
Lecture 2 - Modeling Wireless Channel
Lecture 3 - Wireless Fading Channel Model
Lecture 4 - Fading Channel Distribution
Lecture 5 - Rayleigh Fading Channel
Lecture 6 - Bit Error Rate (BER) Performance
Lecture 7 - Bit Error Rate (BER) of AWGN Channels
Lecture 8 - Bit Error Rate of Rayleigh Fading Wireless Channel
Lecture 9 - Exact BER Expression for Rayleigh Fading Wireless Channel
Lecture 10 - Deep Fade Analysis of Wireless Communication
Lecture 11 - Principle of Diversity
Lecture 12 - Multiple Antenna Diversity
Lecture 13 - Maximal-Ratio Combining
Lecture 14 - BER of Multiple Antenna Wireless Systems
Lecture 15 - Approximate BER for Multiple Antenna Wireless System
Lecture 16 - Examples for BER of Wireless Communication
Lecture 17 - Deep Fade in Multi Antenna Systems
Lecture 18 - Intuition for Deep Fade in Multi-Antenna System
Lecture 19 - Definition of Diversity Order
Lecture 20 - Max Delay Spread
Lecture 21 - RMS Delay Spread
Lecture 22 - Delay Spread and Inter Symbol Interference
Lecture 23 - Coherence Bandwidth of Wireless Channel
Lecture 24 - Mobility and Doppler Effect in Wireless Channels
Lecture 25 - Imapact of Doppler Effect on Wireless Channel
Lecture 26 - Introduction to Code Division Multiple Access (CDMA)
Lecture 27 - Chip Time and Bandwidth Expansion in CDMA
Lecture 28 - Code Generation for CDMA
Lecture 29 - CDMA Codes

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Lecture 32 - Multipath Diversity in CDMA Systems
Lecture 33 - Near-Far Problem in CDMA
Lecture 34 - Multiple Input Multiple Output (MIMO) Systems
Lecture 35 - Examples of MIMO Systems
Lecture 36 - MIMO Receivers
Lecture 37 - BER Performance of ZF Receiver
Lecture 38 - Transmit Beamforming in MISO Systems
Lecture 39 - Alamouti Code and Space-Time Block Codes
Lecture 40 - BER of Alamouti Coded System
Lecture 41 - Singular Value Decomposition (SVD)
Lecture 42 - SVD in MIMO
Lecture 43 - Capacity of MIMO Wireless Systems
Lecture 44 - SVD based MIMO Transmission
Lecture 45 - Orthogonal Frequency Division Multiplexing (OFDM)
Lecture 46 - Transmission in Multicarrier Systems
Lecture 47 - FFT/IFFT Processing in OFDM
Lecture 48 - Cyclic Prefix in OFDM Systems
Lecture 49 - Schematic Represntation of OFDM Transmitter and Receiver
Lecture 50 - BER Performance of OFDM Systems

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Probability and Random Variables, Proces

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Basics - Sample Space and Events
Lecture 2 - Axioms of Probability
Lecture 3 - Conditional Probability - Mary-PAM Example
Lecture 4 - Independent Events - Mary-PAM Example
Lecture 5 - Independent Events - Block Transmission Example
Lecture 6 - Independent Events - Multiantenna Fading Example
Lecture 7 - Bayes Theorem and Aposteriori Probabilities
Lecture 8 - Maximum Aposteriori Probability (MAP) Receiver
Lecture 9 - Random Variables, Probability Density Function (PDF)
Lecture 10 - Application
Lecture 11 - Mean, Variance of Random Variables
Lecture 12 - Application
Lecture 13 - Transformation of Random Variables and Rayleigh Fading Wireless Channel
Lecture 14 - Gaussian Random Variable and Linear Transformation
Lecture 15 - Special Case
Lecture 16 - Application
Lecture 17 - Random Processes and Wide Sense Stationarity (WSS)
Lecture 18 - WSS Example Narrowband Wireless Signal with Random Phase
Lecture 19 - Power Spectral Density (PSD) for WSS Random Process
Lecture 20 - PSD Application in Wireless Bandwidth Required for Signal Transmission
Lecture 21 - Transmission of WSS Random Process Through LTI System
Lecture 22 - Special Random Processes Gaussian Process and White Noise AWGN Communication Channel
Lecture 23 - Gaussian Process Through LTI System Example

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Estimation for Wireless Communications,

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Basics - Sensor Network and Noisy Observation Model
Lecture 2 - Likelihood Function and Maximum Likelihood (ML) Estimate
Lecture 3 - Properties of Maximum Likelihood (ML) Estimate Â Mean and Unbiasedness
Lecture 4 - Properties of Maximum Likelihood (ML) Estimate Â Variance and Spread Around Mean
Lecture 5 - Reliability of the Maximum Likelihood (ML) Estimate Â Number of Samples Required
Lecture 6 - Estimation of Complex Parameters Â Symmetric Zero Mean Complex Gaussian Noise
Lecture 7 - Wireless Fading Channel Estimation Â Pilot Symbols and Likelihood Function
Lecture 8 - Wireless Fading Channel Estimation Â Pilot Training based Maximum Likelihood ML Estimate
Lecture 9 - Wireless Fading Channel Estimation Â Mean and Variance of Pilot Training Based Maximum Likelihoo
Lecture 10 - Example Â Wireless Fading Channel Estimation for Downlink Mobile Communication
Lecture 11 - Cramer Rao Bound (CRB) for Parameter Estimation
Lecture 12 - Cramer Rao Bound CRB Example Â Wireless Sensor Network
Lecture 13 - Vector Parameter Estimation Â System Model for Multi Antenna Downlink Channel Estimation
Lecture 14 - Likelihood Function and Least Squares Cost Function for Vector Parameter Estimation
Lecture 15 - Least Squares Cost Function for Vector Parameter Estimation Vector Derivative Gradient
Lecture 16 - Least Squares Solution Maximum Likelihood ML Estimate Pseudo Inverse
Lecture 17 - Properties of Least Squares Estimate Â Mean Covariance and Distribution
Lecture 18 - Least Squares Multi Antenna Downlink Maximum Likelihood Channel Estimation
Lecture 19 - Multiple Input Multiple Output MIMO Channel Estimation Â Least Squares Maximum Likelihood ML
Lecture 20 - Example Â Least Squares Multiple Input Multiple Output MIMO Channel Estimation
Lecture 21 - Channel Equalization and Inter Symbol Interference ISI Model
Lecture 22 - Least Squares based Zero Forcing Channel Equalizer
Lecture 23 - Example of ISI Channel and Least Squares based Zero Forcing
Lecture 24 - Equalization and Approximation Error for Zero Forcing Channel Equalizer
Lecture 25 - Example Equalization and Approximation Error for Zero Forcing Channel Equalizer
Lecture 26 - Introduction to Orthogonal Frequency Division Multiplexing OFDM Â Cyclic Prefix CP and Circular
Lecture 27 - Introduction to Orthogonal Frequency Division Multiplexing OFDM Â FFT at Receiver and Flat Fadi
Lecture 28 - Channel Estimation Across Each Subcarrier in Orthogonal Frequency Division Multiplexing OFDM
Lecture 29 - Example Orthogonal Frequency Division Mulltiplexing OFDM Â Transmission of Samples with Cyclic

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Lecture 30 - Example Orthogonal Frequency Division Mulltiplexing OFDM Â FFT at Receiver and Channel Estimati
Lecture 31 - Comb Type Pilot CTP Based Orthogonal Frequency Division Multiplexing OFDM Channel Estimation
Lecture 32 - Comb Type Pilot CTP Based Orthogonal Frequency Division Multiplexing OFDM Channel Estimation
Lecture 33 - Example Comb Type Pilot CTP Based Orthogonal Frequency Division Multiplexing OFDM Channel
Lecture 34 - Frequency Domain Equalization FDE for Inter Symbol Interference ISI Removal in Wireless System
Lecture 35 - Example Frequency Domain Equalization FDE for Inter Symbol Interference ISI Removal in Wireless
Lecture 36 - Example Frequency Domain Equalization FDE for Inter Symbol Interference ISI Removal in Wireless
Lecture 37 - Introduction to Sequential Estimation Â Application in Wireless Channel Estimation
Lecture 38 - Sequential Estimation of Wireless Channel Coefficient Â Estimate and Variance Update Equation
Lecture 39 - Example Sequential Estimation of Wireless Channel Coefficient

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Error Control Coding - An Introduction t

Subject Co-ordinator - Dr. Adrish Banerjee

Co-ordinating Institute - IIT - Kanpur

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Lecture 2 - Introduction to Error Coding - II
Lecture 3 - Introduction to Error Control Coding - III
Lecture 4 - Introduction to Convolutional Codes - I
Lecture 5 - Introduction to Convolutional Codes - II
Lecture 6 - Convolutional Codes
Lecture 7 - Convolutional Codes
Lecture 8 - Decoding of Convolutional Codes - I
Lecture 9 - Decoding of Convolutional Codes - II
Lecture 10 - Problem Solving Session - I
Lecture 11 - Problem Solving Session - II
Lecture 12 - Performance Bounds for Convolutional Codes
Lecture 13 - Turbo Codes
Lecture 14 - Turbo Decoding
Lecture 15 - Convergence of Turbo Codes
Lecture 16 - Applications of Convolutional Codes
Lecture 17 - Problem Solving Sessions - III

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Lecture 2 - Introduction to Error Control Coding - II
Lecture 3 - Introduction to Error Control Coding - III
Lecture 4 - Introduction to Linear Block Codes, Generator Matrix and Parity Check Matrix
Lecture 5 - Syndrome, Error Correction and Error Detection
Lecture 6 - Problem Solving Session - I
Lecture 7 - Decoding of Linear Block Codes
Lecture 8 - Distance Properties of Linear Block Codes - I
Lecture 9 - Distance Properties of Linear Block Codes - II
Lecture 10 - Problem Solving Session - II
Lecture 11 - Some Simple Linear Block Codes - I
Lecture 12 - Some Simple Linear Block Codes - II
Lecture 13 - Bounds on the Size of a Code
Lecture 14 - Problem Solving Session - III
Lecture 15 - Low Density Parity Check Codes
Lecture 16 - Decoding of Low Density Parity Check Codes - I
Lecture 17 - Decoding of Low Density Parity Check Codes - II
Lecture 18 - Applications of Linear Block Codes

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Bayesian, MMSE Estimation for Wireless C

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Basics Â Introduction to Bayesian Minimum Mean Squared Error
Lecture 2 - Optimal Bayesian Minimum Mean Squared Error (MMSE) Estimate
Lecture 3 - Derivation of Minimum Mean Squared Error MMSE Estimate for Gaussian Parameter Â Part I
Lecture 4 - Derivation of Minimum Mean Squared Error MMSE Estimate for Gaussian Parameter Â Part II
Lecture 5 - Derivation of Minimum Mean Squared Error (MMSE) Estimate for Gaussian Parameter Â Non-Zero Mean
Lecture 6 - Minimum Mean Squared Error MMSE Estimation Application Â Wireless Sensor Network
Lecture 7 - Simplification and Example of Minimum Mean Squared Error MMSE Estimate for Wireless Sensor Networ
Lecture 8 - Minimum Mean Squared Error MMSE Estimation Application Â Wireless Fading Channel Estimation
Lecture 9 - Simplification and Example of Minimum Mean Squared Error MMSE Estimate for Wireless Fading Channe
Lecture 10 - Minimum Mean Squared Error MMSE for Wireless Sensor Network WSN Â Derivation and Example
Lecture 11 - Reliability of Minimum Mean Squared Error MMSE Estimate Â Part I
Lecture 12 - Reliability of Minimum Mean Squared Error MMSE Estimate Â Part II
Lecture 13 - Minimum Mean Squared Error MMSE for Wireless Fading Channel Estimation Â Derivation
Lecture 14 - Minimum Mean Squared Error (MMSE) for Wireless Fading Channel Estimation Â Example and Properti
Lecture 15 - Linear Minimum Mean Squared Error LMMSE Estimate Derivation Â Part I
Lecture 16 - Linear Minimum Mean Squared Error LMMSE Estimate Derivation Â Part II
Lecture 17 - Vector Parameter Estimation Â System Model for Multi-Antenna Downlink Channel Estimation
Lecture 18 - Linear Minimum Mean Squared Error LMMSE Estimate for Multi Antenna Downlink Wireless Channel - P
Lecture 19 - Linear Minimum Mean Squared Error LMMSE Estimate for Multi Antenna Downlink Wireless Channel - P
Lecture 20 - Example of Linear Minimum Mean Squared Error LMMSE Estimation for Multi Antenna Downlink Wireles
Lecture 21 - Derivation and Example of Error Covariance of Multi Antenna LMMSE Channel Estimation
Lecture 22 - System Model for Multiple Input Multiple Output MIMO Downlink Wireless Channel Estimation
Lecture 23 - Channel/ Noise Statistics for Multiple-Input Multiple-Output (MIMO) Downlink Wireless Channel Es
Lecture 24 - LMMSE/ MMSE Estimation for Multiple-Input Multiple-Output(MIMO) Downlink Wireless Channel Estima
Lecture 25 - Example of LMMSE/ MMSE Estimation for Multiple-Input Multiple-Output (MIMO) Downlink Wireless Ch
Lecture 26 - Introduction and system model for equalization
Lecture 27 - Linear Minimum Mean Square Error (LMMSE) Channel Equalization
Lecture 28 - Error for LMMSE Channel Equalizer and Example of LMMSE Channel Equalization
Lecture 29 - Example of Linear Minimum Mean Square Error (LMMSE) Channel Equalization

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Lecture 30 - Introduction and system model for OFDM
Lecture 31 - System model for OFDMl, IFFT/ FFT Operations
Lecture 32 - LMMSE Estimation for OFDM
Lecture 33 - Estimate and Error variance of LMMSE Estimate
Lecture 34 - Example of OFDM
Lecture 35 - Example of LMMSE estimate and Error variance for OFDM

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Optical communications

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Overview of Fiber-optic communications
Lecture 2 - Optical Transmitter - I
Lecture 3 - Optical Transmitter - I (Continued...)
Lecture 4 - Optical Transmitter - II
Lecture 5 - Optical Transmitter - II (Continued...)
Lecture 6 - Intensity modulation
Lecture 7 - Review of Signals and Representations - I
Lecture 8 - Review of Signals and Representations - II
Lecture 9 - Digital Modulation - I
Lecture 10 - Review of Signals and Representations - III
Lecture 11 - Review of Signals and Representations - IV
Lecture 12 - Digital Modulation - II
Lecture 13 - Digital Modulation - II (Continued...)
Lecture 14 - Digital Modulation - III
Lecture 15 - Optical receivers - I
Lecture 16 - Optical receivers - II
Lecture 17 - Optical Modulator
Lecture 18 - Propagation of Electromagnetic wave
Lecture 19 - Review of EM Theory
Lecture 20 - Reflection of Waves
Lecture 21 - Optical fiber - I
Lecture 22 - Optical fiber - II
Lecture 23 - Modes in Optical fiber - I
Lecture 24 - Modes in Optical fiber - I (Continued...)
Lecture 25 - Modes in Optical fiber - II
Lecture 26 - Dispersion in Fibers
Lecture 27 - Dispersion in Fibers (Continued...)
Lecture 28 - Wrapping up fiber parameters
Lecture 29 - System Design - I

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Lecture 30 - Passive WDM components - I
Lecture 31 - Passive WDM components - II
Lecture 32 - Detection of light
Lecture 33 - Detection of light (Continued...)
Lecture 34 - Response time and Noise in Detectors
Lecture 35 - Noise in photodiodes - I Edit Lesson
Lecture 36 - Noise in photodiodes - II
Lecture 37 - Light sources - I
Lecture 38 - Light sources - II Edit Lesson
Lecture 39 - Semiconductor laser diodes
Lecture 40 - Optical communication
Lecture 41 - Power spectral density
Lecture 42 - Power spectral density (Continued...)
Lecture 43 - Advantage of coherent receiver
Lecture 44 - Dispersion induced limitations
Lecture 45 - Optical amplifiers - I
Lecture 46 - Optical amplifiers - II
Lecture 47 - Noise in optical amplifiers
Lecture 48 - Noise in optical amplifiers (Continued...)
Lecture 49 - ASE induced limitations
Lecture 50 - Determining BER in OOK system
Lecture 51 - BER determination
Lecture 52 - Eye diagram and Higher modulation techniques Edit Lesson
Lecture 53 - Higher modulation techniques (Continued...)
Lecture 54 - Optical OFDM

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Digital Switching-I

Subject Co-ordinator - Prof. Yatindra N Singh

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Introduction to Telephony and Networks
Lecture 2 - Strowger Automatic Exchange
Lecture 3 - Crossbar Switching
Lecture 4 - Logic Circuit for Crosspoint Operation
Lecture 5 - Introduction to Multistage Interconnection Networks
Lecture 6 - Blocking probability of crossbar switches
Lecture 7 - Call congestion and time congestio
Lecture 8 - Clos network
Lecture 9 - Lee's approximation
Lecture 10 - Karnaugh's approximation
Lecture 11 - Time switch
Lecture 12 - Time switch and Clos network
Lecture 13 - TST switch, Strictly Non-blocking network, Rearrangeably non-blocking network
Lecture 14 - Paull's Matrix
Lecture 15 - f-way multicasting
Lecture 16 - Strictly sense non blocking multicasting switch
Lecture 17 - Rearrangeably non blocking networks
Lecture 18 - Slepian Duguid theorem, Paull's theorem
Lecture 19 - Paull's matrix for rearrangeabbly non blocking networks
Lecture 20 - Recursive construction; Crosspoint complexity for rearrangebly and strictly non-blocking network
Lecture 21 - Cantor network
Lecture 22 - Wide-sense non blocking network
Lecture 23 - Example of wide -sense non-blocking switch
Lecture 24 - Packet Switching
Lecture 25 - Buffering strategies
Lecture 26 - Output Queued Switch
Lecture 27 - Input Queued Switch
Lecture 28 - Banyan Network, Delta Network
Lecture 29 - Shufflenet as Delta network

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Lecture 30 - Performance analysis of crossbar and delta network
Lecture 31 - Properties of Delta Network
Lecture 32 - Buffered and Unbuffered Delta network
Lecture 33 - Analysis of Buffered Delta Network - 1 of 3
Lecture 34 - Analysis of Buffered Delta Network - 2 of 3
Lecture 35 - Analysis of Buffered Delta Network - 3 of 3

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NPTEL Video Course - Electronics and Communication Engineering - NOC:An Introduction to Information Theory

Subject Co-ordinator - Dr. Adrish Banerjee

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Introduction
Lecture 2 - Measure of Information
Lecture 3 - Information Inequalities
Lecture 4 - Problem solving session - I
Lecture 5 - Block to Variable Length Coding - I : Prefix-free code
Lecture 6 - Block to Variable Length Coding - II : Bounds on Optimal Code Length
Lecture 7 - Block to Variable Length Coding - III : Huffman Coding
Lecture 8 - Variable to block length coding
Lecture 9 - The asymptotic equipartition property
Lecture 10 - Block to block coding of DMS
Lecture 11 - Problem solving session - II
Lecture 12 - Universal Source Coding - I : Lempel-Ziv Algorithm-LZ77
Lecture 13 - Universal source coding - II : Lempel-Ziv Welch Algorithm (LZW)
Lecture 14 - Coding of sources with memory
Lecture 15 - Channel Capacity
Lecture 16 - Joint typical sequences
Lecture 17 - Noisy channel coding theorem
Lecture 18 - Differential entropy
Lecture 19 - Gaussian channel
Lecture 20 - Parallel Gaussian channel
Lecture 21 - Problem solving session - III
Lecture 22 - Rate distortion theory
Lecture 23 - Blahut-Arimoto Algorithm
Lecture 24 - Problem solving session - IV

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NPTEL Video Course - Electronics and Communication Engineering - NOC:5G Wireless Standard Design

Subject Co-ordinator - Prof. Rohit Budhiraja

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Key 5G Technologies - Adaptive Modulation and Coding (AMC)
Lecture 3 - Key 5G Technologies - Hybrid automatic repeat request (HARQ)
Lecture 4 - Key 5G Technologies - Orthogonal frequency division multiplexing (OFDM)
Lecture 5 - 5G Numerology
Lecture 6 - 5G frame structure
Lecture 7 - 5G physical downlink shared channel (PDSCH) transmit chain- CRC generation
Lecture 8 - 5G PDSCH transmit chain - code block segmentation â Part I
Lecture 9 - 5G PDSCH transmit chain - LDPC coding
Lecture 10 - 5G PDSCH transmit chain - code block segmentation â Part II
Lecture 11 - 5G PDSCH transmit chain - rate matching â Part I
Lecture 12 - 5G PDSCH transmit chain - rate matching â Part II
Lecture 13 - 5G PDSCH transmit chain - interleaving and concatenation
Lecture 14 - 5G PDSCH transmit chain - scrambling and modulation
Lecture 15 - 5G PDSCH transmit chain - recap
Lecture 16 - 5G PDSCH receive chain - Part I
Lecture 17 - 5G PDSCH receive chain - Part II
Lecture 18 - 5G PDSCH - map receiver design - Part I
Lecture 19 - 5G PDSCH - map receiver design - Part II
Lecture 20 - 5G baseband - RF conversion
Lecture 21 - Indigenous 5G network architecture
Lecture 22 - 5G physical downlink control channel (PDCCH) transmit chain - introduction
Lecture 23 - 5G PDCCH transmit chain - CRC and segmentation
Lecture 24 - 5G PDCCH transmit chain - Polar encoding
Lecture 25 - 5G PDCCH transmit chain - CRC interleaver
Lecture 26 - 5G PDCCH transmit chain - sub-block interleaver
Lecture 27 - 5G PDCCH transmit chain - rate matching
Lecture 28 - 5G PDCCH transmit chain - control resource set (CORESET) design â Part I
Lecture 29 - 5G PDCCH transmit chain - CORESET design â Part II

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Lecture 30 - 5G PDCCH transmit chain - CORESET design â Part III
Lecture 31 - 5G PDCCH transmit chain - CORESET design â Part IV
Lecture 32 - 5G physical uplink control channel (PUCCH) - Part I
Lecture 33 - 5G physical uplink control channel (PUCCH) - Part II
Lecture 34 - Multiple input multiple output (MIMO) transceiver chain - Part I
Lecture 35 - MIMO transceiver chain - Part II
Lecture 36 - MIMO transceiver chain - Part III
Lecture 37 - MIMO transceiver chain - Part IV
Lecture 38 - MIMO transceiver chain - Part V
Lecture 39 - MIMO transceiver chain - Part VI
Lecture 40 - MIMO transceiver chain - Part VII
Lecture 41 - 5G demodulation reference signal (DM-RS) design - Part I
Lecture 42 - 5G DM-RS design - Part II
Lecture 43 - 5G DM-RS design - Part III
Lecture 44 - 5G DM-RS design - Part IV
Lecture 45 - 5G sounding reference signal (SRS) design - Part I
Lecture 46 - 5G SRS design - Part II
Lecture 47 - 5G SRS design - Part III
Lecture 48 - 5G SRS design - Part IV
Lecture 49 - 5G SRS design - Part V
Lecture 50 - 5G channel state estimation reference signal (CSI-RS) - Part I
Lecture 51 - 5G CSI-RS - Part II
Lecture 52 - 5G MIMO transceiver chain - Part I
Lecture 53 - 5G MIMO transceiver chain - Part II
Lecture 54 - 5G MIMO codebook design - Part I
Lecture 55 - 5G MIMO codebook design - Part II
Lecture 56
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Lecture 59
Lecture 60

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NPTEL Video Course - Electronics and Communication Engineering - NOC:RFIC Design

Subject Co-ordinator - Prof. Imon Mondal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Refresher dB and Fourier series
Lecture 3 - Linear system frequency properties
Lecture 4 - Frequency Translation and Tranmission
Lecture 5 - Introduction to Receivers
Lecture 6 - Receiver Architecture (Continued...)
Lecture 7 - Introduction to Transmission Lines
Lecture 8 - Transmission Line Analysis
Lecture 9 - Introduction to S parameters
Lecture 10 - S11 and S21 (Continued...)
Lecture 11 - Single Transistor Matching Techniques
Lecture 12 - Example Architecture For Matching
Lecture 13 - Biasing CG Stage Intro To fT
Lecture 14 - Maximising fT of a Transistor
Lecture 15 - Introduction to Thermal Noise
Lecture 16 - Relating Noise to Port Impedances
Lecture 17 - Input Referred Noise Model
Lecture 18 - Input Referred Noise - Noise Figure
Lecture 19 - Gate Noise-Noise Figure Reduction Example
Lecture 20 - Sensitivity NF with matching
Lecture 21 - Noise Analysis in Source Degenerated LNA
Lecture 22 - Use_of_cascode_transistor_in_LNA
Lecture 23 - Intuition_of_cascode_noise_and_Introduction_to_IIP2_IIP3
Lecture 24 - Spurious Free Dynamic Range_P1dB_B1dB
Lecture 25 - Noise and distortion in cascaded systems
Lecture 26 - Distortion Mitigation Techniques in LNAs
Lecture 27 - Inductor Design
Lecture 28 - On chip design of Capacitors and Resistors
Lecture 29 - Impedance Transformation Using LC

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Lecture 30 - Losses In Matching Network
Lecture 31 - Multi Stage Matching
Lecture 32 - Mixers
Lecture 33 - Image Reject Mixers
Lecture 34 - Passive mixers sizing noise
Lecture 35 - Intro to Transmitters Upconversion Mixers
Lecture 36 - ClassA ClassB PA
Lecture 37 - Modulation Schemes Issue with PA
Lecture 38 - FLO Generation

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NPTEL Video Course - Electronics and Communication Engineering - Adaptive Signal Processing

Subject Co-ordinator - Prof. Mrityunjoy Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Adaptive Filters
Lecture 2 - Introduction to Stochastic Processes
Lecture 3 - Stochastic Processes
Lecture 4 - Correlation Structure
Lecture 5 - FIR Wiener Filter (Real)
Lecture 6 - Steepest Descent Technique
Lecture 7 - LMS Algorithm
Lecture 8 - Convergence Analysis
Lecture 9 - Convergence Analysis (Mean Square)
Lecture 10 - Convergence Analysis (Mean Square)
Lecture 11 - Misadjustment and Excess MSE
Lecture 12 - Misadjustment and Excess MSE
Lecture 13 - Sign LMS Algorithm
Lecture 14 - Block LMS Algorithm
Lecture 15 - Fast Implementation of Block LMS Algorithm
Lecture 16 - Fast Implementation of Block LMS Algorithm
Lecture 17 - Vector Space Treatment to Random Variables
Lecture 18 - Vector Space Treatment to Random Variables
Lecture 19 - Orthogonalization and Orthogonal Projection
Lecture 20 - Orthogonal Decomposition of Signal Subspaces
Lecture 21 - Introduction to Linear Prediction
Lecture 22 - Lattice Filter
Lecture 23 - Lattice Recursions
Lecture 24 - Lattice as Optimal Filter
Lecture 25 - Linear Prediction and Autoregressive Modeling
Lecture 26 - Gradient Adaptive Lattice
Lecture 27 - Gradient Adaptive Lattice
Lecture 28 - Introduction to Recursive Least Squares
Lecture 29 - RLS Approach to Adaptive Filters

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Lecture 30 - RLS Adaptive Lattice
Lecture 31 - RLS Lattice Recursions
Lecture 32 - RLS Lattice Recursions
Lecture 33 - RLS Lattice Algorithm
Lecture 34 - RLS Using QR Decomposition
Lecture 35 - Givens Rotation
Lecture 36 - Givens Rotation and QR Decomposition
Lecture 37 - Systolic Implementation
Lecture 38 - Systolic Implementation
Lecture 39 - Singular Value Decomposition
Lecture 40 - Singular Value Decomposition
Lecture 41 - Singular Value Decomposition

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NPTEL Video Course - Electronics and Communication Engineering - Digital Computer Organization

Subject Co-ordinator - Prof. P.K. Biswas

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Computer Organization
Lecture 2 - CPU Design - I
Lecture 3 - CPU Design - II
Lecture 4 - CPU Design Tirning and Control
Lecture 5 - Micro programmed Control - I
Lecture 6 - Micro programmed Control - II
Lecture 7 - Pipeline Concept - I
Lecture 8 - Pipeline Concept - II
Lecture 9 - Pipeline Concept - III
Lecture 10 - Pipeline CPU - I
Lecture 11 - Pipeline CPU - II
Lecture 12 - Pipeline CPU - III
Lecture 13 - Memory Organization - I
Lecture 14 - Memory Organization - II
Lecture 15 - Memory Organization - III
Lecture 16 - Memory Organization - IV
Lecture 17 - Memory Organization - V
Lecture 18 - Cache Memory Architecture
Lecture 19 - Cache Memory Architecture RAM Architecture
Lecture 20 - RAM Architecture
Lecture 21 - DAM Architecture-1
Lecture 22 - DAM Architecture Buffer Cache
Lecture 23 - Buffer Cache
Lecture 24 - Secondary Storage Organization - I
Lecture 25 - Secondary Storage Organization - II
Lecture 26 - Secondary Storage Organization - III
Lecture 27 - I/O Subsystem Organization
Lecture 28 - Error Detection and Correction

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NPTEL Video Course - Electronics and Communication Engineering - Digital Image Processing

Subject Co-ordinator - Prof. P.K. Biswas

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Image Digitization - I
Lecture 3 - Image Digitization - II
Lecture 4 - Pixels Relationships - I
Lecture 5 - Pixels Relationships - II
Lecture 6 - Basic Transformations
Lecture 7 - Camera Model and Imaging Geometry
Lecture 8 - Camera Calibration and Stereo Imaging
Lecture 9 - Interpolation and Resampling
Lecture 10 - Image Interpolation - II
Lecture 11 - Image Interpolation - I
Lecture 12 - Image Transformation - II
Lecture 13 - Fourier Transformation - I
Lecture 14 - Fourier Transformation - II
Lecture 15 - Discrete Cosine Transform
Lecture 16 - K-L Transform
Lecture 17 - Image Enhancement
Lecture 18 - Image Enhancement
Lecture 19 - Image Enhancement
Lecture 20 - Image Enhancement
Lecture 21 - Image Enhancement Frequency
Lecture 22 - Image Restoration - I
Lecture 23 - Image Restoration - II
Lecture 24 - Image Restoration - III
Lecture 25 - Image Registration
Lecture 26 - Colour Image Processing - I
Lecture 27 - Colour Image Processing - II
Lecture 28 - Colour Image Processing - III
Lecture 29 - Image Segmentation - I

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Lecture 30 - Image Segmentation - II
Lecture 31 - Image Segmentation - III
Lecture 32 - Image Segmentation - IV
Lecture 33 - Mathematical Morphology - I
Lecture 34 - Mathematical Morphology - II
Lecture 35 - Mathematical Morphology - III
Lecture 36 - Mathematical Morphology - IV
Lecture 37 - Object Representation and Description - I
Lecture 38 - Object Representation and Description - II
Lecture 39 - Object Representation and Description - III
Lecture 40 - Object Recognition

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NPTEL Video Course - Electronics and Communication Engineering - Digital Systems Design

Subject Co-ordinator - Prof. D. Roychoudhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Systems Design
Lecture 2 - Introduction
Lecture 3 - Digital Logic - I
Lecture 4 - Digital Logic - II
Lecture 5 - Digital Logic - III
Lecture 6 - Boolean Algebra
Lecture 7 - Boolean Algebra
Lecture 8 - Boolean Function Minimization
Lecture 9 - Boolean Function Minimization
Lecture 10 - Boolean Function Minimization
Lecture 11 - Hazzard Covers by K - Map
Lecture 12 - Combinational Circuit Design
Lecture 13 - Design of ADDER Circuits
Lecture 14 - Design of Subtractor Circuits
Lecture 15 - Digital of Common Digital Elements
Lecture 16 - Design of Complex Combinational Circuits
Lecture 17 - Design of Combinational Circuits
Lecture 18 - Combinational Logic Problem Design
Lecture 19 - Combinational Logic Design
Lecture 20 - Logic Design with PLA
Lecture 21 - Synchronous Sequential Circuit Design
Lecture 22 - Design of Sequential Modules
Lecture 23 - Design of Registers and Counter
Lecture 24 - Finite State Machine Design
Lecture 25 - Finite State Machine Design and Optimization
Lecture 26 - Programmable Logic Devices
Lecture 27 - Programmable Logic Devices
Lecture 28 - Programmable Logic Devices
Lecture 29 - Design of Arithmetic Circuits

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Lecture 30 - Design of Arithmetic Circuits
Lecture 31 - Design of Memory Circuits
Lecture 32 - Algorithmic State Machines Chart
Lecture 33 - Design of Computer Instruction Set and the CPU
Lecture 34 - Design of Computer Instruction Set and the CPU
Lecture 35 - Design of Computer Instruction Set and the CPU
Lecture 36 - Design of Computer Instruction Set and the CPU
Lecture 37 - Design of Computer Instruction Set and the CPU
Lecture 38 - Design of Computer Instruction Set and the CPU
Lecture 39 - Design of a Micro Programmed CPU
Lecture 40 - Digital System Design Current State of the Art

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NPTEL Video Course - Electronics and Communication Engineering - Digital Voice and Picture Communication

Subject Co-ordinator - Prof. Somnath Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Speech Production Model
Lecture 3 - Speech Coding
Lecture 4 - Quantizers for Speech Signal
Lecture 5 - mew - Law and Optimum Quantizer
Lecture 6 - Adaptive Quantizer
Lecture 7 - Differential Quantization
Lecture 8 - LDM and ADM
Lecture 9 - Differential PCM and Adaptive Prediction
Lecture 10 - Linear Prediction of Speech
Lecture 11 - Computational Aspects of LPC parameters
Lecture 12 - Cholesky Decomposition
Lecture 13 - Lattice Formulation of LPC Coefficient
Lecture 14 - Linear Predictive Synthesizer
Lecture 15 - LPC Vocoder
Lecture 16 - Introduction to Image and Video Coding
Lecture 17 - Lossy Image Compression
Lecture 18 - DCT Quantization and Limitations
Lecture 19 - Theory of Wavelets
Lecture 20 - Discrete Wavelet Transforms
Lecture 21 - DWT on the Images and its Encoding
Lecture 22 - Embedded Zero Tree Wavelet Encoding
Lecture 23 - Video Coding
Lecture 24 - Motion Estimate Techniques
Lecture 25 - Fast Motion Estimation Techniques
Lecture 26 - Video Coding Standards
Lecture 27 - Advanced Coding Aspects
Lecture 28 - Audio Coding
Lecture 29 - Audio Coding AC - 3

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Lecture 30 - AC -3 Decoder
Lecture 31 - MPEG - 1 Audio Coding
Lecture 32 - Introduction to VoIP
Lecture 33 - VoIP Signaling
Lecture 34 - H.323 Call Controls and Enhancements
Lecture 35 - Interworking with PSTN Limitations and Solution
Lecture 36 - Multiplexing Schemes
Lecture 37 - H.323
Lecture 38 - ISDN Video Conferencing
Lecture 39 - Video Conferencing
Lecture 40 - 4G Multimedia Conferencing

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NPTEL Video Course - Electronics and Communication Engineering - MEMS and Microsystems

Subject Co-ordinator - Prof. Santiram Kal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to MEMS & Microsystems
Lecture 2 - Introduction to Microsensors
Lecture 3 - Evaluation of MEMS, Microsensors, Market Survey
Lecture 4 - Application of MEMS
Lecture 5 - MEMS Materials
Lecture 6 - MEMS Materials Properties
Lecture 7 - MEMS Materials Properties (Continued...)
Lecture 8 - Microelectronic Technology for MEMS - II
Lecture 9 - Microelectronic Technology for MEMS - III
Lecture 10 - Micromachining Technology for MEMS
Lecture 11 - Micromachining Process
Lecture 12 - Etch Stop Techniques and Microstructure
Lecture 13 - Surface and Quartz Micromachining
Lecture 14 - Fabrication of Micromachined Microstructure
Lecture 15 - Microstereolithography
Lecture 16 - MEMS Microsensors Thermal
Lecture 17 - Micromachined Microsensors Mechanical
Lecture 18 - MEMS Pressure and Flow Sensor
Lecture 19 - Micromachined Flow Sensors
Lecture 20 - MEMS Inertial Sensors
Lecture 21 - Micromachined Microaccelerometers for MEMS
Lecture 22 - MEMS Accelerometers for Avionics
Lecture 23 - Temperature Drift and Damping Analysis
Lecture 24 - Piezoresistive Accelerometer Technology
Lecture 25 - MEMS Capacitive Accelerometer
Lecture 26 - MEMS Capacitive Accelerometer Process
Lecture 27 - MEMS Gyro Sensor
Lecture 28 - MEMS for Space Application
Lecture 29 - Polymer MEMS & Carbon Nano Tubes CNT

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Lecture 30 - Wafer Bonding & Packaging of MEMS
Lecture 31 - Interface Electronics for MEMS
Lecture 32 - MEMS for Biomedical Applications (Bio-MEMS)

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NPTEL Video Course - Electronics and Communication Engineering - Neural Networks and Applications

Subject Co-ordinator - Prof. Somnath Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Artificial Neural Networks
Lecture 2 - Artificial Neuron Model and Linear Regression
Lecture 3 - Gradient Descent Algorithm
Lecture 4 - Nonlinear Activation Units and Learning Mechanisms
Lecture 5 - Learning Mechanisms-Hebbian, Competitive, Boltzmann
Lecture 6 - Associative memory
Lecture 7 - Associative Memory Model
Lecture 8 - Condition for Perfect Recall in Associative Memory
Lecture 9 - Statistical Aspects of Learning
Lecture 10 - V.C. Dimensions
Lecture 11 - Importance of V.C. Dimensions Structural Risk Minimization
Lecture 12 - Single-Layer Perceptions
Lecture 13 - Unconstrained Optimization
Lecture 14 - Linear Least Squares Filters
Lecture 15 - Least Mean Squares Algorithm
Lecture 16 - Perceptron Convergence Theorem
Lecture 17 - Bayes Classifier & Perceptron
Lecture 18 - Bayes Classifier for Gaussian Distribution
Lecture 19 - Back Propagation Algorithm
Lecture 20 - Practical Consideration in Back Propagation Algorithm
Lecture 21 - Solution of Non-Linearly Separable Problems Using MLP
Lecture 22 - Heuristics For Back-Propagation
Lecture 23 - Multi-Class Classification Using Multi-layered Perceptrons
Lecture 24 - Radial Basis Function Networks
Lecture 25 - Radial Basis Function Networks
Lecture 26 - Posed Surface Reconstruction
Lecture 27 - Solution of Regularization Equation
Lecture 28 - Use of Greens Function in Regularization Networks
Lecture 29 - Regularization Networks and Generalized RBF

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Lecture 30 - Comparison Between MLP and RBF
Lecture 31 - Learning Mechanisms in RBF
Lecture 32 - Introduction to Principal Components and Analysis
Lecture 33 - Dimensionality reduction Using PCA
Lecture 34 - Hebbian-Based Principal Component Analysis
Lecture 35 - Introduction to Self Organizing Maps
Lecture 36 - Cooperative and Adaptive Processes in SOM
Lecture 37 - Vector-Quantization Using SOM

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NPTEL Video Course - Electronics and Communication Engineering - Probability and Random Processes

Subject Co-ordinator - Prof. Mrityunjoy Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Theory of Probability
Lecture 2 - Axioms of Probability
Lecture 3 - Axioms of Probability (Continued.)
Lecture 4 - Introduction to Random Variables
Lecture 5 - Probability Distributions and Density Functions
Lecture 6 - Conditional Distribution and Density Functions
Lecture 7 - Function of a Random Variable
Lecture 8 - Function of a Random Variable (Continued.)
Lecture 9 - Mean and Variance of a Random Variable
Lecture 10 - Moments
Lecture 11 - Characteristic Function
Lecture 12 - Two Random Variables
Lecture 13 - Function of Two Random Variables
Lecture 14 - Function of Two Random Variables (Continued.)
Lecture 15 - Correlation Covariance and Related Innver
Lecture 16 - Vector Space of Random Variables
Lecture 17 - Joint Moments
Lecture 18 - Joint Characteristic Functions
Lecture 19 - Joint Conditional Densities
Lecture 20 - Joint Conditional Densities (Continued.)
Lecture 21 - Sequences of Random Variables
Lecture 22 - Sequences of Random Variables (Continued.)
Lecture 23 - Correlation Matrices and their Properties
Lecture 24 - Correlation Matrices and their Properties
Lecture 25 - Conditional Densities of Random Vectors
Lecture 26 - Characteristic Functions and Normality
Lecture 27 - Tchebycheff Inequality and Estimation of an Unknown Parameter
Lecture 28 - Central Limit Theorem
Lecture 29 - Introduction to Stochastic Process

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Lecture 30 - Stationary Processes
Lecture 31 - Cyclostationary Processes
Lecture 32 - System with Random Process at Input
Lecture 33 - Ergodic Processes
Lecture 34 - Introduction to Spectral Analysis
Lecture 35 - Spectral Analysis (Continued.)
Lecture 36 - Spectrum Estimation - Non Parametric Methods
Lecture 37 - Spectrum Estimation - Parametric Methods
Lecture 38 - Autoregressive Modeling and Linear Prediction
Lecture 39 - Linear Mean Square Estimation - Wiener (FIR)
Lecture 40 - Adaptive Filtering - LMS Algorithm

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NPTEL Video Course - Electronics and Communication Engineering - Pattern Recognition and Application

Subject Co-ordinator - Prof. P.K. Biswas

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Feature Extraction - I
Lecture 3 - Feature Extraction - II
Lecture 4 - Feature Extraction - III
Lecture 5 - Bayes Decision Theory
Lecture 6 - Bayes Decision Theory (Continued.)
Lecture 7 - Normal Density and Discriminant Function
Lecture 8 - Normal Density and Discriminant Function (Continued.)
Lecture 9 - Bayes Decision Theory - Binary Features
Lecture 10 - Maximum Likelihood Estimation
Lecture 11 - Probability Density Estimation
Lecture 12 - Probability Density Estimation (Continued.)
Lecture 13 - Probability Density Estimation (Continued.)
Lecture 14 - Probability Density Estimation (Continued.)
Lecture 15 - Probability Density Estimation (Continued.)
Lecture 16 - Dimensionality Problem
Lecture 17 - Multiple Discriminant Analysis
Lecture 18 - Multiple Discriminant Analysis (Tutorial)
Lecture 19 - Multiple Discriminant Analysis (Tutorial)
Lecture 20 - Perceptron Criterion
Lecture 21 - Perceptron Criterion (Continued.)
Lecture 22 - MSE Criterion
Lecture 23 - Linear Discriminator (Tutorial)
Lecture 24 - Neural Networks for Pattern Recognition
Lecture 25 - Neural Networks for Pattern Recognition (Continued.)
Lecture 26 - Neural Networks for Pattern Recognition (Continued.)
Lecture 27 - RBF Neural Network
Lecture 28 - RBF Neural Network (Continued.)
Lecture 29 - Support Vector Machine

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Lecture 30 - Hyperbox Classifier
Lecture 31 - Hyperbox Classifier (Continued.)
Lecture 32 - Fuzzy Min Max Neural Network for Pattern Recognition
Lecture 33 - Reflex Fuzzy Min Max Neural Network
Lecture 34 - Unsupervised Learning - Clustering
Lecture 35 - Clustering (Continued.)
Lecture 36 - Clustering using minimal spanning tree
Lecture 37 - Temporal Pattern recognition
Lecture 38 - Hidden Markov Model
Lecture 39 - Hidden Markov Model (Continued.)
Lecture 40 - Hidden Markov Model (Continued.)

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Basic Tools of Microwave Engineering

Subject Co-ordinator - Dr. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Challenges of Microwave Design
Lecture 2 - Introduction to the 1st tool
Lecture 3 - Measurement of Unknown Impedance
Lecture 4 - Application of Smith Chart for finding unknown impedance in laboratory
Lecture 5 - Problem Solving using Smith Chart
Lecture 6 - Need of Impedance Matching at Microwave Frequency
Lecture 7 - Lumped Element Based Impedance Matching Network Design by Smith Chart
Lecture 8 - Distributed Impedance Matching Design by Smith Chart
Lecture 9 - Broadband Impedance Matching Network Design
Lecture 10 - Tutorial 2
Lecture 11 - Voltage and Current at Microwave Frequency
Lecture 12 - Scattering Parameter
Lecture 13 - Properties of Scattering Parameter
Lecture 14 - Network Analyser
Lecture 15 - Tutorial 3
Lecture 16 - Radiation between S-Parameters and Transmission Parameters
Lecture 17 - Scattering Parameters of Coupler and Magic Tee
Lecture 18 - Signal Flow Graph
Lecture 19 - Understanding Network Analyser Calibration with the help of Signal Flow Graph
Lecture 20 - Tutorial 4

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Basic Building Blocks of Microwave Engir

Subject Co-ordinator - Dr. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Mode
Lecture 2 - Mathematical Model of Modes
Lecture 3 - Mathematical Model of TEM Mode
Lecture 4 - Mathematical Model of TE and TM Mode and Impedance Concept
Lecture 5 - Losses Associated with Microwave Transmission
Lecture 6 - Coaxial Line
Lecture 7 - Rectangular Waveguide
Lecture 8 - Circular Waveguide
Lecture 9 - Planar Transmission Line
Lecture 10 - Coaxial Connectors
Lecture 11 - 3 Port Microwave Power Divider/Combiner - Part I
Lecture 12 - 3 Port Microwave Power Divider/Combiner - Part II
Lecture 13 - 4 Port Microwave Power Divider/Combiner
Lecture 14 - Microwave Resonator
Lecture 15 - Microwave Attenuuators
Lecture 16 - Microwave Detector and Switching Diodes
Lecture 17 - Microwave Tubes
Lecture 18 - Microwave Tubes
Lecture 19 - Microwave Solid State Diode Oscillator and Amplifier
Lecture 20 - Microwave Transistors

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Satellite Communication Systems

Subject Co-ordinator - Prof. Kalyankumar Bandyopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Orbit - 1
Lecture 3 - Orbit - 2
Lecture 4 - Orbit - 3
Lecture 5 - Orbit - 4
Lecture 6 - Space Segment - 1
Lecture 7 - Space Segment - 2
Lecture 8 - Space Segment - 3
Lecture 9 - Space Segment - 4
Lecture 10 - Space Segment - 5
Lecture 11 - Link Budget - 1
Lecture 12 - Link Budget - 2
Lecture 13 - Link Budget - 3
Lecture 14 - Link Budget - 4
Lecture 15 - Link Budget - 5
Lecture 16 - Link Budget - 6
Lecture 17 - Link Budget - 7
Lecture 18 - Link Budget - 8
Lecture 19 - Propagation - 1
Lecture 20 - Propagation - 2
Lecture 21 - Propagation - 3
Lecture 22 - Ground Segment - 1
Lecture 23 - Ground Segment - 2
Lecture 24 - Ground Segment - 3
Lecture 25 - Ground Segment - 4
Lecture 26 - Multiple Access - 1
Lecture 27 - Multiple Access - 2
Lecture 28 - Multiple Access - 3
Lecture 29 - Multiple Access - 4

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Lecture 30 - Multiple Access - 5
Lecture 31 - Nonlinearity - I
Lecture 32 - Nonlinearity - II
Lecture 33 - Nonlinearity - III
Lecture 34 - Synchronisation - I
Lecture 35 - Synchronisation - II
Lecture 36 - Effect on Higher Layer - I
Lecture 37 - Effect on Higher Layer - II
Lecture 38 - Effect on Higher Layer - III
Lecture 39 - Satellite Navigation - I
Lecture 40 - Satellite Navigation - II

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Fundamentals of MIMO Wireless Communicat

Subject Co-ordinator - Prof. Suvra Sekhar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of Wireless Communication Systems 1G - 5G
Lecture 2 - Elements of Wireless Communication System
Lecture 3 - Overview of MIMO Communication Systems
Lecture 4 - Layered View of Transmitter and Receiver
Lecture 5 - Wireless Channel Models - I
Lecture 6 - Large Scale Propagation Models Path Loss
Lecture 7 - Large Scale Propagation Models Path Loss and Shadowing
Lecture 8 - Small Scale Propagation Multipath Model
Lecture 9 - Small Scale Propagation Frequency Flat Fading
Lecture 10 - Small Scale Propagation Envelope Distribution
Lecture 11 - Small Scale Propagation Received Signal Correlation
Lecture 12 - Small Scale Propagation Received Signal Correlation (Continued...)
Lecture 13 - Coherence Time
Lecture 14 - Doppler Spectrum
Lecture 15 - Frequency Selective Fading
Lecture 16 - Frequency Selective Fading - II
Lecture 17 - FSF-Coherence Bandwidth, Delay Doppeler Characteristics
Lecture 18 - Spatial Channel Characteristics - I
Lecture 19 - Expression of MIMO Channel
Lecture 20 - MIMO Channel Characteristics
Lecture 21 - Statistical Properties of H
Lecture 22 - Important Results from Linear Algebra
Lecture 23 - Spatial Diversity
Lecture 24 - Selection Combining
Lecture 25 - Maximal Ratio Combining
Lecture 26 - Problem of Error in MRC
Lecture 27 - Diversity Gain and Transmit MRC
Lecture 28 - Transmit Diversity without Channel known at Tx
Lecture 29 - MIMO Transmit Diversity - 1

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Lecture 30 - MIMO Diversity - 2
Lecture 31 - Fundamentals of Information Theory - I
Lecture 32 - Fundamentals of Information Theory - II
Lecture 33 - Fundamentals of Information Theory - III
Lecture 34 - Fundamentals of Information Theory - IV
Lecture 35 - Capacity of Deterministic MIMO Channels
Lecture 36 - Capacity of Channel Unknown at Transmitter
Lecture 37 - Capacity of Channel Known of Transmitter
Lecture 38 - More on MIMO Channel Capacity
Lecture 39 - Capacity of Random Channel
Lecture 40 - MIMO in Practice

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Audio System Engineering

Subject Co-ordinator - Prof. S. Dasmandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fundamentals of Linear Vibrations Edit Lesson
Lecture 3 - Damped Oscillation and Forced Oscillation
Lecture 4 - Equivalent Electrical Circuits for Oscillation
Lecture 5 - Tutorial I
Lecture 6 - Acoustic Wave Equation
Lecture 7 - Acoustic Wave Equation (Continued...)
Lecture 8 - Acoustic Wave Equation (Continued...)
Lecture 9 - Spherical Waves Propagation
Lecture 10 - Perception at Sound
Lecture 11 - Sound Transmission
Lecture 12 - Sound Transmission (Continued...)
Lecture 13 - The Acoustic Environment
Lecture 14 - Room Acoustics - I
Lecture 15 - Room Acoustics - II
Lecture 16 - Large Room Acoustics and Small Room Acoustics
Lecture 17 - Large Room Acoustics and Small Room Acoustics (Continued...)
Lecture 18 - Auditorium Acoustics
Lecture 19 - Transduction - I
Lecture 20 - Transduction - II
Lecture 21 - Transduction - III
Lecture 22 - Microphone - I
Lecture 23 - Microphone Sensitivity
Lecture 24 - Loudspeaker

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Discrete Time Signal Processing

Subject Co-ordinator - Prof. Mrityunjoy Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Discrete Time Signals and Systems
Lecture 3 - Linear, Shift Invariant Systems
Lecture 4 - Properties of Discrete Convolution Causal and Stable Systems
Lecture 5 - Graphical Evaluation of Discrete Convolutions
Lecture 6 - Discrete Time Fourier Transform
Lecture 7 - Properties of DTFT
Lecture 8 - Dirac Comb and Sampling Analog Signals
Lecture 9 - Relation between DTFT and Analog Fourier Transform
Lecture 10 - Nyquist Interpolation Formula
Lecture 11 - Rational Systems
Lecture 12 - Properties of Rational Systems
Lecture 13 - Introduction to Z-transform
Lecture 14 - Properties of Z-transform
Lecture 15 - Properties of z-transform
Lecture 16 - Inverse z-transform
Lecture 17 - Introduction to DFT
Lecture 18 - Properties of DFT
Lecture 19 - Introduction to Interpretation of Circular Convolution
Lecture 20 - Graphically Interpretation of Circular Convolution
Lecture 21 - Zero Padding and Linear convolution Via DFT
Lecture 22 - Decimation and DFT of Decimated Sequences
Lecture 23 - Expension and Interpolation of Sequences
Lecture 24 - Factor-of-M Polyphase Decomposition of Sequences
Lecture 25 - Nobel Identifies
Lecture 26 - Efficient Decimator and Interpolator Structure
Lecture 27 - Linear Phase Filters
Lecture 28 - Properties of Linear Phase Filters
Lecture 29 - Structures for IIR Filters

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Lecture 30 - Structures for FIR Filters
Lecture 31 - Analog LTI Systems, Fourier and Laplace Transforms
Lecture 32 - Pole, Zero and Stability of of Analog Filters
Lecture 33 - Analog Filter Design Example Butterworth Lowpass Filter
Lecture 34 - IIR Filter Design by Implus Invariance Method
Lecture 35 - Design Filter Design from Analog Proptotype Filters by s-z Transformations
Lecture 36 - Bilinear Transformation
Lecture 37 - FIR Filter Design by Window
Lecture 38 - FFT
Lecture 39 - Complexity Analysis of FFT
Lecture 40 - Bit Reversal and FFT

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Digital Image Processing

Subject Co-ordinator - Prof. P.K. Biswas

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Image Processing
Lecture 2 - Application of Digital Image Processing
Lecture 3 - Image Digitalization, Sampling Quantization and Display
Lecture 4 - Signal Reconstruction from Samples
Lecture 5 - Signal Reconstruction from Image
Lecture 6 - Quantizer Design
Lecture 7 - Relationship between Pixels
Lecture 8 - Relationship of Adjacency and Connected Components Labeling
Lecture 9 - Application of Distance Measures
Lecture 10 - Basic Transform
Lecture 11 - Image Formation - I
Lecture 12 - Image Formation - II
Lecture 13 - Image Geometry - I
Lecture 14 - Image Geometry - II
Lecture 15 - Stereo Imaging Model - II
Lecture 16 - Interpolation and Resampling
Lecture 17 - Interpolation Techniques
Lecture 18 - Interpolation with examples - I
Lecture 19 - Interpolation with Examples - II
Lecture 20 - Image Transformation - I Edit Lesson
Lecture 21 - Image Transformation - 2
Lecture 22 - Separable Transformation
Lecture 23 - Basis Images
Lecture 24 - Fourier Transformation
Lecture 25 - Properties of FT
Lecture 26 - FT Result Display - 2
Lecture 27 - Rotation Invariance Property
Lecture 28 - DCT and Walsh Transform
Lecture 29 - Handmard Transformation

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Lecture 30 - Histogram Equalization and Specifications - I
Lecture 31 - KL-transform-2
Lecture 32 - Image Enhancement
Lecture 33 - Contrast Stretching Operation
Lecture 34 - Histogram Equalization and Specification - I
Lecture 35 - Histogram Equalization and Specification - II
Lecture 36 - Histogram Implementation - I
Lecture 37 - Histogram Implementation - II
Lecture 38 - Image Enhancement
Lecture 39 - Image Enhancement
Lecture 40 - Image Enhancement
Lecture 41 - Frequency Domain Processing Techniques
Lecture 42 - Image Restoration Techniques - I
Lecture 43 - Image Restoration Techniques - II
Lecture 44 - Estimation of Degradation Model and Restoration Techniques - I
Lecture 45 - Estimation of Degradation Model and Restoration Techniques - II
Lecture 46 - Other Restoration Techniques - I
Lecture 47 - Other Restoration Techniques - II
Lecture 48 - Image Registration - I
Lecture 49 - Image Registration - II
Lecture 50 - Colour Image Processing
Lecture 51 - Colour Model
Lecture 52 - Conversion of one color model to another - I
Lecture 53 - Conversion of one color model to another - II
Lecture 54 - Pseudo color image processing
Lecture 55 - Full color image processing
Lecture 56 - Different Approaches for Image Segmentation
Lecture 57 - Image Segmentation
Lecture 58 - Region based Segmentation Operation. Thresholding Techniques
Lecture 59 - Region Splitting and Merging Technique Edit Lesson

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Spread Spectrum Communications and Jammi

Subject Co-ordinator - Prof. Debarati Sen

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Spread Spectrum Communication
Lecture 2 - Direct Sequence Spread Spectrum System
Lecture 3 - Performance Analysis of DSSS
Lecture 4 - Concept of Jamming Margin
Lecture 5 - Frequency Hopping Spread Spectrum System
Lecture 6 - Tutorial-1
Lecture 7 - Slow and Fast Frequency Hopping
Lecture 8 - Hybrid Spread Spectrum System and Time Hopped SSS
Lecture 9 - Spread Sequences and Waveforms
Lecture 10 - Generation Mechanism of ML Sequence
Lecture 11 - Properties of Spread Spectrum Sequences
Lecture 12 - Tutorial-2
Lecture 13 - Power Spectral Density of ML Sequence
Lecture 14 - Walsh Hadamard Code and Properties
Lecture 15 - Generation Mechanism and Properties of OVSF and Barker Codes
Lecture 16 - Generation Mechanism and Properties of Gold and Kasami Codes
Lecture 17 - Performance Analysis of DSSS in Presence of Tone Jamming
Lecture 18 - Performance Analysis During Generation Tone Jamming
Lecture 19 - Performance Analysis in Presence of Gaussian Interference
Lecture 20 - Performance Analysis of a Quaternary System
Lecture 21 - Despreading with Matched Filter
Lecture 22 - Noncoherent Systems
Lecture 23 - Tutorial - III
Lecture 24 - Galois Field Mathematics
Lecture 25 - Galois Field Mathematics (Continued...)
Lecture 26 - Galois Field Mathematics (Continued...)
Lecture 27 - Polynomials over Binary Field
Lecture 28 - Long Nonlinear Sequence Generation
Lecture 29 - Rejection of Narrowband Interference

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Lecture 30 - Narrow Band Interference Cancellation by Transform Domain Processing
Lecture 31 - PN Code Acquisition Fundamentals
Lecture 32 - Performance Analysis of PN Code Acquisition System - Part I
Lecture 33 - Performance Analysis of PN Code Acquisition System - Part II
Lecture 34 - Tutorial - IV
Lecture 35 - Rapid Acquisition Using Matched Filter - Part I
Lecture 36 - Rapid Acquisition Using Matched Filter - Part II
Lecture 37 - Active Search Acquisition for FFH/MFSK Signals
Lecture 38 - Active Search Code Acquisiton for FFH/MFSK Analysis
Lecture 39 - Detection Probability Analysis of Code Acquisition for FFH / MFSK
Lecture 40 - Tutorial - V
Lecture 41 - DSSS Tracking
Lecture 42 - FHSS Synchronization Method - I
Lecture 43 - FHSS Synchronization Method - II
Lecture 44 - FHSS Synchronization Method - III
Lecture 45 - FHSS Tracking
Lecture 46 - Tutorial - VI
Lecture 47 - Concept of Fading for Wireless Communications
Lecture 48 - Diversity for Fading Channels
Lecture 49 - Rake Receiver
Lecture 50 - Performance Analysis of Rake Receiver
Lecture 51 - Spread Spectrum Multiple Access
Lecture 52 - Tutorial - VII
Lecture 53 - Introduction to CDMA
Lecture 54 - Interference Handling Mechanism in CDMA Networks
Lecture 55 - Interference Handling by Soft Handover
Lecture 56 - Interference Handling by Smart Antenna
Lecture 57 - Multiuser Detection and Interference Cancellation
Lecture 58 - Tutorial - VIII
Lecture 59 - Multiuser Detection - Part I
Lecture 60 - Multiuser Detection - Part II
Lecture 61 - MUD - Probability of Error
Lecture 62 - IS95 and CDMA - Part I
Lecture 63 - IS95 and CDMA - Part II
Lecture 64 - Tutorial - IX
Lecture 65 - WCDMA and UMTS - Part I
Lecture 66 - WCDMA and UMTS - Part II
Lecture 67 - LPI Communications
Lecture 68 - Radiometer

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Lecture 69 - Interceptor Detectors

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Digital VLSI Testing

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - DFT
Lecture 6 - DFT (Continued...)
Lecture 7 - DFT (Continued...)
Lecture 8 - DFT (Continued...)
Lecture 9 - DFT (Continued...)
Lecture 10 - DFT (Continued...)
Lecture 11 - Logic and Fault Simulation
Lecture 12 - Logic and Fault Simulation (Continued...)
Lecture 13 - Logic and Fault Simulation (Continued...)
Lecture 14 - Logic and Fault Simulation (Continued...)
Lecture 15 - Logic and Fault Simulation (Continued...)
Lecture 16 - Logic and Fault Simulation (Continued...)
Lecture 17 - Test Generation
Lecture 18 - Test Generation (Continued...)
Lecture 19 - Test Generation (Continued...)
Lecture 20 - Test Generation (Continued...)
Lecture 21 - Test Generation (Continued...)
Lecture 22 - Test Generation (Continued...)
Lecture 23 - Test Generation (Continued...)
Lecture 24 - Logic BIST
Lecture 25 - Logic BIST (Continued...)
Lecture 26 - Logic BIST (Continued...)
Lecture 27 - Logic BIST (Continued...)
Lecture 28 - Test Compression
Lecture 29 - Test Compression (Continued...)

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Lecture 30 - Test Compression (Continued...)
Lecture 31 - Test Compression (Continued...)
Lecture 32 - Low Power Testing
Lecture 33 - Low Power Testing (Continued...)
Lecture 34 - Low Power Testing (Continued...)
Lecture 35 - Low Power Testing (Continued...)
Lecture 36 - Low Power Testing (Continued...)
Lecture 37 - Thermal Aware Testing
Lecture 38 - Thermal Aware Testing (Continued...)
Lecture 39 - Thermal Aware Testing (Continued...)
Lecture 40 - Boundary Scan
Lecture 41 - Boundary Scan (Continued...)
Lecture 42 - Boundary Scan (Continued...)
Lecture 43 - Boundary Scan (Continued...)
Lecture 44 - Boundary Scan (Continued...)
Lecture 45 - System/Network - On - Chip Test
Lecture 46 - System/Network - On - Chip Test (Continued...)
Lecture 47 - System/Network - On - Chip Test (Continued...)
Lecture 48 - System/Network - On - Chip Test (Continued...)
Lecture 49 - System/Network - On - Chip Test (Continued...)
Lecture 50 - System/Network - On - Chip Test (Continued...)
Lecture 51 - System/Network - On - Chip Test (Continued...)
Lecture 52 - System/Network - On - Chip Test (Continued...)
Lecture 53 - System/Network - On - Chip Test (Continued...)
Lecture 54 - System/Network - On - Chip Test (Continued...)
Lecture 55 - System/Network - On - Chip Test (Continued...)
Lecture 56 - System/Network - On - Chip Test (Continued...)
Lecture 57 - Memory Testing
Lecture 58 - Memory Testing (Continued...)
Lecture 59 - Memory Testing (Continued...)
Lecture 60 - Memory Testing (Continued...)

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Design Principles of RF and Microwave Fi

Subject Co-ordinator - Prof. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Image Impedance based RF filter design
Lecture 2 - Concept of Image impedance and Propagation Constant
Lecture 3 - Symmetrical lossless network description for filter design
Lecture 4 - Constant k prototype filter design
Lecture 5 - m-derived prototype filter design
Lecture 6 - Introduction to Insertion loss based Microwave Filter Design
Lecture 7 - Prototype low pass filter design
Lecture 8 - Filter transformation
Lecture 9 - Microwave Filter implementation
Lecture 10 - Tutorial an Insertion Loss based Microwave Filter design
Lecture 11 - Gain Definitions of Microwave Amplifiers
Lecture 12 - Stability Analysis of Microwave Amplifiers
Lecture 13 - Conditional stability enforcement for Microwave Amplifier
Lecture 14 - Amplifier design of maximising transducer gain
Lecture 15 - Amplifier design for specified gain
Lecture 16 - Amplifier design for specified noise performance
Lecture 17 - Broadband Amplifier Design
Lecture 18 - Quantitative Characterisation of Nonlinearity for Large Signal Amplifier
Lecture 19 - Quantitative Characterisation of Nonlinearity for Large Signal Amplifier (Continued...)
Lecture 20 - Measurement of Nonlinearity

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Millimeter Wave Technology

Subject Co-ordinator - Prof. Mrinal Kanti Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Millimeter-Wave Technology
Lecture 2 - Introduction to Millimeter-Wave Technology (Continued...)
Lecture 3 - Introduction to Millimeter-Wave Technology (Continued...)
Lecture 4 - Introduction to Millimeter-Wave Technology (Continued...)
Lecture 5 - Introduction to Millimeter-Wave Technology (Continued...)
Lecture 6 - Guiding Structures
Lecture 7 - Guiding Structures (Continued...)
Lecture 8 - Guiding Structures (Continued...)
Lecture 9 - Guiding Structures (Continued...)
Lecture 10 - Guiding Structures (Continued...)
Lecture 11 - Guiding Structures (Continued...)
Lecture 12 - Guiding Structures (Continued...)
Lecture 13 - Guiding Structures (Continued...)
Lecture 14 - Guiding Structures (Continued...)
Lecture 15 - Guiding Structures (Continued...)
Lecture 16 - Antennas at MM-Wave Frequencies
Lecture 17 - Antennas at MM-Wave Frequencies (Continued...)
Lecture 18 - Antennas at MM-Wave Frequencies (Continued...)
Lecture 19 - Antennas at MM-Wave Frequencies (Continued...)
Lecture 20 - Antennas at MM-WaveFrequencies (Continued...)
Lecture 21 - Passive Components
Lecture 22 - Passive Components (Continued...)
Lecture 23 - Passive Components (Continued...)
Lecture 24 - Passive Components (Continued...)
Lecture 25 - Passive Components (Continued...)
Lecture 26 - Active Devices
Lecture 27 - Active Devices (Continued...)
Lecture 28 - Active Devices (Continued...)
Lecture 29 - Active Devices (Continued...)

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Lecture 30 - Active Devices (Continued...)
Lecture 31 - Noise and Link Budget
Lecture 32 - Noise and Link Budget (Continued...)
Lecture 33 - Noise and Link Budget (Continued...)
Lecture 34 - Noise and Link Budget (Continued...)
Lecture 35 - Noise and Link Budget (Continued...)
Lecture 36 - Millimeter-Wave Systems
Lecture 37 - Millimeter-Wave Systems (Continued...)
Lecture 38 - Millimeter-Wave Systems (Continued...)
Lecture 39 - Millimeter-Wave Systems (Continued...)
Lecture 40 - Millimeter-Wave Systems (Continued...)

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Power System Analysis

Subject Co-ordinator - Prof. Debapriya Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Structure of Power Systems and Few other Aspects - I
Lecture 2 - Structure of Power Systems and Few other Aspects - II
Lecture 3 - Structure of Power Systems and Few other Aspects - III
Lecture 4 - Resistance and Inductance
Lecture 5 - Resistance and Inductance (Continued...)
Lecture 6 - Resistance and Inductance (Continued...)
Lecture 7 - Resistance and Inductance (Continued...)
Lecture 8 - Resistance and Inductance (Continued...)
Lecture 9 - Resistance and Inductance (Continued...)
Lecture 10 - Resistance and Inductance (Continued...)
Lecture 11 - Capacitance of Transmisson Lines
Lecture 12 - Capacitance of Transmisson Lines (Continued...)
Lecture 13 - Capacitance of Transmisson Lines (Continued...)
Lecture 14 - Capacitance of Transmisson Lines (Continued...)
Lecture 15 - Power System Components and per-unit system
Lecture 16 - Power System Components and per-unit system (Continued...)
Lecture 17 - Power System Components and per-unit system (Continued...)
Lecture 18 - Power System Components and per-unit system (Continued...)
Lecture 19 - Power System Components and per-unit system (Continued...)
Lecture 20 - Power System Components and per-unit system (Continued...)
Lecture 21 - Characteristic and performance of transmission lines
Lecture 22 - Characteristic and performance of transmission lines (Continued...)
Lecture 23 - Characteristic and performance of transmission lines (Continued...)
Lecture 24 - Characteristic and performance of transmission lines (Continued...)
Lecture 25 - Characteristic and performance of transmission lines (Continued...)
Lecture 26 - Load flow studies
Lecture 27 - Load flow studies (Continued...)
Lecture 28 - Load flow studies (Continued...)
Lecture 29 - Load flow studies (Continued...)

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Lecture 30 - Load flow studies (Continued...)
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36 - Load flow studies (Continued...)
Lecture 37 - Optimal system operation
Lecture 38 - Optimal system operation (Continued...)
Lecture 39 - Optimal system operation (Continued...)
Lecture 40 - Optimal system operation (Continued...)
Lecture 41 - Optimal system operation (Continued...)
Lecture 42 - Optimal system operation (Continued...)
Lecture 43 - Optimal system operation (Continued...)
Lecture 44 - Optimal system operation (Continued...)
Lecture 45 - Three phase fault studies
Lecture 46 - Three phase fault studies (Continued...)
Lecture 47 - Three phase fault studies (Continued...)
Lecture 48 - Three phase fault studies (Continued...)
Lecture 49 - Symmetrical components
Lecture 50 - Symmetrical components (Continued...)
Lecture 51 - Symmetrical components (Continued...)
Lecture 52 - Symmetrical components (Continued...)
Lecture 53 - Symmetrical components (Continued...)
Lecture 54 - Symmetrical components (Continued...)
Lecture 55 - Power system stability>
Lecture 56 - Power system stability (Continued...)
Lecture 57 - Power system stability (Continued...)
Lecture 58 - Power system stability (Continued...)
Lecture 59 - Power system stability (Continued...)
Lecture 60 - Power system stability (Continued...)

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Analog Communication

Subject Co-ordinator - Prof. Goutam Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fourier Series
Lecture 2 - Fourier Series (Continued...)
Lecture 3 - Fourier Series (Continued...)
Lecture 4 - Fourier Series (Continued...)
Lecture 5 - Fourier Series (Continued...)
Lecture 6 - Fourier Series (Continued...)
Lecture 7 - Fourier Series (Continued...)
Lecture 8 - Fourier Transform
Lecture 9 - Fourier Transform (Continued...)
Lecture 10 - Fourier Transform (Continued...)
Lecture 11 - Fourier Transform (Continued...)
Lecture 12 - Energy Spectral Density
Lecture 13 - Power Spectral Density
Lecture 14 - PSD of Random Signal
Lecture 15 - Amplitude Modulation
Lecture 16 - Amplitude Modulation (Continued...)
Lecture 17 - Amplitude Modulation (Continued...)
Lecture 18 - Amplitude Modulation (Continued...)
Lecture 19 - SSB - SC
Lecture 20 - SSB - SC (Continued...)
Lecture 21 - VSB-SC
Lecture 22 - VSB-SC (Continued...)
Lecture 23 - Effect of Carrier Synchronization
Lecture 24 - Comparison of Different Modulation Technique
Lecture 25 - PLL
Lecture 26 - PLL (Continued...)
Lecture 27 - PLL (Continued...)
Lecture 28 - PLL (Continued...) and LTI
Lecture 29 - Dispersion

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Lecture 30 - Channel Nonlinearities and Multipath Effects
Lecture 31 - Probability Theory
Lecture 32 - Probability Theory (Continued...)
Lecture 33 - Probability Theory (Continued...)
Lecture 34 - Probability Theory (Continued...)
Lecture 35 - Probability Theory (Continued...)
Lecture 36 - Probability Theory (Continued...)
Lecture 37 - Probability Theory (Continued...)
Lecture 38 - Random Process
Lecture 39 - Random Process (Continued...)
Lecture 40 - Random Process (Continued...)
Lecture 41 - Random Process (Continued...)
Lecture 42 - Random Process (Continued...)
Lecture 43 - Random Process (Continued...)
Lecture 44 - Noise Analysis - DSB-SC
Lecture 45 - Noise Analysis - AM
Lecture 46 - Noise Analysis - SSB-SC
Lecture 47 - Frequency Modulation
Lecture 48 - Frequency Modulation (Continued...)
Lecture 49 - Frequency Modulation (Continued...)
Lecture 50 - Frequency Modulation (Continued...)
Lecture 51 - Frequency Modulation (Continued...)
Lecture 52 - Frequency Modulation (Continued...)
Lecture 53 - FM Noise Analysis
Lecture 54 - FM Noise Analysis (Continued...)
Lecture 55 - FM Noise Analysis (Continued...)>
Lecture 56 - Sampling Theorem
Lecture 57 - Sampling Theorem (Continued...)
Lecture 58 - FDM Vs TDM
Lecture 59 - Flat Top Vs Natural Sampling
Lecture 60 - Pulse Coded Modulation

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Modern Digital Communication Techniques

Subject Co-ordinator - Prof. Suvra Sekhar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Digital Communication System
Lecture 2 - Introduction of Digital Communication System (Continued...)
Lecture 3 - Introduction of Digital Communication System (Continued...)
Lecture 4 - Introduction of Digital Communication System (Continued...)
Lecture 5 - Introduction of Digital Communication System (Continued...)
Lecture 6 - Source Coding
Lecture 7 - Source Coding (Continued...)
Lecture 8 - Source Coding (Continued...)
Lecture 9 - Source Coding (Continued...)
Lecture 10 - Source Coding (Continued...)
Lecture 11 - Source Coding (Continued...)
Lecture 12 - Source Coding (Continued...)
Lecture 13 - Source Coding (Continued...)
Lecture 14 - Source Coding (Continued...)
Lecture 15 - Analog to Digital Conversion
Lecture 16 - Analog to Digital Conversion (Continued...)
Lecture 17 - Characterization of Signals and Systems
Lecture 18 - Characterization of Signals and Systems (Continued...)
Lecture 19 - Characterization of Signals and Systems (Continued...)
Lecture 20 - Characterization of Signals and Systems (Continued...)
Lecture 21 - Characterization of Signals and Systems (Continued...)
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Lecture 23 - Characterization of Signals and Systems (Continued...)
Lecture 24 - Memoryless Modulation
Lecture 25 - Memoryless Modulation (Continued...)
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Lecture 29 - Memoryless Modulation (Continued...)

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Lecture 30 - Memoryless Modulation (Continued...)
Lecture 31 - Memoryless Modulation (Continued...)
Lecture 32 - Memoryless Modulation (Continued...)
Lecture 33 - With Memory Modulation
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Lecture 35 - With Memory Modulation (Continued...)
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Lecture 39 - With Memory Modulation (Continued...)
Lecture 40 - Optimum Receivers for AWGN
Lecture 41 - Optimum Receivers for AWGN (Continued...)
Lecture 42 - Optimum Receivers for AWGN (Continued...)
Lecture 43 - Optimum Receivers for AWGN (Continued...)
Lecture 44 - Optimum Receivers for AWGN (Continued...)
Lecture 45 - Optimum Receivers for AWGN (Continued...)
Lecture 46 - Performance of Digital Modulation Techniques
Lecture 47 - Performance of Digital Modulation Techniques (Continued...)
Lecture 48 - Performance of Digital Modulation Techniques (Continued...)
Lecture 49 - Performance of Digital Modulation Techniques (Continued...)
Lecture 50 - Performance of Digital Modulation Techniques (Continued...)
Lecture 51 - Performance of Digital Modulation Techniques (Continued...)
Lecture 52 - Performance of Digital Modulation Techniques (Continued...)
Lecture 53 - Channel Estimation and Equalization
Lecture 54 - Channel Estimation and Equalization (Continued...)
Lecture 55 - Channel Estimation and Equalization (Continued...)>
Lecture 56 - Channel Estimation and Equalization (Continued...)
Lecture 57 - Synchronization Techniques
Lecture 58 - Synchronization Techniques (Continued...)
Lecture 59 - Synchronization Techniques (Continued...)
Lecture 60 - Synchronization Techniques (Continued...)

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Digital Speech Processing

Subject Co-ordinator - Prof. Shyamal Kumar Das Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 14
Lecture 15
Lecture 16 - Human Auditory System
Lecture 17
Lecture 18
Lecture 19 - Time Domain Methods in Speech Processing
Lecture 20
Lecture 21 - Introduction to Liner Prediction
Lecture 22 - Autocorrelation Method of LPC analysis
Lecture 23 - Autocorrelation Method of LPC analysis (Continued...)
Lecture 24 - Lattice Formulations of Linear Prediction
Lecture 25 - Lattice Formulations of Linear Prediction (Continued...)
Lecture 26
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Lecture 28
Lecture 29

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Lecture 30
Lecture 31 - Segmental and Supra-segmental features of speech signal
Lecture 32 - Cepstral Transform Coefficients (CC) Parameters extraction
Lecture 33 - Mel Frequency Cepstral Coefficients
Lecture 34 - MFCC features vector
Lecture 35 - Fundamental Frequency (F0) Detection of speech signal
Lecture 36 - Frequency Domain Fundamental Frequency Detection Algorithms
Lecture 37 - Text to Speech Synthesis
Lecture 38 - Text to Speech Synthesis (Continued...)
Lecture 39 - Automatic Speech Recognition
Lecture 40 - Statistical Modeling of Automatic Speech Recognition
Lecture 41 - Speech based Technology Development for e-learning
Lecture 42 - Prosody Modeling
Lecture 43 - Fundamental frequency countur modeling
Lecture 44 - Fundamental frequency contour modeling (Continued...)

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Analog Circuits and Systems through SPIC

Subject Co-ordinator - Prof. Mrigank Sharad

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Analog Design Part I
Lecture 2 - Basic Analog Design Part I (Continued...)
Lecture 3 - Basic Analog Design Part II
Lecture 4 - Basic Analog Design Part II (Continued...)
Lecture 5 - Basic Analog Design Part III
Lecture 6 - Basic Analog Design Part III (Continued...)
Lecture 7 - Basic Analog Design Part III (Continued...)
Lecture 8 - Basic Analog Design Part III (Continued...)
Lecture 9 - Basic Analog Design Part III (Continued...)
Lecture 10 - Basic Analog Design Part III (Continued...)
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NPTEL Video Course - Electronics and Communication Engineering - NOC:Communication Networks

Subject Co-ordinator - Prof. Goutam Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Communication Networks
Lecture 2 - Introduction to Communication Networks (Continued...)
Lecture 3 - Introduction to Communication Networks (Continued...)
Lecture 4 - Circuit Switch Networks
Lecture 5 - Space switch Artitechture
Lecture 6 - Space switch Architecture (Continued...)
Lecture 7 - Space Switch Architecture (Continued...)
Lecture 8 - Space Switch Architecture (Continued...)
Lecture 9 - Space Switch Architecture (Continued...)
Lecture 10 - Time Switch
Lecture 11 - Space Time Switch
Lecture 12 - Space Time Switch (Continued...)
Lecture 13 - Synchronisation
Lecture 14 - Synchronisation (Continued...)
Lecture 15 - Introduction to Queuing Theory
Lecture 16 - Arrival and Service Process
Lecture 17 - Poisson Process
Lecture 18 - poisson process (Continued...)
Lecture 19 - Memorylessness
Lecture 20 - Little's Theorem
Lecture 21 - Little's Theorem (Continued...)
Lecture 22 - D T M C
Lecture 23 - D T M C (Continued...)
Lecture 24 - D T M C To C T M C
Lecture 25 - C T M C
Lecture 26 - M/M/1 Queue
Lecture 27 - M/M/m And M/M/m/m System
Lecture 28 - Introduction to Data Networks
Lecture 29 - Introduction to Data Networks (Continued...)

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Lecture 30 - Introduction to Data Networks (Continued...)
Lecture 31 - Layered Architecture
Lecture 32 - Layered Architecture (Continued...)
Lecture 33 - Broadband Access - Dail Up/ADSL
Lecture 34 - Broadband Access - DSL, Aloha
Lecture 35 - Aloha/Slotted Aloha
Lecture 36 - Slotted Aloha
Lecture 37 - Slotted Aloha (Continued...)
Lecture 38 - Slotted Aloha- Stability Analysis
Lecture 39 - Slotted Aloha- Stability Analysis (Continued...)
Lecture 40 - Stabilized Slotted Aloha-bayesian Estimation
Lecture 41 - Binary Back- off Algorithm
Lecture 42 - Effect of Physical Media
Lecture 43 - PON and Ethernet MAC
Lecture 44 - PON and Ethernet MAC (Continued...)
Lecture 45 - CSMA/CD
Lecture 46 - CSMA/CA
Lecture 47 - CSMA/CA (Continued...)
Lecture 48 - CSMA/CA (Continued...)
Lecture 49 - CSMA/CA (Continued...)
Lecture 50 - Learning Bridges
Lecture 51 - Learning Bridges (Continued...)
Lecture 52 - Distributed Spanning Tree
Lecture 53 - Distributed Spanning Tree (Continued...)
Lecture 54 - Internet Protocol
Lecture 55 - Internet Protocol (Continued...)
Lecture 56 - Subnet and ARP
Lecture 57 - ARP and DHCP
Lecture 58 - DHCP and Routing

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Signal Processing Techniques and its App

Subject Co-ordinator - Prof. Shyamal Kumar Das Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Signal and its Types
Lecture 3 - Characteristics of a Signal
Lecture 4 - Digitization of Signal
Lecture 5 - Digitization of Signal (Continued...)
Lecture 6 - Concept of Frequency in Continuous-time and Discrete-time Signal
Lecture 7 - Tutorial 1
Lecture 8 - Discrete Time Signal
Lecture 9 - Discrete Time System
Lecture 10 - D.T.S (L.T.I System)
Lecture 11 - Linear Time-Invariant Systems (Continued...)
Lecture 12 - Correlation
Lecture 13 - Tutorial 02
Lecture 14 - Z-Transform
Lecture 15 - Z-Transform Properties
Lecture 16 - Pole and Zero in Z-Transform
Lecture 17 - Inverse Z-Transform
Lecture 18 - Frequency-Domain Representation of Discrete Signals and L.T.I Systems
Lecture 19 - Discrete Fourier Transform (DFT)
Lecture 20 - Discrete Fourier Transform Linear Transform View
Lecture 21 - Discrete Fourier Transform Linear Transform View (Continued...)
Lecture 22 - Properties of Discrete Fourier Transform
Lecture 23 - Properties of Discrete Fourier Transform (Continued...)
Lecture 24 - Properties of Discrete Fourier Transform (Continued...)
Lecture 25 - Properties of Discrete Fourier Transform (Continued...)
Lecture 26 - Linear Filtering
Lecture 27 - Tutorial 5
Lecture 28 - Two Dimensional Discrete Fourier Transform
Lecture 29 - Discrete Cosine Transform

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Lecture 30 - Frequency analysis of long signal using DFT
Lecture 31 - Short-Time Fourier Transform (STFT)
Lecture 32 - STFT Synthesis
Lecture 33 - Fast Fourier Transform (FFT) Algorithms
Lecture 34 - Fast Fourier Transform (FFT) Algorithms (Continued...)
Lecture 35 - Radix-2 FFT Algorithms
Lecture 36 - Radix-2 FFT Algorithms (Continued...)
Lecture 37 - Spectrum and spectrogram
Lecture 38 - Digital Filter
Lecture 39 - FIR Filter
Lecture 40 - Linear Symmetric and Anti-symmetric filter
Lecture 41 - FIR Filter Design
Lecture 42 - Frequency Sampling Method
Lecture 43 - Design Optimum equiripple Linear-Phase FIR Filters (optimization methods)
Lecture 44 - Infinite Impulse Response (IIR) Filters
Lecture 45 - Traditional Analog Filter Design
Lecture 46 - Chebyshev filter Design Method
Lecture 47 - Analogue filter to digital filter transformation
Lecture 48 - Linear Prediction and Optimum Linear Filters
Lecture 49 - Autocorrelation Method for Linear Prediction
Lecture 50 - Covariance Method for Linear Prediction
Lecture 51 - Lattice Formulations of Linear Prediction
Lecture 52 - Lattice Formulations of Linear Prediction (Continued....)
Lecture 53 - Introduction to Multirate Signal Processing
Lecture 54 - Analysis of Decimation and Interpolation
Lecture 55 - Fractional Rate Conversion
Lecture 56 - Implementations of Decimator and Interpolator
Lecture 57 - Sample Rate Conversion by Stages
Lecture 58 - Power Spectrum Estimation
Lecture 59 - Power Spectrum Estimation (Continued...)
Lecture 60 - Tutorial 6: Tutorial for Final Examination

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NPTEL Video Course - Electronics and Communication Engineering - Analog IC Design

Subject Co-ordinator - Dr. Nagendra Krishnapura

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course introduction; Negative feedback control
Lecture 2 - Negative feedback amplifier
Lecture 3 - Step response, sinusoidal steady state response
Lecture 4 - Loop gain and unity loop gain frequency; Opamp
Lecture 5 - Opamp realization using controlled sources; Delay in the loop
Lecture 6 - Negative feedback amplifier with ideal delay-small delays
Lecture 7 - Negative feedback amplifier with ideal delay-large delays
Lecture 8 - Negative feedback amplifier with parasitic poles and zeros
Lecture 9 - Negative feedback amplifier with parasitic poles and zeros; Nyquist criterion
Lecture 10 - Nyquist criterion; Phase margin
Lecture 11 - Phase margin
Lecture 12 - Single stage opamp realization
Lecture 13 - Two stage miller compensated opamp
Lecture 14 - Two stage miller compensated opamp
Lecture 15 - Two and three stage miller compensated opamps; Feedforward compensated opamp
Lecture 16 - Feedforward compensated opamp
Lecture 17 - Feedforward compensated opamp
Lecture 18 - Feedforward compensated opamp; typical opamp data sheet
Lecture 19 - Opamp offset and CMRR; Transimpedance amplifier using an opamp
Lecture 20 - Components available in a CMOS process
Lecture 21 - MOS transistors-basics
Lecture 22 - MOS transistors-parasitics, mismatch
Lecture 23 - MOS transistors-mismatch, speed
Lecture 24 - Noise in resistors
Lecture 25 - Noise in MOS transistors; Input and output referred noise
Lecture 26 - Noise scaling; Basic amplifier stages-Common source, common gate
Lecture 27 - Basic amplifier stages-Common drain; Frequency response of amplifiers
Lecture 28 - Common source amplifier frequency response; Differential amplifier
Lecture 29 - Differential and common mode half circuits; Differential pair with active load

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Lecture 30 - Differential pair with current mirror load
Lecture 31 - Single stage opamp characteristics
Lecture 32 - Opamp with single and dual supplies; Single stage opamp tradeoffs
Lecture 33 - Telescopic cascode opamp
Lecture 34 - Telescopic cascode opamp; Folded cascode opamp
Lecture 35 - Folded cascode opamp
Lecture 36 - Two stage opamp
Lecture 37 - Two stage opamp; Three stage and triple cascode opamps
Lecture 38 - Common mode rejection ratio; Example
Lecture 39 - Fully differential circuits
Lecture 40 - Fully differential single stage opamp
Lecture 41 - Common mode feedback
Lecture 42 - Fully differential single stage opamp
Lecture 43 - Fully differential two stage opamp; Fully differential versus pseudo-differential
Lecture 44 - Circuit simulators and analyses
Lecture 45 - Phase locked loop as frequency multiplier
Lecture 46 - Phase domain model
Lecture 47 - Type I PLL transfer function and reference feedthrough
Lecture 48 - Type II PLL
Lecture 49 - Type II PLL transfer functions; Implementation
Lecture 50 - Type II PLL-extra poles; Random noise in a PLL
Lecture 51 - Oscillator phase noise
Lecture 52 - PLL phase noise; LC and ring Oscillators
Lecture 53 - Generating PTAT and constant MOS gm bias currents
Lecture 54 - Reducing supply sensitivity; Bandgap voltage reference
Lecture 55 - Fractional bandgap reference; Low dropout regulator
Lecture 56 - Low dropout regulators; Continuous-time active filters
Lecture 57 - Continuous-time active filters
Lecture 58 - Continuous-time active filters
Lecture 59 - Discrete-time active filters
Lecture 60 - Transistor sizing in practice; Course summary

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NPTEL Video Course - Electronics and Communication Engineering - Coding Theory

Subject Co-ordinator - Dr. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Linear Block Codes
Lecture 2 - Properties of Linear Block Codes
Lecture 3 - Dual of Linear Block Codes
Lecture 4 - Minimum Distance of Codes
Lecture 5 - Operations on Codes
Lecture 6 - Bounds on Code Parameters
Lecture 7 - Optimal Decoders
Lecture 8 - Syndrome Decoder, Basics of Finite Fields
Lecture 9 - Constructions of Finite Fields
Lecture 10 - Computations in Finite Fields
Lecture 11 - Codes over Finite Fields, Minimal Polynomials
Lecture 12 - BCH Codes
Lecture 13 - BCH and RS Codes I
Lecture 14 - BCH and RS Codes II
Lecture 15 - Decoding BCH Codes
Lecture 16 - Decoding RS Codes
Lecture 17 - Coded Modulation and Soft Decision Decoding
Lecture 18 - Optimal Decoders for BPSK and AWGN
Lecture 19 - Bitwise Map Decoder for BPSK over AWGN
Lecture 20 - Bitwise Map Decoder from the Dual Code
Lecture 21 - Simulating Coded Modulation
Lecture 22 - Union Bound, Introduction to LDPC Codes
Lecture 23 - LDPC Codes
Lecture 24 - Message Passing, Density Evolution Analysis
Lecture 25 - Thresholds of LDPC Codes
Lecture 26 - Irregular LDPC Codes
Lecture 27 - Optimized Irregular LDPC Codes, Soft Message Passing Decoders
Lecture 28 - Density Evolution for Soft Message Passing Decoding of LDPC Codes
Lecture 29 - LDPC Codes in Practice

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Lecture 30 - Introduction to Convolutional Codes
Lecture 31 - Viterbi Decoding of Convolutional Codes
Lecture 32 - Union Bound, Recursive Convolutional Encoders
Lecture 33 - Convolutional Codes in Practice
Lecture 34 - BCJR Decoder
Lecture 35 - BCJR & Max-Log-MAP Decoder, Introduction to Turbo Codes
Lecture 36 - Turbo Decoder
Lecture 37 - Turbo Codes in Practice
Lecture 38 - Modern Codes

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NPTEL Video Course - Electronics and Communication Engineering - Semiconductor Device Modeling

Subject Co-ordinator - Prof. S. Karmalkar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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NPTEL Video Course - Electronics and Communication Engineering - VLSI Data Conversion Circuits

Subject Co-ordinator - Dr. Shanthi Pavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Data Conversion
Lecture 2 - Sampling-1
Lecture 3 - Sampling-2
Lecture 4 - Nonidealities in Samples
Lecture 5 - Noise due to Sampling
Lecture 6 - Distortion in a Sampling Switch
Lecture 7 - Gate Boosted Switches-1
Lecture 8 - Gate Boosted Switches-2
Lecture 9 - Charge Injection
Lecture 10 - S/H Characterization-1
Lecture 11 - S/H Characterization-2
Lecture 12 - FFTs and Leakage
Lecture 13 - Spectral Windows-1
Lecture 14 - Spectral Windows-2
Lecture 15 - ADC/DAC Definition
Lecture 16 - Quantization Noise-1
Lecture 17 - Quantization Noise-2
Lecture 18 - Over Sampling and Noise Shaping
Lecture 19 - Delta-Sigma Modulation-1
Lecture 20 - Delta-Sigma Modulation-2
Lecture 21 - Linearized Analysis
Lecture 22 - Stability of Delta Sigma Modulators
Lecture 23 - High Order DSMs
Lecture 24 - NTF Design and Tradeoffs
Lecture 25 - Single bit Modulators
Lecture 26 - Loop Filter Architectures
Lecture 27 - Continous-time Delta Sigma Modulation
Lecture 28 - Implicit Antialiasing
Lecture 29 - Modulators with NRZ and Impulsive DACs

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Lecture 30 - High Order CTDSMs
Lecture 31 - CTDM Design
Lecture 32 - Excess Loop Delay (ELD)
Lecture 33 - ELD Compensation
Lecture 34 - Effect of Clock Jitter on CTDSMs-1
Lecture 35 - Effect of Clock Jitter on CTDSMs-2
Lecture 36 - Dynamic Range Scaling
Lecture 37 - Simulation of CTDSMs
Lecture 38 - Integrator Design-1
Lecture 39 - Integrator Design-2
Lecture 40 - Flash ADC Design
Lecture 41 - Latches and Metastability
Lecture 42 - Offset in a Latch-1
Lecture 43 - Offset in a Latch-2 Auto Zeroing
Lecture 44 - Auto Zeroing-2
Lecture 45 - Auto Zeroing-3
Lecture 46 - Auto Zeroing in flash ADCs
Lecture 47 - Flash ADCs Case Study
Lecture 48 - Flash ADC Case Study
Lecture 49 - Flash ADC in a Delta Sigma Loop
Lecture 50 - DAC Basics
Lecture 51 - Binary and Themometer DACs
Lecture 52 - Segmented DACs
Lecture 53 - Optimal DAC Segmentation
Lecture 54 - DAC Nonlinearities
Lecture 55 - Current Steering DACs-1
Lecture 56 - Current Steering DACs-2
Lecture 57 - DAC Mismatches in DSMs
Lecture 58 - Calibration and Randomization
Lecture 59 - Dynamic Element Matching-1
Lecture 60 - Dynamic Element Matching-2

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NPTEL Video Course - Electronics and Communication Engineering - Digital Circuits and Systems

Subject Co-ordinator - Prof. S. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Digital Circuits
Lecture 2 - Introduction To Digital Circuits
Lecture 3 - Combinational Logic Basics
Lecture 4 - Combinational Circuits
Lecture 5 - Logic Simplification
Lecture 6 - Karnaugh Maps And Implicants
Lecture 7 - Logic Minimization Using Karnaugh Maps
Lecture 8 - Karnaugh Map Minimization Using Maxterms
Lecture 9 - Code Converters
Lecture 10 - Parity Generators And Display Decoder
Lecture 11 - Arithmetic Circuits
Lecture 12 - Carry Look Ahead Adders
Lecture 13 - Subtractors
Lecture 14 - 2?'S Complement Subtractor and BCD Adder
Lecture 15 - Array Multiplier
Lecture 16 - Introduction to Sequential Circuits
Lecture 17 - S-R, J-K and D Flip Flops
Lecture 18 - J-K and T Flip Flops
Lecture 19 - Triggering Mechanisms of Flip Flops and Counters
Lecture 20 - Up/Down Counters
Lecture 21 - Shift Registers
Lecture 22 - Application of shift Registers
Lecture 23 - State Machines
Lecture 24 - Design of Synchronous Sequential Circuits
Lecture 25 - Design using J-K Flip Flop
Lecture 26 - Mealy and Moore Circuits
Lecture 27 - Pattern Detector
Lecture 28 - MSI and LSI Based Design
Lecture 29 - Multiplexer Based Design

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Lecture 30 - Encoders and Decoders
Lecture 31 - Programmable Logic Devices
Lecture 32 - Design using Programmable Logic Devices
Lecture 33 - Design using Programmable Logic Devices (Continued)
Lecture 34 - MSI and LSI based Implementation of Sequential Circuits
Lecture 35 - MSI and LSI based Implementation of Sequential Circuits (Continued)
Lecture 36 - Design of circuits using MSI sequential blocks
Lecture 37 - System Design Example
Lecture 38 - System Design Example (Continued)
Lecture 39 - System Design using the concept of controllers
Lecture 40 - System Design using the concept of controllers (Continued)

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NPTEL Video Course - Electronics and Communication Engineering - Electronics for Analog Signal Processing - I

Subject Co-ordinator - Prof. K. Radhakrishna Rao

Co-ordinating Institute - IIT - Madras | Texas Instruments - India

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Diode
Lecture 3 - Diode characteristics
Lecture 4 - Rectifier
Lecture 5 - Voltage Multiplier
Lecture 6 - Full Wave Rectifier and Peak Detector
Lecture 7 - Diode as a GATE
Lecture 8 - Analog GATE
Lecture 9 - Small Signal Analysis of Diode Circuit
Lecture 10 - Zener Regulator and Voltage Regulator
Lecture 11 - Varactor Diode
Lecture 12 - Amplifiers
Lecture 13 - Cascading of Amplifiers
Lecture 14 - Cascading of Amplifiers
Lecture 15 - h and g Parameters
Lecture 16 - Two Port Analysis
Lecture 17 - Amplifier Applications
Lecture 18 - Frequency Limitations Of An Amplifier
Lecture 19 - Distortion In Amplifiers
Lecture 20 - Bipolar Junction Transistor
Lecture 21 - Transistor (BJT) Inverter
Lecture 22 - Transistor Biasing
Lecture 23 - Stable Way of Biasing
Lecture 24 - Common Emitter Amplifiers
Lecture 25 - Transistor Biasing Using Single Supply
Lecture 26 - Metal Oxide Semiconductor
Lecture 27 - Construction of a MOSFET
Lecture 28 - Varieties of MOSFETS and JFETS
Lecture 29 - Characteristics of MOSFET

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Lecture 30 - Cascading Amplifiers
Lecture 31 - Cascading (Direct Coupling)
Lecture 32 - The Differential Amplifiers
Lecture 33 - BJT Differential Amplifiers
Lecture 34 - MOSFET Differential Amplifiers
Lecture 35 - Cascading Differential Amplifiers
Lecture 36 - Current Source and Current Sink
Lecture 37 - NMOS Inverters and CMOS Inverters
Lecture 38 - Active Components used in Electronics

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NPTEL Video Course - Electronics and Communication Engineering - Electronics for Analog Signal Processing - I

Subject Co-ordinator - Prof. K. Radhakrishna Rao

Co-ordinating Institute - IIT - Madras | Texas Instruments - India

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Feedback Theory
Lecture 2 - Negative Feedback
Lecture 3 - Negative Feedback
Lecture 4 - Y-Feedback
Lecture 5 - h and g Negative Feedback
Lecture 6 - g Feedback with Mosfet
Lecture 7 - Operational Amplifier in Negative Feedback
Lecture 8 - Operational Amplifier in Negative Feedback
Lecture 9 - Positive Feedback (Regenerative)
Lecture 10 - Experimental Demonstration
Lecture 11 - Instrumentation Amplifiers
Lecture 12 - Active Filters
Lecture 13 - Simulation of Harmonic Oscillators
Lecture 14 - Oscillators
Lecture 15 - Oscillators
Lecture 16 - Frequency Compensation in Negative Feedback
Lecture 17 - Frequency Compensation
Lecture 18 - Wideband (video) Amplifiers
Lecture 19 - Wideband Amplifiers
Lecture 20 - ICs For Video And Tuned Amplifier Applications
Lecture 21 - Power Amplifier
Lecture 22 - Power Amplifier
Lecture 23 - Class B and C Power Amplifiers
Lecture 24 - Class-B Power Amplifier Load and Drive
Lecture 25 - Control Circuits
Lecture 26 - Voltage Regulators
Lecture 27 - Voltage Regulators
Lecture 28 - Voltage Regulators
Lecture 29 - Convertors

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Lecture 30 - Analog Multipliers (Modems & Mixers)
Lecture 31 - Log-Antilog Multipliers
Lecture 32 - Multipliers
Lecture 33 - Multipliers
Lecture 34 - AGC/AVC
Lecture 35 - AGC/AVC
Lecture 36 - Experimental Demonstration
Lecture 37 - PLL (Phase Locked Loop)
Lecture 38 - PLL (Phase Locked Loop)
Lecture 39 - Lock Range Capture Range and FSK and FM

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NPTEL Video Course - Electronics and Communication Engineering - High Speed Devices and Circuits

Subject Co-ordinator - Prof. K.N. Bhat

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Basic concepts
Lecture 2 - Requirements for high speed circuits, devices and materials
Lecture 3 - Classification and properties of semiconductor devices
Lecture 4 - Ternary compound semiconductors and their applications
Lecture 5 - Ternary compound semiconductors and their applications (Continued.)
Lecture 6 - Crystal structures in GaAs
Lecture 7 - Dopants and impurities in GaAs and InP
Lecture 8 - Brief Overview of GaAs Technology for High Speed Devices
Lecture 9 - Epitaxial Techniques for GaAs and high speed devices
Lecture 10 - MBE and LPE for GaAs Epitoxy
Lecture 11 - GaAs and InP devices for Microelectronics
Lecture 12 - Metal Semiconductor contacts for MESFET
Lecture 13 - Metal Semiconductor contacts for MESFET (Continued.)
Lecture 14 - Metal Semiconductor contacts for MESFET (Continued.)
Lecture 15 - Ohmic contacts on semiconductors
Lecture 16 - Fermi level pinning, I V characteristics of Schottky Barrier Diodes
Lecture 17 - Schottky Barrier Diodes I V characteristics of Non idealities -1
Lecture 18 - Schottky Barrier Diodes I V characteristics of Non idealities -1
Lecture 19 - Causes of Non idealities in the Schottky Barrier Diodes (I V characteristics)
Lecture 20 - MESFET operations and I V characteristics
Lecture 21 - MESFET I V characteristics Shockley's Model
Lecture 22 - MESFET Shockley's Model and velocity saturation effect
Lecture 23 - MESFET velocity saturation effect on drain current saturation
Lecture 24 - MESFET
Lecture 25 - MESFET
Lecture 26 - MESFET
Lecture 27 - MESFET
Lecture 28 - MESFET
Lecture 29 - Self Aligned MESFET SAINT Threshold Voltage and Sub Threshold current

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Lecture 30 - Hetero junctions
Lecture 31 - Hetero junctions and high electron Mobility Transistor (HEMT)
Lecture 32 - Hetero junctions and high electron Mobility Transistor (HEMT) (Continued.)
Lecture 33 - High Electron Mobility Transistor
Lecture 34 - HEMT off voltage, I-V characteristics and trans conductance
Lecture 35 - I-V characteristics and trans conductance and optimization
Lecture 36 - Indium phosphide based HEMT
Lecture 37 - Pseudomorphic HEMT and Hetrojunction Bipolar Transistors
Lecture 38 - Hetero junction Bipolar Transistors (HBT)
Lecture 39 - Hetero junction Bipolar Transistors (HBT) (Continued.)
Lecture 40 - Hetero junction Bipolar Transistors (HBT) (Continued.)
Lecture 41 - Hetero junction Bipolar Transistors (HBT) (Continued.)

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NPTEL Video Course - Electronics and Communication Engineering - Solid State Devices

Subject Co-ordinator - Prof. S. Karmalkar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction on Solid State Devices
Lecture 2 - Evolution and Uniqueness of Semiconductor
Lecture 3 - Equilibrium Carrier Concentration
Lecture 4 - Equilibrium Carrier Concentration
Lecture 5 - Equilibrium Carrier Concentration
Lecture 6 - Equilibrium Carrier Concentration
Lecture 7 - Equilibrium Carrier Concentration
Lecture 8 - Equilibrium Carrier Concentration
Lecture 9 - Equilibrium Carrier Concentration
Lecture 10 - Equilibrium Carrier Concentration
Lecture 11 - Equilibrium Carrier Concentration
Lecture 12 - Carrier Transport
Lecture 13 - Carrier Transport (Continued.)
Lecture 14 - Carrier Transport (Continued.)
Lecture 15 - Excess Carriers
Lecture 16 - Excess Carriers (Continued.)
Lecture 17 - Procedure for Device Analysis
Lecture 18 - Procedure for Device Analysis (Continued.)
Lecture 19 - PN Junction
Lecture 20 - PN Junction (Continued.)
Lecture 21 - PN Junction (Continued.)
Lecture 22 - PN Junction (Continued.)
Lecture 23 - PN Junction (Continued.)
Lecture 24 - PN Junction (Continued.)
Lecture 25 - PN Junction (Continued.)
Lecture 26 - Bipolar Junction Transistor
Lecture 27 - Bipolar Junction Transistor (Continued.)
Lecture 28 - Bipolar Junction Transistor (Continued.)
Lecture 29 - Bipolar Junction Transistor (Continued.)

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Lecture 30 - Bipolar Junction Transistor (Continued.)
Lecture 31 - Bipolar Junction Transistor (Continued.)
Lecture 32 - Bipolar Junction Transistor (Continued.)
Lecture 33 - Metal-Oxide-Semiconductor (MOS) Junction
Lecture 34 - Metal-Oxide-Semiconductor (MOS) Junction (Continued.)
Lecture 35 - Metal-Oxide-Semiconductor (MOS) Junction (Continued.)
Lecture 36 - Metal-Oxide-Semiconductor (MOS) Junction (Continued.)
Lecture 37 - Metal-Oxide-Semiconductor (MOS) Junction (Continued.)
Lecture 38 - MOS Field Effect Transistor
Lecture 39 - MOS Field Effect Transistor (Continued.)
Lecture 40 - MOS Field Effect Transistor (Continued.)
Lecture 41 - MOS Field Effect Transistor (Continued.)
Lecture 42 - The Final Lecture - Conclusion

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NPTEL Video Course - Electronics and Communication Engineering - VLSI Circuits

Subject Co-ordinator - Prof. S. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to VLSI Design
Lecture 2 - Combinational Circuit Design
Lecture 3 - Programmable Logic Devices
Lecture 4 - Programmable Array Logic
Lecture 5 - Review of Flip-Flops
Lecture 6 - Sequential Circuits
Lecture 7 - Sequential Circuit Design
Lecture 8 - MSI Implementation of Sequential Circuits
Lecture 9 - Design of Sequential Circuits using One Hot Controller
Lecture 10 - Verilog Modeling of Combinational Circuits
Lecture 11 - Modeling of Verilog Sequential Circuits - Core Statements
Lecture 12 - Modeling of Verilog Sequential Circuits - Core Statements(Continued.)
Lecture 13 - RTL Coding Guidelines
Lecture 14 - Coding Organization - Complete Realization
Lecture 15 - Coding Organization - Complete Realization (Continued.)
Lecture 16 - Writing a Test Bench
Lecture 17 - System Design using ASM Chart
Lecture 18 - Example of System Design using ASM Chart
Lecture 19 - Examples of System Design using Sequential Circuits
Lecture 20 - Examples of System Design using Sequential Circuits (Continued.)
Lecture 21 - Microprogrammed Design
Lecture 22 - Microprogrammed Design (Continued.)
Lecture 23 - Design Flow of VLSI Circuits
Lecture 24 - Simulation of Combinational Circuits
Lecture 25 - Simulation of Combinational and Sequential Circuits
Lecture 26 - Analysis of Waveforms using Modelsim
Lecture 27 - Analysis of Waveforms using Modelsim (Continued.)
Lecture 28 - ModelSim Simulation Tool
Lecture 29 - Synthesis Tool

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Lecture 30 - Synthesis Tool (Continued.)
Lecture 31 - Synplify Tool - Schematic Circuit Diagram View
Lecture 32 - Technology View using Synplify Tool
Lecture 33 - Synopsys Full and Parallel Cases
Lecture 34 - Xilinx Place & Route Tool
Lecture 35 - Xilinx Place & Route Tool (Continued.)
Lecture 36 - PCI Arbiter Design using ASM Chart
Lecture 37 - Design of Memories - ROM
Lecture 38 - Design of Memories- RAM
Lecture 39 - Design of External RAM
Lecture 40 - Design of Arithmetic Circuits
Lecture 41 - Design of Arithmetic Circuits (Continued.)
Lecture 42 - Design of Arithmetic Circuits (Continued.)
Lecture 43 - System Design Examples
Lecture 44 - System Design Examples (Continued.)
Lecture 45 - System Design Examples (Continued.)
Lecture 46 - System Design Examples (Continued.)
Lecture 47 - System Design Examples (Continued.)
Lecture 48 - System Design Examples using FPGA Board
Lecture 49 - System Design Examples using FPGA Board (Continued.)
Lecture 50 - Advanced Features of Xilinx Project Navigator
Lecture 51 - System Design Examples using FPGA Board (Continued.)
Lecture 52 - System Design Examples using FPGA Board (Continued.)
Lecture 53 - System Design Examples using FPGA Board (Continued.)
Lecture 54 - System Design Examples using FPGA Board (Continued.)
Lecture 55 - Project Design Suggested for FPGA/ASIC Implementations

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NPTEL Video Course - Electronics and Communication Engineering - VLSI Technology

Subject Co-ordinator - Dr. Nandita Dasgupta

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction on VLSI Design
Lecture 2 - Bipolar Junction Transistor Fabrication
Lecture 3 - MOSFET Fabrication for IC
Lecture 4 - Crystal Structure of Si
Lecture 5 - Crystal Structure (Continued.)
Lecture 6 - Defects in Crystal + Crystal growth
Lecture 7 - Crystal growth Contd + Epitaxy I
Lecture 8 - Epitaxy II - Vapour phase Epitaxy
Lecture 9 - Epitaxy III - Doping during Epitaxy
Lecture 10 - Molecular beam Epitaxy
Lecture 11 - Oxidation I - Kinetics of Oxidation
Lecture 12 - Oxidation II - Oxidation rate constants
Lecture 13 - Oxidation III - Dopant Redistribution
Lecture 14 - Oxidation IV - Oxide Charges
Lecture 15 - Diffusion I - Theory of Diffusion
Lecture 16 - Diffusion II - Infinite Source
Lecture 17 - Diffusion III - Actual Doping Profiles
Lecture 18 - Diffusion IV - Diffusion Systems
Lecture 19 - Ion - Implantation Process
Lecture 20 - Ion - Implantation Process
Lecture 21 - Annealing of Damages
Lecture 22 - Masking during Implantation
Lecture 23 - Lithography - I
Lecture 24 - Lithography - II
Lecture 25 - Wet Chemical Etching
Lecture 26 - Dry Etching
Lecture 27 - Plasma Etching Systems
Lecture 28 - Etching of Si,Sio2,SiN and other materials
Lecture 29 - Plasma Deposition Process

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Lecture 30 - Metallization - I
Lecture 31 - Problems in Aluminium Metal contacts
Lecture 32 - IC BJT - From junction isolation to LOCOS
Lecture 33 - Problems in LOCOS + Trench isolation
Lecture 34 - More about BJT Fabrication and Realization
Lecture 35 - Circuits + Transistors in ECL Circuits
Lecture 36 - MOSFET I - Metal gate vs. Self-aligned Poly-gate
Lecture 37 - MOSFET II Tailoring of Device Parameters
Lecture 38 - CMOS Technology
Lecture 39 - Latch - up in CMOS
Lecture 40 - BICMOS Technology

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NPTEL Video Course - Electronics and Communication Engineering - Basic Electrical Circuits

Subject Co-ordinator - Dr. Nagendra Krishnapura

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course;Current and Voltage;Kirchhoff's Current and Voltage laws
Lecture 2 - Electrical circuit elements
Lecture 3 - Elements in series and parallel; Superposition in linear circuits
Lecture 4 - Controlled sources; Determining the characteristics of a two terminal element; Realizing a resist
Lecture 5 - Nodal analysis of a network with conductances and current sources; Setting up the equations; Cond
Lecture 6 - Circuit analysis; Number of KCL and KVL equations in a circuit; Nodal analysis of a network with
Lecture 7 - Nodal analysis with voltage sources and controlled sources; Brief introduction to modified nodal
Lecture 8 - Mesh analysis of a circuit with resistors and voltage sources; Comparison with nodal analysis; Me
Lecture 9 - Choice of nodal versus mesh analysis; Circuit theorems
Lecture 10 - Thevenin and Norton (theorem and) equivalent circuits; Power conservation in a circuit
Lecture 11 - Tellegen's theorem; Reciprocity theorem
Lecture 12 - Compensation Theorem; Two ports
Lecture 13 - Two port parameters-y parameters
Lecture 14 - Two port parameters(z, h, and g); Reciprocal two ports
Lecture 15 - Opamp, ideal opamp circuits, non-inverting and inverting amplifiers; Ensuring that the opamp has
Lecture 16 - RC circuit natural response; First order differential equation
Lecture 17 - RC (first-order) circuit, complete response with step inputs; Transient(natural) and steady stat
Lecture 18 - Step response of RC circuit with loops of voltage sources and capacitors; RL circuits; RLC circu
Lecture 19 - Second order(RLC circuit) natural response; Series and prallel RLC circuits; Differential equati
Lecture 20 - General formulation of second order(RLC circuit) natural response; Natural frequency and damping
Lecture 21 - Sinusoidal steady state response of RC and RLC circuits

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Basic Electrical Circuits

Subject Co-ordinator - Dr. Nagendra Krishnapura

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preliminaries
Lecture 2 - Current
Lecture 3 - Voltage
Lecture 4 - Electrical elements and circuits
Lecture 5 - Kirchhoff's current law (KCL)
Lecture 6 - Kirchhoff's Voltage law (KVL)
Lecture 7 - Voltage Source
Lecture 8 - Current Source
Lecture 9 - Resistor
Lecture 10 - Capacitor
Lecture 11 - Inductor
Lecture 12 - Mutual Inductor
Lecture 13 - Linearity of Elements
Lecture 14 - Solutions to the assignment on units 1 and 2
Lecture 15 - Series connection-Voltage sources in series
Lecture 16 - Series connection of R, L, C, current source
Lecture 17 - Elements in parallel
Lecture 18 - Current source in series with an element; Voltage source in parallel with an element
Lecture 19 - Extreme cases
Lecture 20 - Summary
Lecture 21 - Voltage controlled voltage source (VCVS)
Lecture 22 - Voltage controlled current source (VCCS)
Lecture 23 - Current controlled voltage source (CCVS)
Lecture 24 - Current controlled current source (CCCS)
Lecture 25 - Realizing a resistance using a VCCS or CCCS
Lecture 26 - Scaling an element's value using controlled sources
Lecture 27 - Example calculation
Lecture 28 - Solution to the assignment on units 3 and 4
Lecture 29 - Power and energy absorbed by electrical elements

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Lecture 30 - Power and energy in a resistor
Lecture 31 - Power and energy in a capacitor
Lecture 32 - Power and energy in an inductor
Lecture 33 - Power and energy in a voltage source
Lecture 34 - Power and energy in a current source
Lecture 35 - Goals of circuit analysis
Lecture 36 - Number of independent KCL equations
Lecture 37 - Number of independent KVL equations and branch relationships
Lecture 38 - Analysis of circuits with a single independent source
Lecture 39 - Analysis of circuits with multiple independent sources using superposition
Lecture 40 - Superposition
Lecture 41 - Solution to the assignment on units 5 and 6
Lecture 42 - What is nodal analysis
Lecture 43 - Setting up nodal analysis equations
Lecture 44 - Structure of the conductance matrix
Lecture 45 - How elements appear in the nodal analysis formulation
Lecture 46 - Completely solving the circuit starting from nodal analysis
Lecture 47 - Nodal analysis example
Lecture 48 - Matrix inversion basics
Lecture 49 - Nodal analysis with independent voltage sources
Lecture 50 - Supernode for nodal analysis with independent voltage sources
Lecture 51 - Nodal analysis with VCCS
Lecture 52 - Nodal analysis with VCVS
Lecture 53 - Nodal analysis with CCVS
Lecture 54 - Nodal analysis with CCCS
Lecture 55 - Nodal analysis summary
Lecture 56 - Solution to the assignment on units 7 and 8
Lecture 57 - Planar circuits
Lecture 58 - Mesh currents and their relationship to branch currents
Lecture 59 - Mesh analysis
Lecture 60 - Mesh analysis with independent current sources-Supermesh
Lecture 61 - Mesh analysis with current controlled voltage sources
Lecture 62 - Mesh analysis with current controlled current sources
Lecture 63 - Mesh analysis using voltage controlled sources
Lecture 64 - Nodal analysis versus Mesh analysis
Lecture 65 - Superposition theorem
Lecture 66 - Pushing a voltage source through a node
Lecture 67 - Splitting a current source
Lecture 68 - Substitution theorem

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Lecture 69 - Substitution theorem
Lecture 70 - Substituting a voltage or current source with a resistor
Lecture 71 - Solutions
Lecture 72 - Extensions to Superposition and Substitution theorem
Lecture 73 - Thevenin's theorem
Lecture 74 - Worked out example
Lecture 75 - Norton's theorem
Lecture 76 - Worked out example
Lecture 77 - Maximum power transfer theorem
Lecture 78 - Preliminaries.
Lecture 79 - Two port parameters
Lecture 80 - y parameters
Lecture 81 - y parameters
Lecture 82 - Solutions.
Lecture 83 - z parameters
Lecture 84 - z parameters
Lecture 85 - h parameters
Lecture 86 - h parameters
Lecture 87 - g parameters
Lecture 88 - g parameters
Lecture 89 - Calculations with a two-port element
Lecture 90 - Calculations with a two-port element.
Lecture 91 - Degenerate cases
Lecture 92 - Relationships between different two-port parameters
Lecture 93 - Equivalent circuit representation for two ports
Lecture 94 - Reciprocity
Lecture 95 - Proof of reciprocity of resistive two-ports
Lecture 96 - Proof for 4-terminal two-ports
Lecture 97 - Reciprocity in terms of different two-port parameters
Lecture 98 - Reciprocity in circuits containing controlled sources
Lecture 99 - Examples
Lecture 100 - Solutions..
Lecture 101 - Feedback amplifier using an opamp
Lecture 102 - Ideal opamp
Lecture 103 - Negative feedback around the opamp
Lecture 104 - Finding opamp signs for negative feedback
Lecture 105 - Example
Lecture 106 - Analysis of circuits with opamps
Lecture 107 - Inverting amplifier

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Lecture 108 - Summing amplifier
Lecture 109 - Instrumentation amplifier
Lecture 110 - Negative resistance and Miller effect
Lecture 111 - Finding opamp signs for negative feedback-circuits with multiple opamps
Lecture 112 - Opamp supply voltages and saturation
Lecture 113 - KCL with an opamp and supply currents
Lecture 114 - Solutions...
Lecture 115 - Circuits with storage elements (capacitors and inductors)
Lecture 116 - First order circuit with zero input-natural response
Lecture 117 - First order RC circuit with zero input-Example
Lecture 118 - First order circuit with a constant input
Lecture 119 - General form of the first order circuit response
Lecture 120 - First order RC circuit with a constant input-Example
Lecture 121 - First order circuit with piecewise constant input
Lecture 122 - First order circuit with piecewise constant input-Example
Lecture 123 - First order circuit-Response of arbitrary circuit variables
Lecture 124 - Summary
Lecture 125 - Does a capacitor block DC?
Lecture 126 - Finding the order of a circuit
Lecture 127 - First order RC circuits with discontinuous capacitor voltages
Lecture 128 - Summary
Lecture 129 - First order RL circuits
Lecture 130 - First order RL circuit with discontinuous inductor current-Example
Lecture 131 - First order RC circuit with an exponential input
Lecture 132 - First order RC response to its own natural response
Lecture 133 - First order RC response to a sinusoidal input
Lecture 134 - First order RC response to a sinusoidal input-via the complex exponential
Lecture 135 - Summary
Lecture 136 - Three methods of calculating the sinusoidal steady state response
Lecture 137 - Calculating the total response including initial conditions
Lecture 138 - Why are sinusoids used in measurement?
Lecture 139 - Second order system natural response
Lecture 140 - Second order system as a cascade of two first order systems
Lecture 141 - Second order system natural response-critically damped and underdamped
Lecture 142 - Generalized form of a second order system
Lecture 143 - Numerical example
Lecture 144 - Series and parallel RLC circuits
Lecture 145 - Forced response of a second order system
Lecture 146 - Steady state response calculation and Phasors

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Lecture 147 - Phasors (Continued...)
Lecture 148 - Magnitude and Phase plots
Lecture 149 - Magnitude and phase plotes of a second order system
Lecture 150 - Maximum power transfer and Conjugate matching

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NPTEL Video Course - Electronics and Communication Engineering - Advanced Logic Synthesis

Subject Co-ordinator - Mr. Dhiraj Taneja

Co-ordinating Institute - Broadcom - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - MOS Transistor
Lecture 2 - MOS Transistor - Detailed Study
Lecture 3 - Combinational Circuits and layout
Lecture 4 - Delay
Lecture 5 - Sequential Circuits
Lecture 6 - Logical Effort
Lecture 7 - Circuit Families
Lecture 8 - Lab-01
Lecture 9 - Lab-02
Lecture 10 - Lab-03
Lecture 11 - Lab-04
Lecture 12 - Introduction to Synthesis
Lecture 13 - Libraries
Lecture 14 - RTL Coding for Synthesis
Lecture 15 - Reading Design in DC
Lecture 16 - Design Environment
Lecture 17 - Design Constraints
Lecture 18 - Compile Flow and stratergies
Lecture 19 - Analysis and Reporting
Lecture 20 - Lab-05
Lecture 21 - Advanced Synthesis Techniques
Lecture 22 - Datapath Extraction Guidelines
Lecture 23 - Power - Methodology and Analysis
Lecture 24 - Lab-06
Lecture 25 - Lab-07
Lecture 26 - Lab-08
Lecture 27 - Lab-09
Lecture 28 - Static Timing Analysis - Concepts and Flow
Lecture 29 - Interconnects and Delay calculation

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Lecture 30 - Clock and Exceptions
Lecture 31 - On Chip Variation
Lecture 32 - Introduction to Crosstalk
Lecture 33 - Gaussian / Normal Distribution
Lecture 34 - Equivalence Checking / Formal Verification

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NPTEL Video Course - Electronics and Communication Engineering - ARM Based Development

Subject Co-ordinator - Mr. S. Chandramouleeswaran

Co-ordinating Institute - Independent Embedded SW Trainer

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Types of computer Architectures, ISA's and ARM History
Lecture 2 - Embedded System Software and Hardware, stack implementation in ARM, Endianness, condition codes
Lecture 3 - Processor core VS CPU core, ARM7TDMI Interface signals, Memory Interface, Bus Cycle types, Regist
Lecture 4 - Instruction Format, ARM Core Data Flow Model, ARM 3 stage Pipeline, ARM family attribute compari
Lecture 5 - ARM 5 stage Pipeline, Pipeline Hazards, Data forwarding - a hardware solution
Lecture 6 - ARM ISA and Processor Variants, Different Types of Instructions, ARM Instruction set, data proces
Lecture 7 - Shift Operations, shift Operations using RS lower byte, Immediate value encoding
Lecture 8 - Dataprocessing Instructions
Lecture 9 - Addressing Mode-1, Addressing Mode-2
Lecture 10 - Addressing Mode-2, LDR/STR, Addressing mode-3 with examples
Lecture 11 - Instruction Timing, Addressing Mode-4 with Examples
Lecture 12 - Swap Instructions, Swap Register related Instructions, Loading Constants
Lecture 13 - Program Control Flow, Control Flow Instructions, B & BL instructions, BX instruction
Lecture 14 - Interrupts and Exceptions, Exception Handlers, Reset Handling
Lecture 15 - Aborts, software Interrupt Instruction, undefined instruction exception
Lecture 16 - Interrupt Latency, Multiply Instructions, Instruction set examples
Lecture 17 - Thumb state, Thumb Programmers model, Thumb Implementation, Thumb Applications
Lecture 18 - Thumb Instructions, Interrupt processing
Lecture 19 - Interrupt Handelling schemes, Examples of Interrupt Handlers
Lecture 20 - Coprocessors
Lecture 21 - Coprocessor Instructions, data Processing Instruction, data transfers, register transfers
Lecture 22 - Number representations, floating point representation
Lecture 23 - Flynn's Taxonomy, SIMD and Vector Processors, Vector Floating Point Processor (VFP), VFP and ARM
Lecture 24 - Memory Technologies, Need for memory Hierarchy, Hierarchical Memory Organization, Virtual Memory
Lecture 25 - Cache Memory, Mapping Functions
Lecture 26 - Cache Design, Unified or split cache, multiple level of caches, ARM cache features, coprocessor
Lecture 27 - Processes, Memory Map, Protected Systems, ARM systems with MPU, memory Protection Unit (MPU)
Lecture 28 - Physical Vs Virtual Memory, Paging, Segmentation
Lecture 29 - MMU Advantage, virtual memory translation, Multitasking with MMU, MMU organization, Tightly coup

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Lecture 30 - ARM Development Environment, Arm Procedure Call Standard (APCS),
Lecture 31 - Example C program
Lecture 32 - Embedded software Development, Image structure, linker inputs and outputs, memory map, applicati
Lecture 33 - AMBA Overview, Typical AMAB Based Microcontroller, AHB bus features, AHB Bus transfers, APB bus
Lecture 34 - DMA, Peripherals, Programming Peripherals in ARM
Lecture 35 - DMA
Lecture 36 - Protocols (I2c, SPI), UART, GPIO
Lecture 37 - ARM ISAs, ARMv5, ARMv6, ARM v7, big.little technology, ARMv8

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NPTEL Video Course - Electronics and Communication Engineering - Embedded Software Testing

Subject Co-ordinator - Mr. Madhukeshwara H.M

Co-ordinating Institute - HCL

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Embedded Systems Basics Session 1
Lecture 2 - Embedded Systems Basics Session 1 (Continued...)
Lecture 3 - Prerequistics for Embedded Systems Testing
Lecture 4 - Test Case Designa and procedures
Lecture 5 - Test Standards
Lecture 6 - Depicting Levels of Testing
Lecture 7 - Depicting Levels of Testing (Continued...)
Lecture 8 - Software Life Cycle
Lecture 9 - Embedded V-Model Life Cycle
Lecture 10 - Embedded V-Model Life Cycle (Continued...)
Lecture 11 - Master Test Planning
Lecture 12 - Black Box Testing (Continued...)
Lecture 13 - Black Box Testing (Continued...)
Lecture 14 - Dynamic Testing
Lecture 15 - Black Box Testing
Lecture 16 - (Lecture Missing)
Lecture 17 - Black Box Testing (Continued...)
Lecture 18 - Model Based Design Intro.
Lecture 19 - Dynamic Testing (Continued...)
Lecture 20 - White Box Testing
Lecture 21 - White Box Testing (Continued...)
Lecture 22 - Grey-box testing
Lecture 23 - Static Testing
Lecture 24 - Static Analysis
Lecture 25 - Static Analysis (Continued...)
Lecture 26 - Static Analysis (Continued...)
Lecture 27 - Test Metrics
Lecture 28 - Software Testing Metrics
Lecture 29 - Integration Test Strategy

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Lecture 30 - Integration Tests Environment
Lecture 31 - Use Case Diagram
Lecture 32 - Depicting Levels of Testing (Continued...)
Lecture 33 - Configure Management Elements
Lecture 34 - SCM Activities
Lecture 35 - Test Management Tool
Lecture 36 - SCM Activities (Continued...)
Lecture 37 - Overview Lecture 1
Lecture 38 - Unit Testing
Lecture 39 - Unit Testing (Continued...)
Lecture 40 - Understading C++
Lecture 41 - Unit Testing (Continued...)
Lecture 42 - Level Testing
Lecture 43 - Identify Test Cases
Lecture 44 - Test Link Work Flow

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NPTEL Video Course - Electronics and Communication Engineering - Linux Programming and Scripting

Subject Co-ordinator - Mr. Anand Iyer

Co-ordinating Institute - Calypto Design Systems

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Linux Basics - I
Lecture 2 - Linux Basics - II
Lecture 3 - Linux Basics - III
Lecture 4 - Linux Basics - IV
Lecture 5 - Linux Networking - I
Lecture 6 - Linux Networking - II
Lecture 7 - File Transfer Protocol
Lecture 8 - Domain Name System
Lecture 9 - DNS (Continued...)
Lecture 10 - DFS
Lecture 11 - AFS and NIS
Lecture 12 - PERL 1
Lecture 13 - PERL 2
Lecture 14 - PERL 3
Lecture 15 - PERL 4
Lecture 16 - PERL 5
Lecture 17 - PERL 6
Lecture 18 - PERL 7
Lecture 19 - PERL 8
Lecture 20 - PERL 9
Lecture 21 - Using sort
Lecture 22 - PERL 10
Lecture 23 - Programming Using Tcl/Tk - I
Lecture 24 - Programming Using Tcl/Tk - II
Lecture 25 - Programming Using Tcl/Tk - III
Lecture 26 - More about Procedures
Lecture 27 - TCP, Ports and Sockets
Lecture 28 - I/O and Processes
Lecture 29 - Bindings

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Lecture 30 - Programming Using Tcl/Tk - IV
Lecture 31 - Furniture Arranger
Lecture 32 - Bindtags
Lecture 33 - Tcl in Synopsys Tools
Lecture 34 - Python Programming
Lecture 35 - Scope
Lecture 36 - Iteration
Lecture 37 - More about Regexps
Lecture 38 - Advanced Functions
Lecture 39 - Exception Handling
Lecture 40 - Examples of file Parsing
Lecture 41 - Program on If Statement
Lecture 42 - Program on Lists
Lecture 43 - Makefiles

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Digital Circuits and Systems

Subject Co-ordinator - Prof. Shankar Balachandran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic Boolean Logic
Lecture 3 - Boolean Theorems
Lecture 4 - Definitions, SoP and Pos
Lecture 5 - Algebraic Minimization Examples
Lecture 6 - Introduction to Verilog
Lecture 7 - Universality, Rearranging Truth Tables
Lecture 8 - Karnaugh Maps
Lecture 9 - K-Map Minimization
Lecture 10 - K-Map with Don't cares
Lecture 11 - Multiple Output Functions
Lecture 12 - Number Systems
Lecture 13 - Encoders and Decoders
Lecture 14 - Multiplexers
Lecture 15 - Multiplexer based Circuit Design
Lecture 16 - Verilog
Lecture 17 - Compiling and Running Verilog - A Demonstration
Lecture 18 - Sequential Elements
Lecture 19 - Gated Latches
Lecture 20 - Flipflops
Lecture 21 - Verilog - Assign Statement and Instantiation
Lecture 22 - Sequential Circuits
Lecture 23 - CMOS+Electrical Properties
Lecture 24 - Delays
Lecture 25 - Sequential Element Delays
Lecture 26 - More Sequential Circuits
Lecture 27 - Introduction to State Machines
Lecture 28 - Always Statement in Verilog
Lecture 29 - Sequential Logic Synthesis

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Lecture 30 - FSM Design Problems
Lecture 31 - State Minimization
Lecture 32 - State Assignment
Lecture 33 - Timing Sequential Circuits
Lecture 34 - Verilog Styles + Sequential Elements
Lecture 35 - GCD Algorithm
Lecture 36 - GCD Machines Datapath
Lecture 37 - GCD State Machine
Lecture 38 - GCD Top Level Module
Lecture 39 - Datapath in Verilog
Lecture 40 - Datapath Elements in Verilog
Lecture 41 - FSM in Verilog
Lecture 42 - Putting it all together
Lecture 43 - Pipelining
Lecture 44 - K-stage Pipeline
Lecture 45 - Interleaving and Parallelism
Lecture 46 - Blocking and Non-blocking Statements
Lecture 47 - Modeling Circuits with Pipelining
Lecture 48 - Signed Number Representation
Lecture 49 - Signed Number Addition
Lecture 50 - Adder/Subtracter
Lecture 51 - Fast Adders
Lecture 52 - Multiplication
Lecture 53 - Closing

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Networks and Systems

Subject Co-ordinator - Prof. V.G.K. Murti, Mr. C. S. Ramalingam, Dr. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functions in circuits - constant and sinusoidal functions
Lecture 2 - Functions in circuits - Exponential function
Lecture 3 - Complex numbers and other topics
Lecture 4 - Systems, Signals, Networks
Lecture 5 - Representation and Classification of Systems
Lecture 6 - Linear systems
Lecture 7 - Time-invariance and causality
Lecture 8 - Signals, Elementary continuous signals
Lecture 9 - Complex frequencies of signals
Lecture 10 - Discontinuous signals - step, ramp
Lecture 11 - Unit impulse or delta function
Lecture 12 - Basic discrete-time signals
Lecture 13 - Examples of Signals
Lecture 14 - Introduction to Systems, Complementary Functions, Initial Conditions
Lecture 15 - Special initial conditions
Lecture 16 - Characterization of a linear system
Lecture 17 - Impulse Response
Lecture 18 - Evaluating the Convolution Integral
Lecture 19 - Worked-out Problems
Lecture 20 - Introduction and Motivation
Lecture 21 - Evaluating Fourier series coefficients
Lecture 22 - Symmetry conditions
Lecture 23 - Symmetry Condition Examples
Lecture 24 - Application to Network Analysis
Lecture 25 - Exponential Fourier Series
Lecture 26 - Frequency Spectrum
Lecture 27 - Examples
Lecture 28 - Signal Power and Related Ideas
Lecture 29 - Convergence of Fourier Series

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Lecture 30 - Week 1 Solutions
Lecture 31 - Hints for Assignment 2
Lecture 32 - Hints for Assignment 3
Lecture 33 - Additional Properties of Fourier Series
Lecture 34 - Exercises on Fourier Series
Lecture 35 - Lab Demo
Lecture 36 - From Fourier Series to Fourier Transform
Lecture 37 - Continuous Time Fourier Transform
Lecture 38 - Fourier Transform Examples
Lecture 39 - Examples and Some Properties of Fourier Transform
Lecture 40 - Properties of Fourier Transform (contd.)
Lecture 41 - More Fourier Transform Properties
Lecture 42 - Energy Considerations
Lecture 43 - Energy Considerations II
Lecture 44 - Helpful Relationships for Inverse Fourier Transform
Lecture 45 - Fourier transform of signals that are not absolutely integrable
Lecture 46 - Fourier Transform of Periodic Signals, Unit Step and Signum Function
Lecture 47 - Truncated Sine wave and Convolution properties
Lecture 48 - Integration in Time domain
Lecture 49 - Application of continuous-time Fourier transform to system analysis
Lecture 50 - Comments about transient analysis
Lecture 51 - Sampling Theorem and Exercises on Fourier Transforms
Lecture 52 - Introduction to Laplace Transform
Lecture 53 - Laplace transforms of important functions
Lecture 54 - Recap, Poles / Zeros and Laplace Transform Notation
Lecture 55 - Properties
Lecture 56 - Application and properties of Laplace transform
Lecture 57 - More properties of Laplace transform
Lecture 58 - More properties of Laplace transform
Lecture 59 - Properties
Lecture 60 - Properties
Lecture 61 - Complex convolution and periodic functions
Lecture 62 - Examples of Laplace transform
Lecture 63 - Laplace transform examples
Lecture 64 - Inverse Laplace transform
Lecture 65 - Partial fractions
Lecture 66 - Inverse Laplace Transform and Contour Integration
Lecture 67 - Relating Fourier and Laplace Transform
Lecture 68 - Exercises

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Lecture 69 - Applications of Laplace transform to network transients
Lecture 70 - Laplace transform for resistor and system analysis
Lecture 71 - Laplace transform method for mutual inductance
Lecture 72 - Mutual Inductance Continued
Lecture 73 - Examples and Advantages of L-transform
Lecture 74 - General LTI systems and more about H(s)
Lecture 75 - Many facets of the system function (contd)
Lecture 76 - Frequency response and stability
Lecture 77 - Full circuit example
Lecture 78 - Exercises

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Circuit Analysis for Analog Designers

Subject Co-ordinator - Prof. Shanthi Pavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction and Motivation
Lecture 2 - Kirchoff's Current and Voltage Laws, and the Incidence Matrix
Lecture 3 - Power Conservation and Tellegen's Theorem
Lecture 4 - Intuition behind Tellegen's Theorem
Lecture 5 - Tellegen's Theorem and reciprocity in linear resistive networks
Lecture 6 - Why is reciprocity useful in practice?
Lecture 7 - Inter-reciprocity in linear time-invariant networks
Lecture 8 - Inter-reciprocity in linear time-invariant networks (Continued...)
Lecture 9 - Inter-reciprocity in networks with ideal operational amplifiers
Lecture 10 - Review of Modified Nodal Analysis (MNA) of linear networks
Lecture 11 - MNA stamps of controlled sources - the VCCS and VCVS
Lecture 12 - MNA stamps of controlled sources - the CCCS and CCVS
Lecture 13 - Inter-reciprocity in linear networks - using the MNA stamp approach
Lecture 14 - The Adjoint Network
Lecture 15 - MNA stamp of an ideal opamp
Lecture 16 - Properties of circuits with multiple ideal opamps
Lecture 17 - Introduction to Analog Active Filters
Lecture 18 - Magnitude approximation principles
Lecture 19 - The maximally flat (Butterworth) approximation
Lecture 20 - The Butterworth Approximation (Continued...)
Lecture 21 - Connection between magnitude response and pole locations in an all-pole filter
Lecture 22 - Cascade-of-biquads, realization of stray-insensitive first-order section
Lecture 23 - Opamp-RC biquadratic sections
Lecture 24 - Active-RC biquads and Impedance scaling
Lecture 25 - Opamp-RC biquadratic sections (Continued...)
Lecture 26 - High-order filters using cascade of biquads, Dynamic range scaling in opamp-RC filters
Lecture 27 - The finite gain-bandwidth model of nonideal opamps
Lecture 28 - Effect of finite opamp bandwidth on an active-RC integrator
Lecture 29 - Effect of finite opamp bandwidth on an active-RC biquad

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Lecture 30 - Visualization and mitigation of the effect of Q-enhancement
Lecture 31 - Transconductance-Capacitance integrators
Lecture 32 - Introduction to noise in electrical networks
Lecture 33 - Noise processed by a linear time-invariant system
Lecture 34 - kT/C noise in a sample-and-hold circuit
Lecture 35 - Noise in RLC networks
Lecture 36 - Total integrated noise in RLC Networks
Lecture 37 - Bode's Noise Theorem - Frequency domain
Lecture 38 - Input referred noise in electrical networks - Part 1
Lecture 39 - Input referred noise in electrical networks - Part 2
Lecture 40 - Input referred noise and the noise factor
Lecture 41 - Noise Factor Examples
Lecture 42 - Introduction to distributed networks, the ideal transmission line
Lecture 43 - Solving the wave equation in an ideal transmission line
Lecture 44 - Transmisson line circuit analysis : The short circuited and open circuited line
Lecture 45 - Transmission line circuit analysis, the reflection coefficient, open and short-circuited lines
Lecture 46 - Transmission line driven by a source, power in a transmission line
Lecture 47 - The Smith chart
Lecture 48 - The need for scattering parameters
Lecture 49 - Scattering Parameters: Introduction
Lecture 50 - Example scattering matrix calculations
Lecture 51 - Scattering matrices properties
Lecture 52 - Measuring the S-parameters of a one-port
Lecture 53 - The one-port vector network analyzer
Lecture 54 - The two-port vector network analyzer
Lecture 55 - Weak nonlinearity in electronic circuits, second-order harmonic distortion, HD2 and IM2
Lecture 56 - Weak nonlinearity in electronic circuits, second-order intermodulation distortion
Lecture 57 - Gain compression and third-order harmonic distortion
Lecture 58 - Third-order intermodulation distortion
Lecture 59 - Weak nonlinearities in circuits: Intuition behind the method of current injection
Lecture 60 - Weak nonlinearities in circuits: Calculating nonlinear components
Lecture 61 - Current-injection analysis of distortion in a negative feedback system
Lecture 62 - Current-injection analysis of distortion in a negative feedback system (Continued...)
Lecture 63 - Course summary and recap

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Design and Analysis of VLSI Subsystems

Subject Co-ordinator - Prof. Madhav Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Silicon
Lecture 2 - Introduction to NMOS
Lecture 3 - NMOS Transistor Working
Lecture 4 - PMOS Transistor
Lecture 5 - MOS Capacitances
Lecture 6 - Non Ideal MOS model
Lecture 7 - Short channel current model
Lecture 8 - Short channel current model analysis
Lecture 9 - Channel Length modulation index
Lecture 10 - DC characteristics of Inverter
Lecture 11 - Transfer characteristics of Inverter
Lecture 12 - Skewed Inverter
Lecture 13 - Skewed Inverter and threshold voltage
Lecture 14 - Equivalent of transistors in series
Lecture 15 - Transmission Gate
Lecture 16 - Bad CMOS Buffer - Part 1
Lecture 17 - Bad CMOS Buffer - Part 2
Lecture 18 - Noise margin characteristics of inverter
Lecture 19 - Noise margin parameters
Lecture 20 - Introduction to Delay in CMOS
Lecture 21 - Transient analysis of CMOS Inverter
Lecture 22 - RC approximated delay
Lecture 23 - Switching Resistance
Lecture 24 - CMOS Inverter approximated to RC Circuit
Lecture 25 - Elmore delay
Lecture 26 - Delay of FO4 inverter
Lecture 27 - Extracting capacitances of 3-Nand gate for delay estimation
Lecture 28 - Characterizing Delay of NOR gate
Lecture 29 - Linear Delay model

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Lecture 30 - Logical effort and Parasitic delay
Lecture 31 - Logical effort and Parasitic delay for different gates
Lecture 32 - Logical effort for short-channel current model
Lecture 33 - Ring Oscillator design
Lecture 34 - Optimizing Gate Size
Lecture 35 - Optimizing Gate Sizes Example
Lecture 36 - Optimizing the Stages for an inverter path
Lecture 37 - Optimizing the Stages for a General Circuit
Lecture 38 - Decoder Design
Lecture 39 - Introduction to Combinational Circuit and assymetric gates
Lecture 40 - Assymetric Gates analysis
Lecture 41 - Assymetric Gates analysis using short-channel current model
Lecture 42 - Introduction to Skewed gates
Lecture 43 - Skewed gates and best P/N ratio
Lecture 44 - vIntroduction to Pseudo NMOS
Lecture 45 - Psudeo NMOS gates
Lecture 46 - Other Logic Family
Lecture 47 - Dynamic Logic and Domino logic
Lecture 48 - Domino gates
Lecture 49 - Introduction to Stick Diagram
Lecture 50 - Stick Diagram for different gates
Lecture 51 - Applying Eulers path for stick diagram representations
Lecture 52 - Multiplexer design and layout
Lecture 53 - Introduction to Interconnects
Lecture 54 - Interconnects - RC delay, and Energy
Lecture 55 - Introduction to crosstalks in interconnects
Lecture 56 - Transient analysis in Crosstalk
Lecture 57 - Introduction to Repeaters in Interconnect Engineering
Lecture 58 - Repeater Design
Lecture 59 - Energy and delay analysis for interconnectwith repeaters
Lecture 60
Lecture 61 - Introduction to Power
Lecture 62 - Switching Power and Energy Estimation
Lecture 63 - Activity factor and estimating dynamic power for a combinational circuit design
Lecture 64 - Analyzing Dynamic Power
Lecture 65 - Energy estimation through driving factor
Lecture 66 - Energy expression in terms of delay
Lecture 67 - Voltage Scaling
Lecture 68 - DVFS

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Lecture 69 - Introduction to subthreshold leakage current model
Lecture 70 - Subthreshold leakage current and Gate leakage current
Lecture 71 - Estimating Static Power
Lecture 72 - Introduction to CMOS Latch design
Lecture 73 - CMOS Latch Design
Lecture 74 - CMOS Latch and flipflop design
Lecture 75 - Static Timing Analysis
Lecture 76 - Static Timing Analysis (Continued...)
Lecture 77 - Static Timing Analysis - Part 2
Lecture 78 - Static Timing Analysis - Part 2.1
Lecture 79 - Static Timing Analysis - Part 3
Lecture 80 - TPDQ and TPCQ
Lecture 81 - Static Timing Analysis - Part 4
Lecture 82 - Static Timing Analysis - Part 5
Lecture 83 - Static Timing Analysis - Part 6
Lecture 84 - SET and CLEAR enabled Latch and Flipflop Design
Lecture 85 - 1-bit Adder design
Lecture 86 - Adder-Part2
Lecture 87 - PG architecture - Part 1
Lecture 88 - PG architecture - Part 2
Lecture 89 - Carry Skip Adder
Lecture 90 - Carry Look Ahead and Carry Increment Adder
Lecture 91 - Other Adder Subsystems
Lecture 92 - Approximate Multipliers - Part 1
Lecture 93 - Approximate Multipliers - Part 2
Lecture 94 - Approximate Adder

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Nonlinear Dynamical Systems and Control

Subject Co-ordinator - Prof. Sanjay Bhat, Prof. Vijaysekhar Chellaboina

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Ordinary Differential Equations - Part 1
Lecture 4 - Ordinary Differential Equations - Part 2
Lecture 5 - ODE Solutions via Examples
Lecture 6 - Solutions to ODEs
Lecture 7 - Existence and Uniqueness Theorems
Lecture 8 - Asymptotic Behaviour of Dynamical Systems - Part 1
Lecture 9 - Asymptotic Behaviour of Dynamical Systems - Part 2
Lecture 10 - Asymptotic Behaviour of Dynamical Systems - Part 3
Lecture 11 - Stability Theory: Definitions - Part 1
Lecture 12 - Stability Theory: Definitions - Part 2
Lecture 13 - Stability Theory: Lyapunov Methods - Part 1
Lecture 14 - Stability Theory: Lyapunov Methods - Part 2
Lecture 15 - Lyapunov Function Examples
Lecture 16 - LaSalle's Invariance Theorem
Lecture 17 - Stability Theory: Converse Lyapunov and Instability Theorems
Lecture 18 - Solved Problems - Part 1
Lecture 19 - Solved Problems - Part 2
Lecture 20 - Linear Systems - Part 1
Lecture 21 - Linear Systems - Part 2
Lecture 22 - Linearization of Nonlinear Systems
Lecture 23 - Linear Systems and Linearization: Solved Problems - Part 1
Lecture 24 - Linear Systems and Linearization: Solved Problems - Part 2
Lecture 25 - Nonlinear Analysis: Key Concepts and Results - Part 1
Lecture 26 - Nonlinear Analysis: Key Concepts and Results - Part 2
Lecture 27 - Construction of Lyapunov Functions - Part 1
Lecture 28 - Construction of Lyapunov Functions - Part 2
Lecture 29 - Futher Topics - Part 1

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Lecture 30 - Futher Topics - Part 2
Lecture 31 - Introduction to Robust Stability
Lecture 32 - Robust Stability for Structured Uncertainty - Part 1
Lecture 33 - Robust Stability for Structured Uncertainty - Part 2
Lecture 34 - Robust Stability for Structured Uncertainty - Part 3
Lecture 35 - The Absolute Stability (Lure) Problem
Lecture 36 - Robust Stability: A Solved Problem
Lecture 37 - Dissipativity Theory - Part 1
Lecture 38 - Dissipativity Theory - Part 2
Lecture 39 - Dissipativity: Solved Problems
Lecture 40 - Feedback Interconnection of Dissipative Systems - Part 1
Lecture 41 - Feedback Interconnection of Dissipative Systems - Part 2
Lecture 42 - Stable Adaptive Control - Part 1
Lecture 43 - Stable Adaptive Control - Part 2
Lecture 44 - Examples and Generalizations - Part 1
Lecture 45 - Examples and Generalizations - Part 2
Lecture 46 - Optimization - Part 1
Lecture 47 - Optimization - Part 2
Lecture 48 - Functional Optimization - Part 1
Lecture 49 - Functional Optimization - Part 2
Lecture 50 - Optimal Control - Part 1
Lecture 51 - Optimal Control - Part 2
Lecture 52 - Optimal Control - Part 3
Lecture 53 - Stability Margins of Feedback Controllers
Lecture 54 - Control Lyapunov Functions
Lecture 55 - Disturbance Rejection - Part 1
Lecture 56 - Disturbance Rejection - Part 2
Lecture 57 - Revisition through Solved Problems - I
Lecture 58 - Revisition through Solved Problems - I (Continued...)
Lecture 59 - Revision through Solved Problems II
Lecture 60 - Revision through Solved Problems III - Part 1
Lecture 61 - Revision through Solved Problems III - Part 2
Lecture 62 - Assorted Topics: Highlights - Part 1
Lecture 63 - Assorted Topics: Highlights - Part 2

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Digital Protection of Power System

Subject Co-ordinator - Prof. Bhaveshkumar R. Bhalja

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Digital Relays - I
Lecture 2 - Introduction to Digital Relays - II
Lecture 3 - Components of Digital Relays
Lecture 4 - Fundamentals of Digital Relays
Lecture 5 - Phasor Estimation Algorithm - I
Lecture 6 - Phasor Estimation Algorithm - II
Lecture 7 - Phasor Estimation Algorithm - III
Lecture 8 - Phasor Estimation Algorithm - IV
Lecture 9 - Phasor Estimation Algorithm - V
Lecture 10 - Frequency Estimation Algorithm
Lecture 11 - Digital Protection of Transformer - I
Lecture 12 - Digital Protection of Transformer - II
Lecture 13 - Digital Protection of Transformer - III
Lecture 14 - Digital Protection of Transformer - IV
Lecture 15 - Digital Protection of Transformer - V
Lecture 16 - Digital Protection of Induction Motors - I
Lecture 17 - Digital Protection of Induction Motors - II
Lecture 18 - Digital Protection of Induction Motors - III
Lecture 19 - Digital Protection of Generators - I
Lecture 20 - Digital Protection OF Generators - II
Lecture 21 - Coordination of Overcurrent Relays for Distribution Network - I
Lecture 22 - Coordination of Overcurrent Relays for Distribution Network - II
Lecture 23 - Coordination of Overcurrent Relays for Distribution Network - III
Lecture 24 - Coordination of Overcurrent Relays for Distribution Network - IV
Lecture 25 - Coordination of Overcurrent Relays for Distribution Network - V
Lecture 26 - Coordination of Overcurrent Relays for Distribution Network - VI
Lecture 27 - Load Shedding and Frequency Relaying - I
Lecture 28 - Load Shedding and Frequency Relaying - II
Lecture 29 - Islanding Detection

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Lecture 30 - Digital Distance Relaying Scheme for transmission Line - I
Lecture 31 - Digital Distance Relaying Scheme for transmission Line - II
Lecture 32 - Introduction to Phasor Measurement Unit - I
Lecture 33 - Introduction to Phasor Measurement Unit - II
Lecture 34 - Introduction to Phasor Measurement Unit - III
Lecture 35 - Introduction to IEC 61850 - I
Lecture 36 - Introduction to IEC 61850 - II
Lecture 37 - Application of Big-Data Analytics in Power System Protection
Lecture 38 - Cyber Security Issues in Power System Network
Lecture 39 - Protection of Hybride AC/DC Microgrid: Issues and Challenges
Lecture 40 - Application of AI-Based Techniques in Digital Protection

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Physics of Nanoscale Devices

Subject Co-ordinator - Prof. Vishvendra Singh Poonia

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction and Course Overview
Lecture 3 - Basics of Quantum Mechanics
Lecture 4 - Electron in a Potential Well
Lecture 5 - Electrons in Solids
Lecture 6 - KP Model
Lecture 7 - KP Model, Effective Mass
Lecture 8 - Bands, Effective Mass, DOS
Lecture 9 - Effective Mass, DOS
Lecture 10 - Density of States
Lecture 11 - Density of States
Lecture 12 - Density of States - 3D, 2D
Lecture 13 - Density of States - 2D, 1D, 0D
Lecture 14 - DOS, Fermi Function
Lecture 15 - Fermi- Dirac Distribution
Lecture 16 - Fermi Function, General Model of Transport
Lecture 17 - General Model of Transport - I
Lecture 18 - General Model of Transport - II
Lecture 19 - General Model of Transport - III
Lecture 20 - General Model of Transport, Modes
Lecture 21 - Modes - I
Lecture 22 - Modes - II
Lecture 23 - Modes, Diffusive Transport
Lecture 24 - Diffusive Transport
Lecture 25 - Diffusive Transport, Conductance
Lecture 26 - Conductance, Bulk Transport - I
Lecture 27 - Conductance, Bulk Transport - II
Lecture 28 - Resistance: Ballistic and Diffusive Cases - I
Lecture 29 - Resistance: Ballistic and Diffusive Cases - II

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Lecture 30 - Resistance: Ballistic and Diffusive Cases - III
Lecture 31 - Resistance: Diffusive Case
Lecture 32 - The Idea of Mobility
Lecture 33 - Voltage Drop in Ballistic Conductor
Lecture 34 - 1D and 2D Realistic Conductors
Lecture 35 - Introduction to MOSFET - I
Lecture 36 - Introduction to MOSFET - II
Lecture 37 - MOSFET: A Barrier Controlled Device
Lecture 38 - MOSFET Electrical Characteristics
Lecture 39 - MOSFET IV Characteristics - I
Lecture 40 - MOSFET IV Characteristics - II
Lecture 41 - MOSFET IV Characteristics - III
Lecture 42 - MOSFET IV Characteristics - Traditional Approach
Lecture 43 - MOSFET: Transport - I
Lecture 44 - MOSFET: Transport - II
Lecture 45 - MOSFET: Landauer Transport
Lecture 46 - Landauer Transport and Ballistic MOSFET
Lecture 47 - Ballistic MOSFET
Lecture 48 - Ballistic Injection Velocity
Lecture 49 - Velocity Saturation in Ballistic MOSFET and Electrostatics
Lecture 50 - MOS Electrostatics
Lecture 51 - MOS Electrostatics
Lecture 52 - MOSFET: Electrostatics, Threshold Voltage
Lecture 53 - MOSFET: 2D Electrostatics
Lecture 54 - MOSFET: 2D Electrostatics and Quantum Confinement
Lecture 55 - ETSOI MOSFETs, Quantum Confinement, Strain Engineering
Lecture 56 - Strain Engineering, Thermoelectric Effects
Lecture 57 - Thermoelectric Effects
Lecture 58 - Thermoelectric Effects, Quantum Dot Devices
Lecture 59 - Quantum Dot Devices
Lecture 60 - Quantum Dot Devices - IV Characteristics, DFT, Course Summary

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Low Voltage CMOS Circuit Operation

Subject Co-ordinator - Prof. Anand Bulusu

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation
Lecture 2 - Review of MOSFET operation - I
Lecture 3 - Review of MOSFET operation - II
Lecture 4 - Basic charge model - I
Lecture 5 - Basic charge model - II
Lecture 6 - Basic charge model - III
Lecture 7 - Basic charge model - IV
Lecture 8 - Basic charge model - V
Lecture 9 - Basic charge model - VI
Lecture 10 - Basic charge model - VII
Lecture 11 - Basic charge model - VIII
Lecture 12 - Basic charge model - IX
Lecture 13 - Basic charge model - X
Lecture 14 - Minimum energy point - I
Lecture 15 - Minimum energy point - II
Lecture 16 - Minimum energy point - III
Lecture 17 - Transistor sizing for combinational circuit - I
Lecture 18 - Transistor sizing for combinational circuit - II
Lecture 19 - Transistor sizing for asymmetric combinational circuits
Lecture 20 - Charging and discharging mechanism in NTV combinational gates
Lecture 21 - Effective current for NTV inverter
Lecture 22 - Effective current for NTV combinational gates - I
Lecture 23 - Effective current for NTV combinational gates - II
Lecture 24 - Effective current for NTV combinational gates - III
Lecture 25 - Combinational circuit design considering variations - I
Lecture 26 - Combinational circuit design considering variations - II
Lecture 27 - Buffer design considering INWE
Lecture 28 - Decoder design considering INWE
Lecture 29 - Flip-flop operation

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Lecture 30 - Warning flip-flops design and operation
Lecture 31 - Single phase flip-flops design and operation
Lecture 32 - Consideration of radiation effects in NTV
Lecture 33 - Radiation-hardened NTV sequential circuit elements
Lecture 34 - Level shifters for multi-Vdd domains
Lecture 35 - Introduction to 6T SRAM
Lecture 36 - Stability and Reliability Issues in 6T SRAM
Lecture 37 - Read and Write-Assist Circuits in 6T SRAM
Lecture 38 - Physical Insights into Channel Charge Distribution
Lecture 39 - FinFET based Standard Cell Design
Lecture 40 - Example problems

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Cryogenic Electronics for Quantum Comput

Subject Co-ordinator - Prof. Sudeb Dasgupta

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles of Quantum Mechanics
Lecture 2 - Principles of Quantum Mechanics - II
Lecture 3 - Schrodingerâ s Wave Equation
Lecture 4 - Schrodingerâ s Wave Equation - II
Lecture 5 - Formation of Energy Bands, The Kronig-Penney Model, K Space Diagram
Lecture 6 - Electrical Conduction in Solids-The Energy Band and the Bond Model, Drift Current, Electron Effec
Lecture 7 - Density of States Function, Statistical Mechanics - I
Lecture 8 - DOS - II
Lecture 9 - Basic MOSFET Structure, symbol, and working as a Switch
Lecture 10 - MOSFET Operation- Depletion, Accumulation, and Inversion
Lecture 11 - MOSFET I/V Characteristics - Threshold voltage, I/V Characteristics, Transconductance
Lecture 12 - MOSFET I/V and Threshold Voltage - II
Lecture 13 - Second-Order Effects - I
Lecture 14 - Second Order Effects - II
Lecture 15 - Introduction to Cryogenics in Electronics
Lecture 16 - Cryogenic Coolant/Fluids used
Lecture 17 - Transition in Properties of materials with variation in Temperature
Lecture 18 - Transition in Properties of materials with variation in Temperature - II
Lecture 19 - Semiconductor devices at Room Temperature @ 300 K
Lecture 20 - Semiconductor devices at Low Temperature@ below 150 K and 77K
Lecture 21 - Change in Bandgap at Low Temperature - I
Lecture 22 - Change in Bandgap at Low Temperature - II
Lecture 23 - Change in Intrinsic Carrier concentration
Lecture 24 - Lowering in the level of Fermi Energy
Lecture 25 - Effect of Freeze-out on dopant atom concentration
Lecture 26 - Effect of Freeze-out on Dopant Atom Concentration - II and Complete Effect of Overall Phenomenor
Lecture 27 - Introduction to Modelling of Cryo-MOS Device
Lecture 28 - Device Performance Modelling at Cryogenic Temperatures
Lecture 29 - Semiconductor Device Equations at Low Temperature

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Lecture 30 - Incomplete Ionization Models
Lecture 31 - Mobility Models: Scattering effect
Lecture 32 - Change in Threshold Voltage
Lecture 33 - Change in Threshold Voltage - II
Lecture 34 - Effect on Mobility
Lecture 35 - Effect on leakage and saturation current
Lecture 36 - Kink-observed at higher VDS due to Impact Ionization
Lecture 37 - Subthreshold Swing and Transconductance - I
Lecture 38 - Subthreshold Swing and Transconductance - II
Lecture 39 - Introduction to MOS Capacitance
Lecture 40 - Traps and Defects at Cryogenic Temperatures
Lecture 41 - C-V Characteristics: High-Frequency and Low-Frequency Capacitance
Lecture 42 - Characterization Techniques and Cryogenic MOS Capacitance Modeling
Lecture 43 - Noise Performance and Flicker Noise
Lecture 44 - Cryo-Analog to Digital Converter
Lecture 45 - Cryo-Low Noise Amplifiers
Lecture 46 - Multiplexers and Circulators
Lecture 47 - Cryo-Oscillators
Lecture 48 - Cryo-Power Management Circuits and Sensors and Sensors Interfaces
Lecture 49 - Introduction to Qubits
Lecture 50 - Properties of Qubits
Lecture 51 - Interfacing Quantum Processor with Classical Controllers
Lecture 52 - Quantum Entanglement and Quantum Communication
Lecture 53 - Single Qubit System
Lecture 54 - Extension to Two-Qubit systems and Multiplexing DC and I/O signal for 4 qubits
Lecture 55 - Multiplexing DC and I/O signal for 4 qubits
Lecture 56 - Multiplexing techniques based on FDMA, TDMA, SDMA
Lecture 57 - Introduction to Quantum Metrology and Quantum Sensing
Lecture 58 - SPADS and Challenges to Quantum Technology
Lecture 59 - Qubit readout front-end circuits for (a) Spin qubit (b)Transmon qubit
Lecture 60 - Sensing the Qubits- Microwave Technique
Lecture 61 - Characterization and Modelling of 22 nm FDSOI Cryogenic RF CMOS
Lecture 62 - Modelling of 22 nm FDSOI Cryogenic RF CMOS - Part II
Lecture 63 - Modelling of 22 nm FDSOI Cryogenic RF CMOS - Part III
Lecture 64 - Parasitic Capacitance in Nanosheet FETs
Lecture 65 - Performance Perspective of Gate All Around Double Nanosheet
Lecture 66 - Nanosheet: Part - I
Lecture 67 - Nanosheet: Part - II
Lecture 68 - Nanosheet: Part - III

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NPTEL Video Course - Electronics and Communication Engineering - Circuits for Analog System Design

Subject Co-ordinator - Prof. M.K. Gunasekaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Transistor Amplifier
Lecture 2 - Transistor Op-amp and Transistor Based Voltage Regulator
Lecture 3 - Some applications of transistor - I
Lecture 4 - Some applications of transistor - II
Lecture 5 - Transformer design & Heat sink design
Lecture 6 - Op-amp Based Linear Voltage Regulator
Lecture 7 - Short circuit protection for linear power supply
Lecture 8 - Temperature indicator design using Op-amp
Lecture 9 - On & off Temperature controller design
Lecture 10 - Proportional Temperature Controller Design
Lecture 11 - PID - Temperature Controller Design
Lecture 12 - Heater Drive for Various Temperature Controllers
Lecture 13 - Short Circuit Protection of Power MOSFET
Lecture 14 - Error budgeting for temperature Indicator
Lecture 15 - PID Temperature Controllers with Error Budgeting
Lecture 16 - Error Budgeting for Constant Current Sources
Lecture 17 - Error Budgeting for Thermo Couple Amplifier
Lecture 18 - Error Budgeting for Op amp Circuits
Lecture 19 - Gain Error Calculation in Op amp Circuits
Lecture 20 - Input Resistance Calculations for Op amp
Lecture 21 - Output Resistance Calculations for Op amp
Lecture 22 - Error Budgeting for Different Circuits
Lecture 23 - 4-20 mA current Transmitter design
Lecture 24 - Error budgeting for 4-20mA Current Transmitters
Lecture 25 - LVDT Based Current Transmitters
Lecture 26 - Constant Current Source Design
Lecture 27 - 4-20 MA Based Temperature Transmitter
Lecture 28 - 3-Wire Current Transmitter
Lecture 29 - Various Resistance Measurement Techniques

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Lecture 30 - Ratio Transformer Technique to Measure Resistance and capacitance
Lecture 31 - Capacitive Sensor Circuit Design Examples
Lecture 32 - Capacitive Sensor Circuit With High Impedance Amplifier
Lecture 33 - AC- applications of the Op-Amp and Lock in Amplifier Design
Lecture 34 - Design of lock in Amplifier Circuit with example
Lecture 35 - Dual Slopes ADC â Design Examples
Lecture 36 - Dual Slope ADC and Successor approximation ADC
Lecture 37 - MC based ADC
Lecture 38 - Digital to analog Converter design and working, Flash ADC
Lecture 39 - Flash ADC and ADC Converter errors
Lecture 40 - Sigma delta ADC working Principle

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NPTEL Video Course - Electronics and Communication Engineering - Digital System design with PLDs and FPGAs

Subject Co-ordinator - Prof. Kuruvilla Varghese

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Contents, Objective
Lecture 2 - Revision of Prerequisite
Lecture 3 - Design of Synchronous Sequential Circuits
Lecture 4 - Analysis of Synchronous Sequential Circuits
Lecture 5 - Top-down Design
Lecture 6 - Controller Design
Lecture 7 - Control algorithm and State diagram
Lecture 8 - Case study 1
Lecture 9 - FSM issues 1
Lecture 10 - FSM Issues 2
Lecture 11 - FSM Issues 3
Lecture 12 - FSM Issues 4
Lecture 13 - FSM Issues 5
Lecture 14 - Synchronization 1
Lecture 15 - Synchronization 2
Lecture 16 - Case study 2
Lecture 17 - Case study on FPGA Board
Lecture 18 - Entity, Architecture and Operators
Lecture 19 - Concurrency, Data flow and Behavioural models
Lecture 20 - Structural Model, Simulation
Lecture 21 - Simulating Concurrency
Lecture 22 - Classes and Data types
Lecture 23 - Concurrent statements and Sequential statements
Lecture 24 - Sequential statements and Loops
Lecture 25 - Modelling flip-flops, Registers
Lecture 26 - Synthesis of Sequential circuits
Lecture 27 - Libraries and Packages
Lecture 28 - Operators, Delay modelling
Lecture 29 - Delay modelling

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Lecture 30 - VHDL Examples
Lecture 31 - VHDL coding of FSM
Lecture 32 - VHDL Test bench
Lecture 33 - VHDL Examples, FSM Clock
Lecture 34 - Evolution of PLDs
Lecture 35 - Simple PLDs
Lecture 36 - Simple PLDs
Lecture 37 - Complex PLDs
Lecture 38 - FPGA Introduction
Lecture 39 - FPGA Interconnection, Design Methodology
Lecture 40 - Xilinx Virtex FPGAâ s CLB
Lecture 41 - Xilinx Virtex Resource Mapping, IO Block
Lecture 42 - Xilinx Virtex Clock Tree
Lecture 43 - FPGA Configuration
Lecture 44 - Altera and Actel FPGAs

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NPTEL Video Course - Electronics and Communication Engineering - Error Correcting Codes

Subject Co-ordinator - Prof. P. Vijay Kumar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview & Basics
Lecture 2 - Example Codes and their Parameters
Lecture 3 - Mathematical Preliminaries
Lecture 4 - Subgroups and Equivalence Relations
Lecture 5 - Cosets, Rings & Fields
Lecture 6 - Vector Spaces, Linear Independence and Basis
Lecture 7 - Linear Codes, & Linear independence
Lecture 8 - Spanning & Basis
Lecture 9 - The Dual Code
Lecture 10 - Systematic Generator Matrix
Lecture 11 - Minimum Distance of a Linear Code
Lecture 12 - Bounds on the size of a Code
Lecture 13 - Asymptotic Bounds
Lecture 14 - Standard Array Decoding
Lecture 15 - Performance Analysis of the SAD
Lecture 16 - State and Trellis
Lecture 17 - The Viterbi Decoder
Lecture 18 - Catastrophic Error Propagation
Lecture 19 - Path Enumeration
Lecture 20 - Viterbi Decoder over the AWGN Channel
Lecture 21 - Generalized Distributive Law
Lecture 22 - The MPF Problem
Lecture 23 - Further Examples of the MPF Problem
Lecture 24 - Junction Trees
Lecture 25 - Example of Junction Tree Construction
Lecture 26 - Message passing on the Junction tree
Lecture 27 - GDL Approach to Decoding Convolutional Codes
Lecture 28 - ML Code-Symbol Decoding of the Convolutional Code
Lecture 29 - LDPC Codes

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Lecture 30 - LDPC Code Terminology
Lecture 31 - Gallager Decoding Algorithm A
Lecture 32 - BP Decoding of LDPC Codes
Lecture 33 - BP Decoding (Continued)
Lecture 34 - Density Evolution under BP decoding
Lecture 35 - Convergence & Concentration Theorem - LDPC Codes
Lecture 36 - A Construction for Finite Fields
Lecture 37 - Finite Fields
Lecture 38 - Deductive Approach to Finite Fields
Lecture 39 - Subfields of a Finite field
Lecture 40 - Transform Approach to Cyclic Codes
Lecture 41 - Estimating the Parameters of a Cyclic Code
Lecture 42 - Decoding Cyclic Codes

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NPTEL Video Course - Electronics and Communication Engineering - Nanoelectronics: Devices and Materials

Subject Co-ordinator - Dr. Navakanta Bhat, Prof. K.N. Bhat, Dr. S.A. Shivashankar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Nanoelectronics
Lecture 2 - CMOS Scaling Theory
Lecture 3 - Short Channel Effects
Lecture 4 - Subthreshold Conduction
Lecture 5 - Drain Induced Barrier Lowering
Lecture 6 - Channel and Source / Drain Engineering
Lecture 7 - CMOS Process Flow
Lecture 8 - Gate oxide scaling and reliability
Lecture 9 - High-k gate dielectrics
Lecture 10 - Metal gate transistor
Lecture 11 - Industrial CMOS Technology
Lecture 12 - Ideal MOS C-V Characteristics
Lecture 13 - Effect of non idealities on C-V
Lecture 14 - MOS Parameter Extraction from C-V Characteristics
Lecture 15 - MOS Parameter Extraction from I-V Characteristics
Lecture 16 - MOSFET Analysis, sub-threshold swing Â SÂ
Lecture 17 - Interface state density effects on Ã SÂ . Short Channel Effects (SCE) and Drain Induced Barrier
Lecture 18 - Velocity Saturation, Ballistic transport, and Velocity Overshoot Effects and Injection Velocity
Lecture 19 - SOI Technology and comparisons with Bulk Silicon CMOS technology
Lecture 20 - SOI MOSFET structures, Partially Depleted (PD)and Fully Depleted (FD) SOIMOSFETs
Lecture 21 - FD SOI MOSFET
Lecture 22 - Sub-threshold Slope & SCE suppression in FD SOI MOSFET, Volume Inversion and Ultra thin (UTFD) S
Lecture 23 - Need for MS contact Source/Drain Junction in Nano scale MOSFETs
Lecture 24 - Rectifying and Ohmic contacts and challenges in MS unction source drain MOSFET Technology
Lecture 25 - Effect of Interface states and Fermi level pinning on MS contacts on Si and passivation techniqu
Lecture 26 - Germanium as an alternate to silicon for high performance MOSFETs and the challenges in Germani
Lecture 27 - Germanium MOSFT technology and recent results on surface passivated Ge MOSFETS
Lecture 28 - Compound semiconductors and hetero junction FETsfor high performance
Lecture 29 - GaAs MESFETs

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Lecture 30 - Hetero-junctions and High Electron Mobility Transistors (HEMT)
Lecture 31 - Introduction to Nanomaterials
Lecture 32 - Basic Principles of Quantum Mechanics
Lecture 33 - Basic Principles of Quantum Mechanics (Continued...)
Lecture 34 - Energy bands in crystalline solids
Lecture 35 - Quantum structures and devices
Lecture 36 - Crystal growth and nanocrystals
Lecture 37 - Nanocrystals and nanostructured thin films
Lecture 38 - Nanowires and other nanostructures
Lecture 39 - Carbon Nanostructures and CVD
Lecture 40 - Atomic layer deposition (ALD)
Lecture 41 - Characterisation of nanomaterials

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NPTEL Video Course - Electronics and Communication Engineering - Pattern Recognition

Subject Co-ordinator - Prof. P.S. Sastry

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Statistical Pattern Recognition
Lecture 2 - Overview of Pattern Classifiers
Lecture 3 - The Bayes Classifier for minimizing Risk
Lecture 4 - Estimating Bayes Error; Minimax and Neymann-Pearson classifiers
Lecture 5 - Implementing Bayes Classifier; Estimation of Class Conditional Densities
Lecture 6 - Maximum Likelihood estimation of different densities
Lecture 7 - Bayesian estimation of parameters of density functions, MAP estimates
Lecture 8 - Bayesian Estimation examples; the exponential family of densities and ML estimates
Lecture 9 - Sufficient Statistics; Recursive formulation of ML and Bayesian estimates
Lecture 10 - Mixture Densities, ML estimation and EM algorithm
Lecture 11 - Convergence of EM algorithm; overview of Nonparametric density estimation
Lecture 12 - Convergence of EM algorithm, Overview of Nonparametric density estimation
Lecture 13 - Nonparametric estimation, Parzen Windows, nearest neighbour methods
Lecture 14 - Linear Discriminant Functions; Perceptron -- Learning Algorithm and convergence proof
Lecture 15 - Linear Least Squares Regression; LMS algorithm
Lecture 16 - AdaLinE and LMS algorithm; General nonliner least-squares regression
Lecture 17 - Logistic Regression; Statistics of least squares method; Regularized Least Squares
Lecture 18 - Fisher Linear Discriminant
Lecture 19 - Linear Discriminant functions for multi-class case; multi-class logistic regression
Lecture 20 - Learning and Generalization; PAC learning framework
Lecture 21 - Overview of Statistical Learning Theory; Empirical Risk Minimization
Lecture 22 - Consistency of Empirical Risk Minimization
Lecture 23 - Consistency of Empirical Risk Minimization; VC-Dimension
Lecture 24 - Complexity of Learning problems and VC-Dimension
Lecture 25 - VC-Dimension Examples; VC-Dimension of hyperplanes
Lecture 26 - Overview of Artificial Neural Networks
Lecture 27 - Multilayer Feedforward Neural networks with Sigmoidal activation functions;
Lecture 28 - Backpropagation Algorithm; Representational abilities of feedforward networks
Lecture 29 - Feedforward networks for Classification and Regression; Backpropagation in Practice

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Lecture 30 - Radial Basis Function Networks; Gaussian RBF networks
Lecture 31 - Learning Weights in RBF networks; K-means clustering algorithm
Lecture 32 - Support Vector Machines -- Introduction, obtaining the optimal hyperplane
Lecture 33 - SVM formulation with slack variables; nonlinear SVM classifiers
Lecture 34 - Kernel Functions for nonlinear SVMs; Mercer and positive definite Kernels
Lecture 35 - Support Vector Regression and ?-insensitive Loss function, examples of SVM learning
Lecture 36 - Overview of SMO and other algorithms for SVM; ?-SVM and ?-SVR; SVM as a risk minimizer
Lecture 37 - Positive Definite Kernels; RKHS; Representer Theorem
Lecture 38 - Feature Selection and Dimensionality Reduction; Principal Component Analysis
Lecture 39 - No Free Lunch Theorem; Model selection and model estimation; Bias-variance trade-off
Lecture 40 - Assessing Learnt classifiers; Cross Validation;
Lecture 41 - Bootstrap, Bagging and Boosting; Classifier Ensembles; AdaBoost
Lecture 42 - Risk minimization view of AdaBoost

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NPTEL Video Course - Electronics and Communication Engineering - Analog Circuits and Systems 1

Subject Co-ordinator - Prof. K. Radhakrishna Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Sensors, Signals and Systems
Lecture 2 - Role of Analog Signal Processing in Electronic Products - Part I
Lecture 3 - Role of Analog Signal Processing in Electronic Products - Part II
Lecture 4 - Analog Signal Processing using One Port Networks
Lecture 5 - Analog Signal Processing using One Port Networks, Passive Two Ports and Ideal amplifiers
Lecture 6 - Synthesis of Amplifiers using Nullators and Norators
Lecture 7 - Passive Electronic Devices for Analog Signal Processing
Lecture 8 - Active Devices for Analog Signal Processing Systems
Lecture 9 - Electronic Devices for Analog Circuits - Part I
Lecture 10 - Electronic Devices for Analog Circuits - Part II
Lecture 11 - Feedback in Systems
Lecture 12 - Static Charecteristic of Feedback Systems
Lecture 13 - Dynamic Behaviour of Feedback Systems - Part I
Lecture 14 - Dynamic Behavior of Feedback Systems - Part II
Lecture 15 - Design of Feedback Amplifiers - Part I
Lecture 16 - Design of Feedback Amplifiers - Part II
Lecture 17 - Design of Feedback Amplifiers and Instrumentation Amplifiers
Lecture 18 - Instrumentation Amplifiers, Integrators and Differentiators
Lecture 19 - Non-linear Analog Signal Processing
Lecture 20 - DC Voltage Regulators
Lecture 21 - Filters - Approximations to ideal filter functions
Lecture 22 - Passive Filters - Part I
Lecture 23 - Passive Filters - Part II
Lecture 24 - Active Filters - Part I
Lecture 25 - Active Filters - Part II
Lecture 26 - Active Filters
Lecture 27 - State Space Filters
Lecture 28 - Universal Active Filter - Effect of Active Device GB
Lecture 29 - State-Space Filters (Tuning of Filters)

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Lecture 30 - Automatic Tuning of Filters (PLL) and Review of Filter Design
Lecture 31 - Waveform Generation
Lecture 32 - LC Oscillator - Effect of Non-idealities
Lecture 33 - Transconductor based Oscillator
Lecture 34 - Regenerative Comparators and Non-Sinusoidal Oscillators
Lecture 35 - Non-Sinusoidal Oscillators and VCO (FM & FSK Generators)
Lecture 36 - Phase and Frequency Followers
Lecture 37 - Frequency Locked Loop (Popularly known as PLL)
Lecture 38 - Design of PLL and FLL
Lecture 39 - Analog System Design

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Design and Simulation of DC-DC converter

Subject Co-ordinator - Prof. L. Umanand

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - System Overview
Lecture 2 - Understanding Rectifier with C-filter
Lecture 3 - Setting up gEDA, ngSpice and Octave
Lecture 4 - Simulation walk-through
Lecture 5 - Designing the rectifier capacitor filter circuit
Lecture 6 - Startup surge limiting
Lecture 7 - DC-DC converter concepts
Lecture 8 - Buck, Boost and Buck-Boost Converters
Lecture 9 - Simulation Example of Buck Converter
Lecture 10 - Understanding Buck Converter
Lecture 11 - Understanding Boost and Buck-Boost
Lecture 12 - Forward Converter Topology
Lecture 13 - Waveforms and Design
Lecture 14 - Simulation of Forward Converter
Lecture 15 - Forward Converter with Lossless Core Reset
Lecture 16 - Transformer Design
Lecture 17 - Inductor Design
Lecture 18 - Flyback Converter Topology
Lecture 19 - Pushpull Converter
Lecture 20 - Half and Full Bridge Converters
Lecture 21 - Close Loop Operation of Converters
Lecture 22 - Simulation examples
Lecture 23 - Multi-Output Converters
Lecture 24 - Concluding Remarks

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Enclosure Design of Electronics Equipmer

Subject Co-ordinator - Prof. N. V Chalapathi Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Enclosure design for Electronics Equipment Introduction
Lecture 2 - Aspects and features that are non electrical and are essential to Electronic Product Realisation
Lecture 3 - Enclosure Design in electronic equipment
Lecture 4 - Design as applied to small electronics products and projects
Lecture 5 - Sketching in design for communication
Lecture 6 - Sketching as a tool with example and exercise
Lecture 7 - Sketching Part 2
Lecture 8 - Enclosures to Product design
Lecture 9 - Examples of product enclosures ID_PD
Lecture 10 - Enclosures with detailing
Lecture 11 - Alternate Designs in an everyday item
Lecture 12 - Sheet metal in small equipment (PSU)
Lecture 13 - Layouts and Materials of small equipment
Lecture 14 - Materials used for construction
Lecture 15 - Materials choice
Lecture 16 - Aluminium for common equipment
Lecture 17 - Use of Aluminium extrusions
Lecture 18 - Application of Sheet metal
Lecture 19 - Sheet Metal bending
Lecture 20 - Development of enclosures for bending
Lecture 21 - Video of Fabrication
Lecture 22 - What can be done in the lab Bending
Lecture 23 - Issues in bending and folding
Lecture 24 - Making a quick model
Lecture 25 - Detailing in plastic
Lecture 26 - Fabricating with flat plastic
Lecture 27 - Video in ID Lab
Lecture 28 - Off the shelf enclosures
Lecture 29 - Ready made enclosures

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Lecture 30 - Application documentation and Selection
Lecture 31 - Index of protection, Safety
Lecture 32 - NEMA and related
Lecture 33 - Testing for IP class
Lecture 34 - Sealed Enclosures Video
Lecture 35 - Public utility boxes
Lecture 36 - EMI Sealing
Lecture 37 - Sealed Enclosures 2
Lecture 38 - Gasketing practice
Lecture 39 - Gasketing Basics
Lecture 40 - Off the shelf Aluminum enclosures
Lecture 41 - Understanding
Lecture 42 - Heat sink enclosures
Lecture 43 - Detailing of Built in Heat sink boxes
Lecture 44 - Connector basics
Lecture 45 - Connectors - Part 2
Lecture 46 - Common connectors
Lecture 47 - Connectors (multi way) and CoAx
Lecture 48 - MIL C connectors
Lecture 49 - CAD in Layout Drawing
Lecture 50 - Types of CAD
Lecture 51 - CAD for enclosure Design
Lecture 52 - Egpt layout with CAD
Lecture 53 - CAD sample Example
Lecture 54 - CAD Layout
Lecture 55 - Detailing with CAD
Lecture 56 - Integrating Products with CAD
Lecture 57 - Product Detailing
Lecture 58 - Components CAD Physical Models
Lecture 59 - Sheet Metal and Plastic common details
Lecture 60 - Sample of Simple Organic Shapes
Lecture 61 - Conclusion

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Design of Photovoltaic Systems

Subject Co-ordinator - Prof. L. Umanand

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A historical perspective
Lecture 2 - PV cell characteristics and equivalent circuit
Lecture 3 - Model of PV cell
Lecture 4 - Short Circuit, Open Circuit and peak power parameters
Lecture 5 - Datasheet study
Lecture 6 - Cell efficiency
Lecture 7 - Effect of temperature
Lecture 8 - Temperature effect calculation example
Lecture 9 - Fill factor
Lecture 10 - PV cell simulation
Lecture 11 - Identical cells in series
Lecture 12 - Load line
Lecture 13 - Non-identical cells in series
Lecture 14 - Protecting cells in series
Lecture 15 - Interconnecting modules in series
Lecture 16 - Simulation of cells in series
Lecture 17 - Identical cells in parallel
Lecture 18 - Non-identical cells in parallel
Lecture 19 - Protecting cells in parallel
Lecture 20 - Interconnecting modules
Lecture 21 - Simulation of cells in parallel
Lecture 22 - Practicals - Measuring i-v characteristics
Lecture 23 - Practicals - PV source emulation
Lecture 24 - Introduction
Lecture 25 - Insolation and irradiance
Lecture 26 - Insolation variation with time of day
Lecture 27 - Earth centric viewpoint and declination
Lecture 28 - Solar geometry
Lecture 29 - Insolation on a horizontal flat plate

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Lecture 30 - Energy on a horizontal flat plate
Lecture 31 - Sunrise and sunset hour angles
Lecture 32 - Examples
Lecture 33 - Energy on a tilted flat plate
Lecture 34 - Energy plots in octave
Lecture 35 - Atmospheric effects
Lecture 36 - Airmass
Lecture 37 - Energy with atmospheric effects
Lecture 38 - Clearness index
Lecture 39 - Clearness index and energy scripts in Octave
Lecture 40 - Sizing PV for applications without batteries
Lecture 41 - Sizing PV Examples
Lecture 42 - Batteries - intro
Lecture 43 - Batteries - Capacity
Lecture 44 - Batteries - C-rate
Lecture 45 - Batteries - Efficiency
Lecture 46 - Batteries - Energy and power densities
Lecture 47 - Batteries - Comparison
Lecture 48 - Battery selection
Lecture 49 - Other energy storage methods
Lecture 50 - PV system design - Load profile
Lecture 51 - PV system design - Days of autonomy and recharge
Lecture 52 - PV system design - Battery size
Lecture 53 - PV system design - PV array size
Lecture 54 - Design toolbox in octave
Lecture 55 - MPPT concept>
Lecture 56 - Input impedance of DC-DC converters - Boost converter
Lecture 57 - Input impedance of DC-DC converters - Buck converter
Lecture 58 - Input impedance of DC-DC converters - Buck-Boost converter
Lecture 59 - Input impedance of DC-DC converters - PV module in SPICE
Lecture 60 - Input impedance of DC-DC converters -Simulation - PV and DC-DC interface
Lecture 61 - Impedance control methods
Lecture 62 - Impedance control methods- Reference cell - voltage scaling
Lecture 63 - Impedance control methods- Reference cell - current scaling
Lecture 64 - Impedance control methods- Reference cell - Sampling method
Lecture 65 - Impedance control methods- Reference cell - Power slope method 1
Lecture 66 - Impedance control methods- Reference cell - Power slope method 2
Lecture 67 - Impedance control methods- Reference cell - Hill climbing method
Lecture 68 - Practical points - Housekeeping power supply

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Lecture 69 - Practical points - Gate driver
Lecture 70 - Practical points - MPPT for non-resistive loads
Lecture 71 - Simulation - MPPT
Lecture 72 - Direct PV-battery connection
Lecture 73 - Charge controller
Lecture 74 - Battery charger - Understanding current control
Lecture 75 - Battery charger - slope compensation
Lecture 76 - Battery charger - simulation of current control
Lecture 77 - Batteries in series - charge equalisation
Lecture 78 - Batteries in parallel
Lecture 79 - Peltier device - principle
Lecture 80 - Peltier element - datasheet
Lecture 81 - Peltier cooling
Lecture 82 - Thermal aspects
Lecture 83 - Thermal aspects - Conduction
Lecture 84 - Thermal aspects - Convection
Lecture 85 - Thermal aspects - A peltier refrigeration example
Lecture 86 - Thermal aspects - Radiation and mass transport
Lecture 87 - Demo of Peltier cooling
Lecture 88 - Water pumping principle
Lecture 89 - Hydraulic energy and power
Lecture 90 - Total dynamic head
Lecture 91 - Numerical solution - Colebrook formula
Lecture 92 - Octave script for head calculation
Lecture 93 - PV and Water Pumping Examples
Lecture 94 - Octave script for hydraulic power
Lecture 95 - Centrifugal pump
Lecture 96 - Reciprocating pump
Lecture 97 - PV power
Lecture 98 - Pumped hydro application
Lecture 99 - Grid connection principle
Lecture 100 - PV to grid topologies Part-I
Lecture 101 - PV to grid topologies Part-II
Lecture 102 - PV to grid topologies Part-III
Lecture 103 - 3ph d-q controlled grid connection intro
Lecture 104 - 3ph d-q controlled grid connection dq-axis theory
Lecture 105 - 3ph d-q controlled grid connection AC to DC transformations
Lecture 106 - 3ph d-q controlled grid connection DC to AC transformations
Lecture 107 - 3ph d-q controlled grid connection Complete 3ph grid connection

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Lecture 108 - 1ph d-q controlled grid connection
Lecture 109 - 3ph PV-Grid interface example
Lecture 110 - SVPWM - discrete implementation
Lecture 111 - SVPWM - analog implementation
Lecture 112 - Application of integrated magnetics
Lecture 113 - Life cycle Costing Growth models
Lecture 114 - Life cycle Costing Growth model examples
Lecture 115 - Life cycle Costing Annual payment and present worth factor
Lecture 116 - Life cycle Costing LCC with example - 1
Lecture 117 - Life cycle Costing LCC example - 2
Lecture 118 - Life cycle Costing LCC example - 3

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Photonic Integrated Circuits

Subject Co-ordinator - Dr. Srinivas Talabatulla

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Photonic Integrated Circuits
Lecture 2 - Optical Waveguide Theory - Symmetric Waveguides
Lecture 3 - Optical Waveguide Theory - Asymmetric Waveguides
Lecture 4 - Vector Modes
Lecture 5 - Channel Waveguide
Lecture 6 - Directional Coupler and Coupled Mode Theory
Lecture 7 - Passive Devices and Beam Propagation Method
Lecture 8 - Dynamic Devices
Lecture 9 - Integrated optical Systems and Applications
Lecture 10 - Fabrication and Characterisation
Lecture 11 - MOEMS
Lecture 12 - Ring Resonators
Lecture 13 - Photonic Band Gap Devices
Lecture 14 - Lecture Summary

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Neural Science for Engineers

Subject Co-ordinator - Prof. Vikas V

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline and Scope
Lecture 2 - Biological Information Systems
Lecture 3 - Analogy between Living Systems with Semiconductor Structures
Lecture 4 - Action Potential - I
Lecture 5 - Action Potential - II
Lecture 6 - Synaptic Potential
Lecture 7 - Threshold and Action Potential Propogation
Lecture 8 - Anatomy of a Neuron
Lecture 9 - Neuro Muscular Junction
Lecture 10 - Spatial and Temporal Summation of neuronal electrical activities
Lecture 11 - Brain Anatomy Introduction
Lecture 12 - Architecture of the Nervous System
Lecture 13 - Architecture of the Nervous System (Continued...)
Lecture 14 - Analog and Digital Processing in the Neuron - I
Lecture 15 - Analog and Digital Processing in the Neuron - II
Lecture 16 - Energy Sources of Neuronal Systems
Lecture 17 - Skull Demonstration
Lecture 18 - Brain Anatomy: Skull
Lecture 19 - Brain Anatomty 3D - I
Lecture 20 - Brain Anatomty 3D - II
Lecture 21 - Brain Anatomty 3D - III
Lecture 22 - Basics of Brain Imaging Techniques
Lecture 23 - Brain anatomy using MR images - I
Lecture 24 - Brain anatomy using MR images - II
Lecture 25 - Spinal Cord Anatomy
Lecture 26 - Reflexes: Introduction
Lecture 27 - Monosynaptic Reflexes
Lecture 28 - Polysynaptic Reflexes
Lecture 29 - Criteria for electrode material

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Lecture 30 - Introduction to brain stimulation
Lecture 31 - Brain Stimulation: Device fabrication - Illustration
Lecture 32 - Brain Stimulation: Electronic Systems (Current Mirrors)
Lecture 33 - Brain regions and associated functions
Lecture 34 - Human vision system - II
Lecture 35 - Network analysis during visual processing
Lecture 36 - Control of eye movements
Lecture 37 - COMSOL Multiphysics for Medical Devices
Lecture 38 - COMSOL Brain Electrical Stimulation Demo
Lecture 39 - Human vision system - III
Lecture 40 - Human auditory system - I
Lecture 41 - Human auditory system - II
Lecture 42 - Human auditory system - III
Lecture 43 - The human balance system
Lecture 44 - Movement: Introduction
Lecture 45 - Movement: Synchronization
Lecture 46 - Movement: Role of Spinall Cord
Lecture 47 - Movement: Role of Cerebellum
Lecture 48 - Memory and Learning - I
Lecture 49 - Memory and Learning - II
Lecture 50 - Microengineering devices for Neural Signal Acquisiton
Lecture 51 - Microfabrication Process for Multi Electrode Array
Lecture 52 - Introduction and Applications of Event Related Potentials
Lecture 53 - ERP Extraction Demonstration

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NPTEL Video Course - Electronics and Communication Engineering - NOC:Analog Circuits and Systems

Subject Co-ordinator - Prof. K Radhakrishna Rao

Co-ordinating Institute - IIT - Madras, Texas Instruments, Freelancer

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Sensors, Signals and Systems
Lecture 2 - Role of Analog Signal Processing in Electronic Products - Part 1
Lecture 3 - Role of Analog Signal Processing in Electronic Products - Part 2
Lecture 4 - Analog Signal Processing using One Port Networks
Lecture 5 - Analog Signal Processing using One Port Networks, Passive Two Ports and Ideal amplifiers
Lecture 6 - Synthesis of Amplifiers using Nullators and Norators
Lecture 7 - Passive Electronic Devices for Analog Signal Processing
Lecture 8 - Active Devices for Analog Signal Processing Systems
Lecture 9 - Electronic Devices for Analog Circuits
Lecture 10 - Electronic Devices for Analog Circuits
Lecture 11 - Feedback in Systems
Lecture 12 - Static Charecteristic of Feedback Systems
Lecture 13 - Dynamic Behavior of Feedback Systems - Part I
Lecture 14 - Dynamic Behavior of Feedback Systems - Part II
Lecture 15 - Design of Feedback Amplifiers
Lecture 16 - Design of Feedback Amplifiers
Lecture 17 - Design of Feedback Amplifiers and Instrumentation Amplifiers
Lecture 18 - Instrumentation Amplifiers, Integrators and Differentiators
Lecture 19 - Non-linear Analog Signal Processing
Lecture 20 - DC Voltage Regulators
Lecture 21 - Filters - Approximations to ideal filter functions
Lecture 22 - Passive Filters - Part 1
Lecture 23 - Passive Filters - Part 2
Lecture 24 - Active Filters - Part 1
Lecture 25 - Active Filters - Part 2
Lecture 26 - Active Filters: Q-enhancement
Lecture 27 - State Space Filters
Lecture 28 - Universal Active Filter - Effect of Active Device GB
Lecture 29 - State-Space Filters (Tuning of Filters)

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Lecture 30 - Automatic Tuning of Filters (PLL) and Review of Filter Design
Lecture 31 - Waveform Generation
Lecture 32 - LC Oscillator - Effect of Non-idealities
Lecture 33 - Transconductor based Oscillator
Lecture 34 - Regenerative Comparators and Non-Sinusoidal Oscillators
Lecture 35 - Non-Sinusoidal Oscillators and VCO (FM and FSK Generators)
Lecture 36 - Phase and Frequency Followers
Lecture 37 - Frequency Locked Loop (Popularly known as PLL)
Lecture 38 - Design of PLL and FLL
Lecture 39 - Analog System Design

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NPTEL Video Course - Engineering Design - NOC:Innovation by Design

Subject Co-ordinator - Dr. B.K. Chakravarthy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Seven Concerns
Lecture 2 - Design Thinking and Collaboration
Lecture 3 - Challenges to Innovation
Lecture 4 - Understanding Users
Lecture 5 - Arriving at Design Insights
Lecture 6 - Prototyping for User Feedback
Lecture 7 - 1st C The Cause
Lecture 8 - Crossing the First Pitfall
Lecture 9 - Trial and Error
Lecture 10 - User Feedback for Development
Lecture 11 - New users, new needs to meet
Lecture 12 - Knowing the Context
Lecture 13 - 2nd C The Context
Lecture 14 - The Basic Need
Lecture 15 - Ingenious Attempts
Lecture 16 - Further Insights
Lecture 17 - The Working Rig
Lecture 18 - Concepts generation
Lecture 19 - Experiencing the Product
Lecture 20 - Refinements
Lecture 21 - 3rd C - The Comprehension
Lecture 22 - Understanding Constraints
Lecture 23 - Positioning the Product
Lecture 24 - Exploring Possibilites
Lecture 25 - More Experiments
Lecture 26 - Understanding the Technology
Lecture 27 - At the 2nd Valley of Death
Lecture 28 - Finishing Touches
Lecture 29 - The Check

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Lecture 30 - The Cause
Lecture 31 - The Product, the Users and the Context
Lecture 32 - The Prototyping
Lecture 33 - User needs
Lecture 34 - The Crucial Step Missed
Lecture 35 - 5th C The Conception
Lecture 36 - Synchronic Studies
Lecture 37 - One product, many problems
Lecture 38 - Concept Clusters
Lecture 39 - From idea to product
Lecture 40 - Prototyping
Lecture 41 - Materials and Technologies
Lecture 42 - Collaborative Efforts
Lecture 43 - 6th C - The Crafting
Lecture 44 - Recap
Lecture 45 - The Manufacturing Challenge
Lecture 46 - The User Feedback
Lecture 47 - The Iterative Process
Lecture 48 - 7th C - The Connection
Lecture 49 - The Seed for Innovation
Lecture 50 - Pinnacle for Innovation
Lecture 51 - The Innovation Timeline
Lecture 52 - The Innovation Champions
Lecture 53 - The Innovation Domains
Lecture 54 - The Innovation Templates
Lecture 55 - The Serial Innovation

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NPTEL Video Course - Engineering Design - NOC:Understanding Design

Subject Co-ordinator - Dr. B.K. Chakravarthy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to Design
Lecture 2 - The many notions of design
Lecture 3 - Design as a process and a product
Lecture 4 - The evolution of design
Lecture 5 - Design engages with many disciplines
Lecture 6 - Design is concerned with the user
Lecture 7 - Good design, bad design
Lecture 8 - Users and Contexts
Lecture 9 - Multiple users, differing contexts
Lecture 10 - Understanding user experience
Lecture 11 - Design for a meaningful impact
Lecture 12 - Design and Society
Lecture 13 - Community and Collaboration
Lecture 14 - Understanding Contexts
Lecture 15 - Knowledge and Access
Lecture 16 - Meeting Needs
Lecture 17 - Function, Context and Consequences
Lecture 18 - Design and Sustainability
Lecture 19 - The cost of looking the other way
Lecture 20 - Sustainability practices in daily life
Lecture 21 - The perspective of engineering
Lecture 22 - Understanding embodied energy
Lecture 23 - The userâ s role in sustainability
Lecture 24 - Framing the worldâ s future
Lecture 25 - Design and industry
Lecture 26 - Understanding varied user needs
Lecture 27 - Success through new materials and manufacturing
Lecture 28 - Pushing the boundaries of mass production
Lecture 29 - A Classic chair for all times

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Lecture 30 - Breaking familiar assumptions
Lecture 31 - Design and Collaboration
Lecture 32 - Team work
Lecture 33 - Collaborating with unlikely partners
Lecture 34 - Principles of collaboration
Lecture 35 - Design thinking
Lecture 36 - Feedback and assessment
Lecture 37 - Innovation by Design
Lecture 38 - Facilitating the reach of a traditional craft
Lecture 39 - Pitfalls of innovation
Lecture 40 - The seven concerns of innovation
Lecture 41 - From a concern to a palki
Lecture 42 - A little design goes a long way

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NPTEL Video Course - Engineering Design - NOC:Design, Technology and Innovation

Subject Co-ordinator - Dr. B.K. Chakravarthy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Jaipur Foot - A classic innovation - Part 1
Lecture 2 - Jaipur Foot - A classic innovation - Part 2
Lecture 3 - User Centred Helmet Design - Part 1
Lecture 4 - User Centred Helmet Design - Part 2
Lecture 5 - Challenges of Reaching a Million Users - Part 1
Lecture 6 - Challenges of Reaching a Million Users - Part 2
Lecture 7 - Challenges of Reaching a Million Users - Part 3
Lecture 8 - Technology to Solution - Part 1
Lecture 9 - Technology to Solution - Part 2
Lecture 10 - A Collaborative Excellence - Part 1
Lecture 11 - A Collaborative Excellence - Part 2
Lecture 12 - Collaborative Innovation Methods - Part 1
Lecture 13 - Collaborative Innovation Methods - Part 2
Lecture 14 - Collaborative Innovation Methods - Part 3
Lecture 15 - Learnings from Grassroot Innovation - Part 1
Lecture 16 - Learnings from Grassroot Innovation - Part 2
Lecture 17 - Systemic Approach to Biomed Innovations - Part 1
Lecture 18 - Systemic Approach to Biomed Innovations - Part 2
Lecture 19 - Systemic Approach to Biomed Innovations - Part 3
Lecture 20 - Research to Innovation - Part 1
Lecture 21 - Research to Innovation - Part 2
Lecture 22 - Smartcane for the Blind - A Success Story - Part 1
Lecture 23 - Smartcane for the Blind - A Success Story - Part 2

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NPTEL Video Course - Engineering Design - NOC:Understanding Ethnography

Subject Co-ordinator - Prof. Nina Sabnani

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Situating Ethnography
Lecture 3 - Engaging with the Other
Lecture 4 - Equality and Empathy
Lecture 5 - Notions of Reality
Lecture 6 - Objectivity and Subjectivity
Lecture 7 - Conclusion
Lecture 8 - Introduction
Lecture 9 - The Ethnographic Process
Lecture 10 - Ethnography
Lecture 11 - Fundamental Concepts
Lecture 12 - Fundamental Concepts (Continued...)
Lecture 13 - Conclusion
Lecture 14 - Introduction
Lecture 15 - The Research Question
Lecture 16 - Is Ethnography the Method?
Lecture 17 - Accessing Existing Knowledge
Lecture 18 - Designing Fieldwork
Lecture 19 - Case Studies
Lecture 20 - Case Studies
Lecture 21 - Case Studies
Lecture 22 - Case Studies
Lecture 23 - Conclusion
Lecture 24 - Access
Lecture 25 - Challenges of Access
Lecture 26 - Building Rapport
Lecture 27 - Gaining Trust
Lecture 28 - Limits to Access
Lecture 29 - Immersion

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Lecture 30 - The Ethics of Engaging
Lecture 31 - Conclusion
Lecture 32 - Introduction
Lecture 33 - Types of Observation
Lecture 34 - (ALM) LxT 1
Lecture 35 - What to Observe
Lecture 36 - Participant Observation
Lecture 37 - Degrees of Participation
Lecture 38 - Ethnographic Records
Lecture 39 - Conclusion
Lecture 40 - Introduction
Lecture 41 - Forms of Interviews
Lecture 42 - (ALM) LxT 1
Lecture 43 - Characteristics of Interviews
Lecture 44 - Listening and Speaking
Lecture 45 - Reflexivity in Interviewing
Lecture 46 - Designing the Interview
Lecture 47 - Designing the Core Discussion - I
Lecture 48 - Designing the Core Discussion - II
Lecture 49 - Doing the Interview - I
Lecture 50 - Doing the Interview - II
Lecture 51 - Conclusion
Lecture 52 - Introduction
Lecture 53 - Researching THE Visual - I
Lecture 54 - Researching THE Visual - II
Lecture 55 - Researching WITH the Visual
Lecture 56 - Choosing the Visual Medium
Lecture 57 - Representation through Visuals
Lecture 58 - (ALM) LxT 1
Lecture 59 - Reflexivity in Visual Ethnography - I
Lecture 60 - Reflexivity in Visual Ethnography - II
Lecture 61 - Conclusion
Lecture 62 - Introduction
Lecture 63 - Designing Information for HIV-AIDS Affected Persons - Prof. Anirudha Joshi
Lecture 64 - A New Approach to Urban Housing - Prof. Uday Athavankar
Lecture 65 - Cognitive Ethnography - Prof. Sahana Murthy
Lecture 66 - Participative Design for Language Learning - Prof. Alka Hingorani
Lecture 67 - Conclusion

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NPTEL Video Course - Engineering Design - NOC:Understanding Incubation and Entrepreneurship

Subject Co-ordinator - Dr. B.K. Chakravarthy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Enterpreneurship
Lecture 2 - Hand holding for Entrepreneurship
Lecture 3 - Methodology for Innovation
Lecture 4 - Team Building
Lecture 5 - Problem Statement presentation
Lecture 6 - IDEAS program DSSE IITB
Lecture 7 - From Users to Customers: Solar Oven case-study
Lecture 8 - IITH Student projects: Customer Discovery
Lecture 9 - Healthcare and Innovation
Lecture 10 - Med-Tech success Stories
Lecture 11 - The Innovation Process
Lecture 12 - Human Centered Innovation
Lecture 13 - Creating User Experience Design
Lecture 14 - Humanizing Technology
Lecture 15 - Business Model Canvas
Lecture 16 - Introduction to SINE Incubator
Lecture 17 - Lean Model Canvas SINE
Lecture 18 - Start-up Success Story Atomberg
Lecture 19 - itic incubator IITH
Lecture 20 - Success stories of CfHE
Lecture 21 - Entrepreneurship: Plan to action
Lecture 22 - From Corporate to Entrepreneurship
Lecture 23 - Creative Ideation
Lecture 24 - Building Proof of Concept
Lecture 25 - Network Entrepreneurship
Lecture 26 - Start-up Project Presentation 1
Lecture 27 - Start-up Project Presentation 2

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NPTEL Video Course - Engineering Design - NOC:Form and Aesthetics

Subject Co-ordinator - Prof. B.K. Chakravarthy

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Wings of Bamboo Prof. AG Rao
Lecture 2 - Innovation by Design - Part 1
Lecture 3 - Innovation by Design - Part 2
Lecture 4 - Innovation by Design - Part 3
Lecture 5 - Innovation by Design - Part 4
Lecture 6 - Introduction to form generation
Lecture 7 - Form and Metamorphosis
Lecture 8 - Form and Abstractions
Lecture 9 - Form and animal abstraction - Student Presentations
Lecture 10 - Form for Sculpture
Lecture 11 - Form and aspiration sculpture - Student presentations
Lecture 12 - Form in Sculpture - Part 1
Lecture 13 - Form in Sculpture - Part 2
Lecture 14 - Form in Sculpture - Part 3
Lecture 15 - Form and Bio-mimicry
Lecture 16 - Form in Automotive
Lecture 17 - Form for Craft
Lecture 18 - Form and Innovation - Part 1
Lecture 19 - Form and Innovation - Part 2
Lecture 20 - Form and Innovation - Part 3
Lecture 21 - Form for Convenience - Part 1
Lecture 22 - Form for Convenience - Part 2
Lecture 23 - Form for Rural Cooking
Lecture 24 - Form for livelihood
Lecture 25 - Form for Ventilation
Lecture 26 - Form for Learning
Lecture 27 - Form for Sanitation - Part 1
Lecture 28 - Form for Sanitation - Part 2
Lecture 29 - Form in Furniture

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Lecture 30 - Form and Research
Lecture 31 - Form and Research

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NPTEL Video Course - Engineering Design - Ergonomics for beginners: Industrial design perspective

Subject Co-ordinator - Prof. Debkumar Chakrabarti

Co-ordinating Institute - IIT - Guwahati

Lecture 1 - Introduction
Lecture 2 - Design today - human aid to lifestyle
Lecture 3 - Journey, fitting task to man
Lecture 4 - Domain, philosophy and objective
Lecture 5 - Mutual task comfort
Lecture 6 - Ergonomics/ human factors fundamentals
Lecture 7 - Physiology, (work physiology) and stress
Lecture 8 - Human body - structure and function, anthropometrics
Lecture 9 - Anthropometry
Lecture 10 - Static and synamic anthropometry
Lecture 11 - Anthropometry landmark
Lecture 12 - Anthropometry
Lecture 13 - Measuring techniques
Lecture 14 - Statistical treatment of data and
Lecture 15 - Human body-structure and function
Lecture 16 - Posture and job relation
Lecture 17 - Posture and body supportive devices
Lecture 18 - Chair characteristics
Lecture 19 - Vertical work surface
Lecture 20 - Horizontal work surface
Lecture 21 - Movement
Lecture 22 - Work Counter
Lecture 23 - Communication and cognitive issues
Lecture 24 - Psycho-social behaviour aspects,
Lecture 25 - Information processing and perception
Lecture 26 - Cognitive aspects and mental workload
Lecture 27 - Human error and risk perception
Lecture 28 - Visual performance
Lecture 29 - Visual displays
Lecture 30 - Environmental factors influencing
Lecture 31 - Ergonomics design methodology
Lecture 32 - Ergonomics criteria/check
Lecture 33 - Design process involving

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Lecture 34 - Some checklist for task easiness
Lecture 35 - Occupational safety and stress at workplace
Lecture 36 - Workstation design
Lecture 37 - Furniture support
Lecture 38 - Vertical arm reach and relevant
Lecture 39 - Humanising design
Lecture 40 - Scope for exploration

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NPTEL Video Course - Engineering Design - NOC:System Design for Sustainability

Subject Co-ordinator - Prof. Sharmistha Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sustainability and Sustainable Development - Understanding Un-sustainability and need for Sustair
Lecture 2 - Sustainability and Sustainable Development - Definitions
Lecture 3 - Sustainability and Sustainable Development - Pathway
Lecture 4 - Systems Approach to Design
Lecture 5 - Evolution of sustainability within Design
Lecture 6 - Diverse Approaches to Design for Sustainability - Part A
Lecture 7 - Diverse Approaches to Design for Sustainability - Part B
Lecture 8 - Relationship between approaches to Design for Sustainability and the application context
Lecture 9 - Product Life Cycle Design - Methods and Strategies
Lecture 10 - Product Life Cycle Assessment - Part A
Lecture 11 - Product Life Cycle Assessment - Part B
Lecture 12 - Life Cycle Assessment using Software
Lecture 13 - Design for Product Life Cycle
Lecture 14 - Product-Service System Design - Definition and Types
Lecture 15 - Sustainable Product-Service System Design - Definition and Examples
Lecture 16 - Sustainable Product-Service System Design - Examples
Lecture 17 - Khadi Movement as a precursor to PSS thinking
Lecture 18 - Sustainable Product-Service System Design - Transition Paths, Strategy and Challenges
Lecture 19 - Sustainable Product-Service System Design - Methods and Tools - Part A
Lecture 20 - Sustainable Product-Service System Design - Methods and Tools - Part B
Lecture 21 - Sustainable Product-Service System Design - Methods and Tools - Part C
Lecture 22 - Sustainable Product-Service System Design - Methods and Tools - Part D
Lecture 23 - Sustainable Product-Service System Design - Methods and Tools - Part E
Lecture 24 - Sustainable Product-Service System Design - Methods and Tools - Part F
Lecture 25 - Sustainable Product-Service System Design - Methods and Tools - Part G
Lecture 26 - Sustainable Product-Service System Design - Methods and Tools (Summary)
Lecture 27 - Sufficiency Economy Philosophy applied to Sustainable PSS Thinking
Lecture 28 - LCA of PSS
Lecture 29 - Sustainable Product-Service System Design Applied to Distributed Economy

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Lecture 30 - Other Design for Sustainability Tools and approaches - Architecture
Lecture 31 - Other Design for Sustainability Tools and approaches - Agriculture
Lecture 32 - Other Design for Sustainability Tools and approaches - Cities and communities
Lecture 33 - Other Design for Sustainability Tools and approaches - Carbon Footprint
Lecture 34 - Co-design Session
Lecture 35 - Design for Sustainability - Engineering Design Criteria and Guidelines
Lecture 36 - Design for Sustainability - Engineering Design Criteria and Guidelines (ICS Toolkit)
Lecture 37 - Design for Sustainability - Concluding Lecture - Part A
Lecture 38 - Design for Sustainability - Concluding Lecture - Part B

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NPTEL Video Course - Engineering Design - NOC:Product Design and Innovation

Subject Co-ordinator - Prof. Debayan Dhar, Prof.Swati Pal, Prof. Supradip Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Innovation
Lecture 2 - Design Inspired Innovation and User Innovation
Lecture 3 - Product Design - Part I
Lecture 4 - Product Design - Part II
Lecture 5 - Product Design - Part III
Lecture 6 - Introduction to User study and Problem and need Identification
Lecture 7 - Contextual Enquiry
Lecture 8 - Physical model
Lecture 9 - Creative Techniques and tools for concept generation, concept evaluation
Lecture 10 - Importance and Overview of Human Factors/Ergonomics in Product Design
Lecture 11 - Physical Ergonomics Principles and Issues (Part 1) - Anthropometry
Lecture 12 - Physical Ergonomics Principles and Issues (Part 2) - Biomechanics
Lecture 13 - Cognitive and Emotional aspects of Human Factors with respect to Product Design and Innovation
Lecture 14 - Tools and Techniques for Prototyping
Lecture 15 - Evaluation Tools and Techniques for User-Product Interaction

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NPTEL Video Course - Engineering Design - NOC:Interaction Design

Subject Co-ordinator - Prof.Abhishek Shrivastava

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Definitions and Concepts in Interaction Design
Lecture 2 - Relevance of goals in Interaction Design
Lecture 3 - System model, mental model, and representation model
Lecture 4 - Interaction Models and Interaction Paradigms
Lecture 5 - Interaction paradigm
Lecture 6 - Overview of Goal Directed Design Process
Lecture 7 - The Research phase in Goal Directed Design Process - Part 1
Lecture 8 - The Research phase in Goal Directed Design Process - Part 2
Lecture 9 - The Research phase in Goal Directed Design Process - Part 3
Lecture 10 - The Modeling phase in Goal Directed Design Process
Lecture 11 - The Requirement definition phase in Goal Directed Design Process - Part 1
Lecture 12 - The Requirement definition phase in Goal Directed Design Process - Part 2
Lecture 13 - The Framework definition and refinement phase in Goal Directed Design Process - Interaction fram
Lecture 14 - The Framework definition and refinement phase in Goal Directed Design Process - Visual design ar
Lecture 15 - Design evaluation and testing

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NPTEL Video Course - Engineering Design - NOC:Ergonomics in Automotive Design

Subject Co-ordinator - Dr. Sougata Karmakar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Automotive Ergonomics
Lecture 2 - Driver Information Acquisition and Processing
Lecture 3 - Anthropometric and Biomechanical Data in Automotive Design
Lecture 4 - Occupant Packaging
Lecture 5 - Principles of Control and Display Design
Lecture 6 - Usability evaluation of In-vehicle control and displays
Lecture 7 - Human Fields of View and Driver's Fields of View
Lecture 8 - Vehicle Entry and Exit
Lecture 9 - Driver Distraction and Driving Performance Measurement
Lecture 10 - Driver Workload Measurement
Lecture 11 - Virtual Ergonomics Evaluation Technique and its application in Automotive Design
Lecture 12 - Automotive Craftsmanship

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NPTEL Video Course - Engineering Design - NOC:Ergonomics Workplace Analysis

Subject Co-ordinator - Prof. Urmi R. Salve

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ergonomics Workplace Assessment - I
Lecture 2 - Introduction to Ergonomics Workplace Assessment - II
Lecture 3 - Task Analysis
Lecture 4 - Physiological Fundamentals of Workplace Evaluation
Lecture 5 - Biomechanics in Workplace Evaluation
Lecture 6 - Assessment of Physical Job Demand
Lecture 7 - Assessment of Physical and Cognitive Work with Psychophysiological Methods
Lecture 8 - Assessment of Physical and Cognitive Work with Psychophysiological Methods
Lecture 9 - Assessment of Mental Workload
Lecture 10 - Neuroergonomics in Work Evaluation
Lecture 11 - Psychosocial Aspect of Workplace Analysis
Lecture 12 - Assessment of Thermal Environment
Lecture 13 - Assessment of Visual Environment
Lecture 14 - Analysis of Auditory Environment and Noise Pollution

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NPTEL Video Course - Engineering Design - NOC:Ergonomics Research Techniques

Subject Co-ordinator - Prof. Urmi R. Salve

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Introduction
Lecture 3 - Plan for Identifiering av Belastnings faktorer (PLIBEL) method
Lecture 4 - Ducth Musculoskeletal Questionnaire (DMQ)
Lecture 5 - Musculoskeletal discomfort National Institute for Occupational Safety and Health (NIOSH)
Lecture 6 - Job Strain Index (JSI)
Lecture 7 - Ovako Working posture Analysis System (OWAS)
Lecture 8 - Rapid Upper Limb Analysis (RULA)
Lecture 9 - Rapid Entire Body Analysis (REBA)
Lecture 10 - Manual handling Assessment Charts (MAC)
Lecture 11 - Manual handling Assessment Charts (MAC)
Lecture 12 - Manual handling at work
Lecture 13 - Quick exposure checklist (QEC)
Lecture 14 - National Institute for Occupational Safety and Health (NIOSH) Lifting equation
Lecture 15 - Borg scale and Rodgers muscle fatigue analysis
Lecture 16 - Snook's Table
Lecture 17 - Lumber motion monitor (LMM)
Lecture 18 - Occupational repetitive action methods (OCRA) methods
Lecture 19 - Hand Arm Risk assessment Method (HARM)
Lecture 20 - Assessment of repetitive tasks of the upper limbs (ART)
Lecture 21 - Risk Assessment of Pushing and Pulling (RAPP)
Lecture 22 - Movement and Assistance of hospital patients (MAPO) method
Lecture 23 - Introduction
Lecture 24 - Observation, interviews and verbal protocol
Lecture 25 - Focus group
Lecture 26 - Hierarchical task analysis
Lecture 27 - Allocation of function methodology
Lecture 28 - Allocation of function methodology
Lecture 29 - Critical decision method

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Lecture 30 - Systemic human error reduction and prediction approach (SHERPA)
Lecture 31 - Task analysis for error identification (TAFEI)
Lecture 32 - NASA task load index (TLX)
Lecture 33 - Multiple resource time sharing model
Lecture 34 - Critical path analysis
Lecture 35 - Situational awareness global assessment technique
Lecture 36 - Electroencephalogram (EEG)
Lecture 37 - Eye tracking
Lecture 38 - Human Error Assessment and Reduction Technique (HEART)
Lecture 39 - Cognitive Reliability and Error Analysis Method (CREAM)
Lecture 40 - Measurement of thermal conditions at workplaces
Lecture 41 - Mesasurement of different environmental factors - Part I
Lecture 42 - Mesasurement of different environmental factors - Part II

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NPTEL Video Course - Engineering Design - NOC:Introduction to Toy Design

Subject Co-ordinator - Prof. Supradip Das

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why Do We Need Toys ?
Lecture 2 - Toys Vs Puzzles Vs Games
Lecture 3 - Importance of Toy Design
Lecture 4 - Classification of Toys
Lecture 5 - History of Toy Design and Timeline of Toys
Lecture 6 - Timeless Toys with Case Studies
Lecture 7 - Influential Toy Designers and Their Work, Artists who Invented Toys
Lecture 8 - Women Who Shaped the Toy Industry
Lecture 9 - Play
Lecture 10 - Theoretical Perspectives on Play
Lecture 11 - Types of Play
Lecture 12 - Play Driven Design
Lecture 13 - Play Experience
Lecture 14 - Influence of Culture on Toys, Current Culture and Trends, Toys and Popular Culture
Lecture 15 - Evolution and Significance of Traditional Indian Toys
Lecture 16 - Toys and Developmental Needs
Lecture 17 - Toy Based Pedagogies
Lecture 18 - Toy Futurism
Lecture 19 - Environment and User Studies for Toy Design
Lecture 20 - Safe and Sustainable Materials, Regulatory Compliances, Durability, Longevity and Toy Safety
Lecture 21 - Ergonomics in Toy Design - Designing for Fit, Comfort, and Experience
Lecture 22 - Right to Play, Special Needs and Toys
Lecture 23 - Inclusive and Universal Design for Toys
Lecture 24 - Toy Design Process, Toy Redesign Process
Lecture 25 - Market Study for Toy Design
Lecture 26 - Material Selection for toys in Manufacturing processes
Lecture 27 - Costing and Pricing in Toys
Lecture 28 - Discussion with Designer from the Industry
Lecture 29 - The Business of Toys, Market Analysis, Current Trends in Toy Design

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Lecture 30 - The Designer and Marketing Gap
Lecture 31 - International Toy Safety standards Requirements
Lecture 32 - Innovative and Advanced Concept in Toys
Lecture 33 - Material-Driven Toy Design
Lecture 34 - Toy Packaging as Behavioural Design and Influence
Lecture 35 - Design Consideration in Toy Packaging
Lecture 36 - Market Segmentation and Branding
Lecture 37 - Marketing Strategies for Different Types of Toys

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NPTEL Video Course - Engineering Design - NOC:Design Practices for Intelligent Product Design

Subject Co-ordinator - Prof. Bishakh Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Intelligent Product Design
Lecture 2 - An overview of Intelligent Product Design - Part 1
Lecture 3 - An overview of Intelligent Product Design - Part 2
Lecture 4 - Design Concept Generation: Axiomatic Design
Lecture 5 - Design Concept Generation TRIZ Principles - Part 1
Lecture 6 - Design Concept Generation TRIZ Principles - Part 2
Lecture 7 - Design Concept Generation TRIZ Principles - Part 3
Lecture 8 - New Product Development using TRIZ
Lecture 9 - An overview of materials for mechanical design
Lecture 10 - A Brief Discussion of Design Process
Lecture 11 - Ashby Chart for material Selection
Lecture 12 - Shape Factor and aesthetic parameters for material selection
Lecture 13 - Selection of Structures for Intelligent Design
Lecture 14 - Overview of Mechanisms for Physical Intelligence - Part 1
Lecture 15 - Overview of Mechanisms for Physical Intelligence - Part 2
Lecture 16 - Introduction to Sensors
Lecture 17 - Overview of Traditional Sensors - Part 1
Lecture 18 - Overview of Optical Sensors - Part 2
Lecture 19 - Overview of Smart Sensors - Part 3
Lecture 20 - Introduction to Actuators
Lecture 21 - High Precision Actuators
Lecture 22 - Introduction to Control Systems
Lecture 23 - Electro-Mechanical Systems and their Representations
Lecture 24 - Design of Control System
Lecture 25 - Root Locus Method
Lecture 26 - Design of Lead Compensator
Lecture 27 - Microcontrollers and Microprocessors
Lecture 28 - Bio-inspired Design
Lecture 29 - Case Study 1: Smart Bipennate Actuator

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Lecture 30 - Case Study 2: Pipe Health Monitoring Robot
Lecture 31 - Case Study 3: Intelligent Buoy for River Health Monitoring
Lecture 32 - Case Study 4: Substation Inspection Robot

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NPTEL Video Course - Engineering Design - NOC:Geographic Information System

Subject Co-ordinator - Prof. Bharath H Aithal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to GIS
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Real World to Digital World Through GIS
Lecture 7 - Real World to Digital World Through GIS (Continued...)
Lecture 8 - Real World to Digital World Through GIS (Continued...)
Lecture 9 - GIS Data (Continued...)
Lecture 10 - Real World to Digital World Through GIS (Continued...)
Lecture 11 - Representing the Real World
Lecture 12 - Representing the Real World (Continued...)
Lecture 13 - Representing the Real World (Continued...)
Lecture 14 - Representing the Real World in Surface Models (Continued...)
Lecture 15 - Representing the Real World (Continued...)
Lecture 16 - Quering and Georeferencing
Lecture 17 - Elevation, Relative and Discrete Referencing
Lecture 18 - Coordinate Systems
Lecture 19 - Maps and Numbering
Lecture 20 - Map Projections
Lecture 21 - Data Quality and Measures
Lecture 22 - Positional Accuracy and Source of Errors
Lecture 23 - Classification Accuracy and Pixel Errors
Lecture 24 - Spatial Data Editing and Transformations
Lecture 25 - Map Display and Visualization in GIS
Lecture 26 - Introduction to GPS
Lecture 27 - GPS
Lecture 28 - GPS errors and DGPS
Lecture 29 - GNSS and Applications

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Lecture 30 - Introduction to QGIS
Lecture 31 - Introduction to database
Lecture 32 - DataBase Management System - Introduction
Lecture 33 - DataBase Management System - (Continued...)
Lecture 34 - DBMS models
Lecture 35 - Normalization forms
Lecture 36 - Creating and Maintaining a database
Lecture 37 - Spatial Query using SQL - Introduction
Lecture 38 - Spatial analysis
Lecture 39 - Spatial analysis (Continued...)
Lecture 40 - Basic Editing
Lecture 41 - Introduction to Remote Sensing
Lecture 42 - Basic spatial analysis
Lecture 43 - Basic spatial analysis
Lecture 44 - Advanced spatial analysis
Lecture 45 - Advanced spatial analysis
Lecture 46 - Introduction to QGIS and Data Import
Lecture 47 - QGIS Plugins
Lecture 48 - Georeferencing an Image
Lecture 49 - Creating Vector Features
Lecture 50 - Vector Functions and Querying
Lecture 51 - Data Acquisition and Raster Functions - I
Lecture 52 - Data Acquisition and Raster Functions - II
Lecture 53 - Map composition
Lecture 54 - Bhuvan geoportal and Google earth
Lecture 55 - Introduction to R - Part I
Lecture 56 - Introduction to R - Part II
Lecture 57 - Open Source GIS Softwares
Lecture 58 - Open Source GIS softwares
Lecture 59 - PROS and CONS of open source
Lecture 60 - GIS Data Standards
Lecture 61 - Open Geospatial Consortium (OGC)
Lecture 62 - National Spatial Data Infrastructure (NSDI)
Lecture 63 - Introduction to Web GIS and Geoserver
Lecture 64 - Geoserver - Raster and SLD Integration

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NPTEL Video Course - Engineering Design - Principles of Engineering System Design

Subject Co-ordinator - Dr. T. Asokan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to system Design
Lecture 2 - Engineering systems Classification & examples
Lecture 3 - Modern System design processes
Lecture 4 - Six functions of design process
Lecture 5 - Tools for enabling creative development
Lecture 6 - Team Development
Lecture 7 - System Requirement Analysis
Lecture 8 - Originating Requirements
Lecture 9 - Functional Architecture Development
Lecture 10 - Functional Decomposition
Lecture 11 - Functional Decomposition
Lecture 12 - Physical Architecture Development
Lecture 13 - Implementing Fault Tolerance in Physical Architecture
Lecture 14 - Operational Architecture Development - Part I
Lecture 15 - Operational Architecture Development - Part II
Lecture 16 - Interface architecture Development
Lecture 17 - Interface standards and Design process
Lecture 18 - Integration and qualification
Lecture 19 - Qualification planning and methods
Lecture 20 - System Design Example
Lecture 21 - System Design Examples
Lecture 22 - System Design Examples (Continued...)
Lecture 23 - Graphical Modelling Techniques
Lecture 24 - Process modeling
Lecture 25 - Behavior modeling
Lecture 26 - Graphical Modelling Techniques (Continued...)
Lecture 27 - System modeling and simulation
Lecture 28 - Bondgraph modeling of Dyanamic systems
Lecture 29 - Decision making in System Design

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Lecture 30 - Decision making in System Design (Continued...)

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NPTEL Video Course - Engineering Design - Vehicle Dynamics

Subject Co-ordinator - Dr. R. Krishnakumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Vehicle Dynamics
Lecture 2 - Longitudinal Dynamics
Lecture 3 - Vehicle Load Distribution - Acceleration and Braking
Lecture 4 - Brake Force Distribution, Braking Efficiency and Braking Distance
Lecture 5 - Tractor - Semi Trailer
Lecture 6 - Tire Mechanics - An Introduction
Lecture 7 - Mechanical Properties of Rubber
Lecture 8 - Slip, Grip and Rolling Resistance
Lecture 9 - Tire Construction and Force Development
Lecture 10 - Contact Patch and Contact Pressure Distribution
Lecture 11 - Tire Brush Model
Lecture 12 - Lateral Force Generation
Lecture 13 - Ply Steer and Conicity - Part 1
Lecture 14 - Ply Steer and Conicity - Part 2
Lecture 15 - Tire Models - Magic Formula
Lecture 16 - Classification of Tyre Models and Combined Slip
Lecture 17 - Lateral Dynamics - An Introduction
Lecture 18 - Lateral Dynamics - Bicycle Model
Lecture 19 - Lateral Dynamics - Stability and Steering Conditions
Lecture 20 - Understeer Gradient and State Space Approach
Lecture 21 - Handling Response of a Vehicle
Lecture 22 - Mimuro Plot for Lateral Transient Response - Part 1
Lecture 23 - Mimuro Plot for Lateral Transient Response - Part 2
Lecture 24 - Parameters affecting vehicle handling characteristics
Lecture 25 - Subjective and Objective Evaluation of Vehicle Handling - Part 1
Lecture 26 - Subjective and Objective Evaluation of Vehicle Handling - Part 2
Lecture 27 - Subjective and Objective Evaluation of Vehicle Handling and Rollover P
Lecture 28 - Rollover Prevention (Continued...) and Vertical Dynamics
Lecture 29 - Vertical Dynamics - An Introduction

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Lecture 30 - Vertical Dynamics - Quarter Car Model
Lecture 31 - Noise, Vibration and Harshness - Random Processes
Lecture 32 - Random Process and Conclusion (Continued...)

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NPTEL Video Course - Engineering Design - NOC:Control Systems

Subject Co-ordinator - Prof. C.S.Shankar Ram

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Control Systems - Part 1
Lecture 2 - Introduction to Control Systems - Part 2
Lecture 3 - Overview of Feedback Control Systems - Part 1
Lecture 4 - Overview of Feedback Control Systems - Part 2
Lecture 5 - Mathematical Preliminaries - Part 1
Lecture 6 - Mathematical Preliminaries - Part 2
Lecture 7 - Transfer Function - Part 1
Lecture 8 - Transfer Function - Part 2
Lecture 9 - System Response - Part 1
Lecture 10 - System Response - Part 2
Lecture 11 - BIBO Stability - Part 1
Lecture 12 - BIBO Stability - Part 2
Lecture 13 - Effect of Zeros - Part 1
Lecture 14 - Effect of Zeros - Part 2
Lecture 15 - Closed Loop System - Part 1
Lecture 16 - Closed Loop System - Part 2
Lecture 17 - First Order Systems - Part 1
Lecture 18 - First Order Systems - Part 2
Lecture 19 - Second Order Systems - Part 1
Lecture 20 - Second Order Systems - Part 2
Lecture 21 - Controllers - Part 1
Lecture 22 - Controllers - Part 2
Lecture 23 - Closed Loop Control - Part 1
Lecture 24 - Closed Loop Control - Part 2
Lecture 25 - Routh's Stabilty Criterion - Part 1
Lecture 26 - Routh's Stabilty Criterion - Part 2
Lecture 27 - Special Cases of Routh's Stability Criterion - Part 1
Lecture 28 - Special Cases of Routh's Stability Criterion - Part 2
Lecture 29 - Performance Specifications - Part 1

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Lecture 30 - Performance Specifications - Part 2
Lecture 31 - Steady State Error Analysis - Part 1
Lecture 32 - Steady State Error Analysis - Part 2
Lecture 33 - Root Locus 1 - Part 1
Lecture 34 - Root Locus 1 - Part 2
Lecture 35 - Root Locus 2 - Part 1
Lecture 36 - Root Locus 2 - Part 2
Lecture 37 - Root Locus 3 - Part 1
Lecture 38 - Root Locus 3 - Part 2
Lecture 39 - Root Locus 4 - Part 1
Lecture 40 - Root Locus 4 - Part 2
Lecture 41 - Case Study - Modelling - Part 1
Lecture 42 - Case Study - Modelling - Part 2
Lecture 43 - Case Study - Control Design - Part 1
Lecture 44 - Case Study - Control Design - Part 2
Lecture 45 - State Space Representation - Part 1
Lecture 46 - State Space Representation - Part 2
Lecture 47 - Frequency Response - Part 1
Lecture 48 - Frequency Response - Part 2
Lecture 49 - Bode Plot 1 - Part 1
Lecture 50 - Bode Plot 1 - Part 2
Lecture 51 - Bode Plot 2 - Part 1
Lecture 52 - Bode Plot 2 - Part 2
Lecture 53 - Bode Plot 3 - Part 1
Lecture 54 - Bode Plot 3 - Part 2
Lecture 55 - Bode Plot 4 - Part 1
Lecture 56 - Bode Plot 4 - Part 2
Lecture 57 - Nyquist Plot 1 - Part 1
Lecture 58 - Nyquist Plot 1 - Part 2
Lecture 59 - Nyquist Plot 2 - Part 1
Lecture 60 - Nyquist Plot 2 - Part 2
Lecture 61 - Nyquist Stability Criterion - Part 1
Lecture 62 - Nyquist Stability Criterion - Part 2
Lecture 63 - Relative Stability 1 - Part 1
Lecture 64 - Relative Stability 1 - Part 2
Lecture 65 - Relative Stability 2 - Part 1
Lecture 66 - Relative Stability 2 - Part 2
Lecture 67 - Lead Compensation - Part 1
Lecture 68 - Lead Compensation - Part 2

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Lecture 69 - Lead Compensator Design - Part 1
Lecture 70 - Lead Compensator Design - Part 2
Lecture 71 - Lag and Lag-Lead Compensation - Part 1
Lecture 72 - Lag and Lag-Lead Compensation - Part 2

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NPTEL Video Course - Engineering Design - NOC:Fundamentals of Automotive Systems

Subject Co-ordinator - Prof. C.S.Shankar Ram

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview and Classification of Internal Combustion Engines - Part 1
Lecture 2 - Course Overview and Classification of Internal Combustion Engines - Part 2
Lecture 3 - Engine Components - Part 1
Lecture 4 - Engine Components - Part 2
Lecture 5 - Operation of Four Stroke Engines - Part 1
Lecture 6 - Operation of Four Stroke Engines - Part 2
Lecture 7 - Two Stroke Engine and Engine Cycles - Part 1
Lecture 8 - Two Stroke Engine and Engine Cycles - Part 2
Lecture 9 - Otto Cycle and Diesel Cycle - Part 1
Lecture 10 - Otto Cycle and Diesel Cycle - Part 2
Lecture 11 - Dual Cycle and Engine Performance - Part 1
Lecture 12 - Dual Cycle and Engine Performance - Part 2
Lecture 13 - Engine Performance - Part 1
Lecture 14 - Engine Performance - Part 2
Lecture 15 - Supercharging and Combustion in SI Engines - Part 1
Lecture 16 - Supercharging and Combustion in SI Engines - Part 2
Lecture 17 - Knocking in SI Engines - Part 1
Lecture 18 - Knocking in SI Engines - Part 2
Lecture 19 - Combustion in CI Engines and Carburetion - Part 1
Lecture 20 - Combustion in CI Engines and Carburetion - Part 2
Lecture 21 - Fuel Introduction Systems - Part 1
Lecture 22 - Fuel Introduction Systems - Part 2
Lecture 23 - Analysis of Carburetor - Part 1
Lecture 24 - Analysis of Carburetor - Part 2
Lecture 25 - Engine Emissions - Part 1
Lecture 26 - Engine Emissions - Part 2
Lecture 27 - Emission Control Systems - Part 1
Lecture 28 - Emission Control Systems - Part 2
Lecture 29 - Automotive Powertrain - Part 1

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Lecture 30 - Automotive Powertrain - Part 2
Lecture 31 - Automotive Clutch - Part 1
Lecture 32 - Automotive Clutch - Part 2
Lecture 33 - Transmission - Part 1
Lecture 34 - Transmission - Part 2
Lecture 35 - Powertrain Analysis - Part 1
Lecture 36 - Powertrain Analysis - Part 2
Lecture 37 - Powertrain Analysis 2 - Part 1
Lecture 38 - Powertrain Analysis 2 - Part 2
Lecture 39 - Transmission Matching - Part 1
Lecture 40 - Transmission Matching - Part 2
Lecture 41 - Brake System - Part 1
Lecture 42 - Brake System - Part 2
Lecture 43 - Components of a Brake System and Drum Brake - Part 1
Lecture 44 - Components of a Brake System and Drum Brake - Part 2
Lecture 45 - Disc Brake and Introduction to Hydraulic Brake - Part 1
Lecture 46 - Disc Brake and Introduction to Hydraulic Brake - Part 2
Lecture 47 - Hydraulic Brake System - Part 1
Lecture 48 - Hydraulic Brake System - Part 2
Lecture 49 - Air Brake System - Part 1
Lecture 50 - Air Brake System - Part 2
Lecture 51 - Antilock Brake System 1 - Part 1
Lecture 52 - Antilock Brake System 1 - Part 2
Lecture 53 - Antilock Brake System 2 - Part 1
Lecture 54 - Antilock Brake System 2 - Part 2
Lecture 55 - Braking Analysis - Part 1
Lecture 56 - Braking Analysis - Part 2
Lecture 57 - Steering System - Part 1
Lecture 58 - Steering System - Part 2
Lecture 59 - Manual Steering Systems - Part 1
Lecture 60 - Manual Steering Systems - Part 2
Lecture 61 - Power Steering and Kinematic Steering Analysis - Part 1
Lecture 62 - Power Steering and Kinematic Steering Analysis - Part 2
Lecture 63 - Wheel Alignment - Part 1
Lecture 64 - Wheel Alignment - Part 2
Lecture 65 - Introduction to Suspension System - Part 1
Lecture 66 - Introduction to Suspension System - Part 2
Lecture 67 - Shock Absorbers and Independent Suspension - Part 1
Lecture 68 - Shock Absorbers and Independent Suspension - Part 2

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Lecture 69 - Dependent Suspension and Suspension Analysis - Part 1
Lecture 70 - Dependent Suspension and Suspension Analysis - Part 2
Lecture 71 - Introduction to Electric and Hybrid Powertrain - Part 1
Lecture 72 - Introduction to Electric and Hybrid Powertrain - Part 2
Lecture 73 - Tyres - Part 1
Lecture 74 - Tyres - Part 2

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NPTEL Video Course - Engineering Design - NOC:Functional and Conceptual Design

Subject Co-ordinator - Dr. T Asokan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Birth and Growth of a Product
Lecture 3 - Types of Design
Lecture 4 - Stage-Gate and Spiral Design
Lecture 5 - Stages in New Product Development
Lecture 6 - Laboratory Exercise - 1
Lecture 7 - Reverse Engg. and Redesign
Lecture 8 - Technical Questioning and Mission Statement
Lecture 9 - Mission Statement- Examples
Lecture 10 - Laboratory Exercise - 2
Lecture 11 - Identifying Customer Needs
Lecture 12 - Customer Need Analysis
Lecture 13 - Product Specifications
Lecture 14 - Laboratory Exercise - 3
Lecture 15 - Need - Metric Matrix
Lecture 16 - Establishing Target Specifications
Lecture 17 - HoQ
Lecture 18 - Laboratory Exercise - 4
Lecture 19 - Functional Decomposition
Lecture 20 - FAST Method
Lecture 21 - Laboratory Exercise - 5
Lecture 22 - Function Structure (Flow Method)
Lecture 23 - Flow Method Examples
Lecture 24 - Laboratory Exercise - 6
Lecture 25 - Product and Portfolio Architecture
Lecture 26 - Portfolio Architecture Selection
Lecture 27 - Laboratory Exercise - 7
Lecture 28 - Product Architecture
Lecture 29 - Identification of Modules

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Lecture 30 - Laboratory Exercise - 8
Lecture 31 - Concept Development
Lecture 32 - Intuitive Methods
Lecture 33 - Laboratory Exercise - 9
Lecture 34 - Logical Method- TRIZ
Lecture 35 - Concept Selection
Lecture 36 - Laboratory Exercise - 10
Lecture 37 - Concept Scoring
Lecture 38 - Laboratory Exercise - 11

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NPTEL Video Course - Engineering Design - NOC:Introduction to Robotics

Subject Co-ordinator - Dr. Krishna Vasudevan, Dr. Balaraman Ravindran, Dr. T Asokan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Evolution of Robotics
Lecture 3 - Kinematics- Coordinate transformations
Lecture 4 - Homogeneus Transformation Matrix
Lecture 5 - Industrial Robot- Kinematic Structures
Lecture 6 - Robot Architectures
Lecture 7 - Kinematic Parameters
Lecture 8 - DH Algorithm
Lecture 9 - DH Algorithm- Examples
Lecture 10 - Forward Kinematics
Lecture 11 - Forward Kinematics- Examples
Lecture 12 - Inverse Kinematics
Lecture 13 - Inverse Kinematics- Examples
Lecture 14 - Differential Relations
Lecture 15 - Manipulator Jacobian and Statics
Lecture 16 - Overview of Electric Actuators and Operational Needs
Lecture 17 - Principles of DC Motor Operation
Lecture 18 - DC Motor Equations and Principles of Control
Lecture 19 - DC Motor Control Regions and Principles of Power Electronics
Lecture 20 - Power Electronic Switching and Current Ripple
Lecture 21 - The H-Bridge and DC Motor Control Structure
Lecture 22 - The Brushless DC Machine
Lecture 23 - Control of the Brushless DC Motor
Lecture 24 - The PM Synchronous Motor (PMSM) and SPWM
Lecture 25 - Principles of PMSM Control
Lecture 26 - Encoders for Speed and Position Estimation
Lecture 27 - Stepper Motors
Lecture 28 - Introduction to Probabilistic Robotics.
Lecture 29 - Recursive State Estimation

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Lecture 30 - Recursive State Estimation
Lecture 31 - Probability basics
Lecture 32 - Probability basics
Lecture 33 - Kalman Filter
Lecture 34 - Extended Kalman Filter
Lecture 35 - Particle Filter
Lecture 36 - Binary Bayes
Lecture 37 - Velocity Motion Model
Lecture 38 - Odometry Motion Model
Lecture 39 - Occupa Grid Mapping
Lecture 40 - Range Finder Measurement Model
Lecture 41 - Localization Taxonomy
Lecture 42 - Markov Localization
Lecture 43 - Path Planning

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NPTEL Video Course - Engineering Design - NOC:Introduction to Graphic Design

Subject Co-ordinator - Prof. Mohammad Shahid, Prof. Saurav Khuttiya Deori

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course and Course Structure
Lecture 2 - Understanding Graphic Design as a Field - 1
Lecture 3 - Understanding Graphic Design as a Field - 2
Lecture 4 - Visual Coherence and Various Facets of Graphic Design
Lecture 5 - Understanding Design Process and Approach
Lecture 6 - Introduction to Elements of Design
Lecture 7 - Understanding Line as an Element of Design
Lecture 8 - Understanding Shape as an Element of Design
Lecture 9 - Understanding Form as an Element of Design
Lecture 10 - Understanding Space as an Element of Design
Lecture 11 - Understanding Value and Texture as an Element of Design
Lecture 12 - Introduction Principles of Design
Lecture 13 - Introduction Principles of Design
Lecture 14 - Understanding Balance as a Principle of Design
Lecture 15 - Understanding Emphasis as a Principle of Design
Lecture 16 - Understanding Variety as a Principle of Design
Lecture 17 - Understanding Contrast as a Principle of Design
Lecture 18 - Understanding Repetition and Rhythm as a Principle of Design
Lecture 19 - Exploring Gestalt Principles
Lecture 20 - Understanding Closer
Lecture 21 - Understanding Similarity
Lecture 22 - Understanding Continuity
Lecture 23 - Proximity and Pragnanz - Part 1
Lecture 24 - Proximity and Pragnanz - Part 2
Lecture 25 - Introduction to Typography
Lecture 26 - Typography History
Lecture 27 - Type Classification
Lecture 28 - Type Construction
Lecture 29 - Typographic Principles

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Lecture 30 - Environmental Typography
Lecture 31 - Introduction to Identity Design - Part 1
Lecture 32 - Introduction to Identity Design - Part 2
Lecture 33 - Brief about Branding and Visual Branding
Lecture 34 - Elements of Visual Branding
Lecture 35 - Types of Logo
Lecture 36 - Logo Design Proces - Part 1
Lecture 37 - Logo Design Proces - Part 2
Lecture 38 - Introduction to Print and Publication
Lecture 39 - Grid System
Lecture 40 - Print production Processes
Lecture 41 - Lino-cut Printing Process

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NPTEL Video Course - Engineering Design - Design of Biophotonics Devices

Subject Co-ordinator - Prof. Nilesh Jayantilal Vasa

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Biophotonics - Introduction - I
Lecture 2 - Biophotonics - Introduction - II, Optics - Introduction
Lecture 3 - Basic Principles of Light - I
Lecture 4 - Basics of Optical Fiber - II
Lecture 5 - Basics of Optical interferometry - I
Lecture 6 - Basics of Optical interferometry - II
Lecture 7 - Fiber Bragg Gratings and Hollow Fibers
Lecture 8 - Optical Sources - I
Lecture 9 - Optical Sources - II (Semiconductor Light Sources)
Lecture 10 - Optical Sources - III (Basics of Lasers - Optical Resonator)
Lecture 11 - Optical Sources - IV (Basics of Lasers - Amplification)
Lecture 12 - Different Types of Lasers - I
Lecture 13 - Different Types of Lasers - II
Lecture 14 - Laser Characteristics - I
Lecture 15 - Laser Characteristics - II
Lecture 16 - Laser Characteristics - III and Optical Sensors - I
Lecture 17 - Types of Lasers and Optical Sensors - II
Lecture 18 - Optical Sensors - III
Lecture 19 - Absorption Spectroscopy Based Devices
Lecture 20 - Absorption Spectroscopy Based Measurements
Lecture 21 - Pulse Oximetry
Lecture 22 - Breath Analysis - I
Lecture 23 - Breath Analysis - II
Lecture 24 - Photoacoustic Spectroscopy Technique - I
Lecture 25 - Photoacoustic Spectroscopy Technique - II
Lecture 26 - Photoacoustic Tomography
Lecture 27 - Evanescent Wave-Based Spectroscopy Technique
Lecture 28 - Optical Coherence Tomography - I
Lecture 29 - Optical Coherence Tomography - II

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Lecture 30 - Optical Coherence Tomography - III
Lecture 31 - Optical Coherence Tomography - IV
Lecture 32 - Light Tissue Interactions and Photo Therapy
Lecture 33 - Photo Therapeutic Approaches - I

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NPTEL Video Course - Engineering Design - Frugal Engineering

Subject Co-ordinator - Prof. Balkrishna C. Rao

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Frugal Engineering - Class 1
Lecture 2 - Frugal Engineering - Class 2

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NPTEL Video Course - Engineering Design - NOC:Digital Accessibility

Subject Co-ordinator - Prof. Richa Gupta

Co-ordinating Institute - IIIT Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Background
Lecture 2 - Definitions and Common Terminologies
Lecture 3 - Why Accessibility Matters ?
Lecture 4 - Understanding Disability and Impact of Bad Accessibility
Lecture 5 - Poor vs Good Accessibility
Lecture 6 - Aspects of Digital Interactions and Experiences of various disabilities
Lecture 7 - Aspects of Digital Interactions and Experiences of various disabilities
Lecture 8 - Universal Design Principles
Lecture 9 - Accomodations and CDE
Lecture 10 - Relooking at Existing Frameworks
Lecture 11 - Three Dimensions of Inclusive Design
Lecture 12 - Affordances and their role in access
Lecture 13 - Economic and Legal Aspects
Lecture 14 - Web Content Accessibility Guidelines
Lecture 15 - Web Content Accessibility Guidelines
Lecture 16 - Evaluation Tools - Pros and Cons + Intro
Lecture 17 - Evaluation Tools - Tutorial - Part 1
Lecture 18 - Evaluation Tools - Tutorial - Part 2
Lecture 19 - Mobile Accessibility Issues
Lecture 20 - Mobile Accessibility Issues (Continued...)
Lecture 21 - AI and Accessibility - Part 1
Lecture 22 - AI and Accessibility - Part 2
Lecture 23 - Emerging Input Technologies
Lecture 24 - Emerging Output Technologies
Lecture 25 - Special Focus (ELDERLY USERS)
Lecture 26 - Special Focus - Neurodivergent users
Lecture 27 - AR VR
Lecture 28 - Assistive Tech
Lecture 29 - Multi sensory interaction

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Lecture 30 - Discussion - Sachin Tanwar Google India
Lecture 31 - Accessibility Testing - Part 1
Lecture 32 - Accessibility Testing - Part 2
Lecture 33 - Accessibility Testing Tools - Part 1
Lecture 34 - Accessibility Testing Tools - Part 2
Lecture 35 - Student Discussion (Priyankar)
Lecture 36 - Accessibilty Optimization - Part 1
Lecture 37 - Accessibilty Optimization - Part 2
Lecture 38 - Screen Readers - Part 1
Lecture 39 - Screen Readers - Part 2
Lecture 40 - Discussion - Anchal Sharma IIT Delhi
Lecture 41 - Mobile Apps and Mobile As a powerful tool
Lecture 42 - Mobile Accessibility-Deep Dive - Part 1
Lecture 43 - Mobile Accessibility-Deep Dive - Part 2
Lecture 44 - Bharath Mobile Testing tutorial
Lecture 45 - Speech Recognition
Lecture 46 - Computer Vision for accessibility
Lecture 47 - Ashwin - Talktile
Lecture 48 - Student Discussion (Chandrama)
Lecture 49 - Discussion - Vikas Upadhyay, Iwayplus
Lecture 50 - Discussion - Volker Sorge University of Birmingham
Lecture 51 - SEO and Accessibility
Lecture 52 - Case Study (Chandrama)
Lecture 53 - Policy Advocacy - Part 1
Lecture 54 - Policy Advocacy - Part 2

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NPTEL Video Course - Engineering Design - NOC:Augmenting Design Thinking with Human-Computer Interaction

Subject Co-ordinator - Prof. Sonal Atreya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Design Thinking Phases - Empathy
Lecture 3 - Design Thinking Phases - Define
Lecture 4 - Design Thinking Phases - Deliver
Lecture 5 - Design Thinking Applications - Part 1
Lecture 6 - Design Thinking Applications - Part 2
Lecture 7 - Components of HCI
Lecture 8 - Components of HCI - Human Ergonomics
Lecture 9 - Interface and Interaction
Lecture 10 - Principles of HCI - Part 1
Lecture 11 - Principles of HCI - Part 2
Lecture 12 - Divergent and Convergent Thinking
Lecture 13 - Convergent Thinking - AEIOU Framework
Lecture 14 - Planning and Implementation of Divergent and Convergent Thinking
Lecture 15 - Divergent and Convergent Thinking (Continued...)
Lecture 16 - Idea Generation and Selection - Overview
Lecture 17 - Techniques for Idea Generation - Part 1
Lecture 18 - Techniques for Idea Generation - Part 2
Lecture 19 - Techniques for Idea Generation - Part 3
Lecture 20 - Methods of Idea Selection
Lecture 21 - Need Analysis and Design for Experience
Lecture 22 - Design for Experience and Storytelling
Lecture 23 - Stakeholder Mapping and Customer Journey Mapping
Lecture 24 - Empathy Mapping and Context Mapping
Lecture 25 - Universal Design
Lecture 26 - Design for Accessibility
Lecture 27 - Design Research Methods - Part 1
Lecture 28 - Design Research Methods - Part 2
Lecture 29 - Questionnaire Design

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Lecture 30 - Data Analysis
Lecture 31 - Card Sorting, Thematic Analysis and Conceptual Model
Lecture 32 - Information Architecture
Lecture 33 - Design Elements and Principles
Lecture 34 - Colour Theory
Lecture 35 - Typography and Iconography
Lecture 36 - Controls and Menus
Lecture 37 - Visual Design Principles
Lecture 38 - Prototyping and Usability Testing
Lecture 39 - Case Study - Medical Bed
Lecture 40 - Case Study - Tourism Website

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NPTEL Video Course - Engineering Design - NOC:Interior Design

Subject Co-ordinator - Prof. Smriti Saraswat

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Interior Design: Definition; Understanding; History of Interior Design; Scope
Lecture 2 - Interior Design: Interior Decoration; and Interior Architecture
Lecture 3 - Interior Design Projects: Overview on Costing and Career
Lecture 4 - Interior Design: Case Studies and Examples
Lecture 5 - Summary and Discourse of Week 1
Lecture 6 - Principles and Elements of Interior Design â Understanding Composition
Lecture 7 - Space Making Elements
Lecture 8 - Trends, Concepts and Schemes in Lighting, Colour, Furnishing, Finishes
Lecture 9 - Interior Design: Drawings and Representation Techniques
Lecture 10 - Summary and Discourse of Week 2
Lecture 11 - Interior Design: Understanding varied spaces
Lecture 12 - Interior-Design-Finishes, Materials and Specifications
Lecture 13 - Interior Design: Space-Making Crafts; Space-Surface Crafts
Lecture 14 - Interior Design: Space-Making Crafts; Space-Making Elements; Inter-relationships
Lecture 15 - Summary and Discourse of Week 3
Lecture 16 - Interior Design: Materials - Timber
Lecture 17 - Interior Design: Materials - Stone
Lecture 18 - Interior Design: Materials - Tiles
Lecture 19 - Interior Design: Materials - Paints
Lecture 20 - Summary and Discourse of Week 4
Lecture 21 - Green Interiors: Introduction to Rating Systems; Examples
Lecture 22 - Green Interiors: Attributes â IAQ, IEQ, Furniture
Lecture 23 - Green Interiors: Physics of Light - Day Light, Artificial Light, Chemistry of Colours
Lecture 24 - Green Interiors: Policies and Incentives; Materials and Finishes
Lecture 25 - Summary and Discourse of Week 5
Lecture 26 - Interior Design Technology: Innovative trends and technologiesâ Tiny Houses, Origami
Lecture 27 - Interior Design Technology: Experimental Finishes and Materials; Joinery
Lecture 28 - Interior Design Tech: Visual Merchandising, Modularity, Portability, Foldability, DIY
Lecture 29 - Interior Design Technology: New Concepts - Installations, Decor

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Lecture 30 - Summary and Discourse of Week 6
Lecture 31 - Professional Practice: Interior Services, Functional Importance
Lecture 32 - Professional Practice: Bye-laws, Supervision
Lecture 33 - Building Material Costing; BoQ; Market Exposure; Product Catalogues
Lecture 34 - Important Organisations, Institutes, Firms, Designers, Avenues of Pedagogy and Practice
Lecture 35 - Summary and Discourse of Week 7
Lecture 36 - Trans-Disciplinary Interventions: Craft-Design Explorations - I
Lecture 37 - Trans-Disciplinary Interventions: Craft-Design Explorations - II
Lecture 38 - Creative and Cultural Industries: Focus on Visual Art and Interior Design (Architecture)
Lecture 39 - Interior Design: Future Roadmap; Opportunities and Challenges
Lecture 40 - Summary and Discourse

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NPTEL Video Course - Environmental Science - NOC:Environmental Geosciences

Subject Co-ordinator - Prof. Prasoon Kumar Singh

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Origin of the Earth
Lecture 2 - Internal Structure of the Earth
Lecture 3 - Concept of Atmosphere and their Constituents
Lecture 4 - Concept of Hydrosphere, Lithosphere and their Constituents
Lecture 5 - Concept of Plate Tectonics
Lecture 6 - Summary of Module 1
Lecture 7 - Types of Weathering
Lecture 8 - Erosion and Transportation
Lecture 9 - Geological Work of Wind
Lecture 10 - Geological Work of River
Lecture 11 - Geological Work of Glaciers
Lecture 12 - Summary of Module 2
Lecture 13 - Dip, Strike, Folds and Fault its Environmental interpretation
Lecture 14 - Geological Hazards - Earthquake
Lecture 15 - Geological Hazards - Volcanoes
Lecture 16 - Geological Hazards - Floods
Lecture 17 - Geological Hazards - Landslides
Lecture 18 - Summary of Module 3
Lecture 19 - Crystals and its Characteristics
Lecture 20 - Crystal Systems - Different Crystal Classes
Lecture 21 - Concept of Mineral and its Properties
Lecture 22 - Properties of Common Silicate Minerals
Lecture 23 - Properties of Common Sulphide and Oxide Minerals
Lecture 24 - Summary of Module 4
Lecture 25 - Concept of Rocks
Lecture 26 - Magma and its Composition and Constitution
Lecture 27 - Description of Common Igneous Rocks
Lecture 28 - Description of Common Sedimentary Rocks
Lecture 29 - Description of Common Metamorphic Rocks

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Lecture 30 - Distribution of Water on Earth
Lecture 31 - Groundwater Provinces of India
Lecture 32 - Hydrological Cycle
Lecture 33 - Aquifer-its Types
Lecture 34 - Porosity and Permeability
Lecture 35 - Law of Groundwater Movement - Darcyâ s Law and Applications - Part 1
Lecture 36 - Law of Groundwater Movement - Darcyâ s Law and Applications - Part 2
Lecture 37 - Law of Groundwater Movement - Darcyâ s Law and Applications - Part 3
Lecture 38 - Groundwater Fluctuations
Lecture 39 - Pollution of Groundwater Resources
Lecture 40 - Indian Stratigraphy and Archaean Group
Lecture 41 - Various Stratigraphic Units of India: Pre-Cambrian Group, Paleozoic Group and Features
Lecture 42 - Various Stratigraphic Units of India: Mesozoic Group and its Features
Lecture 43 - Various Stratigraphic Units of India: Tertiary Group and Quaternary Group
Lecture 44 - Fossils and Prehistoric Life: An Overview of Major Fossil Groups and Gondwana Flora
Lecture 45 - Process of Soil Formation
Lecture 46 - Soil Classification
Lecture 47 - Impact of Soil Erosion
Lecture 48 - Physical Properties of Soil
Lecture 49 - Chemical Properties of Soil
Lecture 50 - Fossils Fuels
Lecture 51 - Fossils Fuels - Coal
Lecture 52 - Fossils Fuels - Petroleum
Lecture 53 - Fossils Fuels - Natural gas
Lecture 54 - Conservation of Non-Renewable Energy
Lecture 55 - Geochemical Classification of Elements
Lecture 56 - Geochemical Classification of Elements: Interaction of Geochemical Cycles
Lecture 57 - Geophysical Methods, Gravity Methods
Lecture 58 - Geophysical Methods: Magnetic Methods
Lecture 59 - Geophysical Methods: Electrical Methods
Lecture 60 - Remote Sensing
Lecture 61 - Geographic Information System
Lecture 62 - Applications of Remote Sensing and Applications of GIS
Lecture 63 - Impact of Climate Change on Water Resources - Part 1
Lecture 64 - Impact of Climate Change on Water Resources - Part 2

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NPTEL Video Course - Environmental Science - NOC:Climate Change Science

Subject Co-ordinator - Prof. J.Srinivasan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Global Mean Temperature
Lecture 3 - Blackbody Radiation
Lecture 4 - Properties of Real Surfaces
Lecture 5 - Planetary Albedo
Lecture 6 - Simple Energy Balance Model
Lecture 7 - Multiple-Equilibrium States
Lecture 8 - General Circulation Models
Lecture 9 - Feedbacks in the Climate System
Lecture 10 - Feedback Analysis
Lecture 11 - Cloud Feedbacks
Lecture 12 - Cloud Feedbacks (Continued...)
Lecture 13 - Radiative transfer in gases
Lecture 14 - Radiative Transfer (Continued...)
Lecture 15 - Radiative Transfer (Continued...)
Lecture 16 - Global warming potential
Lecture 17 - Ozone depletion
Lecture 18 - Ozone depletion (Continued...)
Lecture 19 - Montreal Protocol
Lecture 20 - Two-layer model
Lecture 21 - Meridional variation
Lecture 22 - Paleoclimate
Lecture 23 - Paleoclimate (Continued...)
Lecture 24 - Last ice age
Lecture 25 - Last ice age
Lecture 26 - Atlantic meridional ocean circulation
Lecture 27 - Simulation of AMOC
Lecture 28 - Simulation of AMOC (Continued...)
Lecture 29 - AMOC during deglaciation

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Lecture 30 - Dansgaard-Oeschger events
Lecture 31 - Theory of Ice ages
Lecture 32 - Milankovitch Theory
Lecture 33 - Milankovitch Theory (Continued...)
Lecture 34 - Milankovitch Theory (Continued...)
Lecture 35 - Stochastic resonance
Lecture 36 - Glacial to interglacial transition
Lecture 37 - Simulation of Glacial to interglacial
Lecture 38 - Simulation of glacial to interglacial
Lecture 39 - Snowball earth
Lecture 40 - Snowball earth (Continued...)
Lecture 41 - Simulation of snowball earth
Lecture 42 - Snowball earth cycle
Lecture 43 - Impact of aerosols on climate
Lecture 44 - Relative roles of CO2 and aerosols
Lecture 45 - Kyoto Protocol
Lecture 46 - climate models
Lecture 47 - Approximations in climate models
Lecture 48 - How good is the model simulation
Lecture 49 - Model biases
Lecture 50 - The impact of model resolution
Lecture 51 - Cascade of uncertainty
Lecture 52 - Extreme events
Lecture 53 - Humid heat waves
Lecture 54 - Extreme rainfall
Lecture 55 - Monsoons
Lecture 56 - Simulation of monsoon
Lecture 57 - Why is Venus hot ?
Lecture 58 - Venus energy balance
Lecture 59 - Denial of global warming
Lecture 60 - Wrap up

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NPTEL Video Course - General - NOC:Risk-Based Engineering

Subject Co-ordinator - Prof Prabhakar V Varde

Co-ordinating Institute - Homi Bhabha National Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - RBE: Background and Overview
Lecture 2 - RBE Framework
Lecture 3 - RBE-Framework continuation and Major Procedural Elements
Lecture 4 - RBE-Major Procedural Elements (Continued...)
Lecture 5 - Risk Characterization
Lecture 6 - Reliability Characterization and Probability Distributions-Discrete Distribution
Lecture 7 - Probability Distributions - Continuous Distribution
Lecture 8 - Statistical Estimation in Probability Theory
Lecture 9 - Probability and Confidence Interval
Lecture 10 - Regression Analysis
Lecture 11 - Life Prediction : Introduction
Lecture 12 - Life Prediction : Related Aspects
Lecture 13 - Life Prediction and Assessment Approaches
Lecture 14 - Life Prediction : Accelerated Screening and Life Testing
Lecture 15 - Probabilistic Fracture Mechanic Approach
Lecture 16 - Introduction and Reliability Block Diagram (RBD)
Lecture 17 - RBD - System Redundancies
Lecture 18 - Fault Tree Analysis
Lecture 19 - Fault Tree Analysis ContiÃ¢â ¬Â¦ and Event Tree Analysis
Lecture 20 - Markov Model
Lecture 21 - Dynamic Fault Tree
Lecture 22 - Dynamic Event Tree and Binary Decision Diagram
Lecture 23 - Common Cause Failure
Lecture 24 - Importance and Sensitivity Analysis
Lecture 25 - Maintainability
Lecture 26 - PRA-Introduction
Lecture 27 - PRA-Organizational and Quality Aspects
Lecture 28 - PRA-Qualitative Modeling and Analysis
Lecture 29 - PRA-Quantification of the PRA model

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Lecture 30 - Monte Carlo Simulation, Root Cause Analysis
Lecture 31 - Low Power and Shutdown PRA
Lecture 32 - Internal Flood PRA
Lecture 33 - Level 1 Fire PRA
Lecture 34 - Seismic PRA
Lecture 35 - Level 2 and Level 3 PRA
Lecture 36 - Human Reliability- Introduction
Lecture 37 - State of the Art in Human-Reliability
Lecture 38 - Technique for Human Error Rate Prediction (THERP)
Lecture 39 - Human Cognitive Reliability (HCR) Method
Lecture 40 - CQB - Method Consciousness, Cognition, Conscience and Brain
Lecture 41 - Uncertainty - Introduction
Lecture 42 - Uncertainty: Overview, preliminary discussions considering selected approaches
Lecture 43 - Parametric Approach to Uncertainty
Lecture 44 - Uncertainty Modelling using Fuzzy Approach in RBE
Lecture 45 - Uncertainty â Bayesian, and Monte-Carlo technique
Lecture 46 - Scope of Course and Introduction
Lecture 47 - PoF and FMMECA
Lecture 48 - Failure Mechanism and Models
Lecture 49 - Virtual Qualification
Lecture 50 - Physical qualification and Prognostics
Lecture 51 - PHM Introduction
Lecture 52 - Prognostics and Health Management in RBE
Lecture 53 - Major AI and ML Techniques and Algorithms in PHM
Lecture 54 - Role of ANN technique in RUL Estimation
Lecture 55 - Uncertanity Management in PHM
Lecture 56 - RBE-Introduction
Lecture 57 - RBE for Life Extension in support of regulatory relicensing
Lecture 58 - RBE-Risk Monitor
Lecture 59 - RBE-Inservice-Inspection
Lecture 60 - RB Operator Support System

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NPTEL Video Course - General - Introduction to Japanese Language and Culture

Subject Co-ordinator - Mrs. Vatsala Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Japanese scripts
Lecture 2 - Jiko shoukai (Self introduction)
Lecture 3 - Dochira kara desu ka (Where are you from?)
Lecture 4 - Senmon wa nan desu ka (What is your specialization?)
Lecture 5 - Kore wa hon desu (This is a book)
Lecture 6 - Ikura desu ka (How much is it?)
Lecture 7 - Ima nan-ji desu ka (What is the time now?)
Lecture 8 - Kaigi wa roku-ji-han kara desu (The meeting is from 6
Lecture 9 - Ashita Tokyo e ikimasu. (I will go to Tokyo tomorrow)
Lecture 10 - Watashi wa mainichi roku-ji ni okimasu (I wake up at 6â oclock everyday)
Lecture 11 - Itsu Kanpur e kimashita ka (When did you come to Kanpur?)
Lecture 12 - Y?binkyoku wa asoko ni arimasu (The post office is over there)
Lecture 13 - Rao san wa doko ni imasu ka (Where is Mr. Rao?)
Lecture 14 - Pikuniku e ikimash? (Letâ s go for a picnic)
Lecture 15 - Kesa pan to tamago o tabemashita (I ate eggs and bread for breakfast)
Lecture 16 - Depa-to no tonari no biru wa gink? desu (The building next to the department store is the bank)
Lecture 17 - Taj hoteru wa ookii hoteru desu(Hotel Taj is a big hotel)
Lecture 18 - Hoteru de nani o tabemashita ka (What did you eat at the hotel?)
Lecture 19 - Tokyo wa ?kikute kirei desu (Tokyo is big and beautiful)
Lecture 20 - Ko-hi- wa oishiku arimasen(Coffee is not tasty)
Lecture 21 - Hantai kotoba (Opposites)
Lecture 22 - Watashi wa mainichi miruku o nomimasu (I drink milk everyday)
Lecture 23 - Watashi wa oniisan ni kamera o moratta(I received a camera from my brother)
Lecture 24 - Nani o tabetai desu ka(What do you want to eat?)
Lecture 25 - Nani o sashiagemasu ka (Giving and Receiving)
Lecture 26 - Sensei wa watashi ni hon o kuremashita (My teacher gave me a book)
Lecture 27 - Chotto matte kudasai (Just a minute please)
Lecture 28 - Ke-ki o tabete mite kudasai (Eat and see how is the cake)
Lecture 29 - Nani o shite imasu ka(What are you doing?)

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Lecture 30 - Tokyo ni sunde imasu (I live in Tokyo)
Lecture 31 - Kanji ga kakemasu (I can write Kanji)
Lecture 32 - Im?to wa ningy? o hoshigatte imasu (My sister wants a doll)
Lecture 33 - Aisukuri-mu ga ke-ki yori suki desu (I like ice-cream more than cakes)
Lecture 34 - Kutsu o kai ni ikimasu (I am going to buy shoes)
Lecture 35 - Ashita motto atsuku narimasu (It is going to become very hot tomorrow)
Lecture 36 - Rainen Tokyo e iku to omoimasu (I think I will go to Tokyo next year)
Lecture 37 - Pen de kaite mo ii desu ka(Is it alright to write in pen?)
Lecture 38 - Comprehensions and Expressions
Lecture 39 - Basic Kanji
Lecture 40 - Basic Kanji

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NPTEL Video Course - General - Astronomy in Ancient, Medieval and Early Telescopic Era of India

Subject Co-ordinator - Prof. Amitabha Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Pre Siddhantic Astronomy
Lecture 3 - Siddhantic Astronomy
Lecture 4 - Astronomy in Medieval India
Lecture 5 - Introduction to Telescopic Astronomy and Concluding remarks

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NPTEL Video Course - General - NOC:Carbon Accounting and Sustainable Designs in Product Lifecycle Management

Subject Co-ordinator - Prof. Amandeep Singh Oberoi, Prof. Deepu Philip, Prof. Prabal Pratap Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Productivity and Sustainability - Part 1
Lecture 2 - Measuring Productivity
Lecture 3 - Measures Affecting Productivity
Lecture 4 - Productivity and Sustainability - Part 2
Lecture 5 - Environmental Management system
Lecture 6 - Green System
Lecture 7 - Carbon Footprint
Lecture 8 - Carbon Credit Trading
Lecture 9 - Industrial Ecology and Carbon Footprint
Lecture 10 - Examples of Carbon Footprint Calculations
Lecture 11 - Examples of Carbon Footprint Calculations
Lecture 12 - Some More Green Thoughts and Footprints
Lecture 13 - Green Manufacturing
Lecture 14 - Partnership for a New Generation of Vehicles (PNGV)
Lecture 15 - Smart Design and Engineering
Lecture 16 - Road to Product Lifecycle Management - Part 1
Lecture 17 - Road to Product Lifecycle Management - Part 2
Lecture 18 - Road to Product Lifecycle Management - Part 3
Lecture 19 - Sustainability and Green Supply Chain - Part 1
Lecture 20 - Sustainability and Green Supply Chain - Part 2
Lecture 21 - Energy Transformations
Lecture 22 - PLM Components and levels - Part 1
Lecture 23 - PLM Components and levels - Part 2
Lecture 24 - PLM integration - Part 1
Lecture 25 - PLM integration - Part 2
Lecture 26 - Facility carbon accounting
Lecture 27 - Activities of emission - Part 1
Lecture 28 - Activities of emission - Part 2
Lecture 29 - Carbon and business data - Part 1

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Lecture 30 - Carbon and business data - Part 2
Lecture 31 - Carbon and business data - Part 3
Lecture 32 - Carbon accounting software - Part 1
Lecture 33 - Carbon accounting software - Part 2
Lecture 34 - Carbon Accounting Model - Part 1
Lecture 35 - Carbon Accounting Model - Part 2
Lecture 36 - Carbon Accounting Model - Part 3
Lecture 37 - Carbon Accounting Model - Part 4
Lecture 38 - Carbon Accounting Model - Part 5
Lecture 39 - Integrated PL,SLM and ALM
Lecture 40 - Environmental, Social and Governace (ESG) Systems
Lecture 41 - Carbon Accounting Databases - Part 1
Lecture 42 - Carbon Accounting Databases - Part 2
Lecture 43 - Carbon Accounting Databases - Part 3
Lecture 44 - Database Management Systems
Lecture 45 - Database Design
Lecture 46 - Terminologies in Database Design - I
Lecture 47 - Terminologies in Database Design - II
Lecture 48 - Database Schema - Part 1
Lecture 49 - Database Schema - Part 2
Lecture 50 - Database Normalization - Part 1
Lecture 51 - Database Normalization - Part 2
Lecture 52 - Carbon Accounting User Interface - Part 1
Lecture 53 - Carbon Accounting User Interface - Part 2
Lecture 54 - Carbon Accounting User Interface - Part 3

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NPTEL Video Course - General - NOC:Stress Management

Subject Co-ordinator - Prof. Rajlakshmi Guha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Stress
Lecture 2 - Sources of stress
Lecture 3 - Types of Stress
Lecture 4 - Personality Factors and Stress
Lecture 5 - Stress and the College Student
Lecture 6 - Stress and Nervous System
Lecture 7 - Hypothalamic-Pituitary-Adrenal (HPA) Axis
Lecture 8 - Effect of Stress on Immune System
Lecture 9 - Health Risk Associated with Chronic Stress
Lecture 10 - Stress and Major Psychiatric Disorders
Lecture 11 - Understanding your stress level
Lecture 12 - Role of Personality Pattern, Self Esteem, Locus of Control
Lecture 13 - Role of Thoughts Beliefs and Emotions - I
Lecture 14 - Role of Thoughts Beliefs and Emotions - II
Lecture 15 - Life Situation Intrapersonal
Lecture 16 - Developing Cognitive Coping Skills
Lecture 17 - Autogenic Training, Imagery and Progressive Relaxation
Lecture 18 - Other Relaxation Techniques
Lecture 19 - Exercise and Health
Lecture 20 - DIY Strategies Stress Management

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NPTEL Video Course - General - NOC:Outcome Based Pedagogic Principles for Effective Teaching

Subject Co-ordinator - Prof. Shyamal Kumar Das Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Need of 21st Century Education
Lecture 2 - Accreditation
Lecture 3 - Outcome based Learning
Lecture 4 - Approach to Design Outcome based Learning
Lecture 5 - Approach to Design Outcome based Learning (Continued...)
Lecture 6 - Instructional Design for Active Learning
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20

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NPTEL Video Course - General - Ayurvedic Inheritance of India

Subject Co-ordinator - Dr. M.S. Valiathan

Co-ordinating Institute - Manipal University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Roots of Ayurveda
Lecture 2 - Traditional Medicine in Buddhist India
Lecture 3 - Period of Systematization
Lecture 4 - Philosophical ideas in Ayurveda
Lecture 5 - Human Body in Health
Lecture 6 - Human Body in Disease
Lecture 7 - Food and Drinks
Lecture 8 - Code for Healthy Living
Lecture 9 - Diseases
Lecture 10 - Diagnosis and Prognosis
Lecture 11 - Medical Treatment of Diseases
Lecture 12 - Materia Medica
Lecture 13 - Surgical Treatment of Diseases
Lecture 14 - Surgical Instruments
Lecture 15 - Treatment of fractures; some surgical procedures
Lecture 16 - Principles and methods of rejuvenation
Lecture 17 - Selection of Students
Lecture 18 - A Science Initiative in Ayurveda (ASIIA)
Lecture 19 - Ayurvedic Biology
Lecture 20 - Conclusion

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NPTEL Video Course - General - NOC:Introduction to Research

Subject Co-ordinator - Dr. G. Phanikumar, Prof. C. Balaji, Dr. Arun K.Tangirala, Dr. Abhijit P. Deshpande, Pr

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Insight into research
Lecture 2 - Role of Guide and Student
Lecture 3 - Art of Re-Search
Lecture 4 - Persistent small steps towards success
Lecture 5 - Overview of research
Lecture 6 - Overview of Literature Survey
Lecture 7 - Literature Survey using Web of Science
Lecture 8 - Literature Survey using Scopus
Lecture 9 - Writing Up
Lecture 10 - Tutorial on using BibTeX with LaTeX to add references to a document
Lecture 11 - Tutorial on using Microsoft Word with Bibliographic Sources
Lecture 12 - Tutorial on using Microsoft Word with endnote entries
Lecture 13 - Experimental skills
Lecture 14 - Data analysis - Part 1
Lecture 15 - Data analysis - Part 2
Lecture 16 - Modelling skills - Part 1
Lecture 17 - Modelling skills - Part 2
Lecture 18 - Safety in laboratory
Lecture 19 - How to make Technical presentation
Lecture 20 - Creativity in Research - Part 1
Lecture 21 - Creativity in research - Part 2
Lecture 22 - Creativity in research - Part 3
Lecture 23 - Technical Writing
Lecture 24 - Group discussion on Ethics in Research
Lecture 25 - Intellectual property - Part 1
Lecture 26 - Intellectual property - Part 2
Lecture 27 - DOE Part 1
Lecture 28 - DOE part 2
Lecture 29 - DOE part 3

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Lecture 30 - DOE part 4
Lecture 31 - DOE part 5
Lecture 32 - Research in Applied Mechanics
Lecture 33 - Research in Chemical Engineering
Lecture 34 - Research in Civil Engineering
Lecture 35 - Research in Computer Science and Engineering
Lecture 36 - Research in Engineering Design
Lecture 37 - Research in Humanities and Social Sciences
Lecture 38 - Research in Mechanical Engineering
Lecture 39 - Research in Metallurgical and Materials Engineering
Lecture 40 - Research in Ocean Engineering
Lecture 41 - Research in Management Studies
Lecture 42 - Research in Aerospace Engineering
Lecture 43 - Research in Biotechnology
Lecture 44 - Research in Chemistry
Lecture 45 - Research in Electrical Engineering
Lecture 46 - Research in Mathematics
Lecture 47 - Research in Physics
Lecture 48 - Discussion with Research Scholars

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NPTEL Video Course - General - NOC:Biology for engineers and other non-biologists

Subject Co-ordinator - Dr. Madhulika Dixit, Prof. G.K. Suraishkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Origin of Life
Lecture 3 - Evolution
Lecture 4 - Cells
Lecture 5 - Biomolecules
Lecture 6 - Biomolecules
Lecture 7 - Biomolecules
Lecture 8 - Biomolecules
Lecture 9 - Biomolecules
Lecture 10 - Cell structure and function Â Prokaryotes
Lecture 11 - Cell structure and function Â Eukaryotes
Lecture 12 - Cell cycle
Lecture 13 - Cell division Â mitosis
Lecture 14 - Cell division Â meiosis
Lecture 15 - Culture growth
Lecture 16 - Mendelian genetics
Lecture 17 - Mendelian genetics
Lecture 18 - Mendelian genetics
Lecture 19 - Mendelian genetics
Lecture 20 - DNA replication
Lecture 21 - Transcription
Lecture 22 - Translation

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NPTEL Video Course - General - NOC:Digital and the Everyday - from Codes to Cloud

Subject Co-ordinator - Prof. Amit Prakash, Prof. Bidisha Chaudhuri

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Introduction to the Winter School
Lecture 3 - Socio-algorithmic processes and the Everyday - Part 1
Lecture 4 - Socio-algorithmic processes and the Everyday - Part 2
Lecture 5 - Socio-algorithmic processes and the Everyday - Part 3
Lecture 6 - Data Protection and Privacy Regulation in the Digital Era - Part 1
Lecture 7 - Data Protection and Privacy Regulation in the Digital Era - Part 2
Lecture 8 - Data Protection and Privacy Regulation in the Digital Era - Part 3
Lecture 9 - Data-driven Identities - Part 1
Lecture 10 - Data-driven Identities - Part 2
Lecture 11 - Data-driven Identities - Part 3
Lecture 12 - Promises and Challenges of e-Health - Part 1
Lecture 13 - Promises and Challenges of e-Health - Part 2
Lecture 14 - Promises and Challenges of e-Health - Part 3
Lecture 15 - Digital Finance - Part 1
Lecture 16 - Digital Finance - Part 2
Lecture 17 - Digital and our everyday interactions with the state - Part 1
Lecture 18 - Digital and our everyday interactions with the state - Part 2
Lecture 19 - Digital and our everyday interactions with the state - Part 3
Lecture 20 - Creating a Machine Zone through Affected Feedback
Lecture 21 - Creating a Machine Zone through Affected Feedback
Lecture 22 - Creating a Machine Zone through Affected Feedback

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NPTEL Video Course - General - NOC:Effective Engineering Teaching in Practice

Subject Co-ordinator - Prof. G.K. Suraishkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - An Inexperienced Engineering Teacherâ s View
Lecture 3 - From traditional lecturing to helping students learn - 1
Lecture 4 - From traditional lecturing to helping students learn - 2
Lecture 5 - Better learning (Bloom's Taxonomy)
Lecture 6 - Problem based learning (PBL) and Problem Solving - Part 1
Lecture 7 - Problem based learning (PBL) and Problem Solving - Part 2
Lecture 8 - Writing Learning Outcomes for a Course
Lecture 9 - Active Learning
Lecture 10 - Coorperative Group Learning
Lecture 11 - Flipped Classroom
Lecture 12 - Effective Laboratory Courses
Lecture 13 - Assessment - Part 1
Lecture 14 - Assessment - Part 2
Lecture 15 - How can we use research in education? - Part A1
Lecture 16 - How can we use research in education? - Part A2
Lecture 17 - The Class, as a Whole - Part A3
Lecture 18 - Psychological Type (Orientation) and Learning - Part B
Lecture 19 - Cognitive Development Theories â Two Main Examples - Part C
Lecture 20 - Learning Theories - Part D
Lecture 21 - Feedback and Reflection - Part 1
Lecture 22 - Feedback and Reflection - Part 2
Lecture 23 - Feedback and Reflection - Part 3
Lecture 24 - Live Session 1
Lecture 25 - Live Session 2

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NPTEL Video Course - General - NOC:Virtual Reality Engineering

Subject Co-ordinator - Dr. M. Manivannan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course mechanics
Lecture 2 - Goals and VR definitions
Lecture 3 - Historical perspective
Lecture 4 - Birds-eye view (general)
Lecture 5 - Birds-eye view (general) (Continued...)
Lecture 6 - Birds-eye view (hardware)
Lecture 7 - Birds-eye view (software)
Lecture 8 - Birds-eye view (sensation and perception)
Lecture 9 - Geometric modeling
Lecture 10 - Transforming models
Lecture 11 - Matrix algebra and 2D rotations
Lecture 12 - 3D rotations and yaw, pitch, and roll
Lecture 13 - 3D rotations and yaw, pitch, and roll (Continued...)
Lecture 14 - Axis-angle representations
Lecture 15 - Quaternions
Lecture 16 - Converting and multiplying rotations
Lecture 17 - Converting and multiplying rotations (Continued...)
Lecture 18 - Homogeneous transforms
Lecture 19 - The chain of viewing transforms
Lecture 20 - Eye transforms
Lecture 21 - Eye transforms (Continued...)
Lecture 22 - Canonical view transform
Lecture 23 - Viewport transform
Lecture 24 - Viewport transform (Continued...)
Lecture 25 - Three interpretations of light
Lecture 26 - Refraction
Lecture 27 - Simple lenses
Lecture 28 - Diopters
Lecture 29 - Imaging properties of lenses

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Lecture 30 - Lens aberrations
Lecture 31 - Optical system of eyes
Lecture 32 - Photoreceptors
Lecture 33 - Sufficient resolution for VR
Lecture 34 - Light intensity
Lecture 35 - Eye movements
Lecture 36 - Eye movements (Continued...)
Lecture 37 - Eye movement issues for VR
Lecture 38 - Neuroscience of vision
Lecture 39 - Three Psychophysical Laws
Lecture 40 - Sensation and Perception
Lecture 41 - Psychophysics of Visual Perception
Lecture 42 - Gamma Encoding
Lecture 43 - Limiting Resolution
Lecture 44 - Depth perception
Lecture 45 - Depth perception (Continued...)
Lecture 46 - Motion perception from Visual Systtem
Lecture 47 - Frame rates and displays
Lecture 48 - Frame rates and displays (Continued...)
Lecture 49 - Psyohophysics of Depth Perception
Lecture 50 - Overview
Lecture 51 - Orientation tracking
Lecture 52 - Tilt drift correction
Lecture 53 - Yaw drift correction
Lecture 54 - Tracking with a camera
Lecture 55 - Perspective n-point problem
Lecture 56 - Filtering
Lecture 57 - Lighthouse approach
Lecture 58 - Visual Rendering-Overview
Lecture 59 - Visual Rendering-overview (Continued...)
Lecture 60 - Shading models
Lecture 61 - Rasterization
Lecture 62 - Pixel shading
Lecture 63 - VR-specific problems
Lecture 64 - Distortion shading
Lecture 65 - Post-rendering image warp
Lecture 66 - Why Haptics?
Lecture 67 - What is Haptics?
Lecture 68 - Branches of Haptics

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Lecture 69 - Human Haptics - Tactile System
Lecture 70 - Kinesthetic System
Lecture 71 - Motor System
Lecture 72 - Haptic Devices and Interfaces - Kinesthetic Devices
Lecture 73 - Haptic Devices and Interfaces - Tactile Devices
Lecture 74 - Physics and Physiology
Lecture 75 - Auditory perception
Lecture 76 - Auditory localization
Lecture 77 - Rendering
Lecture 78 - Spatialization and display
Lecture 79 - Combining other senses
Lecture 80 - Interfaces -overview
Lecture 81 - Evaluation of VR Systems
Lecture 82 - Social interaction
Lecture 83 - System control
Lecture 84 - Manipulation
Lecture 85 - Locomotion
Lecture 86 - Principles of Perception
Lecture 87 - Introduction to Kalman Filter
Lecture 88 - Introduction to Extended Kalman Filter
Lecture 89 - Grand Challenges in VR/AR
Lecture 90 - Ultimate VR/AR System

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NPTEL Video Course - General - NOC:Non-Conventional Energy Resources

Subject Co-ordinator - Dr. Prathap Haridoss

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Renewable Energy Technologies
Lecture 2 - Energy Usage by Humans - Estimate of Impact on Atmosphere
Lecture 3 - Conventional Sources of Energy
Lecture 4 - Non-Conventional Sources of Energy - An Overview
Lecture 5 - Energy consumption
Lecture 6 - Details of Energy usage in each sector
Lecture 7 - Consequences of Energy consumption
Lecture 8 - Solar Energy incident on Earth, Solar Spectrum
Lecture 9 - The Solar Energy Budget
Lecture 10 - Electromagnetic Radiation - The Solar Spectrum
Lecture 11 - Solar flat plate collector
Lecture 12 - Solar Radiator
Lecture 13 - Solar Energy - The Semiconductor
Lecture 14 - Solar energy - The p-n junction
Lecture 15 - Solar Cell - Growing the single crystal and making the p-n junction
Lecture 16 - Solar Energy - Interaction of p-n junction with radiation
Lecture 17 - Solar Energy - Solar cell characteristics and usage
Lecture 18 - Solar Energy - Solar cell construction
Lecture 19 - Solar Energy - Solar Photocatalysis
Lecture 20 - Wind Energy - Overview
Lecture 21 - Wind Energy - Energy Considerations
Lecture 22 - Wind Energy - Efficiency
Lecture 23 - Wind Energy - Parts and Materials
Lecture 24 - Wind Energy - Design Considerations
Lecture 25 - Ocean Thermal Energy - Conversion (OTEC)
Lecture 26 - Geothermal Energy
Lecture 27 - Geothermal Energy Technological aspects
Lecture 28 - Biomass Usage and Issues
Lecture 29 - Battery Basics

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Lecture 30 - Battery Testing and Performance
Lecture 31 - Lithium ion Batteries
Lecture 32 - Common Battery Structures and Types
Lecture 33 - Types of Fuel Cells
Lecture 34 - Fuel Processing for PEM Fuel Cells
Lecture 35 - Fuel Cells
Lecture 36 - Characterization of Electrochemical Devices
Lecture 37 - Fuel Cells
Lecture 38 - Supercapacitors
Lecture 39 - Flywheels
Lecture 40 - Magnetohydrodynamic Power Generation

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NPTEL Video Course - General - NOC:Introduction to Remote Sensing

Subject Co-ordinator - Dr.Arun K.Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is satellite based remote sensing?
Lecture 2 - Development of remote sensing technology and advantages
Lecture 3 - Different platforms of remote sensing.
Lecture 4 - Electromagnetic Spectrum, solar reflection and thermal emission
Lecture 5 - Interaction of EM radiation with atmosphere including atmosheric scattering, absorbtion and emiss
Lecture 6 - Interaction machanism of EM radiation with ground and spectral response curve
Lecture 7 - Principles of image interpretation
Lecture 8 - Multi-spectral scanners and imaging devices
Lecture 9 - Salient characteristics of Landsat, IRS, Cartosat, Resourcesat sensors
Lecture 10 - Image characteristics and different resolutions in Remote Sensing
Lecture 11 - Image interpretation of different geological landforms, rock types and structures
Lecture 12 - Remote Sensing Integration with GIS and GPS
Lecture 13 - Geo-referencing Technique
Lecture 14 - Basic Image Enhancement Techniques
Lecture 15 - Spatial Filtering, Band ratio and Principal Component Analysis techniques
Lecture 16 - Image Classification Techniques
Lecture 17 - InSAR Techniques in its applications
Lecture 18 - Hyperspectral Remote Sensing
Lecture 19 - Integrated applications of RS and GIS in groundwater studies
Lecture 20 - Limitations of Remote Sensing Techniques

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NPTEL Video Course - General - NOC:Technical Communications for Engineers

Subject Co-ordinator - Prof. Arun K. Saraf

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Technical Communications and their types
Lecture 2 - Title and an abstract
Lecture 3 - An abstract vs extended abstract vs summary
Lecture 4 - Keywords and Introduction sections
Lecture 5 - Background and review work
Lecture 6 - Data inputs and analytical methods
Lecture 7 - Results and discussion
Lecture 8 - Conclusions and acknowledgement
Lecture 9 - Letters, Email, SMS and WhatsApp message
Lecture 10 - Key components of a chart and types of plots
Lecture 11 - Key components of a chart and types of plots
Lecture 12 - Tables and captions
Lecture 13 - Key elements of a map figure
Lecture 14 - Power Point Presentations - 1
Lecture 15 - Power Point Presentations - 2
Lecture 16 - Power Point Presentations - 3
Lecture 17 - Project Proposals
Lecture 18 - References and bibliography
Lecture 19 - What is Plagiarism - 1
Lecture 20 - What is Plagiarism - 2

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NPTEL Video Course - General - NOC:Biomedical Ultrasound: Fundamentals of Imaging and Micromachined Transduce

Subject Co-ordinator - Prof. Himanshu Shekhar, Prof. Karla P. Mercado-Shekhar, Prof. Hardik J. Pandya

Co-ordinating Institute - IIT - Gandhinagar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Introduction to ultrasound imaging
Lecture 3 - Basics of wave propagation
Lecture 4 - Scattering and acoustic wave equation
Lecture 5 - Intensity, Reflection, Transmission
Lecture 6 - Recap of Week 1
Lecture 7 - Introduction to Imaging modes
Lecture 8 - Imaging artifacts
Lecture 9 - Ultrasound imaging systems
Lecture 10 - Transducers and transducer arrays
Lecture 11 - Recap of Week 2
Lecture 12 - Introduction to Microfabrication
Lecture 13 - Silicon and Silicon Dioxide
Lecture 14 - Numericals on Ultrasound
Lecture 15 - Introduction to Cleanroom
Lecture 16 - Silicon and Silicon Dioxide - II
Lecture 17 - Thermal Oxidation - I
Lecture 18 - Thermal Oxidation - II
Lecture 19 - Thermal Evaporation theory
Lecture 20 - Thermal Evaporation lab demonstration
Lecture 21 - E beam Deposition theory
Lecture 22 - E beam deposition lab demonstration
Lecture 23 - Sputtering theory
Lecture 24 - Sputtering lab demonstration
Lecture 25 - Chemical Vapor Deposition - I
Lecture 26 - Chemical Vapor Deposition - II
Lecture 27 - Lithography
Lecture 28 - Lithography lab demonstration
Lecture 29 - Lithography optics - I

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Lecture 30 - Lithography optics - II
Lecture 31 - Introduction to Beamforming
Lecture 32 - Beamforming Pt 2
Lecture 33 - Beamforming and Signal Processing
Lecture 34 - Intro to Field II simulation - impulse response, beam pattern
Lecture 35 - Recap of week 7
Lecture 36 - Ultrasound image quality metrics
Lecture 37 - Contrast agents
Lecture 38 - Contrast-enhanced imaging
Lecture 39 - Nonlinear acoustics and imaging
Lecture 40 - Recap of week 8
Lecture 41 - Field II imaging simulations
Lecture 42 - Doppler ultrasound
Lecture 43 - Color and Power Doppler ultrasound
Lecture 44 - Quantitative Ultrasound
Lecture 45 - Recap of week 9
Lecture 46 - Ultrasound bioeffects
Lecture 47 - Bioeffects and safety
Lecture 48 - Ultrasound elastography
Lecture 49 - Shear wave imaging
Lecture 50 - Recap of week 10
Lecture 51 - RIE and DRIE
Lecture 52 - Wet etching and Miller Indices - I
Lecture 53 - Wet etching and Miller Indices - II
Lecture 54 - Wet bench lab demonstration
Lecture 55 - PCB (Printed Circuit Board)
Lecture 56 - Ultrasonic Sensor
Lecture 57 - Material Characterisation : STM and AFM
Lecture 58 - Wire bonding lab demo
Lecture 59 - Piezoelectric polymers
Lecture 60 - Characterisation of materials - I
Lecture 61 - Characterisation of materials - II
Lecture 62 - Characterisation of materials - III

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NPTEL Video Course - Humanities and Social Sciences - Contemporary Issues in Philosophy of Mind and Cognition

Subject Co-ordinator - Dr. Rajakishore Nath, Dr. Ranjan K. Panda

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Transcendental Consciousness
Lecture 3 - Plato's Theory of Mind
Lecture 4 - Parable of Cave
Lecture 5 - Aristotle's Concept Mind
Lecture 6 - The Concept of Mind in Upanishadas
Lecture 7 - Dualism - I
Lecture 8 - Dualism - II
Lecture 9 - Dualism - III
Lecture 10 - Against Dualism
Lecture 11 - Property Dualism
Lecture 12 - Varieties of Materialism
Lecture 13 - Mind-Body Identity Theory
Lecture 14 - Functionalism
Lecture 15 - Different Models of Cognitive Mind
Lecture 16 - Connectionism and Folk - Psychology
Lecture 17 - Representation - I
Lecture 18 - Representation - II
Lecture 19 - Artificial Intelligence - I
Lecture 20 - Artificial Intelligence - II
Lecture 21 - Artificial Intelligence - III
Lecture 22 - The Limit of Artificial Intelligence - I
Lecture 23 - The Limit of Artificial Intelligence - II
Lecture 24 - Biological Naturalism
Lecture 25 - The Concept of Intentionality
Lecture 26 - The Structure of Consciousness - I
Lecture 27 - The Structure of Consciousness - II
Lecture 28 - Phenomenal Consciousness - I

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Lecture 29 - Phenomenal Consciousness - II
Lecture 30 - Language, Representation & Meaning - I
Lecture 31 - Language & Meaning - II
Lecture 32 - Language & Mind
Lecture 33 - Language & World - I
Lecture 34 - Language & World - II
Lecture 35 - Emergentism & Supervenience
Lecture 36 - Reduction & Realization - I
Lecture 37 - Reduction & Realization - II
Lecture 38 - The Cartesian Mind Revisited
Lecture 39 - Personal Identity - I
Lecture 40 - Personal Identity - II
Lecture 41 - Creativity
Lecture 42 - Creativity

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NPTEL Video Course - Humanities and Social Sciences - Understanding Creativity and Creative Writing

Subject Co-ordinator - Prof. Neelima Talwar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - In Conversation with Richard Schechner
Lecture 3 - Multilingual Plurality
Lecture 4 - Multilingual Plurality
Lecture 5 - Interplay of Languages and Forms of Writing - Part I
Lecture 6 - Interplay of Languages and Forms of Writing - Part II
Lecture 7 - Creativity and Cultures
Lecture 8 - Notion of Play and The Three Domain Activities
Lecture 9 - Theory of Enjoyment
Lecture 10 - Divergences and Convergences - Part I
Lecture 11 - Divergences and Convergences - Part II
Lecture 12 - Creative and Cultural Spaces for Students
Lecture 13 - Being and Doing
Lecture 14 - Writers and Writing
Lecture 15 - Creativity, Writing, Creative Writing
Lecture 16 - Issues Related to the Teaching of Creative Writing
Lecture 17 - Writers on Writing
Lecture 18 - Critical Reading of Great Writers
Lecture 19 - Critical Reading of Important Writers
Lecture 20 - Reading and Writing
Lecture 21 - Indian Writing
Lecture 22 - Contemporary Indian Writers
Lecture 23 - Contemporary Indian Writers
Lecture 24 - Mosaic Patterns
Lecture 25 - Introduction to Drama
Lecture 26 - Performance and Script Writing
Lecture 27 - Western Classical Theory
Lecture 28 - Student Response - I
Lecture 29 - Indian Drama

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Lecture 30 - Interacting Continuum
Lecture 31 - From The Perspective of Playwriting
Lecture 32 - From The Playwright's Perspective - Part I
Lecture 33 - From The Playwright's Perspective - Part II
Lecture 34 - From The Perspective of Playwriting
Lecture 35 - Drama in the Classroom
Lecture 36 - Student Response - II
Lecture 37 - Performative Reading of the Cherry Orchard
Lecture 38 - Short Story as a Genre
Lecture 39 - Short Stories by Indian Women Writers
Lecture 40 - Modern Western Short Story
Lecture 41 - Varieties of Writing Processes

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NPTEL Video Course - Humanities and Social Sciences - NOC:Energy Resources, Economics and Environment

Subject Co-ordinator - Prof. Rangan Banerjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy Flow Diagram
Lecture 2 - Global Trends in Energy Use
Lecture 3 - Energy Use in India
Lecture 4 - Energy and Environment
Lecture 5 - The Kaya Identity
Lecture 6 - Emission Factor
Lecture 7 - Energy and Quality of Life
Lecture 8 - Energy Inequality
Lecture 9 - Energy Security
Lecture 10 - Introduction to Country Energy Balance assignment
Lecture 11 - Energy balance of Japan
Lecture 12 - Energy balance of Australia
Lecture 13 - Energy balance of Mexico
Lecture 14 - Energy Economics - Part 1
Lecture 15 - Energy Economics - Part 2
Lecture 16 - Energy Economics - Part 3
Lecture 17 - Energy Economics - Tutorial
Lecture 18 - Energy resources - Part 1
Lecture 19 - Energy resources - Part 2
Lecture 20 - Renewable Energy Sources - Part 1
Lecture 21 - Renewable Energy Sources - Part 2
Lecture 22 - Materials for Energy
Lecture 23 - Non Renewable Resource Economics - Part 1
Lecture 24 - Non Renewable Resource Economics - Part 2
Lecture 25 - Non Renewable Resource Economics - Part 3
Lecture 26 - Preferences and Utility
Lecture 27 - Utility and Social Choice - Part 1
Lecture 28 - Utility and Social Choice - Part 2
Lecture 29 - Utility and Social Choice - Part 3

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Lecture 30 - Utility and Social Choice - Part 4
Lecture 31 - Revision Paper-1 - Part 1
Lecture 32 - Public and Private Good/Bads
Lecture 33 - Aggregation of Demand Curves
Lecture 34 - Externalities
Lecture 35 - Revision Paper-1 - Part 2
Lecture 36 - Revision paper-1 - Part 3
Lecture 37 - Energy Project Financing - Part 1
Lecture 38 - Energy Project Financing - Part 2
Lecture 39 - Energy Project Financing - Tutorial
Lecture 40 - Input Output Analysis - Part 1
Lecture 41 - Input Output Analysis - Part 2
Lecture 42 - Input Output Analysis - Part 3
Lecture 43 - Input Output Analysis - Tutorial
Lecture 44 - Primary Energy Analysis - Part 1
Lecture 45 - Primary Energy Analysis - Part 2
Lecture 46 - Net Energy Analysis - Part 1
Lecture 47 - Net Energy Analysis - Part 2
Lecture 48 - Net Energy Analysis - Part 3
Lecture 49 - Net Energy Analysis - Part 4
Lecture 50 - Energy Policy - Part 1
Lecture 51 - Energy Policy - Part 2
Lecture 52 - Energy Policy Examples - Part 1
Lecture 53 - Energy Policy Examples - Part 2
Lecture 54 - Revision Paper-2 - Part 1
Lecture 55 - Revision Paper-2 - Part 2
Lecture 56 - Future Energy Systems

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Paninian Grammar

Subject Co-ordinator - Prof. Malhar Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Aims and objectives of the course
Lecture 2 - Systemic and Textual approaches to study PÄ•á¹ inian grammar
Lecture 3 - PÄ•á¹ ini and his linguistic background
Lecture 4 - Scholars and texts in the PÄ•á¹ inian grammatical tradition and their contribution
Lecture 5 - Non-PÄ•á¹ inian grammatical traditions
Lecture 6
Lecture 7
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Lecture 11
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Lecture 60

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sandhi in Paninian Grammar

Subject Co-ordinator - Prof. Malhar Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
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Lecture 60

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NPTEL Video Course - Humanities and Social Sciences - NOC:à¤¸à¤®à¤¾à¤¸ SamÄ•sa in PÄ•á¹ inian Grammar-I

Subject Co-ordinator - Prof. Malhar Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the contents of the course
Lecture 2 - General features of the à¤¸à¤®à¤¾à¤¸à¤•à¤°à¤• tatpuruá¹£a compound
Lecture 3 - Basics of the theory of compound formation in PÄ•á¹ inian grammar
Lecture 4 - Meaning of the term à¤¸à¤®à¤¾à¤¸ samÄ•sa
Lecture 5 - à¤¸à¤®à¤¾à¤¸ samÄ•sa and the process of speech production as described in the PÄ•á¹ inian grammar
Lecture 6 - à¤ à¤°à¤•à¤¥ artha and introduction to à¤ à¤¾à¤°à¤ karaka
Lecture 7 - 6 à¤ à¤¾à¤°à¤ s karakas
Lecture 8 - Introduction to à¤¸à¤®à¤°à¤•à¤¥ samartha
Lecture 9 - Explanation of à¤¸à¤®à¤°à¤•à¤¥ samartha
Lecture 10 - à¤¸à¤¾à¤®à¤°à¤¥à¤•à¤¯ sÄ•marthya
Lecture 11 - à¤•à¤ à¤¾à¤°à¤¥à¤ à¤-à¤¾à¤µ ekÄ•rthÄ«bhÄ•va and its three features
Lecture 12 - à¤ à¤¸à¤®à¤°à¤¥à¤¸à¤®à¤¾à¤¸ asamarthasamÄ•sa
Lecture 13 - Basic terms and processes of compounding
Lecture 14 - Steps in the process of Compounding
Lecture 15 - Rules of compounding in PÄ•á¹ inian grammar - 1
Lecture 16 - Rules of compounding in PÄ•á¹ inian grammar - 2
Lecture 17 - Rules of compounding in PÄ•á¹ inian grammar - 3
Lecture 18 - Rules of compounding in PÄ•á¹ inian grammar - 4
Lecture 19 - Rules of compounding in PÄ•á¹ inian grammar - 5
Lecture 20 - General remarks on compounding and historical development of Sanskrit Language
Lecture 21 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤¦à¥•à¤µà¤¿à¤¤à¥ à¤¯à¤¾dvitÄ«yÄ• à¤µà
Lecture 22 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤¤à¥ à¤¤à¥ à¤¯à¤¾ tá¹ tÄ«yÄ• à¤µà¤¿à¤
Lecture 23 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤¤à¥ à¤¤à¥ à¤¯à¤¾ tá¹ tÄ«yÄ• à¤µà¤¿à¤
Lecture 24 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤ à¤¤à¥•à¤°à¥•à¥ caturthÄ« à¤µà¤¿
Lecture 25 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤ªà¤ à¥•à¤ à¤®à¥ paÃ±camÄ« à¤µà¤¿à¤-
Lecture 26 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤¸à¤ªà¥•à¤¤à¤®à¥ saptamÄ« à¤µà¤¿à¤-à
Lecture 27 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤¸à¤ªà¥•à¤¤à¤®à¥ saptamÄ« à¤µà¤¿à¤-à
Lecture 28 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤·à¤·à¥•à¤ à¥ á¹£aá¹£á¹-hÄ« à¤µà¤¿à¤
Lecture 29 - à¤¤à¤¤à¥•à¤ªà¥•à¤°à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤·à¤·à¥•à¤ à¥ á¹£aá¹£á¹-hÄ« à¤µà¤¿à¤

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Lecture 30 - à¤¤à¤¤à¥•à¤ª à¥•à¤° à¥•à¤· à¤¸à¤®à¤¾à¤¸ tatpuruá¹£a samÄ•sa-à¤·à¤·à¥•à¤ à¥ á¹£aá¹£á¹-hÄ« à¤µà¤¿à¤
Lecture 31 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 1
Lecture 32 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 2, (à¤¦à¥•à¤µà¤¿à¤ à¥• dvigu)
Lecture 33 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 3
Lecture 34 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 4
Lecture 35 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 5
Lecture 36 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 6
Lecture 37 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 7
Lecture 38 - à¤ à¤°à¥•à¤®à¤§à¤¾à¤°à¤¯ karmadhÄ•raya - 8
Lecture 39 - à¤•à¤ à¤¦à¥ à¤¶à¤¿à¤¸à¥à¤¯ ekadeÅ isamÄ•sa + à¤¨à¤ à¥• à¤¤à¤¤à¥•à¤ª à¥•à¤° à¥•à¤· à¤¸à¤®à¤¾à¤¸
Lecture 40 - à¤ª à¥•à¤° à¤¾à¤¦à¤¿à¤¸à¤®à¤¾à¤¸ prÄ•disamÄ•sa + à¤ à¤¤à¤¿à¤¸à¤®à¤¾à¤¸ gatisamÄ•sa - 1
Lecture 41 - à¤ à¤¤à¤¿à¤¸à¤®à¤¾à¤¸ gatisamÄ•sa - 2
Lecture 42 - à¤ à¤¤à¤¿à¤¸à¤®à¤¾à¤¸ gatisamÄ•sa - 3
Lecture 43 - à¤ à¤¤à¤¿à¤¸à¤®à¤¾à¤¸ gatisamÄ•sa - 3
Lecture 44 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 1
Lecture 45 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 2
Lecture 46 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 3
Lecture 47 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 4
Lecture 48 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 5
Lecture 49 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 6
Lecture 50 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 7
Lecture 51 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 8
Lecture 52 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 9
Lecture 53 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 10
Lecture 54 - à¤ à¤ª à¤ª à¤¦à¤¸à¤®à¤¾à¤¸ upapadasamÄ•sa - 11
Lecture 55 - à¤¸à¤®à¤¾à¤¸à¤¸à¥•à¤¤à¤ª à¥•à¤°à¤¤à¥•à¤¯à¤ samÄ•sÄ•ntapratyaya - 1
Lecture 56 - à¤¸à¤®à¤¾à¤¸à¤¸à¥•à¤¤à¤ª à¥•à¤°à¤¤à¥•à¤¯à¤ samÄ•sÄ•ntapratyaya - I
Lecture 57 - à¤¸à¤®à¤¾à¤¸à¤¸à¥•à¤¤à¤ª à¥•à¤°à¤¤à¥•à¤¯à¤ samÄ•sÄ•ntapratyaya - II
Lecture 58 - à¤ª à¥ à¤°à¥•à¤µà¤ª à¤¦à¤¾à¤¨ pÅ«rvapadakÄ•rya
Lecture 59 - à¤¸à¥•à¤µà¤° à¤¾à¤°à¥•à¤¯ svarakÄ•rya
Lecture 60 - Examples

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NPTEL Video Course - Humanities and Social Sciences - NOC:à¤¸à¤®à¤¾à¤¸ SamÄ•sa in PÄ•á¹ inian Grammar - II

Subject Co-ordinator - Prof. Malhar Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the contents of the course
Lecture 2 - General features of the à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ avyayÄ«bhÄ•va, à¤¬à¤¹à¥•à¤µà¥•à¤°à¥ à¤¹à¤¿ ba
Lecture 3 - Basics of the theory of compound formation in PÄ•á¹ inian grammar
Lecture 4 - Meaning of the term à¤¸à¤®à¤¾à¤¸ samÄ•sa
Lecture 5 - à¤¸à¤®à¤¾à¤¸ samÄ•sa and the process of speech production as described in the PÄ•á¹ inian grammar
Lecture 6 - à¤ à¤°à¥•à¤¥ artha and introduction to à¤ à¤¾à¤°à¤ karaka
Lecture 7 - 6 à¤ à¤¾à¤°à¤ s karakas
Lecture 8 - Introduction to à¤¸à¤®à¤°à¥•à¤¥ samartha
Lecture 9 - Explanation of à¤¸à¤®à¤°à¥•à¤¥ samartha
Lecture 10 - à¤¸à¤¾à¤®à¤°à¥•à¤¥à¥•à¤ sÄ•marthya
Lecture 11 - à¤•à¤ à¤¾à¤°à¥•à¤¥à¥ à¤-à¤¾à¤µ ekÄ•rthÄ«bhÄ•va and its three features
Lecture 12 - à¤ à¤¸à¤®à¤°à¥•à¤¥à¤¸à¤®à¤¾à¤¸ asamarthasamÄ•sa
Lecture 13 - Basic terms and processes of compounding
Lecture 14 - Steps in the process of Compounding
Lecture 15 - Rules of compounding in PÄ•á¹ inian grammar - 1
Lecture 16 - Rules of compounding in PÄ•á¹ inian grammar - 2
Lecture 17 - Rules of compounding in PÄ•á¹ inian grammar - 3
Lecture 18 - Rules of compounding in PÄ•á¹ inian grammar - 4
Lecture 19 - Rules of compounding in PÄ•á¹ inian grammar - 5
Lecture 20 - General remarks on compounding and historical development of Sanskrit Language
Lecture 21 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ avyayÄ«bhÄ•va samÄ•sa â Genral information
Lecture 22 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 23 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 24 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 25 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 26 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 27 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 28 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 29 - à¤ à¤µà¥•à¤¯à¤ à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¾à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na

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Lecture 30 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 31 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 32 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 33 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 34 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 35 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 36 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ avyayÄ«bhÄ•va samÄ•sa vidhÄ•na
Lecture 37 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤à¤¾à¥•à¤°à¤¤à¤¥à¥•à¤¯à¤¯ à¤µà¤¿à¤§
Lecture 38 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤à¤¾à¥•à¤°à¤¤à¤¥à¥•à¤¯à¤¯ à¤µà¤¿à¤§
Lecture 39 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤à¤¾à¥•à¤°à¤¤à¤¥à¥•à¤¯à¤¯ à¤µà¤¿à¤§
Lecture 40 - à¤ à¤µà¥•à¤¯à¤¯à¥ à¤-à¤¾à¤µ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤à¤¾à¥•à¤°à¤¤à¤¥à¥•à¤¯à¤¯ à¤µà¤¿à¤§
Lecture 41 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na- General inf
Lecture 42 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 43 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 44 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 45 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 46 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 47 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 48 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 49 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 50 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 51 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ bahuvrÄ«hi samÄ•savidhÄ•na
Lecture 52 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤à¤¾à¥•à¤°à¤¤à¤¥à¥•à¤¯à¤¯ bahuvrÄ«hi samÄ•sÄ•nta
Lecture 53 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤à¤¾à¥•à¤°à¤¤à¤¥à¥•à¤¯à¤¯ bahuvrÄ«hi samÄ•sÄ•nta
Lecture 54 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤à¤¾à¥•à¤°à¤¤à¤¥à¥•à¤¯à¤¯ bahuvrÄ«hi samÄ•sÄ•nta
Lecture 55 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤-à¤ à¤¦à¥ à¤¶ bahuvrÄ«hi samÄ•sÄ•nta-Ä•deÅ a
Lecture 56 - à¤¬à¤¹à¥•à¤µà¥•à¤° à¤¹à¤¿ à¤¸à¤®à¤¾à¤¸ à¤¸à¤®à¤¾à¤¸à¥à¤•à¥•à¤¤-à¤ à¤¦à¥ à¤¶ bahuvrÄ«hi samÄ•sÄ•nta-Ä•deÅ a
Lecture 57 - à¤¦à¥•à¤µà¤¨à¥•à¤¦à¥•à¤µ à¤¸à¤®à¤¾à¤¸ à¤µà¤¿à¤§à¤¿à¤¨ dvandva samÄ•sa vidhÄ•na
Lecture 58 - à¤¦à¥•à¤µà¤¨à¥•à¤¦à¥•à¤µ à¤¸à¤®à¤¾à¤¸ dvandva samÄ•sa à¤¸à¤®à¤¾à¤¸à¤¾à¥•à¤¤à¤ªà¥•à¤°à¤¤à¥
Lecture 59 - à¤¦à¥•à¤µà¤¨à¥•à¤¦à¥•à¤µ à¤¸à¤®à¤¾à¤¸ dvandva samÄ•sa à¤•à¤ à¤µà¤¦à¥•à¤-à¤¾à¤µ ekavadbhÄ•va
Lecture 60 - à¤¦à¥•à¤µà¤¨à¥•à¤¦à¥•à¤µ à¤¸à¤®à¤¾à¤¸ dvandva samÄ•sa à¤•à¤ à¤µà¤¦à¥•à¤-à¤¾à¤µ ekavadbhÄ•va,à¤²à¤

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NPTEL Video Course - Humanities and Social Sciences - NOC:Text, Texuality and Digital Media

Subject Co-ordinator - Prof. Arjun Ghosh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Marshall McLuhan
Lecture 3 - Marshall McLuhan
Lecture 4 - Marshall McLuhan
Lecture 5 - Walter Ong
Lecture 6 - Walter Ong
Lecture 7 - Walter Ong
Lecture 8 - Dastangoi
Lecture 9 - Dastangoi
Lecture 10 - Manuscript Culture
Lecture 11 - Manuscript Culture
Lecture 12 - Feudalism to Capitalism
Lecture 13 - Febre and Martin
Lecture 14 - Guteberg and Revolution 15th Century
Lecture 15 - Consequences of Print 16-17 Century
Lecture 16 - John Dryden
Lecture 17 - Robert Darnton
Lecture 18 - Benedict Anderson
Lecture 19 - Colonialism
Lecture 20 - Print in Bengal
Lecture 21 - Surveillance and Censorship
Lecture 22 - Rise of the Telugu Novel
Lecture 23 - Publishing in Hindi and Urdu
Lecture 24 - Walter Benjamin
Lecture 25 - Raymond Williams
Lecture 26 - Jay David Bolter
Lecture 27 - Robert Coover
Lecture 28 - Robert Coover
Lecture 29 - N. katherine Hayles

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Lecture 30 - Richard Stallman
Lecture 31 - Lawrence Lessig
Lecture 32 - Copyright - Part 1
Lecture 33 - Copyright - Part 2
Lecture 34 - Nicholas Carr
Lecture 35 - Scott Galloway
Lecture 36 - Zeynep Tufecki
Lecture 37 - Zeynep Tufecki
Lecture 38 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Positive Psychology

Subject Co-ordinator - Prof. Kamlesh Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Psychology
Lecture 2 - Introduction to Positive Psychology
Lecture 3 - Research Methods
Lecture 4 - Character Strengths and Virtues/Positive Personality Traits - Part 1
Lecture 5 - Character Strengths and Virtues/Positive Personality Traits - Part 2
Lecture 6 - Character Strengths and Virtues/Positive Personality Traits - Part 3
Lecture 7 - Happiness and Well-Being - Part 1
Lecture 8 - Happiness and Well-Being - Part 2
Lecture 9 - Happiness and Well-Being - Part 3
Lecture 10 - Positive Emotional States and Processes - Part 1
Lecture 11 - Positive Emotional States and Processes - Part 2
Lecture 12 - Hope and Optimism
Lecture 13 - Self and related Concepts
Lecture 14 - Resilience
Lecture 15 - Flow
Lecture 16 - Mindfulness
Lecture 17 - Spirituality, Grit and Mindset
Lecture 18 - Minding and Compassion
Lecture 19 - Forgiveness, Humanity and Gratitude
Lecture 20 - Love, Empathy and Altruism
Lecture 21 - Recent Trends and Directions In Positive Psychology - Part 1
Lecture 22 - Recent Trends and Directions In Positive Psychology - Part 2
Lecture 23 - Recent Trends and Directions In Positive Psychology - Part 3

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NPTEL Video Course - Humanities and Social Sciences - NOC:Science Communication: Research Productivity and Da

Subject Co-ordinator - Prof. Nabi Hasan, Prof. Mohit Garg

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Science Communication
Lecture 2 - Channels of Science Communication
Lecture 3 - Open Science and Open Access
Lecture 4 - Open Research Data and Open Peer Review
Lecture 5 - Overview of Tools for Maximizing Academic Visibility and Impact of Research Output
Lecture 6 - Understanding Research Metrices: Author, Journal and Article Level Metrices
Lecture 7 - Abstract and Citation Database Scopus
Lecture 8 - Abstract and Citation Database: Web of Science
Lecture 9 - Health Science Database: PubMed
Lecture 10 - Free Academic Search Engine: Google Scholar
Lecture 11 - Installation of R
Lecture 12 - Installation of RStudio
Lecture 13 - Object and different types
Lecture 14 - Vector and Data Frame
Lecture 15 - Lists, Matrices, Factor, Array
Lecture 16 - Packages and Help
Lecture 17 - Science communication and different metrices
Lecture 18 - Lotka's law
Lecture 19 - Bradford's law
Lecture 20 - Zipf's Law
Lecture 21 - Descriptive Analysis - I
Lecture 22 - Descriptive Analysis - II
Lecture 23 - Descriptive Analysis - III
Lecture 24 - Analysis of Bradford and Lotka Law
Lecture 25 - Science Mapping - I
Lecture 26 - Science Mapping - II
Lecture 27 - Data Visualization: An overview, history and skills for researchers
Lecture 28 - Data Visualization: Types, tools and technologies
Lecture 29 - Visualization of Scientific Research Patterns and Trends with VOSviewer and CiteSpace

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Lecture 30 - Text Mining - Introduction
Lecture 31 - Regular Expression
Lecture 32 - Text Pre-processing
Lecture 33 - Topic Modeling
Lecture 34 - THE, QS, Sanghai (ARWU) and (NIRF) Ranking
Lecture 35 - Academic Integrity and Ethical Guidelines in Science Communication
Lecture 36 - IPR/Copyright Issues and Practices in Print and Digital Environment
Lecture 37 - Predatory Publishing: Issues, Challenges and the Road Ahead
Lecture 38 - Case Study #1 Subject Domain
Lecture 39 - Case Study #2 Author
Lecture 40 - Case Study #3 Journal and Institution

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NPTEL Video Course - Humanities and Social Sciences - Cultural Studies

Subject Co-ordinator - Dr. Liza Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Cultural Studies - Part 1
Lecture 2 - Understanding Cultural Studies - Part 2
Lecture 3 - Evolution and Culture
Lecture 4 - Evolutionary Psychology
Lecture 5 - The Modern Mind
Lecture 6 - Memetics
Lecture 7 - Cultural Theory
Lecture 8 - Marxism - Part 1
Lecture 9 - Marxism - Part 2
Lecture 10 - Poststructuralism
Lecture 11 - Subjectivity
Lecture 12 - Identity
Lecture 13 - Ideology - Part 1
Lecture 14 - Ideology - Part 2
Lecture 15 - Representation - Part 1
Lecture 16 - Representation - Part 2
Lecture 17 - Power
Lecture 18 - Discourse
Lecture 19 - Gender - Part 1
Lecture 20 - Gender - Part 2
Lecture 21 - The Body
Lecture 22 - Space
Lecture 23 - Time
Lecture 24 - Development
Lecture 25 - Language
Lecture 26 - Ethnicity, Race and Nation
Lecture 27 - Globalisation
Lecture 28 - Consumption - Part 1
Lecture 29 - Consumption - Part 2

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Lecture 30 - Biology
Lecture 31 - Culture Industry
Lecture 32 - Commodity
Lecture 33 - Media
Lecture 34 - Television
Lecture 35 - New Media
Lecture 36 - Science, Technology and Culture
Lecture 37 - Cyberculture
Lecture 38 - Cultural Policy
Lecture 39 - Critiquing Cultural Studies
Lecture 40 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - English Language and Literature

Subject Co-ordinator - Dr. Krishna Barua, Dr. Liza Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - The Scope of English Studies
Lecture 3 - The English Language
Lecture 4 - International English
Lecture 5 - The Globalization of English
Lecture 6 - World Englishes
Lecture 7 - The Rise of Cultural Studies
Lecture 8 - Old English
Lecture 9 - Middle English
Lecture 10 - Early Modern English
Lecture 11 - Modern English - 1
Lecture 12 - Modern English - 2
Lecture 13 - The Age of Chaucer
Lecture 14 - The Age of Shakespeare
Lecture 15 - Milton and his Times
Lecture 16 - The Augustans
Lecture 17 - The Romantics
Lecture 18 - The Victorians
Lecture 19 - Modern Literature
Lecture 20 - The Novel
Lecture 21 - Poetry
Lecture 22 - Drama
Lecture 23 - Essay
Lecture 24 - Short story
Lecture 25 - Biography
Lecture 26 - Autobiography
Lecture 27 - History Of English Language
Lecture 28 - Marxist Literary Criticism
Lecture 29 - Feminist Criticism

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Lecture 30 - Structuralist Criticism
Lecture 31 - Poststructuralism
Lecture 32 - Postcolonialism
Lecture 33 - Cognitive Approaches To Literature
Lecture 34 - Classical Criticism
Lecture 35 - Liberal Humanism
Lecture 36 - Reader-response Criticism
Lecture 37 - New Historicism
Lecture 38 - Ecocriticism

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NPTEL Video Course - Humanities and Social Sciences - Game Theory for Economists

Subject Co-ordinator - Dr. Debarshi Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition of Game Theory and Rational Choice
Lecture 2 - Interacting Decision Makers
Lecture 3 - Strategic Games
Lecture 4 - Matching Pennies, Stag Hunt and Nash Equilibrium
Lecture 5 - Examples of Nash Equilibrium
Lecture 6 - Altruism and Prisonerâ s Dilemma
Lecture 7 - Variants Stag Hunt Game, Hawk Dove and Coordination Game
Lecture 8 - Public Good Provision, Strict Nash Equilibrium
Lecture 9 - Best Response Functions
Lecture 10 - Strictly and Weakly Dominated Action
Lecture 11 - Application of Weak Domination
Lecture 12 - Symmetric Games and Symmetric Equilibrium
Lecture 13 - Cournot Model of Oligopoly
Lecture 14 - Different Aspects of Cournot Model
Lecture 15 - Further Aspects of Cournot Model
Lecture 16 - Cournot & Bertrand Models
Lecture 17 - Different Aspects of Bertrand Model
Lecture 18 - Electoral Competition 1
Lecture 19 - Different Aspects of Hotelling Model
Lecture 20 - Hotteling Model
Lecture 21 - War of Attrition
Lecture 22 - Second Price Sealed Bid Auction
Lecture 23 - Further Aspects of Second Price Auction
Lecture 24 - First Price Auction
Lecture 25 - All Pay Auction, Multi Unit Auction
Lecture 26 - Accident Laws
Lecture 27 - Mixed Strategy Nash Equilibrium
Lecture 28 - Mixed Strategy, Mixed Strategy Equilibrium
Lecture 29 - Mixed Strategy Equilibrium

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Lecture 30 - Characterisation of Mixed Strategy Equilibrium
Lecture 31 - Dominated Actions and Iterated Elimination
Lecture 32 - Rationalisability and Beliefs
Lecture 33 - Extensive Games
Lecture 34 - Strategy and Equilibrium
Lecture 35 - Nash Equilibrium and Its Problems
Lecture 36 - Subgame Perfect Nash Equilibrium
Lecture 37 - Backward Induction
Lecture 38 - Backward Induction
Lecture 39 - Ultimatum Game
Lecture 40 - Stackelberg Duopoly Model

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NPTEL Video Course - Humanities and Social Sciences - NOC:Digital Human Modeling and Simulation for Virtual E

Subject Co-ordinator - Dr. Sougata Karmakar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ergonomics
Lecture 2 - Notes 1
Lecture 3 - Use of percentile anthropometric and biomechanical data for product design - Part I
Lecture 4 - Use of percentile anthropometric and biomechanical data for product design - Part II
Lecture 5 - Use of percentile anthropometric and biomechanical data for product design - Part III
Lecture 6 - Use of percentile anthropometric and biomechanical data for product design - Part IV
Lecture 7 - Notes 2
Lecture 8 - Virtual Ergonomics and its Advantages
Lecture 9 - Notes 3
Lecture 10 - Introduction of Digital Human Modeling (DHM) and Simulation
Lecture 11 - Notes 4
Lecture 12 - Techniques/Process of virtual ergonomics evaluation using DHMs - Part A (Part I)
Lecture 13 - Notes 5
Lecture 14 - Techniques/Process of virtual ergonomics evaluation using DHMs - Part B (Part I)
Lecture 15 - Techniques/Process of virtual ergonomics evaluation using DHMs - Part B (Part II)
Lecture 16 - Techniques/Process of virtual ergonomics evaluation using DHMs - Part B (Part III)
Lecture 17 - Notes 6
Lecture 18 - Application of Digital Human Modeling and Simulation in various Industrial Sectors - Part I
Lecture 19 - Application of Digital Human Modeling and Simulation in various Industrial Sectors - Part II
Lecture 20 - Notes 7
Lecture 21 - Future research avenues and steps to be taken towards widespread - Part I
Lecture 22 - Future research avenues and steps to be taken towards widespread - Part II
Lecture 23 - Future research avenues and steps to be taken towards widespread - Part III
Lecture 24 - Notes 8

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NPTEL Video Course - Humanities and Social Sciences - NOC:Science, Technology and Society

Subject Co-ordinator - Dr. Sambit Mallick

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Cognitive Dimensions - I
Lecture 2 - Cognitive Dimensions - II
Lecture 3 - Ethical Dimensions
Lecture 4 - Inductivism and Hypothesism - I
Lecture 5 - Inductivism and Hypothesism - II
Lecture 6 - Positivism - I
Lecture 7 - Positivism - II
Lecture 8 - Karl Popper - I
Lecture 9 - Karl Popper - II
Lecture 10 - Thomas Kuhn
Lecture 11 - Popper versus Kuhn
Lecture 12 - Paul Feyerabend
Lecture 13 - Rewards and Recognitions - I
Lecture 14 - Rewards and Recognitions - II
Lecture 15 - Rewards and Recognitions - III
Lecture 16 - Cumulative Advantage and Symbolism of Intellectual Property - I
Lecture 17 - Cumulative Advantage and Symbolism of Intellectual Property - II
Lecture 18 - Cumulative Advantage and Symbolism of Intellectual Property - III
Lecture 19 - Max Weber
Lecture 20 - Preliminary Exercise and Explanation
Lecture 21 - Edwin Layton Jr.
Lecture 22 - Langdon Winner - I
Lecture 23 - Langdon Winner - II
Lecture 24 - Langdon Winner - III
Lecture 25 - Donald MacKenzie and Judy Wajcman - I
Lecture 26 - Donald MacKenzie and Judy Wajcman - II
Lecture 27 - Thomas Edison
Lecture 28 - Capitalism, class, gender, city, machine, workplace - I
Lecture 29 - Capitalism, class, gender, city, machine, workplace - II

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Lecture 30 - Capitalism, class, gender, city, machine, workplace - III
Lecture 31 - Alvin Toffler and Daniel Bell
Lecture 32 - Themes and Factors of Information Technology
Lecture 33 - Information Technology and Reconceptualization of Class
Lecture 34 - Reception of Modern Science in India
Lecture 35 - Science Policies in India
Lecture 36 - Summary of the Course

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NPTEL Video Course - Humanities and Social Sciences - NOC:Gender and Literature

Subject Co-ordinator - Prof. Avishek Parui

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Brief Overview of the Course
Lecture 2 - Performativity and Embodiment
Lecture 3 - The Chess Players - Part 1
Lecture 4 - The Chess Players - Part 2
Lecture 5 - Shooting an Elephant - Part 1
Lecture 6 - Shooting an Elephant - Part 2
Lecture 7 - Heart of Darkness - Part 1
Lecture 8 - Heart of Darkness - Part 2
Lecture 9 - Heart of Darkness - Part 3
Lecture 10 - The Fly - Part 1
Lecture 11 - The Fly - Part 2
Lecture 12 - Look Back in Anger - Part 1
Lecture 13 - Look Back in Anger - Part 2
Lecture 14 - Look Back in Anger - Part 3
Lecture 15 - Look Back in Anger - Part 4
Lecture 16 - Look Back in Anger - Part 5
Lecture 17 - Look Back in Anger - Part 6
Lecture 18 - Gender and Popular Culture Lecture - 1
Lecture 19 - Gender and Popular Culture Lecture = 2
Lecture 20 - Gender and Popular Culture Lecture - 3
Lecture 21 - Gender and Popular Culture Final Lecture

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NPTEL Video Course - Humanities and Social Sciences - NOC:Ecology and Society

Subject Co-ordinator - Prof. Ngamjahao Kipgen

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Ecology and Society - 1
Lecture 2 - Ecology and Society - 2
Lecture 3 - Culture and Cultural Ecology
Lecture 4 - Cultural Ecology and Eocnomic
Lecture 5 - Cultural Ecological Theory
Lecture 6 - Human Ecology
Lecture 7 - Human Ecology - Theoretical Approach
Lecture 8 - Ecological Anthropology
Lecture 9 - Ecosystem-based and Actor-based Model of Human Ecology
Lecture 10 - Nature and Culture Debate
Lecture 11 - Nature - A Contested Concept
Lecture 12 - Conceptions of Nature
Lecture 13 - Contested Domains and Boundaries of Culture
Lecture 14 - MCQs Discussion
Lecture 15 - Paradigms in Humanâ Environmental Relations - Part I
Lecture 16 - Paradigms in Humanâ Environmental Relations - Part II
Lecture 17 - Nature, Culture, Magic and Science
Lecture 18 - Religion, Nature and Environment
Lecture 19 - Religion, Nature and Environment Continue
Lecture 20 - The Historical Roots of our Ecological Crisis
Lecture 21 - Biodiversity Conservation Ethics in Buddhism
Lecture 22 - Hinduism and Nature Conservation, Christian Religion Response to Ecological Crisis
Lecture 23 - Hinduism and Nature Conservation, Christian Religion Response to Ecological Crisis
Lecture 24 - Deep Ecology
Lecture 25 - Social Ecology
Lecture 26 - Ecological Feminist Philosophies
Lecture 27 - Indigenous Knowledge
Lecture 28 - Ecological Journey
Lecture 29 - Kuki Jhumming Practices

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Lecture 30 - Debates on Shifting Cultivation
Lecture 31 - Course Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sociological Perspectives on Modernity

Subject Co-ordinator - Dr. Sambit Mallick

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thematic Preliminaries - I
Lecture 2 - Thematic Preliminaries - II
Lecture 3 - Thematic Preliminaries - III
Lecture 4 - Sociological Modernism
Lecture 5 - Sociological Modernism
Lecture 6 - Sociological Modernism
Lecture 7 - Sociological Modernism
Lecture 8 - Sociological Modernism
Lecture 9 - Sociological Modernism
Lecture 10 - Sociological Modernism
Lecture 11 - Sociological Modernism
Lecture 12 - Structuralist Interpretation - I
Lecture 13 - Structuralist Interpretation - II
Lecture 14 - Structuralist Interpretation - III
Lecture 15 - Western Marxism - I
Lecture 16 - Western Marxism - II
Lecture 17 - Modernity and Social Theory - I
Lecture 18 - Modernity and Social Theory - II
Lecture 19 - Modernity and Social Theory - III
Lecture 20 - Modernity and Social Theory - IV
Lecture 21 - Deconstruction of Modernity
Lecture 22 - Deconstruction of Modernity
Lecture 23 - Deconstruction of Modernity
Lecture 24 - Deconstruction of Modernity
Lecture 25 - Deconstruction of Modernity
Lecture 26 - Deconstruction of Modernity
Lecture 27 - A New Totality - I
Lecture 28 - A New Totality - II
Lecture 29 - Modernity in India

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Lecture 30 - What have we discussed?

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Cognitive Psychology

Subject Co-ordinator - Prof. Naveen Kashyap

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Brief History of Cognitive Psychology - 1
Lecture 2 - A Brief History of Cognitive Psychology - 2
Lecture 3 - Studying Cognition
Lecture 4 - Perception
Lecture 5 - Models of Perception - 1
Lecture 6 - Models of Perception - 2
Lecture 7 - Basic Attention Processes
Lecture 8 - Models of Attention
Lecture 9 - Automization and Attention
Lecture 10 - Memory Introduction
Lecture 11 - Short Term Memory
Lecture 12 - Working Memory
Lecture 13 - Long-Term Memory Encoding
Lecture 14 - Retrieval from Long-Term Memory
Lecture 15 - Semantic Memory Basics
Lecture 16 - Models of Semantic Memory
Lecture 17 - Introducing Concepts and Categories - 1
Lecture 18 - Introducing Concepts and Categories - 2
Lecture 19 - Basics of Visual Memory
Lecture 20 - Object Transformation in Visual Memory
Lecture 21 - Basic Issues in Language
Lecture 22 - Comprehension and Understanding of Language
Lecture 23 - Introduction to Problem Solving
Lecture 24 - Factors Influencing Problem Solving
Lecture 25 - Insight and Creativity
Lecture 26 - Reasoning - 1
Lecture 27 - Reasoning - 2
Lecture 28 - Classical Theory of Decision Making
Lecture 29 - Prospect Theory of Decision Making

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Lecture 30 - Course Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Modern Indian Political Thought

Subject Co-ordinator - Prof. Mithilesh Kumar Jha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Raja Rammohan Roy
Lecture 3 - Raja Rammohan Roy
Lecture 4 - Raja Rammohan Roy
Lecture 5 - Rabindranath Tagore
Lecture 6 - Rabindranath Tagore
Lecture 7 - Rabindranath Tagore
Lecture 8 - Aurobindo Ghosh
Lecture 9 - Aurobindo Ghosh
Lecture 10 - Vivekananda
Lecture 11 - Vivekananda
Lecture 12 - Mahatma Gandhi
Lecture 13 - Mahatma Gandhi
Lecture 14 - Mahatma Gandhi
Lecture 15 - Muhammad Iqbal
Lecture 16 - Muhammad Iqbal
Lecture 17 - Savarkar
Lecture 18 - Savarkar
Lecture 19 - Jawaharlal Nehru
Lecture 20 - Jawaharlal Nehru
Lecture 21 - Jawaharlal Nehru
Lecture 22 - B.R.Ambedkar
Lecture 23 - B.R.Ambedkar
Lecture 24 - B.R.Ambedkar
Lecture 25 - Pandita Ramabai
Lecture 26 - Pandita Ramabai
Lecture 27 - Rammanohar Lohia
Lecture 28 - Rammanohar Lohia
Lecture 29 - Rammanohar Lohia

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Lecture 30 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Consumer Psychology

Subject Co-ordinator - Prof. Naveen Kashyap

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Consumer Psychology - I
Lecture 2 - Introduction to Consumer Psychology - II
Lecture 3 - Problem Recognition - I
Lecture 4 - Problem Recognition - II
Lecture 5 - Alternate Evaluation - I
Lecture 6 - Alternate Evaluation - II
Lecture 7 - Alternate Evaluation - III
Lecture 8 - Post Purchase and Consumption - I
Lecture 9 - Post Purchase and Consumption - II
Lecture 10 - Perception and Cognition - I
Lecture 11 - Perception and Cognition - II
Lecture 12 - Memory and Learning - I
Lecture 13 - Memory and Learning - II
Lecture 14 - Emotion Motivation and Mood - I
Lecture 15 - Emotion Motivation and Mood - II
Lecture 16 - Attitude and Attitude Change - I
Lecture 17 - Attitude and Attitude Change - II
Lecture 18 - Communication and Persuassion - I
Lecture 19 - Communication and Persuassion - II
Lecture 20 - Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Modern Indian Drama

Subject Co-ordinator - Prof. Kiran Keshavamurthy

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sanskrit and National Theatre
Lecture 2 - History of Parsi Theatre and Female Impersonation
Lecture 3 - Female Impersonation and Indian Folk Traditions
Lecture 4 - Early Indian Playwrights
Lecture 5 - Silence! The Court is in Session
Lecture 6 - A Friend's Story
Lecture 7 - Ghashiram Kotwal
Lecture 8 - Kanyadaan
Lecture 9 - Hayavadana
Lecture 10 - Tughlaq
Lecture 11 - The Dreams of Tipu Sultan
Lecture 12 - The Fire and the Rain
Lecture 13 - Broken Images
Lecture 14 - Summary
Lecture 15 - Introduction and Garbo
Lecture 16 - Old Stone Mansion
Lecture 17 - Desire in the Rocks
Lecture 18 - Sonata
Lecture 19 - Summary of Mahesh Elkunchwar
Lecture 20 - Introduction and Final Solutions
Lecture 21 - Bravely Fought the Queen
Lecture 22 - Dance Like a Man
Lecture 23 - Summary of Mahesh Dattani
Lecture 24 - Introduction and Procession
Lecture 25 - Bhoma
Lecture 26 - Stale News and Summary
Lecture 27 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Political Theory

Subject Co-ordinator - Prof. Mithilesh Kumar Jha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Outline and methods
Lecture 2 - Political theories and ideologies
Lecture 3 - Liberty
Lecture 4 - Freedom as autonomy;Positive and negative liberty
Lecture 5 - Freedom as Swaraj, Free speech and hate speech
Lecture 6 - Introduction
Lecture 7 - Equality of opportunity; preferential treatment
Lecture 8 - Luck Egalitarianism and its critiques; Equality and Liberty
Lecture 9 - Introduction and forms of rights
Lecture 10 - Conflicts between rights
Lecture 11 - Rights and Duties
Lecture 12 - Justice
Lecture 13 - Justice
Lecture 14 - Justice
Lecture 15 - Justice
Lecture 16 - Introduction to Power and authority
Lecture 17 - Power, legitimacy and hegemony
Lecture 18 - Power and knowledge; different conceptions of power
Lecture 19 - Introduction and different conceptions of state and sovereignty
Lecture 20 - Modern nation state; liberal, Marxist and feminist conceptions of state
Lecture 21 - State and governmentality
Lecture 22 - Introduction
Lecture 23 - Various models of democracy
Lecture 24 - Challenges and Limits of Democracy; Free press and Democracy
Lecture 25 - Citizenship
Lecture 26 - T H Marshal and liberal conceptions of citizenship as legal and equal member
Lecture 27 - Muliticulturalism and Cosmopolitan Citizenship
Lecture 28 - Introduction; Doom and Gloom; Democracy and environmental crisis
Lecture 29 - Climate change and environmental justice

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Lecture 30 - Revisiting some key themes and concepts

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NPTEL Video Course - Humanities and Social Sciences - NOC:Human Behaviour

Subject Co-ordinator - Prof. Naveen Kashyap

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Science of Human Behavior - I
Lecture 2 - Introduction to the Science of Human Behavior - II
Lecture 3 - Sensation - I
Lecture 4 - Sensation - II
Lecture 5 - Perception - I
Lecture 6 - Perception - II
Lecture 7 - Learning - I
Lecture 8 - Learning - II
Lecture 9 - Memory - I
Lecture 10 - Memory - II
Lecture 11 - Language - I
Lecture 12 - Language - II
Lecture 13 - Intelligence - I
Lecture 14 - Intelligence - II
Lecture 15 - Emotion - I
Lecture 16 - Emotion - II
Lecture 17 - Personality - I
Lecture 18 - Personality - II
Lecture 19 - Social Influence and Cognition - I
Lecture 20 - Social Influence and Cognition - II
Lecture 21 - Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Psychology of Language

Subject Co-ordinator - Prof. Naveen Kashyap

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Communication and Language - I
Lecture 2 - Communication and Language - II
Lecture 3 - Science of Language - I
Lecture 4 - Science of Language - II
Lecture 5 - Speech Perception - I
Lecture 6 - Speech Perception - II
Lecture 7 - Speech Production - I
Lecture 8 - Speech Production - II
Lecture 9 - Words - I
Lecture 10 - Words - II
Lecture 11 - Words - III
Lecture 12 - Sentences - I
Lecture 13 - Sentences - II
Lecture 14 - Discourse - I
Lecture 15 - Discourse - II
Lecture 16 - Reading and Writing - I
Lecture 17 - Reading and Writing - II
Lecture 18 - Bilinguilism - I
Lecture 19 - Bilinguilism - II
Lecture 20 - Overall Review

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NPTEL Video Course - Humanities and Social Sciences - NOC:Development Research Methods

Subject Co-ordinator - Prof. Rajshree Bedamatta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Reflections on Development Studies and Development Research
Lecture 2 - Types, Forms, and Processes of Development Studies Research
Lecture 3 - The Rigour in Development Studies Research
Lecture 4 - Paradigms of Development Research
Lecture 5 - Development Research-Development Work Continuum and Action Research in Development Studies
Lecture 6 - Ethics in Development Studies and Development Research
Lecture 7 - Literature Study
Lecture 8 - A General Lecture based on M.N. Srinivas's The Fieldworker and the Field
Lecture 9 - Introducing Qualitative Research Methods
Lecture 10 - Introducing Qualitative Research Methods (Continued...)
Lecture 11 - Interviews and Focus Group Discussions
Lecture 12 - Participatory Methods and Approaches
Lecture 13 - Conducting Case Studies and Maintaining Field Diaries
Lecture 14 - Introducing Quantitative Research Methods
Lecture 15 - An Overview of Mixed Methods Research
Lecture 16 - Field Surveys and Inventories
Lecture 17 - Logical Framwork and SWOT Analysis
Lecture 18 - The importance of Census and other Secondary Data in Development Studies
Lecture 19 - Communicating Research
Lecture 20 - Operationalizing Rights-based Approaches to Development
Lecture 21 - Poverty Measures and Analysis
Lecture 22 - Gender-sensitive Indicators and Gender Analysis
Lecture 23 - Social Capital Assessment Tools
Lecture 24 - Moitoring and Evaluation
Lecture 25 - A Final Note

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Business History

Subject Co-ordinator - Prof. Vipul Dutta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and General Outline
Lecture 2 - Sources and Methodology to Study Indian Business History
Lecture 3 - East India Company's early ventures in India
Lecture 4 - Agency Houses
Lecture 5 - Emergence of Bombay and Cotton Trade, 1750-1850
Lecture 6 - Indian Business
Lecture 7 - Emergence of Calcutta
Lecture 8 - Swadeshi Movement
Lecture 9 - Case Studies
Lecture 10 - Indian Economy and Business during WW I
Lecture 11 - Impact of the Second World War WW II
Lecture 12 - Political Economy of the Global wars for India; Case Study
Lecture 13 - Impact of Independence and Partition
Lecture 14 - Planning, Statistics and Industrialization Policies
Lecture 15 - Global Currents of economic Thought, 1947-1960
Lecture 16 - Industrial Licensing Policies, Institutions 1947-1964
Lecture 17 - Industrial Licensing Policies, 1966-1980
Lecture 18 - Case Study
Lecture 19 - Liberalisation of the Indian Economy, 1990s
Lecture 20 - Business Developments in India; Indiaâ s Energy Diplomacy through ONGC
Lecture 21 - Indian Business History
Lecture 22 - Learning Outcomes from Indian Business History

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Western Political Thought

Subject Co-ordinator - Prof. Mithilesh Kumar Jha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Outline and Method
Lecture 2 - Method
Lecture 3 - Intro and Justice
Lecture 4 - State and Philosopher King
Lecture 5 - Communism of Wives and Property and Critical Assessment of his Thought
Lecture 6 - Intro and Ethics or Virtue
Lecture 7 - Politics and His Ideal State
Lecture 8 - Aristotle-III
Lecture 9 - Machiavelli-I
Lecture 10 - Machiavelli-II
Lecture 11 - Machiavelli-III
Lecture 12 - Intro and Human Nature
Lecture 13 - The Leviathan or Sovereign
Lecture 14 - Political Obligation and Critical Assessment of his Thought
Lecture 15 - Intro, State of Nature and Natural Rights
Lecture 16 - Limited Government
Lecture 17 - Right to Dissent and Critical Assessment of his Thought
Lecture 18 - Rousseau-I
Lecture 19 - Rousseau-II
Lecture 20 - Kant-I
Lecture 21 - Kant-II
Lecture 22 - Kant-III
Lecture 23 - Hegel-I
Lecture 24 - Hegel-II
Lecture 25 - Hegel-III
Lecture 26 - Marx-I
Lecture 27 - Marx-II
Lecture 28 - Marx-III
Lecture 29 - Mill-I

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Lecture 30 - Mill-II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Psychology of Stress, Health and Well-being

Subject Co-ordinator - Prof. Dilwar Hussain

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Nature of Stress - 1
Lecture 2 - The Nature of Stress - 2
Lecture 3 - The Biology of Stress
Lecture 4 - Stress, Health, and Non-infectious Diseases
Lecture 5 - Stress and Infectious Diseases
Lecture 6 - Stress and Psychological Disorders
Lecture 7 - Stress, Trauma and Posttraumatic growth - 1
Lecture 8 - Stress, Trauma and Posttraumatic growth - 2
Lecture 9 - Factors Influencing Stress Tolerance
Lecture 10 - Coping Strategies: Definition and Types
Lecture 11 - Unconscious mind and defensive coping
Lecture 12 - Characteristics of constructive coping; Physical ways of coping
Lecture 13 - Coping with relaxation exercises
Lecture 14 - Mental ways of coping
Lecture 15 - Coping with social support
Lecture 16 - Coping with meditation and mindfulness
Lecture 17 - Positive mental health and well-being
Lecture 18 - Well-being and resilience
Lecture 19 - What is happiness? What makes us happy?
Lecture 20 - Socio-demographic factors and happiness
Lecture 21 - Positive emotions
Lecture 22 - Genetic set point and hedonic adaptation
Lecture 23 - Sustainable happiness model
Lecture 24 - Sustainable happiness with intentional activities
Lecture 25 - Cultivating happiness with gratitude
Lecture 26 - Cultivating happiness with acts of kindness
Lecture 27 - Social comparison and happiness
Lecture 28 - Cultivating happiness with signature strengths 1 (VIA character strengths)
Lecture 29 - Cultivating happiness with signature strengths 2 (Gallup's/Clifton strength finder)

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Lecture 30 - Cultivating happiness with Flow
Lecture 31 - Humanistic psychology and self-actualization
Lecture 32 - Self-determination, motivation, and well-being
Lecture 33 - Meaning in life and well-being
Lecture 34 - Life goals and well-being

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NPTEL Video Course - Humanities and Social Sciences - NOC:Phonetics and Phonology: A Broad Overview

Subject Co-ordinator - Prof. Shakuntala Mahanta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Articulation of consonants - 1
Lecture 2 - Articulation of consonants - 2
Lecture 3 - Articulation of vowels
Lecture 4 - Language endangerment and linguistic diversity
Lecture 5 - Linguistic diversity - consonants in the languages of the world
Lecture 6 - Linguistic diversity - consonants and vowels in the languages of the world
Lecture 7 - Linguistic diversity - conclusion
Lecture 8 - Acoustic analysis: sound waves
Lecture 9 - Acoustic analysis: source filter theory and spectrograms
Lecture 10 - Acoustic analysis: vowels and formants
Lecture 11 - Acoustic analysis: formant calculation
Lecture 12 - Perceptual cues, variability in the speech signal, acoustic-phonetic invariance
Lecture 13 - Segmentation problem, categorical perception, cp in infants and animals
Lecture 14 - Measuring perceptual distinctiveness, multidimensional scaling, speech perception theories
Lecture 15 - development of the ideas of phonemes and features
Lecture 16 - phonemes as categories, phonemes in different languages, allophonic rules
Lecture 17 - problems in phonemic analysis, context and phonotactics
Lecture 18 - Psychological reality of phonemes
Lecture 19 - Distinctive features and natural classes
Lecture 20 - Phonological rule application
Lecture 21 - Distinctive features, feature economy and markedness
Lecture 22 - Morphophonological rules
Lecture 23 - Syllables
Lecture 24 - Stress
Lecture 25 - Phonetics and phonology of intonation, microprosody, stylization
Lecture 26 - Nuclear tone, pitch accent and boundary tones
Lecture 27 - Focus, givenness

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NPTEL Video Course - Humanities and Social Sciences - NOC:Philosophical Foundations of Social Research

Subject Co-ordinator - Prof. Sambit Mallick

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Empiricism and Rationalism
Lecture 2 - Comte and Positivism; Epistemology and Ontology
Lecture 3 - The Rules of Sociological Method
Lecture 4 - Sociology of Knowledge
Lecture 5 - Religion and the Division of Labour in Society
Lecture 6 - Positivism and Neo-Kantianism
Lecture 7 - Methodology of the Social Sciences
Lecture 8 - Interpretive Sociology
Lecture 9 - Methodological Individualism and Interpretative Understanding of Social Action
Lecture 10 - Weberian Social Sciences: Methodological Implications
Lecture 11 - Materialist Conception of History
Lecture 12 - Dialectic
Lecture 13 - Nature, Ideology and Science
Lecture 14 - Systematic Falsification
Lecture 15 - Hypothetico - Deductive Model
Lecture 16 - The Structure of Scientific Revolutions
Lecture 17 - Popper Versus Kuhn
Lecture 18 - Positivism Versus Hermeneutics - I
Lecture 19 - Positivism Versus Hermeneutics - II
Lecture 20 - Philosophy of Social Sciences: Taking Stock
Lecture 21 - End of the Philosophy of the Social Sciences
Lecture 22 - Return of Grand Theory in the Human Sciences
Lecture 23 - An Overview of the Course

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sociology of Development

Subject Co-ordinator - Prof. Sambit Mallick

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sociology of development: An overview
Lecture 2 - Development historically
Lecture 3 - Decolonization, nationalism and development - I
Lecture 4 - Decolonization, nationalism and development - II
Lecture 5 - Decolonization, nationalism and development - III
Lecture 6 - Social evolution and social change
Lecture 7 - Social change and progress
Lecture 8 - Modernization Theory: An Overview
Lecture 9 - State and Class under Peripheral Capitalism
Lecture 10 - Critique of Samuel Huntington
Lecture 11 - Class, State and Revolution
Lecture 12 - The Empirical Peasantry and the Hypothetical Proletariat
Lecture 13 - Class and Classness: Substitutes and Realities
Lecture 14 - Modernization and Huntington's Argument
Lecture 15 - Huntington, Social Sciences and Ideology
Lecture 16 - The Ideological, Empirical and Methodological Critiques - I
Lecture 17 - The Ideological, Empirical and Methodological Critiques - II
Lecture 18 - Dependency Theory: Intellectual Antecedents
Lecture 19 - The Latin American Debates on Underdevelopment - I
Lecture 20 - The Latin American Debates on Underdevelopment - II
Lecture 21 - Dependency Theory in Transition - I
Lecture 22 - Dependency Theory in Transition - II
Lecture 23 - Critiques of Dependency Theory - I
Lecture 24 - Critiques of Dependency Theory - II
Lecture 25 - Limits to Growth - I
Lecture 26 - Limits to Growth - II
Lecture 27 - E. F. Schmacher's Small is Beautiful
Lecture 28 - Ivan Illich's Towards a History of Needs
Lecture 29 - Paradigms Lost, Paradigms Regained: Development studies in the 21st century - I

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Lecture 30 - Paradigms Lost, Paradigms Regained: Development studies in the 21st century - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Environment and Development

Subject Co-ordinator - Prof. Ngamjahao Kipgen

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Development, Economic Growth and Sustainable Development
Lecture 2 - Basic Ecosystem Ecology
Lecture 3 - Environmentalism
Lecture 4 - Environmental movement
Lecture 5 - Environmentalism in the global south
Lecture 6 - Ecofeminism
Lecture 7 - Feminist political ecology
Lecture 8 - Marx and ecology
Lecture 9 - Deep ecology
Lecture 10 - Gandhi and ecology
Lecture 11 - Social ecology
Lecture 12 - Religion, environment and historical roots of ecological crisis
Lecture 13 - Biodiversity conservation ethics in Buddhism and Hinduism
Lecture 14 - Christian religion in the age of ecological crisis
Lecture 15 - Natural resource management
Lecture 16 - Common property vs. private property
Lecture 17 - Livelihoods, forests, and conservation
Lecture 18 - Conservation-induced displacement
Lecture 19 - Environment impact assessment and national rehabilitation and resettlement policy
Lecture 20 - Dispossession and land acquisition
Lecture 21 - Mining, development, and indigenous people
Lecture 22 - Competing visions of development along the Narmada
Lecture 23 - Dams, development, and resistance: Case studies
Lecture 24 - Development theory and gendered approach to development
Lecture 25 - Gender, environment and sustainable development
Lecture 26 - Climate change interventions and policy framework
Lecture 27 - Eastern Himalayas and climate change
Lecture 28 - Ecological knowledge, biodiversity conservation and sustainability
Lecture 29 - Traditional religion and conservation of nature in Northeast India: Case study

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Lecture 30 - Indigenous knowledge, environment and development
Lecture 31 - Relevance of indigenous knowledge: Case study

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Market Structures

Subject Co-ordinator - Prof. Amarjyoti Mahanta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Industrial Organization, Preferences
Lecture 2 - Utility maximization and derivation of demand curve
Lecture 3 - Examples of utility maximization, demand curve and market demand curve
Lecture 4 - Tutorial Module 1
Lecture 5 - Production Function
Lecture 6 - Cost minimization problem
Lecture 7 - Derivation of cost curves
Lecture 8 - Tutorial on Production and cost curves
Lecture 9 - Optimal output and supply curve of a firm
Lecture 10 - Derivation of Market price in competitive market
Lecture 11 - Long run market price and Pareto optimality
Lecture 12 - Tutorial on Perfectly Competitive Market
Lecture 13 - Monopoly price
Lecture 14 - Price Discrimination - I
Lecture 15 - Price Discrimination - II
Lecture 16 - Tutorial on Monopoly
Lecture 17 - Introduction to Game Theory, Iterated Elimination of Dominated Strategy
Lecture 18 - Pure Strategy Nash Equilibrium
Lecture 19 - Mixed Strategy Nash Equilibrium
Lecture 20 - Existence of Nash Equilibrium in Games with 2 Players and 2 Strategies
Lecture 21 - Tutorial on Normal Form Games
Lecture 22 - Dynamic Games, Backward Induction
Lecture 23 - Subgame Perfect Nash Equilibrium
Lecture 24 - Tutorial on Dynamic Games
Lecture 25 - Cournot Duopoly
Lecture 26 - Cournot Oligopoly
Lecture 27 - Tutorial on Cournot Competition
Lecture 28 - Bertrand Competition with and without fixed cost
Lecture 29 - Bertrand Competition with capacity constraint

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Lecture 30 - Bertrand Competition with capacity constraint
Lecture 31 - Tutorial on Bertrand Competition
Lecture 32 - Bertrand Competition with Decreasing returns to scale
Lecture 33 - Stackelberg Quantity Competition
Lecture 34 - Tutorial on Bertrand Competition and Stackelberg Quantity Competition
Lecture 35 - Stackelberg Price Competition
Lecture 36 - Simultaneous move Hotelling Model
Lecture 37 - Tutorial on Stackelberg Price Competition
Lecture 38 - Sequential Move Hotelling Model
Lecture 39 - Dixit's Model of Entry Deterrence
Lecture 40 - Tutorial on Sequential move Hotelling Model
Lecture 41 - Dixit's Model of Entry Deterrence
Lecture 42 - Bundling and Tying
Lecture 43 - Tutorial on Dixit's Model of Entry Deterrence

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NPTEL Video Course - Humanities and Social Sciences - NOC:Mathematics for Economics - I

Subject Co-ordinator - Prof. Debarshi Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Aim of the course, real numbers
Lecture 2 - Logic, proof
Lecture 3 - Definitions
Lecture 4 - Set operations
Lecture 5 - Definitions
Lecture 6 - Linear functions
Lecture 7 - Quadratic functions
Lecture 8 - Exponential functions, etc.
Lecture 9 - Differentiation: preliminaries
Lecture 10 - Rules of differentiation
Lecture 11 - Partial differentiation
Lecture 12 - Higher order differentiations
Lecture 13 - Approximations and elasticities
Lecture 14 - Differentiability, series, PDV
Lecture 15 - NPV, evaluation of investment projects
Lecture 16 - Exponential, logarithmic functions
Lecture 17 - Tutorials - 1a
Lecture 18 - Tutorials - 1b
Lecture 19 - Tutorials - 1c
Lecture 20 - Extreme, stationary points, first derivative test
Lecture 21 - Global and local extreme points
Lecture 22 - Second derivative test
Lecture 23 - Inflection points
Lecture 24 - Profit maximizations
Lecture 25 - Area under a curve, indefinite integral
Lecture 26 - Definite integral
Lecture 27 - Oil extraction, income distribution, PDV
Lecture 28 - Integration by parts, substitution, Lorenz curve
Lecture 29 - First order difference equations, solution

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Lecture 30 - Dynamic stability, Cobweb model
Lecture 31 - Market model with inventory, Phase diagrams, Higher order equations
Lecture 32 - Multiplier-acceleration model
Lecture 33 - Tutorials - 2a
Lecture 34 - Tutorials - 2b

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NPTEL Video Course - Humanities and Social Sciences - NOC:Language, Culture and Cognition: An Introduction

Subject Co-ordinator - Prof. Bidisha Som

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Nature of human thought - I
Lecture 2 - Brain and cognition, Seat of thought - II
Lecture 3 - Language, meaning, reality - III
Lecture 4 - Categorization
Lecture 5 - Categorization: (Continued...)
Lecture 6 - Frames: another way to understand categories
Lecture 7 - Metaphor
Lecture 8 - Metaphor and Metonymy
Lecture 9 - Image schema
Lecture 10 - Image schema (Continued...)
Lecture 11 - Language acquisition
Lecture 12 - Language acquisition (Continued...)
Lecture 13 - Language in the brain
Lecture 14 - Language in the brain (Continued...)
Lecture 15 - Language and attention
Lecture 16 - Language and visual attention
Lecture 17 - Attention in Sentence processing
Lecture 18 - Executive control/function and its facets
Lecture 19 - Role of executive function in language processing
Lecture 20 - Mental simulation and its relation with language; summary of the course

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NPTEL Video Course - Humanities and Social Sciences - NOC:Bilingualism: A Cognitive and Psycholinguistic Pers

Subject Co-ordinator - Prof. Bidisha Som

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Becoming and being bilingual
Lecture 2 - Attitude, Acculturation and Bilingualism
Lecture 3 - Who is a Bilingual ?
Lecture 4 - Bilingual acquisition among children: simultaneous bilingualism
Lecture 5 - Successive Bilingualism
Lecture 6 - Language and cognition among bilinguals
Lecture 7 - Bilingual cognition (Continued...)
Lecture 8 - Bilingual Memory Models
Lecture 9 - Bilingual brain: neural representation of languages
Lecture 10 - Data from processing studies on bilingual representation in brain
Lecture 11 - Speech perception and comprehension: theories
Lecture 12 - Speech perception and production studies
Lecture 13 - Lexical processing: background
Lecture 14 - Lexical processing: different experimental paradigms: comprehension and production
Lecture 15 - Sentence processing
Lecture 16 - Metalinguistic Awareness
Lecture 17 - Executive Control: bilingual advantage
Lecture 18 - cognitive reserve, new developments
Lecture 19 - New research trends in bilingualism
Lecture 20 - New models. Applied areas

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NPTEL Video Course - Humanities and Social Sciences - NOC:Psychology of Emotion: Theory and Applications

Subject Co-ordinator - Prof. Dilwar Hussain

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Emotions: Concepts and Categories
Lecture 2 - Historical Background and Theories
Lecture 3 - Communication and Measurement of Emotions
Lecture 4 - Universals and cultural differences in emotions - 1
Lecture 5 - Universals and cultural differences in emotions - 2
Lecture 6 - Emotions and the Body
Lecture 7 - Emotions and the Brain
Lecture 8 - Self-evaluative emotions-Guilt, shame, Embarrassment, and pride
Lecture 9 - Social Comparison Emotions-Envy and Jealousy
Lecture 10 - Positive Emotions
Lecture 11 - Happiness and Subjective Well-being - 1
Lecture 12 - Happiness and Subjective Well-being - 2
Lecture 13 - Emotions in Groups - 1
Lecture 14 - Emotions in Groups - 2
Lecture 15 - Emotions and Cognitions: Introduction
Lecture 16 - Emotion and Memory
Lecture 17 - Emotion and Judgment/Decesion making
Lecture 18 - Depression
Lecture 19 - Anxiety Disorders
Lecture 20 - Emotion regulation: Introduction
Lecture 21 - Adaptive emotion regulation using ABC model
Lecture 22 - Adaptive emotion regulation using mindfulness
Lecture 23 - Emotional intelligence: Introduction
Lecture 24 - Skills of EI-Self-awareness
Lecture 25 - Skills of EI-Self-regulation/Self-management
Lecture 26 - Skills of EI-Self-Motivation
Lecture 27 - Skills of EI-Empathy
Lecture 28 - Skills of EI-Social intelligence and social skills
Lecture 29 - Emotional intelligence and workplace

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Lecture 30 - Emotional intelligence, health and well-being
Lecture 31 - Development of emotional intelligence

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NPTEL Video Course - Humanities and Social Sciences - NOC:Economics of Health and Education

Subject Co-ordinator - Prof. Rajshree Bedamatta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Links of Health and Education Achievements to Human Development
Lecture 2 - Health and Education: Human Capital or Human Right?
Lecture 3 - Unique Aspects of Health Economics
Lecture 4 - Perfect Competition and Healthcare Markets
Lecture 5 - Demand for Health-1 (Grossman model)
Lecture 6 - Demand for Health-2 (Is demand for health downward sloping)
Lecture 7 - Demand for Health-3 (Comparative statics)
Lecture 8 - Demand for Health-4 (Health disparities and hypothesis)
Lecture 9 - Economics of Healthcare: Supply side
Lecture 10 - Demand for Insurance
Lecture 11 - Adverse Selection and Moral Hazard
Lecture 12 - Demand for Education
Lecture 13 - A Basic Model of Human Capital Investment and A Few Influential Thinkers
Lecture 14 - Production of Education and Returns to Education - based on global data
Lecture 15 - Fiscal functions of budget policy and the concept of public food
Lecture 16 - Public goods, private goods, merit goods; Market failures and corrections
Lecture 17 - Is higher education a public good, a quasi-public good or a merit good?
Lecture 18 - Inequalities of Outcomes and Opportunities
Lecture 19 - Equity in Healthcare
Lecture 20 - Education Inequalities in Developing Countries and India
Lecture 21 - India's Health Policy
Lecture 22 - India's Education Policy
Lecture 23 - Right to Health and Universal Health Care - The Indian Context
Lecture 24 - Global Disease Burdens
Lecture 25 - How ASER is addressing the problem of Learning Crisis in India
Lecture 26 - The PROBE reports - Public Report on Basic Education
Lecture 27 - Indian Morbidity and Mortality surveys
Lecture 28 - Indian Official Statistics on school education and higher education
Lecture 29 - Health financing

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Lecture 30 - Education financing
Lecture 31 - Health Workforce
Lecture 32 - Women in India's Labour Market
Lecture 33 - Summary and Conclusions

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NPTEL Video Course - Humanities and Social Sciences - NOC:Engineering Psychology

Subject Co-ordinator - Prof. Naveen Kashyap

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Introduction - 2
Lecture 3 - Research Methods - 1
Lecture 4 - Research Methods - 2
Lecture 5 - Visual and tactile displays - 1
Lecture 6 - Visual and tactile displays - 2
Lecture 7 - Auditory display - 1
Lecture 8 - Auditory display - 2
Lecture 9 - Methods of evaluation - 1
Lecture 10 - Methods of evaluation - 2
Lecture 11 - Multitasking - 1
Lecture 12 - Multitasking - 2
Lecture 13 - Decision Making - 1
Lecture 14 - Decision Making - 2
Lecture 15 - Motor skill and control - 1
Lecture 16 - Motor skill and control - 2
Lecture 17 - Environmental design - 1
Lecture 18 - Environmental design - 2
Lecture 19 - Human error - 1
Lecture 20 - Human error - 2
Lecture 21 - Course Review

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NPTEL Video Course - Humanities and Social Sciences - NOC:Psychology of Personality and Individual Difference

Subject Co-ordinator - Prof. Dilwar Hussain

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Personality: Definition, concepts and overview
Lecture 2 - Research methods in personality psychology
Lecture 3 - Personality Assessment - Introduction
Lecture 4 - Methods of Personality Assessment
Lecture 5 - Genetics, Physiology and Personality
Lecture 6 - Evolutionary psychology and personality
Lecture 7 - The concept of traits and the person-situation debate
Lecture 8 - Cattellâ s Sixteen Personality Factor and Eysenckâ s three super traits
Lecture 9 - The five factor model and beyond
Lecture 10 - Psychoanalysis - 1
Lecture 11 - Psychoanalysis - 2
Lecture 12 - Behaviorism and Personality 1: Classical conditioning and personality
Lecture 13 - Behaviorism and personality 2: Operant conditioning and personality
Lecture 14 - Humanistic psychology, Maslow and Personality
Lecture 15 - Rogers theory of Personality
Lecture 16 - Kellyâ s personal construct theory
Lecture 17 - Banduraâ s social-cognitive theory
Lecture 18 - Mini cognitive theories of personality
Lecture 19 - Gender and personality
Lecture 20 - Culture and personality
Lecture 21 - Stability and change of personality
Lecture 22 - Personality development 1: Ericksonâ s Psychosocial Stages of Personality Development
Lecture 23 - Personality development 2: Attachment and personality development
Lecture 24 - Positive personality trait: Character strengths
Lecture 25 - Positive personality trait: Resilient Personality
Lecture 26 - Positive personality trait: Empathy
Lecture 27 - Positive personality trait: Kindness
Lecture 28 - Personality, Stress, and physical health
Lecture 29 - Personality and mental health

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Lecture 30 - Personality, career and workplace
Lecture 31 - Personality and interpersonal relationships

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NPTEL Video Course - Humanities and Social Sciences - NOC:Applied Positive Psychology

Subject Co-ordinator - Prof. Dilwar Hussain

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is positive psychology? Why do we need it ?
Lecture 2 - Flourishing, Well-Being and Positive mental health
Lecture 3 - Eastern and Western Perspective on Well-being/Positive psychology
Lecture 4 - Emotions in positive psychology
Lecture 5 - Happiness and subjective well-being
Lecture 6 - Interventions for promoting positive emotions and happiness 1 : Gratitude and Savoring Interventi
Lecture 7 - Interventions for promoting positive emotions and happiness 2 : Social comparison and happiness
Lecture 8 - Optimism: Concepts and interventions
Lecture 9 - Hope: Concepts and interventions
Lecture 10 - Mindfulness: Mechanisms, benefits and practice
Lecture 11 - The Psychology of Flow
Lecture 12 - Interventions for Cultivating Mindfulness and Flow
Lecture 13 - Character strengths: Concepts, theories and Interventions
Lecture 14 - Gallupâ s Strengths Finder: Concepts, theories and interventions - Part 1
Lecture 15 - CAPPâ s Realise2 4M model: Concepts, theories and interventions - Part 2
Lecture 16 - Successful aging - Part 1
Lecture 17 - Successful aging - Part 2
Lecture 18 - Understanding and building resilience - Part 1
Lecture 19 - Understanding and building resilience - Part 2
Lecture 20 - Posttraumatic growth: Theories and interventions
Lecture 21 - Meaning and purpose in life: Concepts and theories
Lecture 22 - Meaning Oriented Interventions What Makes
Lecture 23 - Kindness: Concepts, theories and benefits
Lecture 24 - Altruism and pro-social behavior
Lecture 25 - Development and Interventions for pro-social behavior/Kindness
Lecture 26 - Positive relationship and social support
Lecture 27 - Positive relationships: Theoretical models and interventions
Lecture 28 - Approaches to positive education
Lecture 29 - School-based positive psychology interventions

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Lecture 30 - Self Determination and Motivation in Classroom Teaching
Lecture 31 - Positive psychology and workplace
Lecture 32 - Well-being in the workplace
Lecture 33 - Positive Psychology and the Practice of Counseling and Psychotherapy
Lecture 34 - Positive Psychological Interventions and Models of Therapy

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NPTEL Video Course - Humanities and Social Sciences - NOC:Fundamentals of Language Acquisition

Subject Co-ordinator - Bidisha Som

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course, specific properties of human language
Lecture 2 - Evolution, biological markers
Lecture 3 - Biological markers of evolution
Lecture 4 - Gestural theory of language evolution
Lecture 5 - Cultural theory of language evolution
Lecture 6 - Stages of development; Behaviorism
Lecture 7 - Behaviorism; Nativism
Lecture 8 - Other variables: CPH and ToM
Lecture 9 - Joint attention and body schematics
Lecture 10 - Methods of studying language acquisition
Lecture 11 - Stages of Development: Prenatal to Childhood
Lecture 12 - Theories of Speech Perception: Motor Theory, Universal Theory
Lecture 13 - Attunement Theory
Lecture 14 - Speech Segmentation
Lecture 15 - Speech Production
Lecture 16 - Inflectional morphology
Lecture 17 - Theories
Lecture 18 - Constructivism
Lecture 19 - Blocking Hypothesis
Lecture 20 - Dual and Single Route Models
Lecture 21 - From Phonological Word Form to Word-Meaning Mapping; Word Comprehension
Lecture 22 - Reference Problem and Extension Problem
Lecture 23 - Theories of Word Acquisition
Lecture 24 - Sociopragmatic factors and attentional learning account
Lecture 25 - Emergentist Coalition Model
Lecture 26 - The Beginning
Lecture 27 - Naivist and Constructivist Theories
Lecture 28 - Theories
Lecture 29 - Morphosyntactic Dependency

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Lecture 30 - Complex Structures
Lecture 31 - Early approaches to SLA
Lecture 32 - Parallel between First and Second Language Acquisition
Lecture 33 - Theoretical Approaches
Lecture 34 - Functional Approaches
Lecture 35 - Psychological and Neural Aspects of SLA
Lecture 36 - Social aspects of SLA
Lecture 37 - Childhood bilingualism
Lecture 38 - Successive bilingualsim among children
Lecture 39 - Adult SLA
Lecture 40 - New domains
Lecture 41 - Is experience necessary?
Lecture 42 - Linguistic input, BTR
Lecture 43 - BTR (Continued...)
Lecture 44 - Geographical factors, statistical learning, social brain
Lecture 45 - Social brain (Continued...)
Lecture 46 - Grice's rules, preverbal communication
Lecture 47 - Verbal communication: speech act
Lecture 48 - Implicatures: scalar and relevance
Lecture 49 - Turn taking
Lecture 50 - Politeness, figurative language
Lecture 51 - Language areas in the Brain
Lecture 52 - Brain Mapping Methods and Milestones in Language Development
Lecture 53 - Brain Development and its Correlation with Language Development
Lecture 54 - Neural Activation Pattern for Bilinguals
Lecture 55 - Proficiency
Lecture 56 - Language Development and Cognitive Processes: Independent or Interdependent
Lecture 57 - William Syndrome
Lecture 58 - Other Neuro Developmental Disorders
Lecture 59 - Down Syndrome Interventions
Lecture 60 - Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:Ethnography of Speaking

Subject Co-ordinator - Prof. Bidisha Som

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course; language as seen from sociological and linguistic perspective; Histor
Lecture 2 - Role of society on language use and speakers: Hobbes, Locke, and Rousseau
Lecture 3 - Condillac, Vico and Herder
Lecture 4 - Other modern scholars of the social-origin theory of language
Lecture 5 - Some other domains: sociolinguistics, anthropological linguistics, ethnolinguistics, and pragmati
Lecture 6 - What is language? How do languages and dialects get their labels ?
Lecture 7 - Regional and social variation: case studies from various Indian languages
Lecture 8 - Gender and age: key variables in language use and structure; role of underlying cultural construa
Lecture 9 - Ethnicity and social network
Lecture 10 - Language change
Lecture 11 - Style and register
Lecture 12 - Politeness strategies
Lecture 13 - Cross cultural communication; ethnographic accounts from different cultures
Lecture 14 - Performance of language: narratives and genres
Lecture 15 - Language and perception; social class and language, elaborate code vs restricted code
Lecture 16 - Language and Identities
Lecture 17 - Language attitude in multilingual communities
Lecture 18 - Language ideology
Lecture 19 - Language socialization
Lecture 20 - Case studies
Lecture 21 - Different types of contact: social, political, economic
Lecture 22 - Pidgins and creoles, post creole continuum
Lecture 23 - Mixed languages: reasons, grammar and cultural significance
Lecture 24 - Bi/multilingualism: reasons and types; social VS individual bilingualism, impact of bilingualism
Lecture 25 - Linguistic Area (Sprachbunds), India as a linguistic area
Lecture 26 - Diglossia
Lecture 27 - Language maintenance, shift: different forces of assimilation leading to shift in language loyal
Lecture 28 - Death and revitalization: repercussions of language death, language and cultural cognition; case
Lecture 29 - Discourse analysis; conversation analysis

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Lecture 30 - Critical discourse analysis
Lecture 31 - Language policy and planning
Lecture 32 - Language in Mass communication
Lecture 33 - Language and Law
Lecture 34 - Discourse strategy used in Daily Communication
Lecture 35 - Sociolinguistics of Sign Languages
Lecture 36 - What is collective cognition? How is language related to collective cognition? Case studies and
Lecture 37 - Supracultural models
Lecture 38 - Social cognition in discourse
Lecture 39 - Cognitive sociolinguistics
Lecture 40 - Social neuroscience and language: new findings on the neural signatures of language and social p

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NPTEL Video Course - Humanities and Social Sciences - Communication Skills

Subject Co-ordinator - Dr. T. Ravichandran

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Barriers to Communication - 1
Lecture 3 - Barriers to Communication - 2
Lecture 4 - Barriers to Communication - 3
Lecture 5 - Non-Verbal Communication - 1
Lecture 6 - Non-Verbal Communication - 2
Lecture 7 - Non-Verbal Communication - 3
Lecture 8 - Non-Verbal Communication - 4
Lecture 9 - Non-Verbal Communication - 5
Lecture 10 - Listening Skills - 1
Lecture 11 - Listening Skills - 2
Lecture 12 - Listening Skills - 3
Lecture 13 - Business Letters Writing - 1
Lecture 14 - Business Letters Writing - 2
Lecture 15 - Business Letters Writing - 3
Lecture 16 - Business Letters Writing - 4
Lecture 17 - Report Writing - 1
Lecture 18 - Report Writing - 2
Lecture 19 - Group Discussion - 1
Lecture 20 - Group Discussion - 2
Lecture 21 - Group Discussion - 3
Lecture 22 - Interview Skills - 1
Lecture 23 - Interview Skills - 2
Lecture 24 - Interview Skills - 3
Lecture 25 - Interview Skills - 4
Lecture 26 - Interview Skills - 5
Lecture 27 - Interview Skills - 6
Lecture 28 - Interview Skills - 7
Lecture 29 - Netiquette - 1

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Lecture 30 - Netiquette - 2
Lecture 31 - Oral Presentation - 1
Lecture 32 - Oral Presentation - 2
Lecture 33 - Oral Presentation - 3
Lecture 34 - Cross Cultural Communication - 1
Lecture 35 - Cross Cultural Communication - 2
Lecture 36 - Cross Cultural Communication - 3
Lecture 37 - Cross Cultural Communication - 4
Lecture 38 - Common Errors - 1
Lecture 39 - Common Errors - 2
Lecture 40 - Common Errors - 3

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NPTEL Video Course - Humanities and Social Sciences - Ethics

Subject Co-ordinator - Dr. Vineet Sahu

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ethics - 'Crtio' A Socratic dialoguea
Lecture 2 - Introduction to Ethics -An assessment of Ethical relativism
Lecture 3 - Consequentialism -Introduction
Lecture 4 - Consequentialism Rule and Act
Lecture 5 - Hedonism
Lecture 6 - Utilitarianism
Lecture 7 - Deontological theories - Introduction
Lecture 8 - Deontological theories - Immanuel Kant
Lecture 9 - Ethical Rules (with reference to W D Ross)
Lecture 10 - Situation Ethics
Lecture 11 - Virtue Ethics
Lecture 12 - Metaethical Theories
Lecture 13 - Ethical Relativism
Lecture 14 - Ethical Naturalism
Lecture 15 - Ethical Naturalism (Continued...)
Lecture 16 - Ethical Naturalism-Emotivism
Lecture 17a - Ethical Non-naturalism
Lecture 17b - Ethical Non-naturalism-II
Lecture 18 - Non-cognitive or Nondescriptivist Theories - Intuitionism
Lecture 19 - Non-cognitive or Nondescriptivist Theories - Intuitionism Nihilism
Lecture 20 - Why be Moral?
Lecture 21 - Ethics in the Indian tradition
Lecture 22 - Theory of Karma - Part 1
Lecture 23 - Theory of Karma - Part 2
Lecture 24 - Nishkama Karma - Part 1
Lecture 25 - Nishkama Karma - Part 2
Lecture 26 - Gandhian Ethics - Part 1
Lecture 27 - Gandhian Ethics - Part 2
Lecture 28 - Gandhian Ethics - Part 3 (Satyagraha)

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Lecture 29 - Purusharthas
Lecture 30 - Buddhist Ethics - Part 1
Lecture 31 - Buddhist Ethics - Part 2 - Jaina Ethics
Lecture 32 - Some ethical issues (Applied Ethics) Discussing Peter Singer's 'Famine Affluence and Morality'
Lecture 33 - Some ethical issues (Applied Ethics) Discussing Peter Singer's 'Famine Affluence and Morality'
Lecture 34 - Discussing Thomas Pogge's 'Real World Justice' - Part 1
Lecture 35 - Discussing Thomas Pogge's 'Real World Justice' - Part 2
Lecture 36 - Discussing Thomas Pogge's 'Real World Justice' - Part 3
Lecture 37 - Sexuality
Lecture 38 - Sexuality

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NPTEL Video Course - Humanities and Social Sciences - International Economics

Subject Co-ordinator - Dr. Somesh K. Mathur

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - International Economics
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Lecture 29 - International Economics

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Lecture 42 - International Economics
Lecture 43 - International Economics

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NPTEL Video Course - Humanities and Social Sciences - Introduction to Logic

Subject Co-ordinator - Dr. A.V. Ravishankar Sarma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Identification of Arguments
Lecture 2 - Non-arguments
Lecture 3 - Types of Arguments
Lecture 4 - Nature and Scope of Deductive and Inductive Arguments
Lecture 5 - Truth, Validity and Soundness
Lecture 6 - Strength of Inductive arguments, Counter example method
Lecture 7 - Toulminâ s Model of Argumentation
Lecture 8 - Identification of Formal and Informal Fallacies
Lecture 9 - Informal Fallacies
Lecture 10 - Fallacies of Weak Induction and Fallacies arising out of ambiguity in Language
Lecture 11 - Introduction and motivation for Syllogistic Logic
Lecture 12 - Aristotle theory of Syllogisms - 1
Lecture 13 - Syllogistic Poem, Reduction of Syllogisms
Lecture 14 - Syllogistic Poem, Reduction of Syllogisms
Lecture 15 - Nature and Scope of Propositional Logic
Lecture 16 - Syntax of Propositional Logic
Lecture 17 - Logical Connectives
Lecture 18 - Truth Table Method
Lecture 19 - Semantic Tableaux Method for Propositional Logic
Lecture 20 - Knights and Knaves Puzzles
Lecture 21 - Semantic Tableaux Method
Lecture 22 - Natural Deduction Method
Lecture 23 - Natural Deduction
Lecture 24 - Conjunctive and Disjunctive Normal Forms
Lecture 25 - CNF, DNF and satisfiability and Validity
Lecture 26 - Resolution and refutation method
Lecture 27 - Resolution and refutation method
Lecture 28 - Axiomatic Propositional Logic
Lecture 29 - Hlbert Ackermann Axiomatic system

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Lecture 30 - Proofs in the PM system
Lecture 31 - Hilbert and Ackermann System
Lecture 32 - Outlines of Predicate Logic
Lecture 33 - Outlines of Predicate Logic
Lecture 34 - Building blocks of Predicate Logic
Lecture 35 - Quantifiers, freedom, bondage
Lecture 36 - Translation in to predicate Logic
Lecture 37 - Semantics of Predicate Logic
Lecture 38 - Truth, satisfiability, validity in Predicate Logic
Lecture 39 - Formation Trees for wffâ s in predicate Logic
Lecture 40 - Semantic Tableaux Method for Predicate Logic
Lecture 41 - Semantic Tableaux method
Lecture 42 - Natural Deduction in Predicate Logic
Lecture 43 - Important theorems in First order Logic
Lecture 44 - Limitations of first order logic and Introduction to the course

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NPTEL Video Course - Humanities and Social Sciences - Population and Society

Subject Co-ordinator - Prof. A.K. Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics Concepts
Lecture 3 - Perspectives On Population
Lecture 4 - Indian Society
Lecture 5 - Social Change in India
Lecture 6 - India
Lecture 7 - Methodology
Lecture 8 - Primary and Secondry Data and Related Issues
Lecture 9 - Sources of Population Data
Lecture 10 - Participatory Rural Appraisal
Lecture 11 - Demographic Models - I
Lecture 12 - Demographic models - II
Lecture 13 - Contemporary Issues In Modelling Population Processes
Lecture 14 - World Population Growth
Lecture 15 - Demographic Transition in the Nineteenth and Twentieth Centuries
Lecture 16 - Demographic schism between Developed and Developing Countries and Future Prospects
Lecture 17 - History Of Growth
Lecture 18 - Population of India - II
Lecture 19 - Trends In Death and Birth Rates
Lecture 20 - Population projections,Migration and Future Prospects
Lecture 21 - Urbanization and Development
Lecture 22 - Urbanization in India
Lecture 23 - Theories Of urbanization and Development
Lecture 24 - Future Of Urbanization In India
Lecture 25 - Population Theories
Lecture 26 - Marxist theory Of Population
Lecture 27 - Demographic Transition Theory and Related Issues
Lecture 28 - Gandhian Theory Of population
Lecture 29 - Population Policy

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Lecture 30 - Effectiveness Of population Policies
Lecture 31 - Family Planning Programme and Beyond
Lecture 32 - National Population Policy
Lecture 33 - The First Policy Statement
Lecture 34 - Subsequent Developments Leading To National Population Policy 2000
Lecture 35 - Ecological Degradation and Environmental Protection
Lecture 36 - Diffrences In Perception Between Developed and Developing Countries
Lecture 37 - Total Environment Impact and Beliefs
Lecture 38 - Emerging Issues In sociology Of Population
Lecture 39 - Population Issues In The framework of MDGs
Lecture 40 - Population Issues (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - Macro Economics

Subject Co-ordinator - Prof. Surajit Sinha

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Humanities and Social Sciences - Introduction to Sociology

Subject Co-ordinator - Prof. A.K. Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is sociology?
Lecture 2 - Sociological approaches
Lecture 3 - Nature of society
Lecture 4 - Cooperation and conflict
Lecture 5 - Family-I
Lecture 6 - Family-II
Lecture 7 - State-I
Lecture 8 - State-II
Lecture 9 - State-III
Lecture 10 - State-IV
Lecture 11 - Sociology of work-I
Lecture 12 - Sociology of work-II
Lecture 13 - Sociology of work-III
Lecture 14 - Sociology of work-IV
Lecture 15 - Religion-I
Lecture 16 - Religion-II
Lecture 17 - Religion-III
Lecture 18 - What is sociology?
Lecture 19 - Religion-V
Lecture 20 - Religion-VI
Lecture 21 - Education-I
Lecture 22 - Education-II
Lecture 23 - Social stratification-I
Lecture 24 - Social stratification-II
Lecture 25 - Social stratification-III
Lecture 26 - Social stratification-IV
Lecture 27 - Deviance-I
Lecture 28 - Deviance-II
Lecture 29 - Deviance-III

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Lecture 30 - Social change-I
Lecture 31 - Social change-II
Lecture 32 - Social change-III
Lecture 33 - Social change-IV
Lecture 34 - Population-I
Lecture 35 - Population-II
Lecture 36 - Perspectives in Sociology-I
Lecture 37 - Perspectives in Sociology-II
Lecture 38 - Social Problems and Theory
Lecture 39 - Sociological methods-I
Lecture 40 - Sociological methods-II
Lecture 41 - Sociological methods-III

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NPTEL Video Course - Humanities and Social Sciences - Money and Banking

Subject Co-ordinator - Prof. Surajit Sinha

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Humanities and Social Sciences - Human Adjustment Processes

Subject Co-ordinator - Prof. Braj Bhushan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module-1 - Lecture-1
Module-1 - Lecture-2
Module-1 - Lecture-3
Module-1 - Lecture-4
Module-2 - Lecture-1
Module-2 - Lecture-2
Module-2 - Lecture-3
Module-3 - Lecture-1
Module-4 - Lecture-1
Module-4 - Lecture-2
Module-4 - Lecture-3
Module-4 - Lecture-4
Module-4 - Lecture-5
Module-4 - Lecture-6
Module-4 - Lecture-7
Module-4 - Lecture-8
Module-4 - Lecture-9
Module-5 - Lecture-1
Module-5 - Lecture-2
Module-5 - Lecture-3
Module-6 - Lecture-1
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Module-7 - Lecture-1
Module-7 - Lecture-2
Module-7 - Lecture-3
Module-7 - Lecture-4
Module-7 - Lecture-5

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Module-8 - Lecture-1
Module-8 - Lecture-2
Module-8 - Lecture-3
Module-8 - Lecture-4
Module-9 - Lecture-1
Module-9 - Lecture-2
Module-9 - Lecture-3
Module-9 - Lecture-4
Module-9 - Lecture-5
Module-10 - Lecture-1
Understanding Oneself

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NPTEL Video Course - Humanities and Social Sciences - Selected Topics in Psychology

Subject Co-ordinator - Prof. Manas K Mandal, Prof. JBP Sinha, Prof. Alok Bajpai, Prof. Rakesh K. Gupta, Prof. Ramadhar Singh, Prof. Braj Bhushan, Prof. Vivek Benegal, Prof. Ajit Dalal, Prof. Girishwar Misra

Co-ordinating Institute - DRDO | ASSERT | Institute of Management Studies | Consultant Psychiatrist, Fortis Memorial Research Institute | IIM - Bangalore | IIT - Kanpur | NIMHANS | University of Allahabad | University of Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Selected Topics in Psychology
Lecture 2 - Psychology
Lecture 3 - Psychology
Lecture 4 - Beginning, growth and decline of Western psychology in India
Lecture 5 - The core and context of Indian psychology
Lecture 6 - The indigenization of psychology in India
Lecture 7 - Weaving culture into psychology
Lecture 8 - Culture and Self
Lecture 9 - Cultural and organizational behaviour
Lecture 10 - How do similar attitudes determine attraction?
Lecture 11 - Why do similar attitudes determine attraction?
Lecture 12 - A beautiful mind? Perspective on brain , mind and it's challenges
Lecture 13 - Emotion and well?being
Lecture 14 - Mental health and illness - Part 1
Lecture 15 - Mental health and illness - Part 2
Lecture 16 - Folk Healing Traditions in India
Lecture 17 - To sleep or not
Lecture 18 - Issues and challenges in psychological assessment
Lecture 19 - Nontraditional research in behavioural sciences
Lecture 20 - What a surprise
Lecture 21 - Neuropsychology and cognitive neuroscience research
Lecture 22 - Functional MRI in psychology - Part 1
Lecture 23 - Functional MRI in psychology - Part 2
Lecture 24 - Side bias in human behaviour
Lecture 25 - Brain microstructural correlates of cognition in Cerebral Palsy

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Lecture 26 - Brain microstructural correlates of cognition in vitamin B12 deficiency
Lecture 27 - The neuroscience of addictive behaviour
Lecture 28 - Who is at risk and why? The neurogenetics of vulnerability to addiction - Part 1
Lecture 29 - Who is at risk and why? The neurogenetics of vulnerability to addiction - Part 2
Lecture 30 - The gambler's lament
Lecture 31 - Art and the brain - Part 1
Lecture 32 - Art and the brain - Part 2
Lecture 33 - Technological advances in other areas and their impact on psychology
Lecture 34 - Positioning the state of psychology in India in the global scenario
Lecture 35 - Introduction Selected Topics in Psychology

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NPTEL Video Course - Humanities and Social Sciences - NOC:Elements of Visual Representation

Subject Co-ordinator - Dr. Shatarupa Thakurta Roy

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Visual Literacy
Lecture 2 - What is Art? Visual styles
Lecture 3 - Principle of Visual Communication
Lecture 4 - Elements of Visual Representation
Lecture 5 - Need of Visual Harmony, Aerial Perspective in Visual Representation
Lecture 6 - Visual Mediums Method and Material
Lecture 7 - Visual Arrangement
Lecture 8 - Illusion of Space Overlapping and Vertical Location
Lecture 9 - Multiple point Perspective, Cubist form
Lecture 10 - Oriental Perspective, Isometric Projection
Lecture 11 - Unconventional Space, Visual Riddle
Lecture 12 - Perspective, Foreshortening and Amplification
Lecture 13 - Static Form
Lecture 14 - Impression of Movement
Lecture 15 - Movement by Repetition
Lecture 16 - Use of Multiple Image to Depict Motion
Lecture 17 - Principle of Op Art
Lecture 18 - Asymmetry in Visual Narration
Lecture 19 - Scale and Space in Composition
Lecture 20 - Choosing the Right Scale
Lecture 21 - Natural Proportion
Lecture 22 - Ideal Proportion
Lecture 23 - Arbitrary and Mandatory Proportion
Lecture 24 - Form of Visual Paradox
Lecture 25 - Line as Line and Line as Shape
Lecture 26 - Character Specific Use of Line in Visual Representation
Lecture 27 - Implied, Psychic, Contour Line and Gesture Line
Lecture 28 - Line as Building Block
Lecture 29 - Line for Rendering

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Lecture 30 - Quality of Line in Visual Expression
Lecture 31 - Example of Unified Composition
Lecture 32 - Visual Continuity
Lecture 33 - Gestalt law of Universal Whole
Lecture 34 - Unity in Variation. Visual Climax and Harmony
Lecture 35 - Degree of Emphasis to Maintain Harmony
Lecture 36 - Rhythm and Motion in Visual Representation Alternating and Progressing Arrangement
Lecture 37 - Visual Balance in Symmetry, Radial and Crystallographic Balance
Lecture 38 - Balance in Asymmetry
Lecture 39 - Visual Balance in Colour Combination, Conflicting Colours
Lecture 40 - Balance through Achromatic Value Distribution
Lecture 41 - Local, optical and Arbitrary colour
Lecture 42 - Colour in Digital Media Pigment and Light, Resolution
Lecture 43 - Rectilinear and Curvilinear Form
Lecture 44 - Volume and Surface Texture
Lecture 45 - Visual and Tactile Texture
Lecture 46 - Form, Texture and Pattern
Lecture 47 - Visual Analysis
Lecture 48 - Steps of Problem Solving

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NPTEL Video Course - Humanities and Social Sciences - NOC:Practical English: Learning and Teaching

Subject Co-ordinator - Dr. Bhaskar Dasgupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Humanities and Social Sciences - NOC:Brief introduction to Psychology

Subject Co-ordinator - Braj Bhushan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Humanities and Social Sciences - NOC:Psychiatry:An overview

Subject Co-ordinator - Mr. Alok Bajpai

Co-ordinating Institute - Consultant Psychiatrist

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Neuroanatomy
Lecture 2 - Neurophysiology
Lecture 3 - Imaging
Lecture 4 - Electrophysiology
Lecture 5 - Psychology
Lecture 6 - Mental Status Examination 1 & 2
Lecture 7 - Classificatory Systems
Lecture 8 - Investigation and Psychological Testing
Lecture 9 - Organic Syndromes
Lecture 10 - Schizophrenia
Lecture 11 - Mood Disorders
Lecture 12 - Anxiety Disorders
Lecture 13 - Obsessive Compulsive Disorder
Lecture 14 - Childhood Disorder Introduction
Lecture 15 - Autism
Lecture 16 - Learning Disability
Lecture 17 - ADHD
Lecture 18 - Personality Disorder
Lecture 19 - Sleep Disorder 1
Lecture 20 - Sleep Disorder 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Indian Art - An appreciation

Subject Co-ordinator - Prof.Soumik Nandy Majumdar

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Geographical Expanse
Lecture 2 - Chronological Journey
Lecture 3 - Forms of Indian Architecture
Lecture 4 - Variations in Indian Sculpture
Lecture 5 - Formats of Indian Painting
Lecture 6 - Pre-historic art
Lecture 7 - Ancient Art
Lecture 8 - Early Buddhist Art
Lecture 9 - Art of the Royal Dynasty
Lecture 10 - Islamic Architecture
Lecture 11 - Wonder from Classical period
Lecture 12 - Narrative Art in Sculpture
Lecture 13 - Narrative Art in Miniature Painting
Lecture 14 - Indigenous Art
Lecture 15 - Indigenous Art
Lecture 16 - End of Traditional Art - Advent of the British
Lecture 17 - Art patronized by the Colonial Rulers
Lecture 18 - Art for National Cause
Lecture 19 - Art in the post-independent India
Lecture 20 - Art Now - Trends in contemporary art

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NPTEL Video Course - Humanities and Social Sciences - NOC:Basic Concepts of Modal Logic

Subject Co-ordinator - Dr. A.V. Ravishankar Sarma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is logic? General Introduction
Lecture 2 - Propositional Logic
Lecture 3 - Propositional Logic
Lecture 4 - Semantic Tableaux Method for Propositional Logic
Lecture 5 - Semantic Tableaux Method
Lecture 6 - Semantic Tableaux Method-3
Lecture 7 - Limitations of Classical Logic
Lecture 8 - Origin of Modal Logic
Lecture 9 - Origin of Modal Logic
Lecture 10 - Strict Implication
Lecture 11 - Strict Implication
Lecture 12 - Language of Normal Modal Logic
Lecture 13 - Language of Modal Logic, Modal Sentences - 1
Lecture 14 - Language of Modal Logic 2
Lecture 15 - Axiomatic Modal Logic
Lecture 16 - Semantics of Modal Logic
Lecture 17 - Kripke semantics for Modal Logic systems
Lecture 18 - Kripke semantics for Modal Logic
Lecture 19 - Kripke Semantics for Modal Logic
Lecture 20 - Semantic Tableaux method - I
Lecture 21 - Semantic Tableaux method - II
Lecture 22 - Possible worlds and Modal realism
Lecture 23 - Conditional logic introduction
Lecture 24 - Conditional logic C
Lecture 25 - Conditional logics

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NPTEL Video Course - Humanities and Social Sciences - NOC:Probability and Stochastic for Finance II

Subject Co-ordinator - Dr. Joydeep Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Interest Rates
Lecture 2 - Fixed Income Securities
Lecture 3 - Term Structure of Interest Rates - I
Lecture 4 - Optimization Models In Finance
Lecture 5 - Crash course on KKT Condition
Lecture 6 - Mean Variance Portfolio Optimization - I
Lecture 7 - Mean Variance Portfolio Optimization - II
Lecture 8 - Mean Variance Portfolio Optimization - III
Lecture 9 - Mean Variance Portfolio Optimization - IV
Lecture 10 - Last lecture on Portfolio Optimization
Lecture 11 - Capital Asset Pricing Model
Lecture 12 - The Binomial Model [Lox-Ross-Rubenstein Model]
Lecture 13 - The Binomial Method - II
Lecture 14 - Binomial Method - III (Multiperiod model)
Lecture 15 - Binomial model - IV
Lecture 16 - Girsanav's Theorem (Basic tool)
Lecture 17 - Girsanav's Theorem (Statement and proof)
Lecture 18 - Stock price under risk netral measure
Lecture 19 - The Black Scholes formula
Lecture 20 - Final Lecture

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Psychology

Subject Co-ordinator - Braj Bhushan

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Major Areas of Psychology
Lecture 2 - Major Milestones in Psychology
Lecture 3 - Methods in Psychology
Lecture 4 - Schools of thoughts in Psychology
Lecture 5 - Sensory Mechanisms
Lecture 6 - External Factors in Perception
Lecture 7 - Theory of Signal Detection
Lecture 8 - Gestalt Principles
Lecture 9 - Form Perception
Lecture 10 - Role of Culture in Perception
Lecture 11 - Basic Concepts of Learning
Lecture 12 - Classical Conditioning
Lecture 13 - Concepts and Applications of Classical Conditioning
Lecture 14 - Operant Conditioning
Lecture 15 - Observational Learning
Lecture 16 - Cognitive Learning
Lecture 17 - Models of Memory
Lecture 18 - Short Term Memory - Storage and Retention
Lecture 19 - Long Term Memory - Episodic Memory
Lecture 20 - Long Term Memory - Autobiographical and Semantic Memory
Lecture 21 - Long Term Memory - Procedural Memory
Lecture 22 - Forgetting
Lecture 23 - Theories of Emotion - 1
Lecture 24 - Theories of Emotion - 2
Lecture 25 - Basic Emotions
Lecture 26 - Culture and Emotions
Lecture 27 - Musculature Analysis of Facial Expressions
Lecture 28 - Biological Basis of Emotion
Lecture 29 - Nature vs Nurture

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Lecture 30 - Behavioural Genetics - I
Lecture 31 - Behavioural Genetics - II
Lecture 32 - Intelligence
Lecture 33 - Aptitude
Lecture 34 - Various Perspectives of Personality
Lecture 35 - Neo Freudian and Behaviourist Perspective
Lecture 36 - Behaviourist and Humanistic Perspective
Lecture 37 - Indian Perspective of Personality and Assessment of Personality
Lecture 38 - Psychometric tests of Personality Assessment
Lecture 39 - Lab Session 1
Lecture 40 - Lab Session 2
Lecture 41 - Lab Session 3
Lecture 42 - Lab Session 4
Lecture 43 - Lab Session 5

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NPTEL Video Course - Humanities and Social Sciences - NOC:Folk and Minor Art in India

Subject Co-ordinator - Dr. Shatarupa Thakurta Roy

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Changing Definition of Folk and Minor Art
Lecture 2 - Timelines and Regions
Lecture 3 - Traditional Roots
Lecture 4 - Timelessness
Lecture 5 - Evolution in Purpose
Lecture 6 - Contemporary Practice
Lecture 7 - Classification and Connections
Lecture 8 - Early Literary Resources
Lecture 9 - Mythical Associations
Lecture 10 - Idea of Nationalism and Modernism in the Context of Folk Art-I and II
Lecture 11 - Relevance of the Art Practice
Lecture 12 - Contextualization and Decontextualization
Lecture 13 - Concept of Communication for Social Purpose
Lecture 14 - Aesthetic Perspective
Lecture 15 - Secularity and Religious Plurality
Lecture 16 - Ethnographic perspective on the study of Folk Art and Culture
Lecture 17 - About the Exponents who brought the culture under the Limelight
Lecture 18 - Commonality and Congruity in the Diverse Content of Art
Lecture 19 - School of Art in Madhubani Painting
Lecture 20 - Art as a Feminine Preserve vs the Male painters of Madhubani
Lecture 21 - Yamapata, Pytkar and other art practice of Jharkhand
Lecture 22 - Patachitra of Bengal
Lecture 23 - Patachitra of Odisha
Lecture 24 - Continuum of the Practice
Lecture 25 - Continuum of the Practice
Lecture 26 - Continuum of the Practice
Lecture 27 - Case study-1
Lecture 28 - Case study-2
Lecture 29 - Case study-3

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Lecture 30 - Characteristics of Contemporary Collection - Semiotic Analysis
Lecture 31 - Characteristics of Contemporary Collection - Thematic and Iconic Analysis
Lecture 32 - Characteristics of Contemporary Collection of Indian Folk and Minor Art
Lecture 33 - Thematic Change in Contemporary Collection of Indian Folk and Minor Art
Lecture 34 - Individual Expression in Contemporary Collection of Indian Folk and Minor Art
Lecture 35 - Cultural Condition
Lecture 36 - Cultural Condition
Lecture 37 - Contextualizing Folk idiom - Part I
Lecture 38 - Contextualizing Folk idiom - Part II
Lecture 39 - Contextualizing Folk idiom - Part III
Lecture 40 - Coexistence and Collaborations with Mainstream Art
Lecture 41 - Alternative Context
Lecture 42 - Need of Paradigm Shift - I
Lecture 43 - Need of Paradigm Shift - II
Lecture 44 - Endnote

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NPTEL Video Course - Humanities and Social Sciences - NOC:Developing Soft Skills and Personality

Subject Co-ordinator - Dr. T. Ravichandran

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Planning and Goal-Setting
Lecture 3 - Human Perceptions
Lecture 4 - Types of Soft Skills
Lecture 5 - Aiming for Excellence
Lecture 6 - Need Achievement and Spiritual Intelligence
Lecture 7 - Conflict Resolution Skills
Lecture 8 - Inter-Personal Conflicts
Lecture 9 - Inter-Personal Conflicts
Lecture 10 - Types of Conflicts
Lecture 11 - Types of Stress
Lecture 12 - Regulating Stress
Lecture 13 - Habits
Lecture 14 - Habits
Lecture 15 - Habits
Lecture 16 - Breaking Bad Habits
Lecture 17 - Using the Zeigarnik Effect for Productivity and Personal Growth
Lecture 18 - Forming Habits of Success
Lecture 19 - Communication
Lecture 20 - Communication
Lecture 21 - Communication
Lecture 22 - Telephone Communication
Lecture 23 - Telephone Communication
Lecture 24 - Telephone Communication
Lecture 25 - Technology and Communication
Lecture 26 - Technology and Communication
Lecture 27 - Topic
Lecture 28 - Technology and Communication
Lecture 29 - Technology and Communication

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Lecture 30 - Technology and Communication
Lecture 31 - Communication Skills
Lecture 32 - Barriers to Communication
Lecture 33 - Barriers to Communication
Lecture 34 - Barriers To Communication
Lecture 35 - Non-Verbal Communication
Lecture 36 - Non-Verbal Communication
Lecture 37 - Nonverbal Communication
Lecture 38 - Non-Verbal Communication
Lecture 39 - Non-Verbal Communication
Lecture 40 - Non-Verbal Communication
Lecture 41 - Body Language
Lecture 42 - Body Language
Lecture 43 - Lecture 43
Lecture 44 - Presentation Skills
Lecture 45 - Presentation Skills
Lecture 46 - Presentation Skills
Lecture 47 - Reading Skills
Lecture 48 - Human Relations

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NPTEL Video Course - Humanities and Social Sciences - NOC:How the Brain Creates Mind

Subject Co-ordinator - Alok Bajpai

Co-ordinating Institute - Consultant Psychiatrist

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brain - 1
Lecture 2 - Brain - 2
Lecture 3 - Brain - 3
Lecture 4 - Electrical Activity In Brain - 1
Lecture 5 - Electrical Activity In Brain - 2
Lecture 6 - EEG
Lecture 7 - Dynamics - 1
Lecture 8 - Dynamics - 2
Lecture 9 - Dynamics - 3
Lecture 10 - Dynamics - 4
Lecture 11 - Cognition and Emotions - 1
Lecture 12 - Cognition and Emotions - 2 Edit Lesson
Lecture 13 - Cognition and Emotions - 3
Lecture 14 - Cognition and Emotions - 4
Lecture 15 - Consciousness
Lecture 16 - Sleep - 1
Lecture 17 - Sleep - 2
Lecture 18 - Sleep - 3
Lecture 19 - Future of Brain - 1
Lecture 20 - Future of Brain - 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Understanding Design Thinking and People Centred De

Subject Co-ordinator - Prof. Jhumkee Iyengar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Design Thinking
Lecture 2 - The Need to be People Centered
Lecture 3 - People Centered Design Methodology
Lecture 4 - Examine and Reflect on the Problem
Lecture 5 - Reconsider and arrive at the Â rightÂ problem to solve
Lecture 6 - Research with Users and their Contexts
Lecture 7 - Question Framing and Conducting Research
Lecture 8 - User Stories and Themes
Lecture 9 - Personas
Lecture 10 - Insight Statements, Â How Might WeÂ Questions, Design Strategy Statement
Lecture 11 - Generating Ideas
Lecture 12 - Top Five Ideas
Lecture 13 - Bundle Ideas and Create a Concept
Lecture 14 - Scenarios and Storyboards
Lecture 15 - Rapid Prototyping
Lecture 16 - Importance of Testing with People
Lecture 17 - Testing your Design with People
Lecture 18 - Conducting the Usability Test
Lecture 19 - Record Results, Enhance, Retest and Refine Design
Lecture 20 - Create a Pitch for your Design

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NPTEL Video Course - Humanities and Social Sciences - NOC:Enhancing Soft Skills and Personality

Subject Co-ordinator - Dr. T. Ravichandran

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - MIND-SET-1
Lecture 4 - MIND-SET-2
Lecture 5 - MIND-SET-3
Lecture 6 - Managing Time-1
Lecture 7 - Managing Time-2
Lecture 8 - Handling Delay-1
Lecture 9 - Handling Delay-2
Lecture 10 - Assertiveness - 1
Lecture 11 - Assertiveness - 2
Lecture 12 - Assertiveness - 3
Lecture 13 - Managing Negative Emotions
Lecture 14 - Channelizing Positive Emotions - 1
Lecture 15 - Channelizing Positive Emotions - 2
Lecture 16 - People Skills-1-What Makes Others Dislike You
Lecture 17 - People Skills-2-What Makes Others Like You - 1
Lecture 18 - People Skills-3
Lecture 19 - People Skills-4-Being Attractive - 1
Lecture 20 - People Skills-5-Being Attractive - 2
Lecture 21 - English Skills
Lecture 22 - English Skills-2
Lecture 23 - English Skills-3
Lecture 24 - English Skills-4
Lecture 25 - English Skills-5
Lecture 26 - Significance of Humour in Communication - 1
Lecture 27 - Humour in the Workplace
Lecture 28 - Function of Humour in the Workplace
Lecture 29 - Money and Personality

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Lecture 30 - Managing Money
Lecture 31 - Health and Personality
Lecture 32 - Managing Health-1 Importance of Exercise
Lecture 33 - Managing Health-2 Diet and Sleep
Lecture 34 - Love and Personality
Lecture 35 - Managing Love
Lecture 36 - Ethics and Etiquette
Lecture 37 - Business Etiquette
Lecture 38 - Managing Mind and Memory
Lecture 39 - Improving Memory
Lecture 40 - Care for Environment

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NPTEL Video Course - Humanities and Social Sciences - NOC:Postcolonial Literature

Subject Co-ordinator - Prof. Sayan Chattopadhyay

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Commonwealth Literature
Lecture 3 - Colonial Discourse Analysis
Lecture 4 - Colonial Discourse Analysis
Lecture 5 - Joseph Conrad's Heart of Darkness
Lecture 6 - Colonialism
Lecture 7 - Chinua Achebe's Things Fall Apart - I
Lecture 8 - Chinua Achebe's Things Fall Apart - II
Lecture 9 - Decolonisation and the Discourse of Nationalism
Lecture 10 - Sonnets of Henry Derozio
Lecture 11 - Raja Rao's Kanthapura - I
Lecture 12 - Raja Rao's Kanthapura - II
Lecture 13 - Critics of Nationalism
Lecture 14 - Homi Bhabha and the concept of Cultural Hybridity
Lecture 15 - Caribbean Poetry
Lecture 16 - Diasporic Literature
Lecture 17 - Gayatri C. Spivak
Lecture 18 - Mahasweta Devi's Pterodactyl - I
Lecture 19 - Mahasweta Devi's Pterodactyl - II
Lecture 20 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introducing Modern Western Art: Movements and Artis

Subject Co-ordinator - Prof.Soumik Nandy Majumdar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Modern Art?
Lecture 2 - Pre-history of Modern Art
Lecture 3 - Chronology of Modern Western Art
Lecture 4 - Beginning(s) of Modern Art Â 1 (Romanticism and Realism)
Lecture 5 - Beginning(s) of Modern Art Â 2 (Impressionism and Post - Impressionism)
Lecture 6 - Fauvism and Matisse
Lecture 7 - Cubism and Picasso
Lecture 8 - Futurism and Dada-ism
Lecture 9 - Surrealism
Lecture 10 - German Expressionism
Lecture 11 - Rodin Â the precursor of Modern Sculpture
Lecture 12 - From Figuration to Abstract (Henry Moore and Brancusi)
Lecture 13 - Pure Abstract Sculpture (Constructivism and Minimalism)
Lecture 14 - Introspection and Innovations (Giacometti and Calder)
Lecture 15 - Outdoor Sculpture and Public Art
Lecture 16 - Abstract Painting (Picasso, Paul Klee, Mondrian)
Lecture 17 - Abstract Expressionism
Lecture 18 - Art and Optical Science: Op Art
Lecture 19 - Art and the Mass Culture: Pop Art
Lecture 20 - Contemporary Trends: Breaking the Barriers

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NPTEL Video Course - Humanities and Social Sciences - NOC:Cognition, Transformation and Lives

Subject Co-ordinator - Alok Bajpai

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Cognition, Emotion and Transformation
Lecture 2 - Self and Others
Lecture 3 - Human Cognition
Lecture 4 - Cognition and Human Behaviour
Lecture 5 - Human Emotions
Lecture 6 - Understanding Emotions
Lecture 7 - Stories from the Brain
Lecture 8 - Stories from the Brain (Continued...)
Lecture 9 - Humans and Madness
Lecture 10 - Humans and Madness (Continued...)
Lecture 11 - Vices and Virtues
Lecture 12 - Change and its Context
Lecture 13 - Can we transform?
Lecture 14 - Need for transformation
Lecture 15 - Process of Transformation
Lecture 16 - Biographical models of transformations
Lecture 17 - Biographical narrative of Gandhi
Lecture 18 - Gandhi's process of transformation
Lecture 19 - Transformation and Ethics
Lecture 20 - Transformation and Society

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NPTEL Video Course - Humanities and Social Sciences - NOC:Visual Perception and Art - A Survey Across the Cul

Subject Co-ordinator - Prof.Soumik Nandy Majumdar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Lecture
Lecture 2 - What is Visual Perception?
Lecture 3 - Visual Perception and Visual Reality
Lecture 4 - Visual Perception and Creativity - 1
Lecture 5 - Visual Perception and Creativity - 2
Lecture 6 - Child art
Lecture 7 - Pre-historic art
Lecture 8 - Folk art
Lecture 9 - Primitive art
Lecture 10 - Photography
Lecture 11 - Popular visual culture
Lecture 12 - Mimetic and Non-mimetic art
Lecture 13 - Traditional art
Lecture 14 - Traditional art
Lecture 15 - Realistic art of the West
Lecture 16 - Alternative realism
Lecture 17 - Breakthrough in Visual Perception
Lecture 18 - Abstract art - 1
Lecture 19 - Abstract art - 2
Lecture 20 - Contemporary art

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Basic Cognitive Processes

Subject Co-ordinator - Prof. ARK Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cognitive Psychology
Lecture 2 - A Brief History of Cognitive Psychology
Lecture 3 - A Brief History of Cognitive Psychology (Continued...)
Lecture 4 - Foundational Assumptions of Cognitive Psychology
Lecture 5 - Foundations of Cognitive Psychology
Lecture 6 - Foundations of Cognitive Psychology
Lecture 7 - Approaches towards Cognitive Psychology
Lecture 8 - Modularity and Cognitive Neuropsychology
Lecture 9 - Basic Concepts in Cognitive Neuroscience
Lecture 10 - The Cerebral Cortex
Lecture 11 - Basics of Research Methods
Lecture 12 - Research Methods in Cognitive Psychology
Lecture 13 - Sensation and Perception
Lecture 14 - Psychophysics
Lecture 15 - Signal Detection Theory
Lecture 16 - Physiology of Visual Perception
Lecture 17 - Representation in Perception
Lecture 18 - Approaches to Visual Perception - 1
Lecture 19 - Approaches to Visual Perception - 2
Lecture 20 - Approaches to Visual Perception - 3
Lecture 21 - Theories of Object Recognition
Lecture 22 - Perception and Action
Lecture 23 - Auditory Perception - I
Lecture 24 - Auditory Perception - II
Lecture 25 - Attention - I
Lecture 26 - Attention - II
Lecture 27 - Attention - III
Lecture 28 - Attention - IV
Lecture 29 - Memory - I

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Lecture 30 - Memory - II
Lecture 31 - Memory - III
Lecture 32 - Memory - IV
Lecture 33 - Memory - V
Lecture 34 - Memory - VI
Lecture 35 - Memory - VII
Lecture 36 - Everyday Memory and Memory Errors
Lecture 37 - Disorders for Perception and Attention
Lecture 38 - Disorders of Memory
Lecture 39 - Summary and Q & A

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NPTEL Video Course - Humanities and Social Sciences - NOC:Calculus of One Real Variable

Subject Co-ordinator - Dr. Joydeep Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Numbers
Lecture 2 - Countability and Uncountability
Lecture 3 - Examples of Irrational numbers
Lecture 4 - Functions
Lecture 5 - Limits of Functions - I
Lecture 6 - Limits of Functions - II
Lecture 7 - Continuous Functions
Lecture 8 - Intermediate Value Theorem
Lecture 9 - Maximum Value Theorem
Lecture 10 - Supremum and Infimum
Lecture 11 - Derivative of a Function
Lecture 12 - Rules of Differentiation
Lecture 13 - Maxima and Minima
Lecture 14 - Rolles Theorem and Lagrange Mean Value Theorem (MVT)
Lecture 15 - Monotonic Functions and Inverse Functions
Lecture 16 - Newtonâ s Method for solving Equations
Lecture 17 - Optimization Problems
Lecture 18 - Integration-I
Lecture 19 - Integration-II
Lecture 20 - Integration-III
Lecture 21 - Integration theory of Riemann - I
Lecture 22 - Integration theory of Riemann - II
Lecture 23 - Integration Rule
Lecture 24 - Fundamental Theorem of Calculus (in Riemann style)
Lecture 25 - The Kurzweil-Henstock Integral (K-H Integral)
Lecture 26 - Calculating Indefinite Integrals
Lecture 27 - Improper Integral - I
Lecture 28 - Improper Integral - II
Lecture 29 - Application of Definite Integral - I

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Lecture 30 - Application of definite Integral - II
Lecture 31 - Application of definite Integral - III
Lecture 32 - Application of definite Integral - III (Continued......)
Lecture 33 - Numerical Integration - I
Lecture 34 - Numerical Integration - II
Lecture 35 - Sequences
Lecture 36 - Sequences (Continued...)
Lecture 37 - Infinite Series
Lecture 38 - infinite series (Continued...)
Lecture 39 - Taylors Theorem, other issues and end of the course - I
Lecture 40 - Taylors Theorem, other issues and end of the course - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:An Introduction to Microeconomics

Subject Co-ordinator - Dr. Vimal Kumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Economics ?
Lecture 2 - Resources, Wants and Scarcity
Lecture 3 - Allocation, Command, Market and Mixed Economy
Lecture 4 - Individual
Lecture 5 - Rationality, Self Interest and Optimization
Lecture 6 - Branches of Economics
Lecture 7 - Introduction to Demand and Supply
Lecture 8 - Demand
Lecture 9 - Demand
Lecture 10 - Market Demand Function
Lecture 11 - Factors Affecting Demand
Lecture 12 - Supply and Market Supply
Lecture 13 - Supply
Lecture 14 - Factors Affecting Supply
Lecture 15 - Market Equilibrium
Lecture 16 - Few Examples
Lecture 17 - Application
Lecture 18 - Consumer Surplus
Lecture 19 - Producer Surplus
Lecture 20 - Total Surplus
Lecture 21 - Effect of Price Control on Surplus
Lecture 22 - Implications of Market Equilibrium
Lecture 23 - Price Elasticity of Demand
Lecture 24 - Elastic, Inelastic and Unit- elastic Demand
Lecture 25 - Perfectly Elastic and Perfectly Inelastic Demand
Lecture 26 - More on Elasticity
Lecture 27 - Factors Affecting Price Elasticity of Demand
Lecture 28 - Effect of Taxation
Lecture 29 - Tax Imposed on Seller

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Lecture 30 - Incidence of Tax
Lecture 31 - Incidence of Tax
Lecture 32 - Incidence of Tax
Lecture 33 - Towards Consumer Theory
Lecture 34 - Budget Line and Budget Set
Lecture 35 - Factors Affecting the Budget Line
Lecture 36 - Few Examples of Changes in Budget Line
Lecture 37 - Consumption Set
Lecture 38 - Convexity of Consumption Set
Lecture 39 - Describing Utility
Lecture 40 - Some Axioms
Lecture 41 - Preferences as a Mathematical Construct
Lecture 42 - Rationality in Real Life Vs. Rationality in Economics
Lecture 43 - More on Three Axioms of Rationality
Lecture 44 - Defining Utility Function
Lecture 45 - Ordinal Vs. Cardinal Utility
Lecture 46 - Properties of Preferences
Lecture 47 - Indifference Set
Lecture 48 - Indifference Curve
Lecture 49 - Behavioural Assumption
Lecture 50 - Properties of Preferences
Lecture 51 - Marginal Rate of Substitution (MRS)
Lecture 52 - DMRS and Convexity
Lecture 53 - Summary
Lecture 54 - Utility Maximization
Lecture 55 - Utility Maximization
Lecture 56 - More on Utility Maximization
Lecture 57 - Utility Maximization
Lecture 58 - Example Revisited
Lecture 59 - Marginal Utility Vs. Marginal Rate of Substitution (MRS)
Lecture 60 - Perfect Substitutes
Lecture 61 - Perfect Complements
Lecture 62 - An Example with Quasi Linear Preferences
Lecture 63 - Demand Revisited
Lecture 64 - Effect of Income on Quantity Demanded
Lecture 65 - Effect of Change in Price
Lecture 66 - Substitution Effect and Income Effect
Lecture 67 - Giffen Good
Lecture 68 - Expenditure Minimization as a Dual Problem of Utility Maximization

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Lecture 69 - Marshallian and Hicksian Demand Function
Lecture 70 - Slutsky Equation
Lecture 71 - An Application
Lecture 72 - Towards Producer Theory
Lecture 73 - Technology or Production Function
Lecture 74 - Isoquants
Lecture 75 - Few Axioms Related to Technology
Lecture 76 - Axioms/ Assumptions Continued
Lecture 77 - Production in Short Run
Lecture 78 - Average and Marginal Product of Labour (APL and MPL)
Lecture 79 - More on APL and MPL
Lecture 80 - Law of Diminishing Marginal Returns
Lecture 81 - Production in Long Run
Lecture 82 - MRTS
Lecture 83 - Decreasing MRTS
Lecture 84 - Elasticity of Substitution
Lecture 85 - Returns to Scale
Lecture 86 - Elasticity of Scale
Lecture 87 - Economic Terminology
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Lecture 90 - Diminishing Marginal Product Vs. DMRTS
Lecture 91 - Returns to Scale through Graphs
Lecture 92 - Cost in Long Run
Lecture 93 - Cost Minimization
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Lecture 96 - More on Cost Minimization
Lecture 97 - Cost Function in the Long Run
Lecture 98 - Cost in Short Run
Lecture 99 - Cost in Short Run
Lecture 100 - Shape of Cost Curves
Lecture 101 - Factor Demand Function
Lecture 102 - Output Expansion Path
Lecture 103 - Cost Revisited
Lecture 104 - Cobb-Douglas Function
Lecture 105 - Short Run Vs. Long Run Cost Minimization
Lecture 106 - Short Run Vs. Long Run Cost Minimization Through Graphs
Lecture 107 - Average Cost in Short Run Vs. Long Run

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Lecture 108 - Short Run Marginal Cost Vs. Long Run Marginal Cost
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Lecture 110 - Marginal Revenue
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Lecture 112 - Profit Maximization in Short Run Through Algebra and Calculus
Lecture 113 - Market Environment
Lecture 114 - Perfectly Competitive Market
Lecture 115 - Supply Curve
Lecture 116 - An example obtaining the short run supply function
Lecture 117 - Two Interpretation of Supply Function
Lecture 118 - Profit maximization implies cost minimization
Lecture 119 - Producerâ s Surplus Revisited
Lecture 120 - Profit Maximization and Returns to Scale
Lecture 121 - Short Run Supply Vs. Long Run Supply
Lecture 122 - Long Run Equilibrium and Supply Function
Lecture 123 - Introduction to Monopoly
Lecture 124 - Marginal Revenue of the Monopolist
Lecture 125 - Monopoly
Lecture 126 - Profit Maximization for the Monopolist
Lecture 127 - Inverse Elasticity Pricing Rule
Lecture 128 - Profit Maximization for the Monopolist through Graph
Lecture 129 - No Supply Function for Monopoly
Lecture 130 - Monopoly
Lecture 131 - Imposition of the Tax on the Monopolist
Lecture 132 - Welfare Effects of Monopoly Pricing
Lecture 133 - Price Discrimination
Lecture 134 - Monopoly
Lecture 135 - Responses from Policy Makers
Lecture 136 - Introduction to Oligopoly
Lecture 137 - Nash Equilibrium
Lecture 138 - Cournot Model of Duopoly
Lecture 139 - Stackelberg Model of Duopoly
Lecture 140 - Bertrand Model of Duopoly
Lecture 141 - Market Environment

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Advanced Cognitive Processes

Subject Co-ordinator - Prof. ARK Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preface, Outline and Course Structure
Lecture 2 - Knowledge - I
Lecture 3 - Knowledge - II
Lecture 4 - Knowledge - III
Lecture 5 - Knowledge - IV
Lecture 6 - Knowledge - V
Lecture 7 - Visual Imagery - I
Lecture 8 - Visual Imagery - II
Lecture 9 - Cognitive Maps
Lecture 10 - Mental Imagery
Lecture 11 - Language
Lecture 12 - Language
Lecture 13 - Evolution of Language
Lecture 14 - Language Acquisition - I
Lecture 15 - Language Acquisition - II
Lecture 16 - Language Comprehension - I
Lecture 17 - Language Comprehension - II
Lecture 18 - Language Production
Lecture 19 - Reading - I
Lecture 20 - Reading - II
Lecture 21 - Aphasia
Lecture 22 - Bilingualism
Lecture 23 - Reasoning and Decision Making - I
Lecture 24 - Reasoning and Decision Making - II
Lecture 25 - Reasoning and Decision Making - III
Lecture 26 - Problem Solving - I
Lecture 27 - Problem Solving - II
Lecture 28 - Problem Solving - III
Lecture 29 - Problem Solving - IV

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Lecture 30 - Creativity
Lecture 31 - Cognition and Emotion - I
Lecture 32 - Cognition and Emotion - II
Lecture 33 - Cognition and Emotion - III
Lecture 34 - Cognition and Emotion - IV
Lecture 35 - Cognition and Emotion - V
Lecture 36 - Cognitive Development - I
Lecture 37 - Cognitive Development - II
Lecture 38 - Cognitive Development - III
Lecture 39 - Cognitive Development - IV
Lecture 40 - Summary and Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Literary Theory

Subject Co-ordinator - Prof. Sayan Chattopadhyay

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Literature and Mimesis
Lecture 3 - Literature and Mimesis
Lecture 4 - Literature and Mimesis
Lecture 5 - Literature and Mimesis
Lecture 6 - Literature and the Sublime
Lecture 7 - Neoclassical Literary Theory
Lecture 8 - Literature and Romanticism - I
Lecture 9 - Literature and Romanticism - II
Lecture 10 - New Criticism
Lecture 11 - Formalism
Lecture 12 - Dialogism I
Lecture 13
Lecture 14 - Reader Response Theory I
Lecture 15 - Reader Response Theory II
Lecture 16 - Structuralism I
Lecture 17 - Structuralism II
Lecture 18 - Poststructuralism I
Lecture 19 - Poststructuralism II
Lecture 20 - Poststructuralism III
Lecture 21 - Marxist Literary Theory I
Lecture 22 - Marxist Literary Theory II
Lecture 23 - Marxist Literary Theory III
Lecture 24 - Literature and Psychoanalysis
Lecture 25 - Literature and Psychoanalysis
Lecture 26 - Literature and Psychoanalysis
Lecture 27 - Literature and Psychoanalysis IV
Lecture 28 - Literature and Psychoanalysis V
Lecture 29 - Feminism and Literature I

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Lecture 30 - Feminism and Literature II
Lecture 31 - Feminism and Literature III
Lecture 32 - Modernism and Postmodernism
Lecture 33 - Postcolonial Theory I
Lecture 34 - Postcolonial Theory II
Lecture 35 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Development of Sociology in India

Subject Co-ordinator - Prof. Ashish Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6 - On Civilizational perspective
Lecture 7 - On Indological perspective
Lecture 8 - On Indological perspective
Lecture 9 - On Marxian perspective
Lecture 10 - On Marxian perspective
Lecture 11 - Structural-functional perspective
Lecture 12 - Structural-functional perspective
Lecture 13 - On Environmental Perspective
Lecture 14 - On Environmental Perspective
Lecture 15 - On Gender perspective
Lecture 16 - On Gender perspective
Lecture 17 - Subaltern perspective
Lecture 18 - Subaltern perspective
Lecture 19 - On Dalit Perspective
Lecture 20 - On Dalit Perspective

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to the Pyschology of Language

Subject Co-ordinator - Prof. ARK Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Language
Lecture 2 - Basic Concepts in Psycholinguistics
Lecture 3 - Animal Communication
Lecture 4 - Evolution of Language
Lecture 5 - Language and Thought
Lecture 6 - Do children talk ? And How ?
Lecture 7 - The First Steps in Language Acquisition
Lecture 8 - Segmenting the speech stream
Lecture 9 - Learning Word - Meanings
Lecture 10 - Acquiring Morphological and Syntactic Knowledge
Lecture 11 - Speech Production - 1
Lecture 12 - Speech Production - 2
Lecture 13 - Speech Production - 3
Lecture 14 - Speech Comprehension - 1
Lecture 15 - Speech Comprehension - 2
Lecture 16 - Understanding Word Meaning
Lecture 17 - Word Meaning and Lexical Access
Lecture 18 - Lexical Access
Lecture 19 - Ambiguity and Representation of Meaning in the Brain
Lecture 20 - Meaning in the Brain
Lecture 21 - What is a sentence ?
Lecture 22 - Parsing Sentences - 1
Lecture 23 - Parsing Sentences - 2
Lecture 24 - Parsing Sentences - 3
Lecture 25 - Parsing Sentences - 4
Lecture 26 - Reading - 1
Lecture 27 - Theories of Reading
Lecture 28 - Cognitive Processes in Reading
Lecture 29 - Recognising Visual Words

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Lecture 30 - Dyslexia
Lecture 31 - Neural Basis of Word Meaning
Lecture 32 - Neural Basis of Language Comprehension
Lecture 33 - Neural Basis of Language Comprehension
Lecture 34 - Neural Basis of Language Comprehension and Production
Lecture 35 - Aphasia
Lecture 36 - Bilingualism - 1
Lecture 37 - Bilingualism - 2
Lecture 38 - Bilingualism - 3

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NPTEL Video Course - Humanities and Social Sciences - NOC:Population Studies

Subject Co-ordinator - Prof. A.K. Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Population Studies
Lecture 2 - Population Ecology / Geography
Lecture 3 - Population Growth
Lecture 4 - Population Growth and Development
Lecture 5 - Population Dynamics - 1
Lecture 6 - Population Dynamics - 2
Lecture 7 - Population Policies
Lecture 8 - Population Policy in India
Lecture 9 - Population and Family Welfare - 1
Lecture 10 - Population and Family Welfare - 2
Lecture 11 - Techniques of Population Analysis - 1
Lecture 12 - Techniques of Population Analysis - 2
Lecture 13 - Population and Society
Lecture 14 - Population and Society
Lecture 15 - Statistical Techniques in Population Studies - 1
Lecture 16 - Statistical Techniques in Population Studies - 2
Lecture 17 - Population Growth and Women - 1
Lecture 18 - Population Growth and Women - 2
Lecture 19 - Population Concepts and Aging - 1
Lecture 20 - Population Concepts and Aging - 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Psychology of Everyday

Subject Co-ordinator - Alok Bajpai

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Psychology
Lecture 2 - Psychology and Psychiatry
Lecture 3 - Understanding day-to-day behaviour - I
Lecture 4 - Understanding day-to-day behaviour - II
Lecture 5 - Revisiting normal-abnormal dilemma - I
Lecture 6 - Revisiting normal-abnormal dilemma - II
Lecture 7 - Revisiting normal-abnormal dilemma - III
Lecture 8 - Revisiting normal-abnormal dilemma - IV
Lecture 9 - Issues confronting the young adults - I and II
Lecture 10 - Issues confronting the young adults - III and IV
Lecture 11 - Mental health issues of adults - I and II
Lecture 12 - Mental health issues of adults - III
Lecture 13 - Mental health issues of adults - IV
Lecture 14 - Mental health issues of child and adolescents - I and II
Lecture 15 - Mental health issues of child and adolescents - III and IV

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Brain and Behaviour

Subject Co-ordinator - Prof. ARK Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Brief History of Cognitive Neuroscience
Lecture 2 - A Brief History of Cognitive Neuroscience (Continued...)
Lecture 3 - Structure and Function of the Nervous System
Lecture 4 - Neuronal communication
Lecture 5 - An Overview of the Nervous System
Lecture 6 - The Cerebral Cortex
Lecture 7 - Methods in Cognitive Neuroscience
Lecture 8 - Studying the Damaged Brain
Lecture 9 - Structural Analysis of the Brain
Lecture 10 - Measuring Structure and Function Together in the Brain
Lecture 11 - Neuroscience of Sensation and Perception
Lecture 12 - Olfaction
Lecture 13 - Somatosensation
Lecture 14 - Vision
Lecture 15 - Moving beyond Sensation
Lecture 16 - Attention
Lecture 17 - Models of Attention
Lecture 18 - Neural Mechanisms of Attention
Lecture 19 - Mechanisms of Attention
Lecture 20 - Networks of Attention
Lecture 21 - Memory
Lecture 22 - Mechanisms of Memory
Lecture 23 - The Medial Temporal Lobe Memory System
Lecture 24
Lecture 25
Lecture 26 - Emotion
Lecture 27 - Categorizing Emotions
Lecture 28 - Emotions and Other Cognitive Processes
Lecture 29 - Emotions and other Cognitive Processes (Continued...)

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Lecture 30 - Cognitive Control of Emotions
Lecture 31 - Cognitive Neuroscience of Language
Lecture 32 - Language in the Human Brain
Lecture 33 - Language Comprehension - I
Lecture 34 - Language Comprehension - II
Lecture 35 - Neural Models of Language
Lecture 36 - Neuroscience of Social Cognition
Lecture 37 - Theory of Mind
Lecture 38 - Neural Correlates of Mental State Attribution
Lecture 39 - Autism and Mental State Attribution
Lecture 40 - Social Knowledge in Social Cognition

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NPTEL Video Course - Humanities and Social Sciences - NOC:Modern Indian Art From the Colonial Period to the P

Subject Co-ordinator - Prof.Soumik Nandy Majumdar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Modern Indian Art
Lecture 2 - Advent of the British Colonial Rule
Lecture 3 - Company Painting - A new genre in Indian Art
Lecture 4 - Kalighat Painting - from folk art to urban milieu
Lecture 5 - Raja Ravi Varma, Amrita Sher-Gil, Jamini Roy
Lecture 6 - Early Modern Indian Sculpture
Lecture 7 - Nationalism, Rabindranath Tagore and Bengal School
Lecture 8 - Calcutta - the happening center of modern Indian art
Lecture 9 - Santiniketan - the alternative modernism Nandalal and Benode Behari
Lecture 10 - Santiniketan - the alternative modernism Ramkinkar and Rabindranath
Lecture 11 - 1940s - a different social reality
Lecture 12 - Calcutta Groups and Bombay Progressive Artists Group
Lecture 13 - Post Independent Sculpture
Lecture 14 - Diversities in style and content
Lecture 15 - Diversities in style and content
Lecture 16 - Abstraction in modern Indian art
Lecture 17 - Neo figuration and the narrative trends
Lecture 18 - Folk Art and Modernism
Lecture 19 - Breaking the barriers
Lecture 20 - Experiments Innovations

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Japanese Language and Culture

Subject Co-ordinator - Mrs.Vatsala Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Japanese Scripts
Lecture 2 - Jikou Shoukai ã ã• ã• ã• ã ã• ã ã• ã• ã•
Lecture 3 - Dochira kara desu ka? ã•©ã•¡ã ã ã• ã ã ã•§ã• ã ã• ï¼
Lecture 4 - Senmon wa nan desu ka? å° é ã ¯ã•¯ã ã•ªã ã ã•§ã• ã ã• ï¼
Lecture 5 - Kore wa hon desu.ã ã• ã ã ã•¯ã æ ¬ã ã•§ã• ã
Lecture 6 - Are wa nan desu ka? ã• ã ã ã•¯ã ä½ ã ã•§ã• ã ã• ï¼
Lecture 7 - Ikura desu ka? ã• ã••ã ã ã•§ã• ã ã• ï¼
Lecture 8 - Ima nan-ji desu ka?ã ä» ã ä½ æ ã ã•§ã• ã ¯ã• ï¼
Lecture 9 - Kaigi wa roku-ji han kara desu.ã ä¼ è-°ã ã• ¯ã å -æ ã å• ã ã• ã ã ã•§ã• ã
Lecture 10 - Ashita TÅ•kyÅ• e ikimasu.ã æ æ ¥ã æ•±äº¬ã ã•¸ã è¡ ã••ã•¾ã• ã
Lecture 11 - Watashi wa mainichi roku-ji ni okimasu.ã ç§•ã• ã æ¯ æ ¥ã å -æ ã ã•«ã ã• ã••ã•¾ã• ã
Lecture 12 - Itsu Kanpur e kimashita ka? ã• ã•¤ã ã «ã ©ã ã «ã ã•¸ã æ•¥ã•¾ã• ã• ã ã• ï¼
Lecture 13 - YÅ«binkyoku wa asoko ni arimasu.ã æ¹¯ä¾¿å± ã ã•¯ã ã• ã••ã• ã ã•«ã ã• ã ã•¾ã• ã
Lecture 14 - Rao san wa doko ni imasu ka? ã©ã ªã ã• ã ã ã•¯ã ã•©ã• ã ã•«ã ã• ã•¾ã• ã ã• ï¼
Lecture 15 - Pikunikku e ikimashÅ•.ã ã ã ¯ã ã ã ¯ã ã•¸ã ã• ã••ã•¾ã• ã ã• ã
Lecture 16 - Kesa pan to tamago o tabemashita. ä» æ •ã ã ã ³ã ã•¨ã ã• ã•¾ã• ã ã ã é£ ã•¹ã•¾ã• ã• ã ã
Lecture 17 - Depa-to no tonari no biru wa ginkÅ• desu.ã ã•§ã ã ¼ã ã ¯ã•®ã ã•¨ã•ªã ã ã•®ã ã ã «ã ã•¯ã
Lecture 18 - Taj hoteru wa ookii hoteru desu.ã ã ¿ã ¸ã ã ã ã «ã ã•¯ã å¤§ã••ã• ã ã ã ã «ã ã•§ã• ã
Lecture 19 - Hoteru de nani o tabemashita ka?ã ã ã ã «ã¯ ã•§ã ã•ªã•«ã ã ã é£ ã•¹ã•¾ã• ã• ã ã• ï¼
Lecture 20 - TÅ•kyÅ• wa Å•ki kute kirei desu.ã æ•±äº¬ã ã•¯ã å¤§ã••ã••ã•¦ã ã••ã ã• ã ã•§ã• ã
Lecture 21 - Ko-hi- wa oishiku arimasen.ã ã ³ã ¼ã ã ¼ã ã•¯ã ã• ã• ã• ã••ã ã• ã ã•¾ã• ã ã
Lecture 22 - Hantai Kotoba (Opposites)
Lecture 23 - Watashi wa mainichi miruku o nomimasu.ã ç§•ã•¯ã æ¯ æ ¥ã ã ã «ã ¯ã ã ã é£²ã•¿ã•¾ã• ã ã
Lecture 24 - Watashi wa oniisan ni kamera o moratta.ã ç§•ã•¯ã ã• å ã• ã ã ã•«ã ã «ã ¡ã ©ã ã ã ã ã
Lecture 25 - Nani o tabetai desu ka? ä½ ã ã ã é£ ã•¹ã• ã• ã ã•§ã• ã ã• ï¼
Lecture 26 - Nani o sashiagemasu ka?ã ã•ªã•«ã ã ã ã• ã• ã• ã•¸ã• ã ã• ï¼
Lecture 27 - Sensei wa watashi ni hon o kuremashita.ã å ç ã ã•¯ã ç§•ã ã•«ã æ ¬ã ã ã ã••ã ã•¾ã• ã•
Lecture 28 - Watashi wa pikunikku e ikitakunai.ã ç§•ã•¯ã ã ã ¯ã ã ã ¯ã ã•¸ã è¡ ã••ã• ã••ã•ªã• ã
Lecture 29 - Chotto matte kudasai.ã ã•¡ã ã•£ã•¨ã ã•¾ã•£ã•¦ã ã••ã• ã• ã• ã

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Lecture 30 - Ke-ki o tabete mite kudasai.ã ã ±ã ¼ã -ã ã ã é£ ã•¹ã•¦ã ã•¿ã•¦ã ã••ã• ã• ã• ã
Lecture 31 - Heya ni nani ga arimasu ka?ã é ¨å± ã ã•«ã ä½ ã ã• ã ã• ã ã•¾ã• ã ã• ï¼
Lecture 32 - Nani o shite imasu ka?ã ä½ ã ã ã ã• ã•¦ã• ã•¾ã• ã ã• ï¼
Lecture 33 - TÅ•kyÅ• ni sunde imasu.ã æ•±äº¬ã ã•«ã ã• ã ã•§ã ã• ã•¾ã• ã
Lecture 34 - Kanji ga kakemasu.ã æ¼¢å- ã ã• ã ã• ã• ã•¾ã• ã
Lecture 35 - ImÅ•to wa ningyÅ• o hoshigatte imasu.ã ã• ã ã• ã•¨ã ã•¯ã ã•«ã ã• ã ã• ã ã ã ã•»ã• ã• ã•
Lecture 36 - Watashi wa Aisukuri-mu ga daisuki desu. ã ç§•ã•¯ã¯ã ¢ã ¤ã ¹ã ¯ã ªã ¼ã ã ã• ã å¤§å¥½ã••ã ã•
Lecture 37 - Aisukuri-mu ga ke-ki yori suki desu.ã ã ¢ã ¤ã ¹ã ¯ã ªã ¼ã ã ã• ã ã ±ã ¼ã -ã ã ã ã å¥½ã••
Lecture 38 - Kutsu o kai ni ikimasu.ã ã••ã•¤ã ã ã ã• ã• ã•«ã ã• ã••ã•¾ã• ã
Lecture 39 - Ashita motto atsuku narimasu.ã æ æ ¥ã ã ã•£ã•¨ã ã• ã•¤ã••ã ã•ªã ã•¾ã• ã
Lecture 40 - Rainen TÅ•kyÅ• e iku to omoimasu.ã æ•¥å¹´ã æ•±äº¬ã ã•¸ã è¡ ã••ã ã•¨ã æ •ã• ã•¾ã• ã
Lecture 41 - Pen de kaite mo ii desu ka.ã ã ã ³ã ã•§ã æ ¸ã• ã•¦ã ã ã ã• ã• ã ã•§ã• ã ã• ï¼
Lecture 42 - New Expressions
Lecture 43 - Revision
Lecture 44 - Kanji I
Lecture 45 - Kanji II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Applied Statistics and Econometrics

Subject Co-ordinator - Prof. Deep Mukherjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Statistics
Lecture 2 - Introduction to Econometrics
Lecture 3 - Organization and Presentation of Data
Lecture 4 - Summarizing Data through Descriptive Statistics
Lecture 5 - Discrete Random Variable and Probability Distribution
Lecture 6 - Continuous Random Variables and Probability Distribution
Lecture 7 - Normal Distribution
Lecture 8 - Introduction to Statistical Inference
Lecture 9 - Estimation - Part I
Lecture 10 - Estimation - Part II
Lecture 11 - Hypothesis Testing - Part I
Lecture 12 - Hypothesis Testing - Part II
Lecture 13 - Hypothesis Testing - Part III
Lecture 14 - Hypothesis Testing - Part IV
Lecture 15 - Relationship between Qualitative Variables
Lecture 16 - Relationship Between Quantitative Variables
Lecture 17 - Analysis of Variance
Lecture 18 - One Way ANOVA
Lecture 19 - Two Way ANOVA
Lecture 20 - Analysis of Covariance
Lecture 21 - Index Numbers - Part I
Lecture 22 - Index Numbers - Part II
Lecture 23 - Classical Time Series Analysis - Part I
Lecture 24 - Classical Time Series Analysis - Part II
Lecture 25 - Classical Linear Regression Model - Part I
Lecture 26 - Classical Linear Regression Model - Part II
Lecture 27 - Classical Linear Regression Model
Lecture 28 - Hypothesis Testing with CNLRM
Lecture 29 - More on Hypothesis Testing and Model Specification

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Lecture 30 - Violations of CLRM Assumptions (Heteroskedasticity)
Lecture 31 - Violations of CLRM Assumptions (Autocorrelation and Multicollinearity)
Lecture 32 - Time Series Regression with Stationary Data
Lecture 33 - Time Series Regression with Non-Stationary Data
Lecture 34 - Regression with Dummy Explanatory Variable
Lecture 35 - Dummy Dependent Variable Models - Part I
Lecture 36 - Dummy Dependent Variable Models - Part II
Lecture 37 - Simultaneous Equations Model
Lecture 38 - Panel Data Regression
Lecture 39 - Program Evaluation
Lecture 40 - Data Analysis and Regression with R
Lecture 41 - Regression Involving Dummy Variables in R
Lecture 42 - Time Series Analysis in R

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NPTEL Video Course - Humanities and Social Sciences - NOC:Literature and Coping Skills

Subject Co-ordinator - Prof. Ajit K Mishra

Co-ordinating Institute - IITBHU - Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Existential Concerns - I
Lecture 2 - Existential Concerns - II
Lecture 3 - Emotional wellbeing - I
Lecture 4 - Emotional wellbeing - II
Lecture 5 - Personality - I
Lecture 6 - Personality - II
Lecture 7 - Simulation and higher order thinking
Lecture 8 - Empathy and emotional intelligence
Lecture 9 - Poetry therapy - I
Lecture 10 - Poetry therapy - II
Lecture 11 - Verbal imagery and healing - I
Lecture 12 - Verbal imagery and healing - II
Lecture 13 - Rhetoric and prosody - I
Lecture 14 - Rhetoric and prosody - II
Lecture 15 - Rhetoric and prosody - III
Lecture 16 - Rhetoric and prosody - IV
Lecture 17 - The psychology of fear and anxiety - I
Lecture 18 - The psychology of fear and anxiety - II
Lecture 19 - John Donne, â Death be not Proud
Lecture 20 - Robert Frost, The Road not Taken
Lecture 21 - Feeling Weird, Losing Touch - I
Lecture 22 - Feeling Weird, Losing Touch - II
Lecture 23 - Alfred Lord Tennyson, Break, Break, Break
Lecture 24 - John Keats, Ode on Melancholy
Lecture 25 - Unclaimed Experiences - I
Lecture 26 - Unclaimed Experiences - II
Lecture 27 - Maya Angelou, Still I Rise
Lecture 28 - Elizabeth Murphy, The Night That Changed Everything
Lecture 29 - Love, Heartbreak, and Healing - I

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Lecture 30 - Love, Heartbreak, and Healing - II
Lecture 31 - Robert Browning, The Last Ride Together
Lecture 32 - Derek Walcott, The Fist
Lecture 33 - The Culture of Escape: Elusion or Illusion? - I
Lecture 34 - The Culture of Escape: Elusion or Illusion? - II
Lecture 35 - Charles Baudelaire, Be Drunk
Lecture 36 - Charles Bukowski, The Suicide Kid
Lecture 37 - Mimetic Desire and the Possessed Body - I
Lecture 38 - Mimetic Desire and the Possessed Body - II
Lecture 39 - Carol Ann Duffy, The Diet
Lecture 40 - Marty McConnell, Instructions for a Body

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Economy: Some Contemporary Perspectives

Subject Co-ordinator - Prof. Wasim Ahmad

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Indian Economy - Economic Planning - 1
Lecture 2 - Indian Economy - Economic Planning - 2
Lecture 3 - Indian Economy - Economic Planning - 3
Lecture 4 - Indian Economy - Economic Planning - 4
Lecture 5 - Indian Economy - Economic Planning - 5
Lecture 6 - Indian Economy - Economic Planning - 6
Lecture 7 - Indian Economy - Economic Planning - 7
Lecture 8 - Indian Economy - Economic Planning - 8
Lecture 9 - Indian Economy - Agriculture Policy - 1
Lecture 10 - Indian Economy - Agriculture Policy - 2
Lecture 11 - Indian Economy - Agriculture Policy - 3
Lecture 12 - Indian Economy - Agriculture Policy - 4
Lecture 13 - Indian Economy - Industrial Policy - 1
Lecture 14 - Indian Economy - Industrial Policy - 2
Lecture 15 - Indian Economy - Industrial Policy - 3
Lecture 16 - Indian Economy - Industrial Policy - 4
Lecture 17 - Indian Economy - Service Sector Policy - 1
Lecture 18 - Indian Economy - Service Sector Policy - 2
Lecture 19 - Indian Economy - Financial Sector - 1
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Lecture 26 - Indian Economy - Indian Banking Crisis - 2
Lecture 27 - Indian Economy - Indian Banking Crisis - 3
Lecture 28 - Indian Economy - Financial Inclusion
Lecture 29 - Indian Economy - Monetary Policy - 1

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Lecture 30 - Indian Economy - Monetary Policy - 2
Lecture 31 - Indian Economy - Monetary Policy - 3
Lecture 32 - Indian Economy - Monetary Policy - 4
Lecture 33 - Indian Economy - Monetary Policy - 5
Lecture 34 - Indian Economy - Fiscal Policy - 1
Lecture 35 - Indian Economy - Fiscal Policy - 2
Lecture 36 - Indian Economy - India and WTO - 1
Lecture 37 - Indian Economy - India and WTO - 2
Lecture 38 - Indian Economy - India and WTO - 3
Lecture 39 - Indian Economy - India's Economic Outlook (2020-21)
Lecture 40 - Indian Economy - Union Budget (2021-22)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Japani Bhasha - Saral Swaroop

Subject Co-ordinator - Prof. Vatsala Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Japanese scripts
Lecture 2 - Watashi wa Tanaka desu
Lecture 3 - Dochira kara desu ka?
Lecture 4 - Pen wa watashi no desu
Lecture 5 - Watashi mo gakusei desu
Lecture 6 - Nan sai desu ka?
Lecture 7 - Ikura desu ka?
Lecture 8 - Irasshaimase
Lecture 9 - Nan-ji desu ka?
Lecture 10 - Kyou wa getsuyoubi desu
Lecture 11 - Doko desu ka?
Lecture 12 - Tanjoubi wa itsu desu ka?
Lecture 13 - Nan-ji ni okimasu ka?
Lecture 14 - Tokyo e ikimasu
Lecture 15 - Expressions
Lecture 16 - Itsu Nihon ni kimashita ka?
Lecture 17 - Hon wa asoko ni arimasu
Lecture 18 - Yuubinkyouku wa hon-ya no tonari ni arimasu
Lecture 19 - Nan nin imasu ka?
Lecture 20
Lecture 21 - Ashita kurabu e ikimasen ka?
Lecture 22 - Kocha wa oishii desu
Lecture 23 - Iroiro na hito ni aimashita
Lecture 24 - Tanaka san onegaishimasu
Lecture 25 - Tanaka san irashshaimasu ka?
Lecture 26 - Tokyo wa ookikute kirei na machi desu
Lecture 27 - Pa-ti wa tanoshikatta desu
Lecture 28 - Raigetsu Amerika e ikimasu
Lecture 29 - Verbs 1

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Lecture 30 - Verbs 2
Lecture 31 - Imouto ni kamera o agemashita
Lecture 32 - Sensei ni pen o sashiagemashita
Lecture 33 - Tomodachi wa hana o kuremashita
Lecture 34 - Hawaii e ikitakunai desu
Lecture 35 - Nanika tabetai desu ka?
Lecture 36 - Dokoemo ikitakunai desu
Lecture 37 - Chotto matte kudasai
Lecture 38 - Mata irashite kudasai
Lecture 39 - Omiyage o tsutsumanaide kudasai
Lecture 40 - Watashi wa aisukurimu ga suki desu
Lecture 41 - Nihongo no jishou ga hoshii desu
Lecture 42 - Rainen kuni e kaeru tsumori desu
Lecture 43 - Hikouki to shinkansen to dochira no houga hayai desu ka?
Lecture 44 - Kurasu no naka de dare ga ichiban kashikoi desu ka?
Lecture 45 - Kore wa tanaka san no jishou da to omoimasu
Lecture 46 - Kasa wa eigo de nan to iimasu ka?
Lecture 47 - Watashi ha Nihongo ga yomemasen
Lecture 48 - Watashi wa kanji o kaku koto ga dekimasu
Lecture 49 - Sonna koto iwanaide kudasai
Lecture 50 - Watashiwa kuruma o unten suru toki ongaku o kikimasu
Lecture 51 - Kanji o kaku koto ga dekimasu
Lecture 52 - Shousetsu o yomu tame ni toshoukan e ikimasu
Lecture 53 - Shashin o totte mo ii desu ka?
Lecture 54 - Mainichi kaisha ni ikanakereba narimasen
Lecture 55 - Tanaka san wa yoku hatarakimasu

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Japanese Language and Culture-II

Subject Co-ordinator - Prof. Vatsala Misra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Kore wa watashi no hon desu (This is my book)
Lecture 2 - Ima nan ji desu ka? (What is the time now?)
Lecture 3 - Hon wa tsukue no ue ni arimasu (The book is on the table)
Lecture 4 - Ashita kurabu e ikimasen ka? (Will you please come to the club tomorrow?)
Lecture 5 - Kodoma-tachi wa ima asonde imasu (Children are playing now)
Lecture 6 - Kodomotachi wa asonde kara benkyou shimasu (Children will study after playing)
Lecture 7 - Douzo meshiagatte kudasai (Please eat it)
Lecture 8 - Tabete mite kudasai (Please eat and see)
Lecture 9 - Koko de tabenaide kudasai (Please do not eat here)
Lecture 10 - Hitori de ikimasu ka? (Will you go alone?)
Lecture 11 - Irasshaimase ! (Welcome !)
Lecture 12 - Shiken wa dou deshita ka? (How was the exam?)
Lecture 13 - Tomodachi wa tanjoubi ni hana o kuremashita (My friend gave me flowers on my birthday)
Lecture 14 - Tomodachi wa ke-ki o tsukutte kuremashita (My friend made a cake and gave it to me)
Lecture 15 - Kimura to moushimasu (I am Kimura)
Lecture 16 - O-genki desu ka ? (How are you ?)
Lecture 17 - Kare wa 'happyou wa ashita desu' to iimashita (He said, 'the presentation is tomorrow)
Lecture 18 - Tanaka to iu hito ni aimashita (I met a person called Tanaka)
Lecture 19 - Tomodachi ga kuru to omoimasu (I think my friend will come)
Lecture 20 - Watashi wa hitori de ikemasu (I can go alone)
Lecture 21 - Ikka-getsu de dekimasu (I can do it in one mouth)
Lecture 22 - Kare wa Indo no shuukan no koto o yoku shitte imasu (He know a lot about Indian customs)
Lecture 23 - Aisatsu (Greetings)
Lecture 24 - Aisatsu (Greetings)
Lecture 25 - Chokore-to yori aisukuri-mu ga suki desu (I like ice cream more than chocolate)
Lecture 26 - Dochira ga suki desu ka ? (Which do you like ?)
Lecture 27 - Mira san asobi ni irashite kudasai (Mira san please visit us)
Lecture 28 - Houmon (Visiting)
Lecture 29 - Pen de kaite mo ii desu ka ? (Can I write with a pen?)

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Lecture 30 - Konakute mo ii desu ka ? (Is is alright if I do not come ?)
Lecture 31 - Nani mo tabetakunai desu (I do not want to eat anything)
Lecture 32 - Watashi wa eiwa jiten ga hoshii desu (I want an English-Japanese dictionary)
Lecture 33 - Rainen kekkon suru tsumori desu (I intend to get married next year)
Lecture 34 - Soto wa kuraku narimashita (It has become dark outside)
Lecture 35 - Kyuujitai and Shinjitai
Lecture 36 - Nihon e itta koto ga arimasu (I have been to Japan)
Lecture 37 - Minikui ahiru no ko - I (Ugly duckling - I)
Lecture 38 - Minikui ahiru no ko - II (Ugly duckling - II)
Lecture 39 - Working in Japan
Lecture 40 - Haru ni naru to sakura ga saku (When it is spring cherry blossoms will bloom)
Lecture 41 - Mira wa konai kamoshirenai (Mira may not come)
Lecture 42 - Okane ga attara uchi o kaimasu (If I have money I will buy a house)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Art: Materials, Techniques and Artistic Prac

Subject Co-ordinator - Prof. Rajarshi Sengupta

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Humanities and Social Sciences - NOC:à¤ªà¥•à¤°à¤®à¥•à¤ à¤¹à¤¿à¤ à¤¦à¥ à¤¹à¤¾à¤¨à¤¿à

Subject Co-ordinator - Prof. Shri Prakash Shukla

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Humanities and Social Sciences - NOC:Computer Aided Decision Systems - Industrial Practi

Subject Co-ordinator - Prof. Deepu Philip, Prof. Amandeep Singh Oberoi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Decision Support Systems (DSS)
Lecture 2 - Characteristics and Capabilities of DSS
Lecture 3 - Misconception and Components of DSS
Lecture 4 - Decision Process
Lecture 5 - Overview of Database Management Systems
Lecture 6 - Introduction to Modelbase Management Systems
Lecture 7 - Introduction to User Interface System
Lecture 8 - Principles of Graphical User Interface
Lecture 9 - Introduction to Database
Lecture 10 - Reasons behind using DBMS
Lecture 11 - Concepts and Architecture of Database Systems
Lecture 12 - Entity Relationship
Lecture 13 - Entity Relationship Diagrams
Lecture 14 - Translation of ER Diagram to DB
Lecture 15 - Database Normalization
Lecture 16 - More SQL Commands
Lecture 17 - Big Data: An Overview
Lecture 18 - Big Data Analytics Team
Lecture 19 - Big Data Analytics Lifecycle - Phase 1
Lecture 20 - Big Data Analytics Lifecycle - Phase 2
Lecture 21 - Big Data Analytics Lifecycle - Phase 3 and 4
Lecture 22 - Big Data Analytics Lifecycle - Phase 5 and 6
Lecture 23 - Big Data Analytics Tools and Software - Part 1
Lecture 24 - Big Data Analytics Tools and Software - Part 2
Lecture 25 - Big Data Analytics Tools and Software - Part 3
Lecture 26 - Big Data Analytics Tools and Software - Part 4
Lecture 27 - Big Data Analytics Lifecycle - Case Study
Lecture 28 - Introduction to Industrial Internet of Things (IIoT)
Lecture 29 - Structure of BDA in IIoT

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Lecture 30 - BDA in IIoT, Gas Pipeline Case Study
Lecture 31 - BDA in IIoT, RR Engine Case Study
Lecture 32 - DSS in CAD/CAM
Lecture 33 - Assembly Tree
Lecture 34 - BDA in Computer Aided Design
Lecture 35 - Product Data Exchange - Part 1
Lecture 36 - Product Data Exchange - Part 2
Lecture 37 - DSS in CAM - Part 1
Lecture 38 - DSS in CAM - Part 2
Lecture 39 - DSS in Additive Manufacturing
Lecture 40 - Usability and User Interface Design
Lecture 41 - Usability Problems and Usability Design Process
Lecture 42 - Usability Principles
Lecture 43 - HTML as a User Interface Language - 1
Lecture 44 - HTML as a User Interface Language - 2
Lecture 45 - Introduction to PHP
Lecture 46 - Basic Components of PHP
Lecture 47 - More on PHP: Hypertext PreProcessor (PHP)
Lecture 48 - MySQL and PHP - The Backend of Decision Support Systems
Lecture 49 - Forms and PHP - Design of Interactive and Dynamic Applications
Lecture 50 - An Introduction to Networking
Lecture 51 - Data Visualization - Part 1
Lecture 52 - Data Visualization - Part 2
Lecture 53 - Summarizing the Course

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introductory Rural Sociology: Continuity and Change

Subject Co-ordinator - Prof. Ashish Saxena

Co-ordinating Institute - University of Allahabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Humanities and Social Sciences - NOC:Threads of Visual Exploration: Textiles and Allied

Subject Co-ordinator - Prof. Rajarshi Sengupta

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Humanities and Social Sciences - NOC:Moral Thinking: An Introduction to Values and Ethic

Subject Co-ordinator - Prof. Vineet Sahu

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Humanities and Social Sciences - NOC:Psychology Of Bilingualism and Multilingualism

Subject Co-ordinator - Prof. Ark Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 38
Lecture 39

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sociology and Sanitation: An Introduction

Subject Co-ordinator - Prof. Ashish Saxena

Co-ordinating Institute - University of Allahabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sanitation Practices in a Historical Perspective
Lecture 2 - Sociology in Sanitation: Definition, Scope and Strategies
Lecture 3 - Perspectives on Sociology of Sanitation
Lecture 4 - Research Methodology in Sociology of Sanitation
Lecture 5 - Social Science Concepts Applicable to Sanitation Practices
Lecture 6 - Forms of Sanitation and their Social Implications
Lecture 7 - Social Movements and Societal Sanitation
Lecture 8 - Ramifications of Cultural Practices : Caste and Sanitation in Rural and Urban India
Lecture 9 - Interventions of Public and Private Agencies on Sanitation in India: An Overview
Lecture 10 - Toilet as a Tool of Change: Exemplifying Sulabh International Social Service Organization

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NPTEL Video Course - Humanities and Social Sciences - NOC:Business Japanese and Business Manner

Subject Co-ordinator - Prof. Vatsala Misra, Prof. Yumiko Furuichi

Co-ordinating Institute - IIT - Kanpur, University of Tokyo

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - è ªå·±ç´¹ä» / Self-introduction in business environment - Part I
Lecture 2 - Practice and Shitsumon corner(è ªå·±ç´¹ä» / Self-introduction in business environment) - Part II
Lecture 3 - ã ã ¸ã •ã ¹å ´é•¢ã•§ã•®æ ¨æ ¶ / Greetings in Business Environment - Part I
Lecture 4 - Practice and Shitsumon corner(ã ã ¸ã •ã ¹å ´é•¢ã•§ã•®æ ¨æ ¶ / Greetings in Business Environment)
Lecture 5 - ã ã ¸ã •ã ¹å ´é•¢ã•§ä¾•é ¼ã ã• ã / Requests in Business Environment - Part I
Lecture 6 - Practice and Shitsumon corner(ã ã ¸ã •ã ¹å ´é•¢ã•§ä¾•é ¼ã ã• ã / Requests in Business Environm
Lecture 7 - è¨±å•¯ ã ã ã ã• / Ask and refuse permission - Part I
Lecture 8 - Practice and Shitsumon corner(è¨±å•¯ ã ã ã ã• / Ask and refuse permission) - Part II
Lecture 9 - é »è©±å¿ å¯¾ / Attending the phone - Part I
Lecture 10 - Practice and Shitsumon corner(é »è©±å¿ å¯¾ / Attending the phone) - Part II
Lecture 11 - é »è©±ï¼ ä¼•è¨ / Telephone messages - Part I
Lecture 12 - Practice and Shitsumon corner(é »è©±ï¼ ä¼•è¨ / Telephone messages) - Part II
Lecture 13 - ä¼ è-° / Formal Meetings - Part I
Lecture 14 - Practice and Shitsumon corner(ä¼ è-° / Formal Meetings) - Part II
Lecture 15 - ã ¡ã ¼ã «ã•®æ ¸ã••æ ¹ / How to write an Email - Part I
Lecture 16 - Practice(ã ¡ã ¼ã «ã•®æ ¸ã••æ ¹ / How to write an Email) - Part II
Lecture 17 - å ºæ ¬ã•®ã ¡ã ¼ã «ã•®æ ¸ã••æ ¹ / Writing Basic Emails and Shitsumon corner
Lecture 18 - å±¥æ-´æ ¸ã•®æ ¸ã••æ ¹ / How to write a CV

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NPTEL Video Course - Humanities and Social Sciences - NOC:Threads of Visual Exploration: Textiles and Allied

Subject Co-ordinator - Prof. Rajarshi Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Yarn and Fabric Dyeing
Lecture 2 - History of Yarn and Fabric Dyeing in India
Lecture 3 - History of Yarn and Fabric Dyeing and its Relevance
Lecture 4 - Demonstrations - Week 1
Lecture 5 - Variety of Block Printed Textiles and Woodblock Making in the Indian Subcontinent
Lecture 6 - History of Woodblock Making and Printing: Material Evidence
Lecture 7 - Woodblock Making and Block Printing in Southeastern India
Lecture 8 - Demonstrations - Week 2
Lecture 9 - Histories and Centres of Dye and Mordant Painting in India
Lecture 10 - Dye Painted Textiles: Temple Cloth, Utilitarian Textiles and Artistic Expressions
Lecture 11 - Demonstrations - Week 3
Lecture 12 - Reflections on Sustainability - I
Lecture 13 - Reflections on Sustainability - II
Lecture 14 - Reflections on Sustainability - III
Lecture 15 - Reflections on Sustainability - IV
Lecture 16 - Interviews

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Economic Growth - I

Subject Co-ordinator - Prof. Sohini Sahu

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Placing this course in context of other courses in Economics
Lecture 3 - Short-run fluctuations versus the long run economic growth
Lecture 4 - The stylized facts of economic growth
Lecture 5 - GDP
Lecture 6 - Comparing GDP across nations
Lecture 7 - Measuring Economic Growth
Lecture 8 - Role of Proxy Variables in Measuring Economic Growth
Lecture 9 - What can we learn from data
Lecture 10 - An Introduction to the Solow Growth Model - Part 1
Lecture 11 - An Introduction to the Solow Growth Model - Part 2
Lecture 12 - An Introduction to the Solow Growth Model - Part 3
Lecture 13 - An Introduction to the Solow Growth Model - Part 4
Lecture 14 - The Augmented Solow Growth Model
Lecture 15 - Unconditional and Conditional Convergence
Lecture 16 - Growth Accounting
Lecture 17 - Development Accounting
Lecture 18 - Emergence of the New Growth Theory

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NPTEL Video Course - Humanities and Social Sciences - NOC:Social Behavior and the Brain: An Introduction to S

Subject Co-ordinator - Prof. Ark Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
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Lecture 30
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NPTEL Video Course - Humanities and Social Sciences - NOC:Mental Health and Wellbeing

Subject Co-ordinator - Prof. Santanu Misra, Prof. Oyin Mibang, Prof. Aneesh T, Prof. Akanksha Awasthy, Prof.

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of Mental and Emotional Health during Adolescence
Lecture 2 - The Role of Social and Relationships in Promoting Wellbeing
Lecture 3 - Strategies for Managing stress and Anxiety
Lecture 4 - The Impact of Technology and Social Media on Adolescent Wellbeing
Lecture 5 - The Importance of Self-Care and Self-Compassion
Lecture 6 - Ways of Coping and Developing Healthy Coping Mechanism
Lecture 7 - Navigating Peer Pressure and Relationship
Lecture 8 - Addressing Body Image and Self-Esteem
Lecture 9 - Mindfulness for Mental Wellbeing
Lecture 10 - Communication Skills for Mental Wellbeing
Lecture 11 - Building Resilience During the Transition from School to College
Lecture 12 - Time Management and Goal Setting
Lecture 13 - Emotional Regulation and Understanding Emotions
Lecture 14 - Conflict Resolution Skills
Lecture 15 - The Role of Sleep, Nutrition and Physical Activity in Mental Wellbeing
Lecture 16 - Dealing with Academic Pressure
Lecture 17 - Navigating Career Anxiety
Lecture 18 - Introduction to Therapy and Counselling
Lecture 19 - Emotional Intelligence and Leadership
Lecture 20 - Social Responsibility and Mental Well-being
Lecture 21 - Emotional Validation and Ventilation
Lecture 22 - Setting Boundaries in Relationships
Lecture 23 - Managing Emotional Overwhelm and Stress
Lecture 24 - Managing Conflict with Emotional Intelligence
Lecture 25 - Fostering Emotional Resilience
Lecture 26 - The Role of Creative Arts (Painting and Music) in Mental Health
Lecture 27 - Managing Exam Anxiety
Lecture 28 - Writing as a Tool for Emotional Clarity
Lecture 29 - Movement Based Therapies for Mental Health

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Lecture 30 - StoryTelling and Role-Playing for Personal Growth
Lecture 31 - Attachment Styles and Love in Relationship
Lecture 32 - Balancing Personal Life and Professional Life
Lecture 33 - Building Healthy Friendships
Lecture 34 - Healing from Relationship Trauma
Lecture 35 - The Interplay between Attachment and Parenting
Lecture 36 - Motivational Enhancement Training
Lecture 37 - Psychological First Aid
Lecture 38 - Suicide Prevention and Intervention in Higher Education
Lecture 39 - Resilience Building in Times of Crisis
Lecture 40 - Addressing Burnout in Academic and Professional Settings
Lecture 41 - Crisis Management Skills for Mental Health Professionals
Lecture 42 - On Supervisor - Students Relationship
Lecture 43 - Peer Collaboration and Teamwork in Academia
Lecture 44 - Interdisciplinary Networking and Academic Growth
Lecture 45 - Cultural Sensitivity in Academic Relationships
Lecture 46 - Building Relationships with Administrative and Support Staff
Lecture 47 - Understanding Mental Health in Adolescent and Early Adulthood
Lecture 48 - Impact of Academic Stress on Emotional Wellbeing
Lecture 49 - Navigating Social Relationships and Emotional Intelligence
Lecture 50 - Personal Experiences and Emotional Growth
Lecture 51 - Promoting Self-Care and Emotional Resilience
Lecture 52 - Understanding Stress and Its Impact on Mental Health
Lecture 53 - Mindfulness as a Stress Management Technique
Lecture 54 - Physical Exercise for Stress Relief
Lecture 55 - Relaxation Techniques for Managing Stress
Lecture 56 - Building a Personalized Stress Management Routine
Lecture 57 - The Role of Social Media in Modern life
Lecture 58 - Social Media and Self Esteem
Lecture 59 - Body Image and Social Media
Lecture 60 - Mental Health Risk of Social Media use
Lecture 61 - Building Healthy Digital Habits for Well-being

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NPTEL Video Course - Humanities and Social Sciences - NOC:Basics of Experimental Design for Cognitive Psychol

Subject Co-ordinator - Prof. Ark Verma

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Science and the Scientific Methods
Lecture 2 - Of Theories and Paradigms
Lecture 3 - Psychology As a Scientific Discipline !
Lecture 4 - Quantitative Research Methods in Psychology
Lecture 5 - Qualitative Research Methods in Psychology
Lecture 6 - Descriptive Research Designs - 1
Lecture 7 - Descriptive Research Designs - 2
Lecture 8 - Descriptive Research Designs - 3
Lecture 9 - Correlational Research Design - 1
Lecture 10 - Correlational Research Design - 2
Lecture 11 - Overview of an Experiment - 1
Lecture 12 - Mechanics of Experiment Design - 1
Lecture 13 - Mechanics of Experiment Design - 2
Lecture 14 - Mechanics of Experiment Design - 3
Lecture 15 - Elements of an Experiment - 1
Lecture 16 - Elements of an Experiment - 2
Lecture 17 - Elements of an Experiment - 3
Lecture 18 - Elements of an Experiment - 4
Lecture 19 - Elements of an Experiment - 5
Lecture 20 - Elements of an Experiment - 6
Lecture 21 - Experimental Design - 1
Lecture 22 - Experimental Design - 2
Lecture 23 - Experimental Design - 3
Lecture 24 - Ensuring Reliable and Valid Experiments - 1
Lecture 25 - Ensuring Reliable and Valid Experiments - 2
Lecture 26 - Ensuring Reliable and Valid Experiments - 3
Lecture 27 - Ensuring Reliable and Valid Experiments - 4
Lecture 28 - Ensuring Reliable and Valid Experiments - 5
Lecture 29 - Psychophysics - 1

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Lecture 30 - Psychophysics - 2
Lecture 31 - Reaction Time Studies - 1
Lecture 32 - Reaction Time Studies - 2
Lecture 33 - Reaction Time Studies - 3
Lecture 34 - Eye-Tracking - 1
Lecture 35 - Eye-Tracking - 2
Lecture 36 - Event-Related Potentials - 1
Lecture 37 - Event-Related Potentials - 2
Lecture 38 - Event-Related Potentials - 3
Lecture 39 - Neuroimaging - 1
Lecture 40 - Neuroimaging - 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Technology Transfer through Joint Venture

Subject Co-ordinator - Prof. Indrajit Dube

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Forms of Strategic Alliance
Lecture 2 - Negotiations and Contractual Aspect
Lecture 3 - Risks and Opportunities
Lecture 4 - Regulatory Issues
Lecture 5 - Implication on Stakeholders
Lecture 6 - Joint Venture [JV] Options
Lecture 7 - Types of Joint Venture [JV]
Lecture 8 - Issues Frequently Arise During JV Negotiation
Lecture 9 - Key Compliance
Lecture 10 - Governing Laws in Cross-Border Transaction
Lecture 11 - Formation of Joint Venture Agreement
Lecture 12 - Governance Issues in Joint Venture
Lecture 13 - Business Plan in Joint Venture
Lecture 14 - Shareholder Agreement in Joint Venture
Lecture 15 - Specific Issues of Share Transfer in Joint Venture
Lecture 16 - Preparation for SPV
Lecture 17 - Formation of SPV
Lecture 18 - Disclosure to be made by SPV
Lecture 19 - Risk Management and SPV
Lecture 20 - Offset and SPV

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NPTEL Video Course - Humanities and Social Sciences - NOC:Legal Compliance for Incorporating Startup

Subject Co-ordinator - Prof. Indrajit Dube

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why we need a business form for startup
Lecture 2 - How to choose appropriate business form for startup
Lecture 3 - Comparative Analysis of Incorporation Requirement
Lecture 4 - Comparative Analysis of Compliance Cost
Lecture 5 - Other Formalities to Comply
Lecture 6 - Law relating to Partnership and Deed
Lecture 7 - Law relating to LL.P
Lecture 8 - How to Incorporate LL.P
Lecture 9 - Law relating to Co-operative
Lecture 10 - How to Incorporate Co-operative
Lecture 11 - Law Relating to One Person Company
Lecture 12 - Law Relating to Pvt. Ltd. Company
Lecture 13 - Law Relating to Pub. Ltd. Compnay
Lecture 14 - Law Relating to Non-Profit Company
Lecture 15 - How to Incorporate these Companies
Lecture 16 - How to Capitalize the Business
Lecture 17 - Raising fund through Private Equity and Venture Capital
Lecture 18 - Raising fund from Financial Institution
Lecture 19 - Types of Instruments for raising the fund
Lecture 20 - Issue of the Instruments

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NPTEL Video Course - Humanities and Social Sciences - NOC:Soft Skill Development

Subject Co-ordinator - Prof. Priyadarshi Patnaik, Prof. V.N. Giri, Prof. D. Suar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lectire 36 - Managing Time
Lecture 1 - Understanding the Communicative Environment Â I
Lecture 2 - Understanding the Communicative Environment Â II
Lecture 3 - What to listen for and why
Lecture 4 - When to speak and how
Lecture 5 - Staring and Sustaining a Conversation
Lecture 6 - What to Present and How - Part I
Lecture 7 - What to Present and How - Part II
Lecture 8 - Multimedia Presentation
Lecture 9 - Communication Styles
Lecture 10 - Speaking in Groups
Lecture 11 - The World of Visual Culture I
Lecture 12 - Visual Perception
Lecture 13 - The Aural
Lecture 14 - The Body and the Way It Communicates
Lecture 15 - The Face, Its Expressions and What It Says
Lecture 16 - Building Relationships
Lecture 17 - Understanding Group Dynamics - I
Lecture 18 - Understanding Group Dynamics - II
Lecture 19 - Groups, Conflicts and their Resolution
Lecture 20 - Social Network, Media and Extending Our Identity
Lecture 21 - How Emotionally Mature Are You
Lecture 22 - Improving Your Emotional Intelligence
Lecture 23 - Empathy
Lecture 24 - Intrapersonal Communication
Lecture 25 - Change Tolerance
Lecture 26 - Creativity
Lecture 27 - Creativity
Lecture 28 - Creativity

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Lecture 29 - Creativity at Workplace
Lecture 30 - Creativity, Critical Thinking and Problem Solving
Lecture 31 - Motivating Oneself
Lecture 32 - The Art of Persuasion - I
Lecture 33 - The Art of Persuasion - II
Lecture 34 - From Persuasion to Negotiation
Lecture 35 - Leadership and Motivating Others
Lecture 37 - Managing Stress
Lecture 38 - Resilience
Lecture 39 - Work - Life Balance
Lecture 40 - Applying Soft Skills to Workplace

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NPTEL Video Course - Humanities and Social Sciences - NOC:Symbolic Logic

Subject Co-ordinator - Prof. Chhanda Chakraborti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Propositions, Arguments, Components, Basic Characteristics
Lecture 3 - Recognizing arguments, Diagramming logic flow
Lecture 4 - Types of arguments, Deductive, Inductive, different norms to assess arguments
Lecture 5 - Concepts of Validity Soundness, Consistency
Lecture 6 - History of Symbolic Language
Lecture 7 - Propositional Logic
Lecture 8 - Connectives, Scope of Connectives
Lecture 9 - Truth-functional Connectives, Propositional Variables, Propositional Constants
Lecture 10 - Symbolization with Connectives
Lecture 11 - Propositional Logic
Lecture 12 - Using Truth Table
Lecture 13 - Using Truth Table
Lecture 14 - Shorter Truth Table
Lecture 15 - Using Truth Table
Lecture 16 - Introduction to Truth Trees
Lecture 17 - Truth Tree Rules and their Application
Lecture 18 - More on Truth-Tree Recovery of Partial Truth - Values
Lecture 19 - Using the Truth Trees
Lecture 20 - More on Truth Trees
Lecture 21 - Formal Proof of Validity
Lecture 22 - Valid Argument Forms
Lecture 23 - How to Apply the Rules of Inference in a Proof
Lecture 24 - Understanding the Rules
Lecture 25 - Proofs with All Rules
Lecture 26 - Completeness
Lecture 27 - Indirect Proof
Lecture 28 - Conditional Proof
Lecture 29 - More on Conditional Proof

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Lecture 30 - More on Derivations
Lecture 31 - Limitation of Propositional Logic
Lecture 32 - Basic 4 Types of Categorical Propositions
Lecture 33 - Understanding Logical Relations in Standard Form Categorical Propositions
Lecture 34 - Translating Non-Standard Propositions into Standard Form Categorical Propositions
Lecture 35 - Validity and Invalidity of Syllogisms
Lecture 36 - First Order Predicate Logic
Lecture 37 - Quantifiers
Lecture 38 - Scope of a Quantifier Edit Lesson
Lecture 39 - Multiple Quantifiers
Lecture 40 - Understanding Overlapping Quantifiers Sharing Predicates and Scope

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction on Intellectual Property to Engineers

Subject Co-ordinator - Prof. Tapas Kumar Bandyopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic of Intellectual Property
Lecture 2 - Introduction to Law
Lecture 3 - Theories of IP
Lecture 4 - Different Forms of IP
Lecture 5 - Different Forms of IP and Applicability of Theory
Lecture 6 - Patent Basic
Lecture 7 - Patent Ability Criteria
Lecture 8 - Non-Patentable Invention
Lecture 9 - Prier-Art Search
Lecture 10 - Patent Filing Procedure
Lecture 11 - Patent Prosecution
Lecture 12 - Patent Prosecution (Continued...)
Lecture 13 - International Patent
Lecture 14 - Patent Infringement
Lecture 15 - Patent Management
Lecture 16 - Utility Model Protection
Lecture 17 - Copyright Basic
Lecture 18 - Copy Right Registration
Lecture 19 - Copyright Infringement and Fair Use
Lecture 20 - Copyright in Digital Media
Lecture 21 - Industrial Design Basic
Lecture 22 - Industrial Design Registration
Lecture 23 - Utility Patent Vs Industrial Design
Lecture 24 - Trademark Basic
Lecture 25 - Trademark Registration
Lecture 26 - Tradmark and Internet
Lecture 27 - Certification Mark and Collective Mark
Lecture 28 - Geographical Indication
Lecture 29 - Economics of GI Edit Lesson

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Lecture 30 - Trademark Vs GI Trademark Managment
Lecture 31 - IC Layout Design and Basic
Lecture 32 - IC Layout Design Registration
Lecture 33 - Trade- Secret and Basic
Lecture 34 - Trade-Secret Protection
Lecture 35 - Patent Vs Trade-Secret
Lecture 36 - Plant Variety Protection
Lecture 37 - Bio-diversity
Lecture 38 - Comparative Analysis
Lecture 39 - IP Management
Lecture 40 - Case - Study on IP Management

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NPTEL Video Course - Humanities and Social Sciences - NOC:Globalization and Culture

Subject Co-ordinator - Prof. Anjali Gera Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Globalization Definition
Lecture 2 - Global Flows and New Media and Technologies
Lecture 3 - Globalization and Nation
Lecture 4 - Rise of Global Capitalism
Lecture 5 - Cultural Imperialism
Lecture 6 - Global Monocultures
Lecture 7 - Birth of Asian Kool
Lecture 8 - Bhangra Reinvention
Lecture 9 - Disorienting Bhangra
Lecture 10 - The Body of Dance
Lecture 11 - World Music I - Tabla
Lecture 12 - World Music II - Qawwali
Lecture 13 - World Music III - Baul
Lecture 14 - Is Chutney the New Rage
Lecture 15 - Bollywood Song and Dance
Lecture 16 - Planet Bollywood
Lecture 17 - Bollywood at Large
Lecture 18 - Bollywood Assemblages - Part I
Lecture 19 - Bollywood Assemblages - Part II
Lecture 20 - Bollywood's Soft Power
Lecture 21 - Travels of Dastan
Lecture 22 - Scripting the Nation
Lecture 23 - Cracking the Nation
Lecture 24 - Narrating and Interrogating the Nation
Lecture 25 - Cosmopolitans the Borderless World
Lecture 26 - Orientalism
Lecture 27 - Yoga, Meditation, Gurus
Lecture 28 - Beatles, Ravi Shankar and Sitar
Lecture 29 - Orientalizing India

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Lecture 30 - Neoorientalism
Lecture 31 - The Birth of Indo-Chic
Lecture 32 - Henna, Bindi, Saris and Bangles
Lecture 33 - The Taste of Curry
Lecture 34 - Global News
Lecture 35 - News as Infortainment
Lecture 36 - Global Media Cultures
Lecture 37 - Cultural Imperialism
Lecture 38 - Contraflows in Global Media
Lecture 39 - Contraflows in News and Entertainment

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NPTEL Video Course - Humanities and Social Sciences - NOC:Qualitative Research Methods

Subject Co-ordinator - Prof. Aradhna Malik

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - The Qualitative Researcher
Lecture 3 - Quantitative vs. Qualitative Research
Lecture 4 - History of Qualitative Research
Lecture 5 - The Process of Qualitative Research
Lecture 6 - Dominant Paradigms of Qualitative Research
Lecture 7 - Interpretivist Thinking
Lecture 8 - Verstehen
Lecture 9 - Constructivism
Lecture 10 - Properties of Constructions
Lecture 11 - Constructivism-Sub Paradigms
Lecture 12 - Criticisms of Interpretivism and Constructivism
Lecture 13 - Critical Theory
Lecture 14 - Characteristics of Critical Theory
Lecture 15 - Critiques of Critical Theory
Lecture 16 - Introduction to Qualitative Inquiry
Lecture 17 - Qualitative Research Design
Lecture 18 - Qualitative Research Design (Continued...)
Lecture 19 - Ethnography
Lecture 20 - Autoethnography
Lecture 21 - Case Studies
Lecture 22 - Case Studies (Continued...)
Lecture 23 - Analyzing Interpretive Practice
Lecture 24 - Analyzing Interpretive Practice (Continued...)
Lecture 25 - Grounded Theory
Lecture 26 - Grounded Thoery (Continued...)
Lecture 27 - Participatory Action Research
Lecture 28 - Participatory Action Research (Continued...)
Lecture 29 - Observation

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Lecture 30 - Interviewing
Lecture 31 - Interviewing (Continued...)
Lecture 32 - Interpretation of Documents and Material Culture
Lecture 33 - Autoethnography, Personal Narrative and Reflexivity
Lecture 34 - Analyzing Visual Data
Lecture 35 - Analyzing Talk and Text
Lecture 36 - Data Management and Analysis Methods
Lecture 37 - Data Management and Analysis Methods (Continued...)
Lecture 38 - Software and Qualitative Research
Lecture 39 - The Problem of Criteria
Lecture 40 - Interpretation
Lecture 41 - Writing
Lecture 42 - Writing (Continued...)
Lecture 43 - Understanding Social Programs through Evaluation
Lecture 44 - Understanding Social Programs through Evaluation (Continued...)
Lecture 45 - IInfluencing the Policy Progress with Qualitative Research
Lecture 46 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Emotional Intelligence

Subject Co-ordinator - Prof. Rabindra Kumar Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to EI and Related Concepts
Lecture 2 - Introduction to EI and Related Concepts (Continued...)
Lecture 3 - Introduction to EI and Related Concepts (Continued...)
Lecture 4 - Introduction to EI and Related Concepts (Continued...)
Lecture 5 - Introduction to Intelligence
Lecture 6 - Meaning, Nature, Scope, Types of Intelligence
Lecture 7 - Measurement of Intelligence
Lecture 8 - Applications
Lecture 9 - Discovery of Emotional Intelligence
Lecture 10 - Meaning, Nature Theory
Lecture 11 - Measurement of EI
Lecture 12 - Difference Between EQ and IQ
Lecture 13 - EQ Assessment
Lecture 14 - EQ and Empathy
Lecture 15 - EQ and Resilience
Lecture 16 - EQ and Health and Wellbeing
Lecture 17 - EQ Map
Lecture 18 - EQ Map (Continued...)
Lecture 19 - EQ Map (Continued...)
Lecture 20 - EQ Map (Continued...)
Lecture 21 - Emotional Intelligence in Education
Lecture 22 - Evaluation of EQ for Students
Lecture 23 - EI New Vision for Learning
Lecture 24 - EQ Skills for Students Success
Lecture 25 - EI in Health and Well Being
Lecture 26 - EI in Health and Well Being (Continued...)
Lecture 27 - EI and Cultural Adjustment
Lecture 28 - EI at Work
Lecture 29 - Emotional Intelligence and Happiness Positive Psychology

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Lecture 30 - Emotional Intelligence and Happiness Positive Psychology (Continued...)
Lecture 31 - Emotional Intelligence and Happiness Positive Psychology (Continued...)
Lecture 32 - Emotional Intelligence and Happiness Positive Psychology (Continued...)
Lecture 33 - Emotional Intelligence and Leadership
Lecture 34 - Emotional Intelligence an Leadership (Continued...)
Lecture 35 - Emotional Intelligence an Leadership (Continued...)
Lecture 36 - Emotional Intelligence an Leadership (Continued...)
Lecture 37 - Culture and Emotion
Lecture 38 - Role of EI
Lecture 39 - Cultural Intelligence
Lecture 40 - Emotional Intelligence for Cross Cultural Adaptability

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NPTEL Video Course - Humanities and Social Sciences - NOC:Speaking Effectively

Subject Co-ordinator - Prof. Anjali Gera Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, The Art of Speakihg
Lecture 2 - Encoding Meaning Using Verbal and Nonverbal Symbols
Lecture 3 - Encoding Meaning Using Verbal Symbols
Lecture 4 - The Power of words
Lecture 5 - Cross Cultural Factors in Communication Verbal and Nonverbal
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11 - Phonetics
Lecture 12 - Sounds of English Vowels
Lecture 13 - Sounds of English Diphthongs and Consonants
Lecture 14 - Stress and Rhythm Intonation
Lecture 15 - Role plays and activities
Lecture 16 - Speaking Voice
Lecture 17 - Speaking Delivery
Lecture 18 - How to Improve Voice
Lecture 19 - How to Improve Delivery
Lecture 20 - Sample Speeches
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32

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NPTEL Video Course - Humanities and Social Sciences - NOC:Great Experiments in Psychology

Subject Co-ordinator - Prof. Rajlakshmi Guha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History and Origin of Psychology
Lecture 2 - Establishing Psychology as a Science
Lecture 3 - Establishing Psychology as a Science (Continued...)
Lecture 4 - A New Psychology
Lecture 5 - Structuralism and Beyond
Lecture 6 - Herman Ebbinghaus on Memory
Lecture 7 - Reconstruction of an Automobile Destruction - An Example of the Interactin between Language and M
Lecture 8 - Emotionality and Perceptual Defence
Lecture 9 - Festinger's Cognitive Dissonance Theory
Lecture 10 - Milgram's Study on Obedience
Lecture 11 - Case Studies and Experiments in Clinical and Health Psychology
Lecture 12 - Obsessive Compulsive Disorder
Lecture 13 - A Case of Multiple Personality
Lecture 14 - The Story of Dibs
Lecture 15 - On Being Sane in Insane Places
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20

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NPTEL Video Course - Humanities and Social Sciences - NOC:Human Resource Development

Subject Co-ordinator - Prof. K. B. L. Srivastava

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to HRD
Lecture 2 - Introduction to HRD (Continued...)
Lecture 3 - Introduction to HRD (Continued...)
Lecture 4 - Introduction to HRD (Continued...)
Lecture 5 - Introduction to HRD (Continued...)
Lecture 6 - The Context of HRD
Lecture 7 - The Context of HRD (Continued...)
Lecture 8 - The Context of HRD (Continued...)
Lecture 9 - The Context of HRD (Continued...)
Lecture 10 - The Context of HRD (Continued...)
Lecture 11 - HRD Process - I
Lecture 12 - HRD Process - I (Continued...)
Lecture 13 - HRD Process - I (Continued...)
Lecture 14 - HRD Process - I (Continued...)
Lecture 15 - HRD Process - I (Continued...)
Lecture 16 - HRD Process - II
Lecture 17 - HRD Process - II (Continued...)
Lecture 18 - HRD Process - II (Continued...)
Lecture 19 - HRD Process - II (Continued...)
Lecture 20 - HRD Process - II (Continued...)
Lecture 21 - Coaching
Lecture 22 - Coaching (Continued...)
Lecture 23 - Coaching (Continued...)
Lecture 24 - Coaching (Continued...)
Lecture 25 - Coaching (Continued...)
Lecture 26 - Mentoring
Lecture 27 - Mentoring (Continued...)
Lecture 28 - Mentoring (Continued...)
Lecture 29 - Mentoring (Continued...)

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Lecture 30 - Mentoring (Continued...)
Lecture 31 - Employee Counseling and Wellbeing
Lecture 32 - Employee Counseling and Wellbeing (Continued...)
Lecture 33 - Employee Counseling and Wellbeing (Continued...)
Lecture 34 - Employee Counseling and Wellbeing (Continued...)
Lecture 35 - Employee Counseling and Wellbeing (Continued...)
Lecture 36 - Competency Mapping Approach to HRD
Lecture 37 - Competency Mapping Approach to HRD (Continued...)
Lecture 38 - Competency Mapping Approach to HRD (Continued...)
Lecture 39 - Competency Mapping Approach to HRD (Continued...)
Lecture 40 - Competency Mapping Approach to HRD (Continued...)
Lecture 41 - Career Planning and Development
Lecture 42 - Career Planning and Development (Continued...)
Lecture 43 - Career Planning and Development (Continued...)
Lecture 44 - Career Planning and Development (Continued...)
Lecture 45 - Career Planning and Development (Continued...)
Lecture 46 - Intellectual Capital Management
Lecture 47 - Intellectual Capital Management (Continued...)
Lecture 48 - Intellectual Capital Management (Continued...)
Lecture 49 - Intellectual Capital Management (Continued...)
Lecture 50 - Intellectual Capital Management (Continued...)
Lecture 51 - HRD, Organizational Learning, and Learning Organization
Lecture 52 - HRD, Organizational Learning, and Learning Organization (Continued...)
Lecture 53 - HRD, Organizational Learning, and Learning Organization (Continued...)
Lecture 54 - HRD, Organizational Learning, and Learning Organization (Continued...)
Lecture 55 - HRD, Organizational Learning, and Learning Organization (Continued...)
Lecture 56 - Diversity, HRD Ethics, and Future of HRD
Lecture 57 - Diversity, HRD Ethics, and Future of HRD (Continued...)
Lecture 58 - Diversity, HRD Ethics, and Future of HRD (Continued...)
Lecture 59 - Diversity, HRD Ethics, and Future of HRD (Continued...)
Lecture 60 - Diversity, HRD Ethics, and Future of HRD (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Educational Leadership

Subject Co-ordinator - Prof. Atasi Mohanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Educational Management and Leadership
Lecture 2 - Key Challenges for Educational Leaders
Lecture 3 - Key Challenges for Educational Leaders (Continued...)
Lecture 4 - Key Challenges for Educational Leaders (Continued...)
Lecture 5 - Key Challenges for Educational Leaders (Continued...)
Lecture 6 - Professional Development and The Reflective Practitioner
Lecture 7 - Professional Development and The Reflective Practitioner (Continued...)
Lecture 8 - Professional Development and The Reflective Practitioner (Continued...)
Lecture 9 - Professional Development and The Reflective Practitioner (Continued...)
Lecture 10 - Professional Development and The Reflective Practitioner (Continued...)
Lecture 11 - Professional Ethics and Values in Teaching
Lecture 12 - Professional Ethics and Values in Teaching (Continued...)
Lecture 13 - Professional Ethics and Values in Teaching (Continued...)
Lecture 14 - Emotional Intelligence and Educational Leadership
Lecture 15 - Emotional Intelligence and Educational Leadership (Continued...)
Lecture 16 - Emotional Intelligence and Educational Leadership (Continued...)
Lecture 17 - Emotional Intelligence and Educational Leadership (Continued...)
Lecture 18 - Managing Diversity and Inclusion
Lecture 19 - Managing Diversity and Inclusion (Continued...)
Lecture 20 - Managing Diversity and Inclusion (Continued...)
Lecture 21 - Managing Diversity and Inclusion (Continued...)
Lecture 22 - Managing Diversity and Inclusion (Continued...)
Lecture 23 - Educational Research and Pedagogy
Lecture 24 - Educational Research and Pedagogy (Continued...)
Lecture 25 - Educational Research and Pedagogy (Continued...)
Lecture 26 - Educational Research and Pedagogy (Continued...)
Lecture 27 - Educational Research and Pedagogy (Continued...)
Lecture 28 - Innovative Pedagogy and Technology for Learning
Lecture 29 - Innovative Pedagogy and Technology for Learning (Continued...)

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Lecture 30 - Innovative Pedagogy and Technology for Learning (Continued...)
Lecture 31 - Innovative Pedagogy and Technology for Learning (Continued...)
Lecture 32 - Innovative Pedagogy and Technology for Learning (Continued...)
Lecture 33 - Innovative Pedagogy and Technology for Learning (Continued...)
Lecture 34 - Innovative Pedagogy and Technology for Learning (Continued...)
Lecture 35 - Turnaround Leadership and Educational Entrepreneurship
Lecture 36 - Turnaround Leadership and Educational Entrepreneurship (Continued...)
Lecture 37 - Turnaround Leadership and Educational Entrepreneurship (Continued...)
Lecture 38 - Turnaround Leadership and Educational Entrepreneurship (Continued...)
Lecture 39 - New Normal Education
Lecture 40 - New Normal Education (Continued...)
Lecture 41 - New Normal Education (Continued...)
Lecture 42 - New Normal Education (Continued...)
Lecture 43 - New Normal Education (Continued...)
Lecture 44 - Adult learning/Andragogy
Lecture 45 - Adult learning/Andragogy (Continued...)
Lecture 46 - Adult learning/Andragogy (Continued...)
Lecture 47 - Adult learning/Andragogy (Continued...)
Lecture 48 - Adult learning/Andragogy (Continued...)
Lecture 49 - National Education Policy 2020
Lecture 50 - National Education Policy 2020 (Continued...)
Lecture 51 - National Education Policy 2020 (Continued...)
Lecture 52 - National Education Policy 2020 (Continued...)
Lecture 53 - National Education Policy 2020 (Continued...)
Lecture 54 - Education and UNESCO Sustainable Development Goals
Lecture 55 - Education and UNESCO Sustainable Development Goals (Continued...)
Lecture 56 - Education and UNESCO Sustainable Development Goals (Continued...)
Lecture 57 - Education and UNESCO Sustainable Development Goals (Continued...)
Lecture 58 - Education and UNESCO Sustainable Development Goals (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Strategic Performance Management

Subject Co-ordinator - Prof. Kbl Srivastava

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Performance management
Lecture 2 - Aim and purpose of performance management
Lecture 3 - Characteristics of an effective PM system
Lecture 4 - Performance Management Process
Lecture 5 - Role of PM in employee development and identification of Key performance areas
Lecture 6 - Understanding performance planning
Lecture 7 - Strategic Planning and performance
Lecture 8 - Strategic planning and performance - 2
Lecture 9 - Strategic planning and performance - 3
Lecture 10 - Strategy and performance alignment
Lecture 11 - Performance dimensions
Lecture 12 - Behavior, result and trait approach system
Lecture 13 - Measuring behavior and results
Lecture 14 - Measurement system
Lecture 15 - Collecting information in performance management
Lecture 16 - Implementing PM System
Lecture 17 - Implementing PMS (2)
Lecture 18 - Self appraisal
Lecture 19 - Managing team performance
Lecture 20 - 360 degree appraisal
Lecture 21 - Performance Management Skill
Lecture 22 - Performance Management and Employee Development
Lecture 23 - Coaching for performance improvement
Lecture 24 - Coaching process,analysis and techniques
Lecture 25 - Coching skills for managers and evaluation
Lecture 26 - Performance Review
Lecture 27 - Performance Review (Continued...)
Lecture 28 - Performance review Discussion
Lecture 29 - Performance Analysis

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Lecture 30 - Use of performance management data for HR decision making
Lecture 31 - Potential Appraisal 1
Lecture 32 - Potential Appraisal 2
Lecture 33 - Reward system 1
Lecture 34 - Reward system 2
Lecture 35 - Performance Management and Legal System
Lecture 36 - PMS in Indian Organisations
Lecture 37 - Culture and Performance Management
Lecture 38 - Technology and Performance Management
Lecture 39 - PMS in Select Indian Companies
Lecture 40 - Future of Performance Management

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Basic Spoken Sanskrit

Subject Co-ordinator - Prof. Anuradha Choudry

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - The Sounds of Sanskrit
Lecture 3 - Sentence Construction and its underlying logic
Lecture 4 - Introduction of Self and Others
Lecture 5 - Basic Verbs and Some Conjugations
Lecture 6 - Introduction to the Genitive (6th) Case
Lecture 7 - Counting and Reading the Time
Lecture 8 - Plural of Pronouns and Nouns
Lecture 9 - Conjugation of Basic Verbs in the Plural
Lecture 10 - Introduction to the Locative (7th) Case
Lecture 11 - Days of the Week, Months, Future Tense
Lecture 12 - Past Tense and More Verbs
Lecture 13 - Introduction to the Accusative (2nd) Case
Lecture 14 - Continuation of the Accusative (2nd) Case
Lecture 15 - Introduction to the Instrumental (3rd) Case
Lecture 16 - Continuation of the Instrumental (3rd) Case
Lecture 17 - Introduction to the Ablative (5th) Case
Lecture 18 - Introduction to the Dative (4th) Case
Lecture 19 - Introduction to the Vocative (8th) Case
Lecture 20 - Overview and Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Water, Society and Sustainability

Subject Co-ordinator - Prof. Jenia Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Setting the Context
Lecture 2 - Beyond Hydrology
Lecture 3 - Socio Hydrology
Lecture 4 - Political Ecology of Water
Lecture 5 - Hydrosocial
Lecture 6 - Critical Physical Geography (CPG)
Lecture 7 - The South Asian Context
Lecture 8 - Water Harvesting and Water Use Techniques in Ancient India - 1
Lecture 9 - Water Harvesting and Water Use Techniques in Ancient India - 2
Lecture 10 - Water Harvesting and Water Use Techniques in Ancient India - 3
Lecture 11 - Water Technology in Medieval India - 1
Lecture 12 - Water Technology in Medieval India - 2
Lecture 13 - Colonial Hydrology
Lecture 14 - Dams and Development in Contemporary India
Lecture 15 - The Farakka Barrage Project
Lecture 16 - The FarakkaBarrage Project
Lecture 17 - Urban Waters
Lecture 18 - Peri-urban Water Justice in the Global South
Lecture 19 - Transforming Trajectories of Blue Infrastructures of Kolkata
Lecture 20 - Discussion and Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Employment Communication A Lab based course

Subject Co-ordinator - Prof. Seema Singh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Employment Communication - A Lab based Course
Lecture 2 - Communication - An Introduction
Lecture 3 - Communication Skills at the Workplace
Lecture 4 - Verbal Communication - Introduction
Lecture 5 - Verbal Communication (Continued...)
Lecture 6 - Non-verbal Communication - Introduction
Lecture 7 - Non-verbal Communication - Conclusion
Lecture 8 - Inter Cultural Communication - Introduction
Lecture 9 - Inter Cultural Communication - Conclusion
Lecture 10 - Practice Session 0
Lecture 11 - Body Language - Introduction
Lecture 12 - Body Language - Conclusion
Lecture 13 - Listening Skills - Introduction
Lecture 14 - Listening Skills - Conclusion
Lecture 15 - Practice Session 1
Lecture 16 - Body Language
Lecture 17 - Introduction to the Employment Process
Lecture 18 - Listening Skills
Lecture 19 - Introduction to CV Writing
Lecture 20 - Samples of Good CVs and Cover Letter
Lecture 21 - The Cover Letter
Lecture 22 - CV Writing Lab Session - I
Lecture 23 - CV Writing Lab Session - II
Lecture 24 - Fundamentals of Group Discussions (GDs)
Lecture 25 - Strategies for Success in GDs
Lecture 26 - Group Discussions Lab - Practice Session I
Lecture 27 - Group Discussions Lab - Practice Session II
Lecture 28 - Group Discussions Lab - Practice Session III
Lecture 29 - Group Discussions Lab - Practice Session IV

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Lecture 30 - Interviewing for Employment
Lecture 31 - Preparing for the Personal Interview
Lecture 32 - PI Practice Session - I
Lecture 33 - PI Practice Session - II
Lecture 34 - PI Practice Session - III
Lecture 35 - PI Practice Session - IV
Lecture 36 - Tackling Questions during Personal Interviews (PIs)
Lecture 37 - Success in Personal Interviews (PIs)
Lecture 38 - Life Skills Lab and Student Speak
Lecture 39 - Life Skills
Lecture 40 - Course Wrap Up

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NPTEL Video Course - Humanities and Social Sciences - NOC:Intermediate Level of Spoken Sanskrit

Subject Co-ordinator - Prof. Anuradha Choudry

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the devanÄ•garÄ« script
Lecture 2 - Introduction to the devanÄ•garÄ« script
Lecture 3 - Revision and practice of vibhakti - declension forms
Lecture 4 - Revision and practice of vibhakti - declension forms
Lecture 5 - Revision and practice of vibhakti - declension forms
Lecture 6 - Revision and practice of vibhakti - declension forms
Lecture 7 - Introduction to the first and second person pronouns in the plural forms - Part 1
Lecture 8 - Revision and practice of the first and second person pronouns in the plural - Part 2
Lecture 9 - Introduction of the first person pronoun in the dual form - Part 1
Lecture 10 - Introduction of the first person pronoun in the dual form - Part 2
Lecture 11 - Introduction of the second person pronoun in the dual form - Part 1
Lecture 12 - Introduction of the second person pronoun in the dual form - Part 2
Lecture 13 - Third person pronouns and nouns (m/f) in the plural - Part 1
Lecture 14 - Third person pronouns and nouns (m/f) in the plural - Part 2
Lecture 15 - Third person pronouns and nouns (m/f) in the plural - Part 3
Lecture 16 - Third person pronouns and nouns (m/n/f) in the plural - Part 4
Lecture 17 - Third person pronouns and nouns (m/n/f) in the plural - Part 5
Lecture 18 - Revision and Exercises
Lecture 19 - Third person pronouns and nouns (m/n/f) in the dual - Part 1
Lecture 20 - Third person pronouns and nouns (m/n/f) in the dual - Part 2
Lecture 21 - Third person pronouns and nouns (m/n/f) in the dual - Part 3
Lecture 22 - Third person pronouns and nouns (m/n/f) in the dual - Part 4
Lecture 23 - Third person pronouns and nouns (m/n/f) in the dual - Part 5
Lecture 24 - Revision of the third person pronouns and nouns (m/n) in the dual - Part 1
Lecture 25 - Revision of the third person pronouns and nouns (f) in the dual - Part 2
Lecture 26 - Introduction to the verb conjugations in the kriyÄ•tipatti-lá¹ á¹ (the conditional)
Lecture 27 - Introduction to the verb conjugations in the vidhi-liá¹ (the optative)
Lecture 28 - Introductiá to the conjugation of â asâ (to be) from the adÄ•digaá¹ a (2nd group) in the var
Lecture 29 - Introduction to the conjugation of the verb â dÄ•â (to give) from the juhotyÄ•digaá¹ a (3rd g

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Lecture 30 - Introduction to the conjugation of the verb â divâ (to shine, to sport) and â vidâ (to kno
Lecture 31 - Introduction to the conjugation of the verb â Å ruâ (to hear) from the svÄ•digaá¹ a (5th grou
Lecture 32 - Introduction to the conjugation of the verb from the ká¹ (to do) from the tanÄ•digaá¹ a (8th gr
Lecture 33 - Introduction to the conjugation of the verb 'mil' (to meet) from the tudÄ•digaá¹ a (6th group) i
Lecture 34 - Introduction to the conjugation of the verb 'bhuj' (to protect) from the rudhÄ•digaá¹ a (7th gro
Lecture 35 - Introduction to the conjugation of the verb â jÃ±Ä•â (to know) from the kryÄ•digaá¹ a (9th gr
Lecture 36 - Introduction of nouns (m) ending with â uâ and â iâ in the three vacanas
Lecture 37 - Introduction of nouns (n) ending with â uâ and â iâ in the three vacanas
Lecture 38 - Introduction of nouns (f) ending with â uâ and â iâ in the three vacanas
Lecture 39 - Introduction of nouns (m) ending with â inâ and of nouns (n/f) ending with â nâ in the thr
Lecture 40 - Introduction of nouns (m/n/f) ending with â tâ in the three vacanas
Lecture 41 - Introduction of nouns (m/f/n) ending with â á¹ â in the three vacanas
Lecture 42 - Introduction to the svarasandhi
Lecture 43 - Introduction to the visargasandhi
Lecture 44 - Introduction to the vyaÃ±janasandhi
Lecture 45 - Summary and Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Entrepreneurship and IP strategy

Subject Co-ordinator - Prof. Gouri Gargate

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - What is an entrepreneurship ?
Lecture 3 - What do you understand by IP ?
Lecture 4 - Whether entrepreneurship and IP related? What is role of IP straegy in entrepreneurship?
Lecture 5 - Case study I - IT industry
Lecture 6 - Innovation, invention and creativity
Lecture 7 - Types of innovation
Lecture 8 - Innovation, market and IP
Lecture 9 - Open innovation and IP
Lecture 10 - Case Study II - Biotechnology
Lecture 11 - Trademark - Definition
Lecture 12 - Trademark - Types
Lecture 13 - Trademark - Registration
Lecture 14 - Trademark infringement
Lecture 15 - Case study III - Textile industry
Lecture 16 - Patent - introduction
Lecture 17 - Patent infringement
Lecture 18 - Patent strategies - I
Lecture 19 - Patent strategies - II
Lecture 20 - Capsule version
Lecture 21 - Copyright - Definition and subject matter
Lecture 22 - Copyright and related rights
Lecture 23 - Copyright registration and entrepreneurship
Lecture 24 - Copyright infringement
Lecture 25 - Case study IV - Film industry
Lecture 26 - Industrial Design- Definition, concept
Lecture 27 - Industrial Designs Act - Key features
Lecture 28 - Industrial Design-Business
Lecture 29 - Industrial Design infringement

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Lecture 30 - Case study V - Automobile industry
Lecture 31 - IP strategy for start-up and MSME
Lecture 32 - IP transaction - introduction
Lecture 33 - IP valuation, bank loan, insurance
Lecture 34 - Success story and business model of a few start-ups
Lecture 35 - Case Study VI - Agriculture
Lecture 36 - Incubators, research parks
Lecture 37 - Various Government policies
Lecture 38 - Various Government policies
Lecture 39 - Capsule revision
Lecture 40 - Am I ready to venture my start up? (Course applicability)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Urbanization and Environment

Subject Co-ordinator - Prof. Jenia Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Setting the Context
Lecture 2 - The Anthropocene
Lecture 3 - The Nine Planetary Boundaries Framework
Lecture 4 - The Capitalocene
Lecture 5 - The Urbanocene
Lecture 6 - COVID 19, Urban Informality and Environment
Lecture 7 - Sanitary Cities: Urban, Environment and Modernity in the West
Lecture 8 - Networked Cities: Path-dependent Consequences
Lecture 9 - From Sanitary to Sustainable Cities
Lecture 10 - How sustainable? Critical analysis of contemporary urban models
Lecture 11 - Historical Pasts
Lecture 12 - Colonial Urbanization
Lecture 13 - Limits and Legacies of Colonial Urbanization
Lecture 14 - The Post-independence Scenario: Planned Cities and Renewal Missions
Lecture 15 - Smart Cities
Lecture 16 - Smart Cities: Critique and Contestations
Lecture 17 - Fantasy Cities? Understanding Limits of Smart, Eco and Green Doctrines
Lecture 18 - Fantasy Cities? Understanding Limits of Smart, Eco and Green Doctrines Case (Continued...)
Lecture 19 - Fantasy Cities? Understanding Limits of Smart, Eco and Green Doctrines Case (Continued...)
Lecture 20 - Urban Environmental History: The US Part I: Context and Themes
Lecture 21 - Urban Environmental History: The US Part II: More Thematic Variations and Global
Lecture 22 - Urban Environmental History: Europe Part I: Context and Themes
Lecture 23 - Urban Environmental History: Europe Part II: Recent Advances
Lecture 24 - Urban Environmental History: South Asia [SAUEH] Part I.A: The Prelude: Inception
Lecture 25 - Urban Environmental History: South Asia [SAUEH] Part I.B: (More) Nuanced Narratives
Lecture 26 - Urban Environmental History: South Asia [SAUEH] Part II: Trends and Trajectories
Lecture 27 - Urban Environmental History: South Asia [SAUEH] Part II: Trends and Trajectories (Continued...)
Lecture 28 - Urban Political Ecology Part I: Emergence and Development
Lecture 29 - Urban Political Ecology Part II: (More) Recent Advances

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Lecture 30 - Urban Political Ecology Part III: Internal Debates and New Political Possibilities
Lecture 31 - Urban Political Ecology: The Indian Context Part I: Themes and Concepts
Lecture 32 - Urban Political Ecology: The Indian Context Part II: (More) Recent Advances
Lecture 33 - Historical Urban Political Ecology (HUPE): Blue Infrastructures of Kolkata
Lecture 34 - Urban Environmentalisms
Lecture 35 - Urban Environmentalisms: Case Study 1: The Adi Ganga Bachao Andolan
Lecture 36 - Urban Environmentalisms: Case Study 2: Protests to Protect the EKW
Lecture 37 - Translocal Learning for Water Justice: Peri-urban Pathways in India, Tanzania and ...
Lecture 38 - Informing Urban Disaster Studies using Comparative Urban Environmentalism
Lecture 39 - Urban Environmental Heritage: Insights from Bengalâ s Mini-Europe
Lecture 40 - The Way Forward

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NPTEL Video Course - Humanities and Social Sciences - NOC:Advanced Level of Spoken Sanskrit

Subject Co-ordinator - Prof. Anuradha Choudry

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview and Revision of Sentence formation
Lecture 2 - Understanding the concepts of à¤ à¤¾à¤°à¤ à¤®à¥• and à¤µà¤¿à¤-à¤ à¥•à¤¤à¤¿à¤
Lecture 3 - Revision of Masculine nouns (à¤ªà¥•à¤ à¤²à¤¿à¤ à¥•à¤ -à¤¸à¥•à¤¬à¤¨à¥•à¤¤à¤¾à¤) and some verbs (à
Lecture 4 - Revision of Masculine nouns (à¤ªà¥•à¤²à¥•à¤²à¤¿à¤ à¥•à¤ -à¤¸à¥•à¤¬à¤¨à¥•à¤¤à¤¾à¤) and some verb
Lecture 5 - Revision of Feminine nouns (à¤¸à¥•à¤¤à¥•à¤°à¥ à¤²à¤¿à¤ à¥•à¤ -à¤¸à¥•à¤¬à¤¨à¥•à¤¤à¤¾à¤) and some
Lecture 6 - Neuter nouns (à¤¨à¤ªà¥•à¤ à¤¸à¤ à¤²à¤¿à¤ à¥•à¤ -à¤¸à¥•à¤¬à¤¨à¥•à¤¤à¤¾à¤) and some verb forms (à¤
Lecture 7 - Revision of à¤µà¤°à¥•à¤£à¤®à¤¾à¤², à¤®à¤¾à¤¹à¥ à¤¶à¥•à¤µà¤°à¤¸à¥ à¤¤à¥•à¤°à¤¾à¤£à¤¿, vibration
Lecture 8 - Revision of à¤ à¤ªà¤¸à¥•à¤ à¤¾à¤ and their applications
Lecture 9 - Revision of à¤¸à¥•à¤µà¤°à¤¸à¤¨à¥•à¤§à¤¿à¤ with à¤¸à¥ à¤¤à¥•à¤°à¤¾à¤£à¤¿
Lecture 10 - Revision of à¤µà¥•à¤¯à¤ à¥•à¤ à¤¨à¤¸à¤¨à¥•à¤§à¤¿à¤ with à¤¸à¥ à¤¤à¥•à¤°à¤¾à¤£à¤¿ and practice -
Lecture 11 - Revision of à¤µà¥•à¤¯à¤ à¥•à¤ à¤¨à¤¸à¤¨à¥•à¤§à¤¿à¤ with à¤¸à¥_à¤¤à¥•à¤°à¤¾à¤£à¤¿ and practice -
Lecture 12 - Revision of à¤µà¤¿à¤¸à¤°à¥•à¤ à¤¸à¤¨à¥•à¤§à¤¿à¤ with à¤¨à¤¿à¤ à¤®à¤¾à¤ and practice
Lecture 13 - Understanding the 10 à¤ à¤£à¤¾à¤ - Part 1
Lecture 14 - Understanding the 10 à¤ à¤£à¤¾à¤ - Part 2
Lecture 15 - Understanding the à¥§à¥¦ à¤²à¤ à¤¾à¤°à¤¾à¤ in à¤ªà¤°à¤¸à¥•à¤®à¥ à¤ªà¤¦à¥ and in à¤ à¤¤à¥•à¤®à¤
Lecture 16 - Overview of à¤¸à¥•à¤¨à¤¨à¥•à¤¤à¤¾à¤ (Nouns), à¤¤à¤¿à¤ à¤¨à¥•à¤¤à¤¾à¤ (Verbs), à¤_à¤µà¥•à¤_à¤_à
Lecture 17 - Introduction and practice of à¤µà¤¾à¤ à¥•à¤_à¤®à¥• - à¤ à¤°à¥•à¤¤à¥ à¤µà¤¾à¤ à¥•à¤_à¤®à¥•, à¤ à¤
Lecture 18 - à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤¨à¤¨à¤¿à¤°à¥ à¤ªà¤£à¤®à¥•: Elaboration of the concept of à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤
Lecture 19 - à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤¨à¤¨à¤¿à¤°à¥ à¤ªà¤£à¤®à¥•: Elaboration of the concept of à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤
Lecture 20 - à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤¨à¤¨à¤¿à¤°à¥ à¤ªà¤£à¤®à¥•: Elaboration of the concept of à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤
Lecture 21 - à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤¨à¤¨à¤¿à¤°à¥ à¤ªà¤£à¤®à¥•: Elaboration of the concept of à¤µà¥ à¤¤à¥•à¤¤à¤¿à¤
Lecture 22
Lecture 23 - Practice of à¤¸à¤®à¤¾à¤¸à¤ /compound word
Lecture 24 - Introduction and Practice of à¤ à¤µà¥•à¤_à¤_à¤ªà¥•à¤°à¤ à¤°à¤£à¤®à¥• / Indeclinables
Lecture 25 - Introduction to the concept of à¤ à¤¨à¥•à¤µà¤_à¤ with practice
Lecture 26 - The concept of à¤ à¤¨à¥•à¤µà¤_à¤ with practice
Lecture 27 - Course summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:Education for Sustainable Development

Subject Co-ordinator - Prof. Atasi Mohanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sustainable Development Goals
Lecture 3 - Sustainable Development Goals (Continued...)
Lecture 4 - Sustainable Development Goals (Continued...)
Lecture 5 - Education for Sustainable Development
Lecture 6 - Education for Sustainable Development (Continued...)
Lecture 7 - Education for Sustainable Development (Continued...)
Lecture 8 - Education for Sustainable Development (Continued...)
Lecture 9 - Education for Sustainable Development (Continued...)
Lecture 10 - Education for Sustainable Development (Continued...)
Lecture 11 - ESD and Global Citizenship
Lecture 12 - ESD and Global Citizenship (Continued...)
Lecture 13 - ESD and Global Citizenship (Continued...)
Lecture 14 - ESD for Technical and Vocational Education / Training
Lecture 15 - ESD for Technical and Vocational Education / Training (Continued...)
Lecture 16 - ESD for Technical and Vocational Education / Training (Continued...)
Lecture 17 - ESD for Technical and Vocational Education / Training (Continued...)
Lecture 18 - ESD for Sustainable Healthcare
Lecture 19 - ESD for Sustainable Healthcare (Continued...)
Lecture 20 - ESD for Sustainable Healthcare (Continued...)
Lecture 21 - ESD for Sustainable Healthcare (Continued...)
Lecture 22 - ESD for Sustainable Healthcare (Continued...)
Lecture 23 - ESD for Sustainable Healthcare (Continued...)
Lecture 24 - ESD for Food Security
Lecture 25 - ESD for Food Security (Continued...)
Lecture 26 - ESD for Food Security (Continued...)
Lecture 27 - ESD for Food Security (Continued...)
Lecture 28 - ESD for Food Security (Continued...)
Lecture 29 - Sustainable and Clean Energy

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Lecture 30 - Sustainable and Clean Energy (Continued...)
Lecture 31 - Sustainable and Clean Energy (Continued...)
Lecture 32 - Sustainable and Clean Energy (Continued...)
Lecture 33 - Sustainable and Clean Energy (Continued...)
Lecture 34 - Sustainable and Clean Energy (Continued...)
Lecture 35 - Sustainable Education
Lecture 36 - Sustainable Education (Continued...)
Lecture 37 - Sustainable Education (Continued...)
Lecture 38 - Sustainable Education (Continued...)
Lecture 39 - Sustainable Education (Continued...)
Lecture 40 - Sustainable Education (Continued...)
Lecture 41 - Sustainable Education (Continued...)
Lecture 42 - Sustainable Education (Continued...)
Lecture 43 - Sustainable Education (Continued...)
Lecture 44 - Sustainable Education (Continued...)
Lecture 45 - Sustainable Education (Continued...)
Lecture 46 - Sustainable Leadership
Lecture 47 - Sustainable Leadership (Continued...)
Lecture 48 - Sustainable Leadership (Continued...)
Lecture 49 - Sustainable Leadership (Continued...)
Lecture 50 - Sustainable Leadership (Continued...)
Lecture 51 - Sustainable Leadership (Continued...)
Lecture 52 - Sustainable Leadership (Continued...)
Lecture 53 - Sustainable Leadership (Continued...)
Lecture 54 - Sustainable Cities and Communities
Lecture 55 - Sustainable Cities and Communities (Continued...)
Lecture 56 - Sustainable Consumption and Production
Lecture 57 - Sustainable Consumption and Production (Continued...)
Lecture 58 - ESD for Global Partnership
Lecture 59 - ESD for Global Partnership (Continued...)
Lecture 60 - Sustainable Happiness
Lecture 61 - Sustainable Happiness (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Elements of Literature and Creative Communication

Subject Co-ordinator - Prof. H.S. Komalesha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Elements of Literature and Creative communication
Lecture 2 - Literature and its relevance
Lecture 3 - A Multidimensional Engagement with Literature
Lecture 4 - How to read and appreciate Literature?
Lecture 5 - Literature - Learner's Perspective
Lecture 6 - Ways of Reading .1
Lecture 7 - Forms and Genres of Literature
Lecture 8 - Feminist Literary Criticism
Lecture 9 - Marxist Literary Criticism
Lecture 10 - Postcolonial Literary Criticism
Lecture 11 - Tracing the Roots of Poetry
Lecture 12 - Origins of Poetry
Lecture 13 - Poetry and its Tributaries - 1
Lecture 14 - Poetry and its Tributaries - 2
Lecture 15 - Reflecting on poetry and its forms (Quiz)
Lecture 16 - Elements of Poetry - 1
Lecture 17 - Elements of Poetry - 2
Lecture 18 - English Poetry: An Overview. Old English to Elizabethan
Lecture 19 - English Poetry: An Overview. Elizabethan to Metaphysical
Lecture 20 - English Poetry: An Overview. 17th centure onwards
Lecture 21 - Indian English Poetry: The Beginnings
Lecture 22 - Arun Kolatkar and the Bombay Circle of Poets
Lecture 23 - Kamala Das
Lecture 24 - Confessional Poetry of Kamala Das
Lecture 25 - AK Ramanujan
Lecture 26 - Contemporary World poetry
Lecture 27 - Hafez: The Poet for Life
Lecture 28 - Date with European Poetry
Lecture 29 - Second date with European Poetry

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Lecture 30 - American poetry
Lecture 31 - Introduction to Fiction
Lecture 32 - Elements of Fiction - 1
Lecture 33 - Elements of Fiction - 2
Lecture 34 - Fiction and its Branches - 1
Lecture 35 - Fiction and its Branches - 2
Lecture 36 - Tools of the Trade: Narrative Techniques in Fiction
Lecture 37 - Tools of the Trade: Narrative Techniques in Fiction
Lecture 38 - Animal Farm - 1
Lecture 39 - Animal Farm - 2
Lecture 40 - Animal Farm: A Critical Exploration
Lecture 41 - Introducing Short Fiction
Lecture 42 - Origin and Development of Short Fiction
Lecture 43 - Borges and the Book of Sand
Lecture 44 - Two Stories and Three Cheers
Lecture 45 - Quiz on Short Fiction
Lecture 46 - Introduction to Drama
Lecture 47 - Elements of Drama
Lecture 48 - Drama and its types
Lecture 49 - Comedy: Drama and its Types
Lecture 50 - Dramatic Devices: Tricks and Tactics that make Theatre Tick
Lecture 51 - Aristotle and the Dramatic Art
Lecture 52 - A Snapshot of Western Drama
Lecture 53 - Modern Drama
Lecture 54 - A Doll's House
Lecture 55 - A Critical Dismantling of Dolls House
Lecture 56 - Indian Drama
Lecture 57 - Modern Indian Drama
Lecture 58 - Hayavadana
Lecture 59 - Hayavadana: a critical perspective
Lecture 60 - A Quiz

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NPTEL Video Course - Humanities and Social Sciences - NOC:Training and Development

Subject Co-ordinator - Prof. Susmita Mukhopadyay, Prof. Sangeeta Sahney, Prof. S.Srinivasan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Employees Training and Development
Lecture 2 - Employee and Employer Relationship
Lecture 3 - Employment Contract
Lecture 4 - Employee as a Human Capital
Lecture 5 - Employees Training and Organizational Excellence
Lecture 6 - Strategic Training
Lecture 7 - Strategic Training and Its Process
Lecture 8 - Strategic Training Model
Lecture 9 - Learning, Training and Development from Change Model Perspective
Lecture 10 - Training as a Function of Human Resources Management
Lecture 11 - Concept and Importance of Training Need Assessment
Lecture 12 - Steps and Process of Training Need Assessment
Lecture 13 - When to Conduct TNA
Lecture 14 - Techniques Used in Need Assessment
Lecture 15 - Competency in Need Assessment
Lecture 16 - Concept, Types and Importance of Learning
Lecture 17 - Learning Theories
Lecture 18 - Transfer of Training
Lecture 19 - Factors Affecting Transfer of Training
Lecture 20 - Theories of Transfer of Training
Lecture 21 - Concept and Importance of Programme and Training Programme
Lecture 22 - Training Programme Design
Lecture 23 - Steps/Process of Programme Design
Lecture 24 - Basic Consideration for Programme Design
Lecture 25 - Documentation in Designing Training Program
Lecture 26 - Defining Evaluation
Lecture 27 - Training Evaluation
Lecture 28 - Training evaluation process
Lecture 29 - Tools and Techniques of Training Evaluation

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Lecture 30 - Training Evaluation Design
Lecture 31 - Training Methods
Lecture 32 - Presentation Methods
Lecture 33 - Hands-on-training methods
Lecture 34 - Group Building Methods
Lecture 35 - Implication of Traditional Training Methods
Lecture 36 - Technology Based Training: Concept, Types and Importance
Lecture 37 - Computer Based Training
Lecture 38 - Social Media
Lecture 39 - Learning Management System (LMS)
Lecture 40 - Choosing a New Technology for Training
Lecture 41 - Employees Development
Lecture 42 - Career Development and Training
Lecture 43 - Development Planning System
Lecture 44 - Approaches to Employee Development
Lecture 45 - Interpersonal Relationship, Succession Planning
Lecture 46 - Social Responsibility
Lecture 47 - Legal Aspects of Social Responsibility
Lecture 48 - Managing Diversity in Training
Lecture 49 - Career Challenges
Lecture 50 - Meeting the Needs of Older Workers
Lecture 51 - Future of Training and Development
Lecture 52 - Future Trends of Trainersâ Skills and Competencies
Lecture 53 - Emphasis for Future Training and Development
Lecture 54 - Trends of New Technology Used in Training
Lecture 55 - Training Partnership and Outsourcing
Lecture 56 - Train the Trainers
Lecture 57 - Concept of Disruption
Lecture 58 - Disruption in Creativity and Innovation
Lecture 59 - Implication of Digital Disruption in Training and Learning
Lecture 60 - Managing Disruptive Trainees
Lecture 61 - Managing Disruptive Trainees (Continued...)
Lecture 62 - Managing Disruption in Organizations through Training c
Lecture 63 - Some Examples/Cases
Lecture 64 - Some Examples/Cases (Continued...)
Lecture 65 - Some Examples/Cases (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sociology and Resource Management

Subject Co-ordinator - Prof. Amrita Sen, Prof. Archana Patnaik

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Categorizing Resources Governed under Different Property Regimes
Lecture 2 - Common Pool Resource Management
Lecture 3 - Tragedy of The Commons
Lecture 4 - Institutional Analysis and Development (IAD) Framework
Lecture 5 - Institutional Analysis and Development (IAD) Framework (Continued...)
Lecture 6 - Common Pool Resource Management
Lecture 7 - Community Control of Natural Resources and Man-Made Resource
Lecture 8 - Debates on Intellectual Property Rights
Lecture 9 - The internet, Opensource and the commons
Lecture 10 - Agricultural biotechnology, opensource and commons
Lecture 11 - Natural resources and urban ecological commons in the city
Lecture 12 - Urban Common and social ownership
Lecture 13 - Ecological Commons and Sustainable City Planning
Lecture 14 - Rethinking environmental justice in cities
Lecture 15 - Urban Commons and Political Ecology
Lecture 16 - Rights-based approaches to natural resources
Lecture 17 - Reformistic legislations on resource management
Lecture 18 - Case studies from specific rights-based resource management policies
Lecture 19 - Critiques of decentralisation and participatory resource management
Lecture 20 - Problems of Access and Distribution in Resource Management of Water

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NPTEL Video Course - Humanities and Social Sciences - NOC:Urban Sociology

Subject Co-ordinator - Prof. Archana Patnaik, Prof. Amrita Sen

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Sociological Theories of Urbanization and Key Concepts
Lecture 3 - Globalization, technology and the Growth of Cities
Lecture 4 - Urban Infrastructure and Governance
Lecture 5 - Urbanization in the Global South: Approaches of Understanding
Lecture 6 - Indian context and informality: Cities and slums
Lecture 7 - Urban Development and Sustainability in India
Lecture 8 - Major Policies of urban India
Lecture 9 - Gentrification, migration, inequality and urban social stratification in India.
Lecture 10 - Recent developments and emerging theories
Lecture 11 - Smart cities - global perspective and Indian perspective
Lecture 12 - Social Interactions in Publicspaces
Lecture 13 - Community, SmartCitizenship and the Digital Divide
Lecture 14 - Urban Commons
Lecture 15 - Urban Greens
Lecture 16 - Community and Identity
Lecture 17 - Gender Race and the City - Part I
Lecture 18 - Gender Race and the City - Part II
Lecture 19 - Natural and (Un)Natural Disaster in the City
Lecture 20 - Urban Subcultures

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NPTEL Video Course - Humanities and Social Sciences - NOC:Management of Fixed Income Securities

Subject Co-ordinator - Prof. Jitendra Mahakud

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fixed Income Securities
Lecture 2 - Risks in Fixed Income Securities Investments
Lecture 3 - Bond Valuation - I
Lecture 4 - Bond Valuation - II
Lecture 5 - Bond Price Relations
Lecture 6 - Bond Returns - I
Lecture 7 - Bond Returns - II
Lecture 8 - Bond Returns - III
Lecture 9 - Bond Returns - IV
Lecture 10 - Level of Interest Rate Determination - I
Lecture 11 - Level of Interest Rate Determination - II
Lecture 12 - Level of Interest Rate Determination - III
Lecture 13 - The Term Structure of Interest Rates - I
Lecture 14 - The Term Structure of Interest Rates - II
Lecture 15 - The Term Structure of Interest Rates - III
Lecture 16 - The Term Structure of Interest Rates - IV
Lecture 17 - The Term Structure of Interest Rates - V
Lecture 18 - The Term Structure of Interest Rates - VI
Lecture 19 - The Term Structure of Interest Rates - VII
Lecture 20 - The Term Structure of Interest Rates - VIII
Lecture 21 - Determination of Theoretical Spot Rate and Forward Yield Curves
Lecture 22 - Interest Rate Risk
Lecture 23 - Bond Duration
Lecture 24 - Bond Convexity
Lecture 25 - Default Risk
Lecture 26 - Short-Term Government Bond Markets
Lecture 27 - Long-Term Government Bond Markets
Lecture 28 - Issuance and Trading Mechanism of Government Securities
Lecture 29 - Short-Term Corporate Bond Markets

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Lecture 30 - Medium and Long-term Corporate Bond Markets
Lecture 31 - Issuance and Trading Mechanism of Corporate Securities
Lecture 32 - Municipal Bonds - I
Lecture 33 - Municipal Bonds - II
Lecture 34 - Debt Securities of Commercial Banks
Lecture 35 - International Bonds
Lecture 36 - Bonds with Embedded Options
Lecture 37 - Binomial Valuation of Callable Bonds - I
Lecture 38 - Binomial Valuation of Callable Bonds - II
Lecture 39 - Binomial Valuation of Puttable and Sinking-Fund Bonds
Lecture 40 - Binomial Valuation of Convertible Bonds
Lecture 41 - Estimation of Binomial Trees - I
Lecture 42 - Estimation of Binomial Trees - II
Lecture 43 - Estimation of Binomial Trees - III
Lecture 44 - Estimation of Binomial Trees - IV
Lecture 45 - Estimation of Binomial Trees - V
Lecture 46 - Bond Investment Strategies - I
Lecture 47 - Bond Investment Strategies - II
Lecture 48 - Bond Investment Strategies - III
Lecture 49 - Bond Investment Strategies - IV
Lecture 50 - Bond Investment Strategies - V
Lecture 51 - Mortgage Backed Securities - I
Lecture 52 - Mortgage Backed Securities - II
Lecture 53 - Mortgage Backed Securities - III
Lecture 54 - Mortgage Backed Securities - IV
Lecture 55 - Mortgage Backed Securities - V
Lecture 56 - Fixed Income Securities Derivatives - I
Lecture 57 - Fixed Income Securities Derivatives - II
Lecture 58 - Fixed Income Securities Derivatives - III
Lecture 59 - Fixed Income Securities Derivatives - IV
Lecture 60 - Fixed Income Securities Derivatives - V

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NPTEL Video Course - Humanities and Social Sciences - NOC:Petroleum Economics and Management

Subject Co-ordinator - Prof. Anwesha Aditya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Relevance and Syllabus
Lecture 2 - Role of Oil
Lecture 3 - Energy and Sustainability
Lecture 4 - North-South conflict, Way to future
Lecture 5 - Introduction
Lecture 6 - Analysis of demand
Lecture 7 - Determinants of demand
Lecture 8 - Analysis of supply
Lecture 9 - Equilibrium
Lecture 10 - Elasticity
Lecture 11 - Revenue and price elasticity of demand
Lecture 12 - Petroleum rents and petroleum taxes
Lecture 13 - Welfare analysis
Lecture 14 - Government Intervention - I
Lecture 15 - Government Intervention - II
Lecture 16 - Introduction
Lecture 17 - Movement of oil price
Lecture 18 - Sector wise use of oil
Lecture 19 - Oil Price Movements 2010-15/16
Lecture 20 - Oil Price since 2018
Lecture 21 - Oil price in the recent times
Lecture 22 - Structure of OPEC
Lecture 23 - Cartel
Lecture 24 - Role of OPEC in explaining oil price
Lecture 25 - Role of Saudi Arabia
Lecture 26 - Petroleum as a depleting resource
Lecture 27 - Can depletion explain price development ?
Lecture 28 - Cost performance of global oil industry and Oil Spills
Lecture 29 - Structural change and resource discovery

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Lecture 30 - Theory of Production: A brief overview
Lecture 31 - Production Possibility Frontier
Lecture 32 - Labour Demand
Lecture 33 - Theoretical model - I
Lecture 34 - Theoretical Framework - II
Lecture 35 - Country Experiences
Lecture 36 - Market structure
Lecture 37 - Oligopoly and Market structure
Lecture 38 - Introduction to Game Theory - I
Lecture 39 - Introduction to Game Theory - II
Lecture 40 - Nash Equilibirum
Lecture 41 - Competition versus collusion
Lecture 42 - Collusive Oligopoly: Price Leadership
Lecture 43 - Price Leadership Dominant Firm Model - I
Lecture 44 - Price Leadership Dominant Firm Model - II
Lecture 45 - Cartel
Lecture 46 - Intemporal Allocation and Utility
Lecture 47 - Optimum Choice of a Consumer: Problem of Utility Maximisation
Lecture 48 - Optimal Division of Natural Resources
Lecture 49 - Hotelling's rule
Lecture 50 - Intertemporally Optimal Prices: Some observations
Lecture 51 - Model of Economic Growth - I
Lecture 52 - Model of Economic Growth - II
Lecture 53 - Discovery of Natural Resources
Lecture 54 - Model of Economic growth with uncertainty
Lecture 55 - Exchange Rate and its Determination
Lecture 56 - Oil Price Shock
Lecture 57 - BoP Crisis of the Indian Economy in 1991
Lecture 58 - Crisis and efficiency of exchange rate policies
Lecture 59 - Concluding Remarks - I
Lecture 60 - Concluding Remarks - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Science of Happiness and Wellbeing

Subject Co-ordinator - Prof. Priyadarshi Patnaik, Prof. Manas K Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Why Happiness Matters and How We Will Go About Exploring It
Lecture 2 - Can We Define Happiness?
Lecture 3 - Happiness and Wellbeing : Do Cultures and Environments Call the Shorts!
Lecture 4 - Doing Happiness' - Philosophical and existential questions, and responses
Lecture 5 - Happiness - antecedents and implications
Lecture 6 - Basic Issues
Lecture 7 - Myths and Misconceptions
Lecture 8 - Happiness - the unanswered questions
Lecture 9 - Evolution of Happiness
Lecture 10 - Belief and Gene
Lecture 11 - Empathy
Lecture 12 - Happiness and Morality
Lecture 13 - Exploring the self and the other
Lecture 14 - Pro-sociality and happiness - Generosity, give and take
Lecture 15 - Pro-sociality and happiness - Virtuesand strengths
Lecture 16 - Relationship - Connected and happy
Lecture 17 - Networking and its relevance for happiness and wellbeing
Lecture 18 - Money and Happiness
Lecture 19 - How does optimism affect happiness?
Lecture 20 - Sharing and Belonging
Lecture 21 - Happiness and body language
Lecture 22 - Failure and Resilience
Lecture 23 - Innovation and Happiness
Lecture 24 - Conflicts and Stress
Lecture 25 - Stress and Coping
Lecture 26 - Reconnecting happiness: beyond pandemic
Lecture 27 - Meditation and Mindfulness: An Overview
Lecture 28 - Meditation and Mindfulness: Practice Toolkit
Lecture 29 - Creativity, Intuition and Flow

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Lecture 30 - Can we really not be creative and happy?
Lecture 31 - Emotional intelligence
Lecture 32 - Happiness at work
Lecture 33 - Nudging and Decision-making
Lecture 34 - Can we measure happiness? The case of cities and states
Lecture 35 - Happiness and leadership habits
Lecture 36 - Measurement of Happiness
Lecture 37 - Consumerism, happiness and wellbeing
Lecture 38 - Technology and happiness
Lecture 39 - Doing research on happiness: Connecting dots
Lecture 40 - Summing up: Social innovation and project ideas for social transformation

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NPTEL Video Course - Humanities and Social Sciences - NOC:Environmental Science

Subject Co-ordinator - Dr. Samik Chowdhury, Dr. Sudha Goel

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Major Environmental Concerns and Pollution
Lecture 2 - Population Growth Models
Lecture 3 - Resource Consumption and Pollution
Lecture 4 - Measuring Environmental Impacts - the IPAT Model and Ecological Footprint
Lecture 5 - Measuring - Earth Overshoot Day, Energy Performance Index and Lifecycle Assessment
Lecture 6 - Principles of Sustainable Development
Lecture 7 - Principles of Sustainable Development (Sustainable Development Goals)
Lecture 8 - Principles of Sustainable Development (Achieving SDGs and Sustainability Indices)
Lecture 9 - Principles of Sustainable Development (Case Study I: Sustainable Urbanization)
Lecture 10 - Principles of Sustainable Development (Case Study II: Green Buildings)
Lecture 11 - Air Pollution (Definition, Causes, Sources and Types)
Lecture 12 - Air Pollution (Influence of Meteorology)
Lecture 13 - Air Pollution (Local Effects and Mitigation Measures)
Lecture 14 - Air Pollution (Regional Issues and Mitigation Measures)
Lecture 15 - Air Pollution (Global Issues and Mitigation Measures, Indoor Air Quality)
Lecture 16 - Climate Change (Definition and Evidence)
Lecture 17 - Climate Change (Causes and Determinants)
Lecture 18 - Climate Change (Projections and Related Impacts)
Lecture 19 - Climate Change (Mitigation Options)
Lecture 20 - Climate Change (Adaption and Policy Responses)
Lecture 21 - Renewable Energy - I (Overview)
Lecture 22 - Renewable Energy - I (Solar Energy - I)
Lecture 23 - Renewable Energy - I (Solar Energy - II)
Lecture 24 - Renewable Energy - I (Solar Energy - III)
Lecture 25 - Renewable Energy - I (Wind Energy)
Lecture 26 - Renewable Energy - II (Geothermal Energy)
Lecture 27 - Renewable Energy - II (Ocean Energy - I)
Lecture 28 - Renewable Energy - II (Ocean Energy - II)
Lecture 29 - Renewable Energy - II (Hydropower)

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Lecture 30 - Renewable Energy - II (Bioenergy)
Lecture 31 - Circular Economy (Introduction to the Concept)
Lecture 32 - Circular Economy (Circular Economy Strategies - I)
Lecture 33 - Circular Economy (Circular Economy Strategies - II)
Lecture 34 - Circular Economy (Circular Business Models)
Lecture 35 - Circular Economy (Industrial Symbiosis)
Lecture 36 - Hydrologic cycle, sources of water and water pollution
Lecture 37 - Water Quality Parameters - General
Lecture 38 - Water Quality Parameters - Oxygendemanding wastes and Microbial
Lecture 39 - Nitrogen species in rivers and the DO Sag Curve
Lecture 40 - NGT, WQI and reuse and recycling of wastewater
Lecture 41 - Importance and Integrated Solid Waste Management
Lecture 42 - Sources of MSW, MSW Generation Rates and Composition
Lecture 43 - MSW Composition and Collection
Lecture 44 - MSW Treatment and Disposal
Lecture 45 - E-Waste Management
Lecture 46 - Sound, noise and its characteristics
Lecture 47 - Audiometry
Lecture 48 - Effects of noise
Lecture 49 - Noise rating systems and modeling
Lecture 50 - Noise control and regulations
Lecture 51 - Fundamentals of Ecology - I
Lecture 52 - Fundamentals of Ecology - II
Lecture 53 - Fundamentals of Ecology - III
Lecture 54 - Soil Pollution - I
Lecture 55 - Soil Pollution - II
Lecture 56 - The Environmental Movement and its global and local impacts
Lecture 57 - Environmental Law and Rules in India
Lecture 58 - Important legal judgments pertaining to the Environment
Lecture 59 - NGT and its important judgments
Lecture 60 - Rapid Environmental Impact Assessment - A case study of the River Ib Barrage

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NPTEL Video Course - Humanities and Social Sciences - NOC:Psychology of Learning

Subject Co-ordinator - Dr. Atasi Mohanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Psychology of Learning
Lecture 2 - Psychology of Learning (Continued...)
Lecture 3 - Psychology of Learning (Continued...)
Lecture 4 - Psychology of Learning (Continued...)
Lecture 5 - Psychology of Learning (Continued...)
Lecture 6 - Major Theories of Learning
Lecture 7 - Major Theories of Learning (Continued...)
Lecture 8 - Major Theories of Learning (Continued...)
Lecture 9 - Major Theories of Learning (Continued...)
Lecture 10 - Major Theories of Learning (Continued...)
Lecture 11 - Memory and Cognition
Lecture 12 - Memory and Cognition (Continued...)
Lecture 13 - Memory and Cognition (Continued...)
Lecture 14 - Memory and Cognition (Continued...)
Lecture 15 - Memory and Cognation (Continued...)
Lecture 16 - Thinking and Cognition
Lecture 17 - Thinking and Cognition (Continued...)
Lecture 18 - Thinking and Cognition (Continued...)
Lecture 19 - Thinking and Cognition (Continued...)
Lecture 20 - Thinking and Cognition (Continued...)
Lecture 21 - Motivation of Learning
Lecture 22 - Motivation of Learning (Continued...)
Lecture 23 - Motivation of Learning (Continued...)
Lecture 24 - Motivation of Learning (Continued...)
Lecture 25 - Motivation of Learning (Continued...)
Lecture 26 - Emotional Intelligence and Learning
Lecture 27 - Emotional Intelligence and Learning (Continued...)
Lecture 28 - Emotional Intelligence and Learning (Continued...)
Lecture 29 - Emotional Intelligence and Learning (Continued...)

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Lecture 30 - Emotional Intelligence and Learning (Continued...)
Lecture 31 - Learning and Instruction
Lecture 32 - Learning and Instruction (Continued...)
Lecture 33 - Learning and Instruction (Continued...)
Lecture 34 - Learning and Instruction (Continued...)
Lecture 35 - Learning and Instruction (Continued...)
Lecture 36 - Learning and Pedagogy
Lecture 37 - Learning and Pedagogy (Continued...)
Lecture 38 - Learning and Pedagogy (Continued...)
Lecture 39 - Learning and Pedagogy (Continued...)
Lecture 40 - Learning and Pedagogy (Continued...)
Lecture 41 - Psychology of E-Learning
Lecture 42 - Psychology of E-Learning (Continued...)
Lecture 43 - Psychology of E-Learning (Continued...)
Lecture 44 - Psychology of E-Learning (Continued...)
Lecture 45 - Psychology of E-Learning (Continued...)
Lecture 46 - Effective Learning: Assessment and Feedback
Lecture 47 - Effective Learning: Assessment and Feedback (Continued...)
Lecture 48 - Effective Learning: Assessment and Feedback (Continued...)
Lecture 49 - Effective Learning: Assessment and Feedback (Continued...)
Lecture 50 - Effective Learning: Assessment and Feedback (Continued...)
Lecture 51 - Learning for Sustainability
Lecture 52 - Learning for Sustainability (Continued...)
Lecture 53 - Learning for Sustainability (Continued...)
Lecture 54 - Learning for Sustainability (Continued...)
Lecture 55 - Learning for Sustainability (Continued...)
Lecture 56 - Learning for Sustainability
Lecture 57 - Learning for Sustainability (Continued...)
Lecture 58 - Learning for Sustainability (Continued...)
Lecture 59 - Learning for Sustainability (Continued...)
Lecture 60 - Learning for Sustainability (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Language and Linguistics

Subject Co-ordinator - Dr. Dripta Piplai (Mondal), Dr. Bornini Lahiri

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - How do we define language?
Lecture 2 - What is knowledge of language?
Lecture 3 - How is Human communication unique?
Lecture 4 - Universal properties of language
Lecture 5 - What do we do in Linguistics?
Lecture 6 - Transdisciplinary Approach to Linguistics
Lecture 7 - Rules of Language
Lecture 8 - Competence and Performance, Langue and Parole
Lecture 9 - Universal Grammar
Lecture 10 - Faculty of Language
Lecture 11 - Introduction to Phonetics
Lecture 12 - More about Phonetics
Lecture 13 - Introduction to IPA
Lecture 14 - Introduction to Phonology
Lecture 15 - More about Phonology
Lecture 16 - Introducing Morphology
Lecture 17 - Morpheme, Morph and Allomorph
Lecture 18 - Types of Morpheme
Lecture 19 - Morphological Processes
Lecture 20 - More about Morphological Process
Lecture 21 - Morphological Typology
Lecture 22 - Introducing Syntax
Lecture 23 - Syntactic Categories and Subcategories
Lecture 24 - Constituents and Phrase Structures Rules
Lecture 25 - More about Trees
Lecture 26 - Different parts of a tree
Lecture 27 - From Transformation to GB Theory
Lecture 28 - Introducing Minimalism
Lecture 29 - Introducing Semantics

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Lecture 30 - Lexical Semantics
Lecture 31 - Introducing Pragmatics
Lecture 32 - Language and Script
Lecture 33 - Defining Computational Linguistics
Lecture 34 - An Introduction to Corpus Linguistics
Lecture 35 - Introducing Linguistic Typology
Lecture 36 - More about Linguistic Typology
Lecture 37 - Typology through Indian Languages
Lecture 38 - Language Families of India
Lecture 39 - More about Language Families of India
Lecture 40 - India as a Linguistic Area
Lecture 41 - Introducing Sociolinguistics
Lecture 42 - Language Maintenance and Language Shift
Lecture 43 - Multilingualism and Varieties of Language
Lecture 44 - Language, Dialect and Standardization
Lecture 45 - Standard Language Ideology
Lecture 46 - Language Variation
Lecture 47 - Language Change
Lecture 48 - Language and Identity
Lecture 49 - Language Endangerment
Lecture 50 - Different Aspects of Language Endangerment
Lecture 51 - Language Documentation
Lecture 52 - Language Documentation and Revitalization
Lecture 53 - A Discussion on Field Linguistics
Lecture 54 - Language Teaching
Lecture 55 - More about Language Teaching
Lecture 56 - Sociolinguistics and language teaching
Lecture 57 - Language Policy
Lecture 58 - Endangered Languages and its Revitization through Classroms
Lecture 59 - Summing up
Lecture 60 - Summing up

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NPTEL Video Course - Humanities and Social Sciences - NOC:Philosophy and Critical Thinking

Subject Co-ordinator - Prof. Gyan Prakash

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Branches of Philosophy
Lecture 3 - Philosophy and other Subjects
Lecture 4 - History of Western Philosophy
Lecture 5 - Pre Socrates-Philosopher
Lecture 6 - Pre Socrates-Philosopher
Lecture 7 - Socrates
Lecture 8 - Plato
Lecture 9 - Aristotle
Lecture 10 - Rene Descartes
Lecture 11 - Rene Descartes
Lecture 12 - Rene Descartes
Lecture 13 - Benedict Spinoza
Lecture 14 - Benedict Spinoza
Lecture 15 - John Lock
Lecture 16 - John Lock
Lecture 17 - Hume
Lecture 18 - Hume
Lecture 19 - Critical argument against empiricism
Lecture 20 - Ethics
Lecture 21 - Branches of Ethics
Lecture 22 - Virtue Ethics
Lecture 23 - Hedonism
Lecture 24 - Utilitarianism
Lecture 25 - Mill on happiness
Lecture 26 - Immanuel Kant
Lecture 27 - Immanuel Kant
Lecture 28 - Immanuel Kant
Lecture 29 - Indian Philosophy

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Lecture 30 - Indian Philosophy
Lecture 31 - Indian Philosophy
Lecture 32 - Indian Philosophy
Lecture 33 - Indian Philosophy
Lecture 34 - Sankara's philosophy
Lecture 35 - Sankara's philosophy
Lecture 36 - Sankara's philosophy
Lecture 37 - Sankara's philosophy
Lecture 38 - Sankara's philosophy
Lecture 39 - Ramanuja's Philosophy
Lecture 40 - Ramanuja's Philosophy
Lecture 41 - Ramanuja's Philosophy
Lecture 42 - Ramanuja's Philosophy
Lecture 43 - Vedanta Philosophy
Lecture 44 - Buddhist Philosophy
Lecture 45 - Buddhist Philosophy
Lecture 46 - Buddhist Philosophy
Lecture 47 - Buddhist Philosophy
Lecture 48 - Buddhist Philosophy
Lecture 49 - Samkhya Philosophy
Lecture 50 - Samkhya Philosophy
Lecture 51 - Samkhya Philosophy
Lecture 52 - Samkhya Philosophy
Lecture 53 - Samkhya Philosophy
Lecture 54 - The Jaina Philosophy
Lecture 55 - The Jaina Philosophy
Lecture 56 - The Jaina Philosophy
Lecture 57 - The Jaina Philosophy
Lecture 58 - The Jaina Philosophy

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sustainable Happiness

Subject Co-ordinator - Prof. Atasi Mohanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sustainability and Happiness
Lecture 3 - Sustainability and Wellbeing
Lecture 4 - Sustainable Happiness Theory
Lecture 5 - Sustainable Happiness Process
Lecture 6 - Introduction
Lecture 7 - Positive Education
Lecture 8 - Predictors of Happiness
Lecture 9 - Contemplative Learning
Lecture 10 - ESD and Sustainable Learning
Lecture 11 - Introduction - Sustainable Happiness at Workplace
Lecture 12 - Work Culture
Lecture 13 - Work Culture and Emotional Intelligence at Work
Lecture 14 - Emotional Intelligence at Work (Continued...)
Lecture 15 - Sustainable Competences
Lecture 16 - Definition Sustainable Organisations
Lecture 17 - Corporate Sustainability
Lecture 18 - Sustainability policies and practices
Lecture 19 - Role of Technology in Sustainability
Lecture 20 - Building Resilient Organizations
Lecture 21 - Need for Sustainable Leadership
Lecture 22 - Competencies of Sustainable Leaders
Lecture 23 - Sustainable Lifestyle, Work-life balance and Wellbeing practices
Lecture 24 - Transforming Self and Other
Lecture 25 - Transforming Self and other (Continued...)
Lecture 26 - Positive Character Strengths
Lecture 27 - Positive and Creative Organizations
Lecture 28 - Nurturing Talent and Career Growth
Lecture 29 - Nudging

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Lecture 30 - Habits of Mind and Life Skills
Lecture 31 - Introduction to Sustainable Wellbeing
Lecture 32 - Good Health and Wellbeing
Lecture 33 - Sustainable Learning and Education
Lecture 34 - Green Creativity and Responsible Innovation
Lecture 35 - Consumers' Sustainability Demands and Trends
Lecture 36 - Education for Sustainable Development
Lecture 37 - ESD for Social Transformation
Lecture 38 - ESG for Value Creation
Lecture 39 - ESG for Sustainable Wellbeing
Lecture 40 - ESG and Inner Development Goals

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NPTEL Video Course - Humanities and Social Sciences - NOC:Logistics and Supply Chain Management

Subject Co-ordinator - Prof. Vikas Thakur

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Logistics: Design and Management
Lecture 2 - Logistics Stakeholders and Modern Logistics Concepts
Lecture 3 - Manufacturing Logistics: National and International Scenario
Lecture 4 - Storage and Warehousing
Lecture 5 - Logistics Services Providers
Lecture 6 - E-Logistics
Lecture 7 - International Logistics
Lecture 8 - International Logistics
Lecture 9 - Logistics Key Performance Indicators (KPIs)
Lecture 10 - Tools for Improving Logistics Efficiency
Lecture 11 - Tools for Improving Logistics Efficiency (Continued...)
Lecture 12 - Reverse Logistics
Lecture 13 - Reverse Logistics (Continued...)
Lecture 14 - Green Logistics
Lecture 15 - Lean Logistics
Lecture 16 - Lean Logistics (Continued...)
Lecture 17 - Lean Logistics (Continued...)
Lecture 18 - Trends in Logistics
Lecture 19 - Trends in Logistics (Continued...)
Lecture 20 - Logistics vs SCM
Lecture 21 - Fundamentals of Supply Chain Management (SCM)
Lecture 22 - SC Operations: Manufacturing versus Service SC
Lecture 23 - Principle Streams of Supply Chain
Lecture 24 - Principle Streams of Supply Chain
Lecture 25 - Objectives of Supply Chain Networks
Lecture 26 - Supply Chain Uncertainty and Processes
Lecture 27 - Supply Chain Operational Views
Lecture 28 - Supply Chain Models and Modelling Systems
Lecture 29 - Supply Chain Drivers

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Lecture 30 - Supply Chain Drivers
Lecture 31 - upply Chain Impellers and Value Chain
Lecture 32 - Strategic Supply Chain Management
Lecture 33 - Strategic Supply Chain Management (Continued...)
Lecture 34 - Achieving Supply Chain Strategic Fit
Lecture 35 - Achieving Supply Chain Strategic Fit (Continued...)
Lecture 36 - Make or Buy Decision
Lecture 37 - Strategic Sourcing
Lecture 38 - Vendor Rating
Lecture 39 - Supply Chain Coordination
Lecture 40 - Supply Chain Performance: Balanced Scorecard Approach
Lecture 41 - Supply Chain Performance: Balanced Scorecard Approach (Continued...)
Lecture 42 - Importance of Distribution in Supply Chain
Lecture 43 - Designing Distribution Networks in Supply Chain
Lecture 44 - Facility Location Planning
Lecture 45 - Demand Forecasting
Lecture 46 - Capacity Planning
Lecture 47 - Sequencing and Scheduling
Lecture 48 - Transportation Management
Lecture 49 - Transportation Problem Programming
Lecture 50 - Transportation Problem Programming
Lecture 51 - Assignment Problem Programming
Lecture 52 - Inventory Management
Lecture 53 - Inventory Management (Continued...)
Lecture 54 - Supply Chain Digitalization: 21st Century Supply Chain
Lecture 55 - Smart Supply Chains
Lecture 56 - Robust and Resilient Supply Chain Design
Lecture 57 - 21st Century Supply Chain
Lecture 58 - Sustainable Supply Chain
Lecture 59 - Emergency Supply Chain
Lecture 60 - Assets Management in Supply Chain

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NPTEL Video Course - Humanities and Social Sciences - NOC:Tools and Technologies of Language Documentation

Subject Co-ordinator - Prof. Bornini Lahiri, Prof. Dripta Piplai

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Language Endangerment
Lecture 3 - Introducing Language Shift and Ethnolinguistic Vitality
Lecture 4 - More about Language Shift
Lecture 5 - Linguistic diversity, biodiversity and wellbeing
Lecture 6 - Assessing Language Vitality
Lecture 7 - Language Documentation
Lecture 8 - Language attitude and vitality
Lecture 9 - Evaluating Language Attitude
Lecture 10 - Designing Questionnaire - Part 1
Lecture 11 - Designing Questionnaire - Part 2
Lecture 12 - Documenting Oral Literature - Part 1
Lecture 13 - Documenting Oral Literature - Part 2
Lecture 14 - How to collect Ethnolinguistic Data?
Lecture 15 - Methods for Remote Data Collection
Lecture 16 - Metadata and Other related information
Lecture 17 - Different Approaches of Language Documentation
Lecture 18 - Challenges in the Indian field - Part 1
Lecture 19 - Challenges in the Indian field - Part 2
Lecture 20 - Best Practices in the Field: Dos and Don'ts
Lecture 21 - Issues related to Ethics
Lecture 22 - Sapirâ Whorf hypothesis
Lecture 23 - Fieldwork Conversations: Challenges, Precautions and Solutions
Lecture 24 - Language documentation and the problem of standardization
Lecture 25 - Script and Language
Lecture 26 - Data Processing and IPA
Lecture 27 - IPA Transcription - Part I
Lecture 28 - IPA Transcription - Part II
Lecture 29 - IPA Transcription with Field Data

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Lecture 30 - Glossing Rules
Lecture 31 - Language Revitalization
Lecture 32 - Creating Dictionaries
Lecture 33 - Writing Grammar
Lecture 34 - Creating pedagogical material
Lecture 35 - More about the use of pedagogical material
Lecture 36 - Language Technology for Endangered Languages
Lecture 37 - Case Studies of Language Documentation from India
Lecture 38 - Language Documentation Across the World
Lecture 39 - Conclusion
Lecture 40 - Summing up

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NPTEL Video Course - Humanities and Social Sciences - NOC:Educational Technology and ICT

Subject Co-ordinator - Prof. Sarita Anand

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to ET
Lecture 2 - Nature and Evolution of ET
Lecture 3 - Types and Forms of ET
Lecture 4 - Instructional Strategies and Media For Instruction
Lecture 5 - Mass Media and Multimedia
Lecture 6 - Personalized System of Instruction (PSI)
Lecture 7 - Blended Learning
Lecture 8 - Flipped Classroom
Lecture 9 - Integrating Individualized Learning, Blended Learning and Flipped Classes
Lecture 10 - Mobile Learning
Lecture 11 - Scope of Educational Technology
Lecture 12 - System approach and its components
Lecture 13 - Systems Approach to Education
Lecture 14 - Daleâ s Cone and Multi-Sensory Instructions
Lecture 15 - Hardware and Software Instructional Aids
Lecture 16 - Communication: Concept, Nature, Process, Modes
Lecture 17 - Barriers of Communication
Lecture 18 - Effective classroom Communication and Role of Teacher
Lecture 19 - Classroom Interaction and Flanders Interaction Analysis System
Lecture 20 - Technological Trends in Communication
Lecture 21 - Basics of ICT
Lecture 22 - NME-ICT
Lecture 23 - PM e-Vidya
Lecture 24 - E-Learning Concepts and Tools
Lecture 25 - OER (Open Educational Resources)
Lecture 26 - CC Licenses
Lecture 27 - ICT in Classroom
Lecture 28 - SMART CLASSROOMS
Lecture 29 - SWAYAM

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Lecture 30 - NEP-2020 and ICT
Lecture 31 - Applications of ET in formal, non-formal (Open and Distance Learning)
Lecture 32 - Applications of ET in informal and Inclusive Education Systems
Lecture 33 - Assessment and Educational Technology - Part I
Lecture 34 - Assessment and Educational Technology - Part II
Lecture 35 - Emerging Technologies in Education different Reality - AR, VR, MR and XR
Lecture 36 - Educational Games and Simulations in Education
Lecture 37 - Teleconferencing
Lecture 38 - EDUSAT and Swayam Prabha
Lecture 39 - Resource Centre for Educational Technology: CIET
Lecture 40 - Resource Centre for Educational Technology: CET, AVRC and EMRCs
Lecture 41 - ICT Recourses
Lecture 42 - ICTs in Teaching Learning
Lecture 43 - Importance and Utility of Internet in Education
Lecture 44 - Applications of ICTs in and Outside the Classroom - Part I
Lecture 45 - Applications of ICTs in and outside the Classroom - Part II (Practical Tools)
Lecture 46 - Institutions and Professional Development of Teachers - Part I
Lecture 47 - Institutions and Professional Development of Teachers - Part II
Lecture 48 - Computer Assisted Instruction (CAI)
Lecture 49 - Computer Managed Learning (CML)
Lecture 50 - Computer Aided Evaluation (CAE)
Lecture 51 - Digital infrastructure and DIKSHA
Lecture 52 - MOOCs- mooKIT and SWAYAM
Lecture 53 - Learning Management Systems (LMS)
Lecture 54 - Artificial Intelligence in Education - Part I
Lecture 55 - Artificial Intelligence in Education - Part II
Lecture 56 - Digital Content Creation Tools: Text
Lecture 57 - Digital Content Creation Tools: Audio
Lecture 58 - Digital Content Creation Tools: Video and Animation
Lecture 59 - Social Media in Education
Lecture 60 - Web 2.0 Tools in Education

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NPTEL Video Course - Humanities and Social Sciences - NOC:Exercise and Sports Biomechanics

Subject Co-ordinator - Prof. Viswanath Sundar, Prof. P.Rajinikumar, Prof. Rahul Tiwari

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Exercise and Sports Biomechanics
Lecture 2 - Basics of Biomechanics Research
Lecture 3 - Fundamental Directions
Lecture 4 - Fundamental Movements Planes and Axes
Lecture 5 - Skeletal System Oestokinematics and Arthrokinematics
Lecture 6 - Joint Movements
Lecture 7 - Muscular System
Lecture 8 - Muscle Origin, Insertion and Action
Lecture 9 - Muscle Origin, Insertion and Action
Lecture 10 - Muscle Origin, Insertion and Action
Lecture 11 - Introduction to Kinematics and Kinetics Types of Analysis
Lecture 12 - Qualitative analysis Software
Lecture 13 - Dartfish
Lecture 14 - Dartfish (Continued...)
Lecture 15 - Dartfish (Continued...)
Lecture 16 - My Dartfish Express
Lecture 17 - Measurement issues and Data Collection
Lecture 18 - Kinovea
Lecture 19 - Kinovea (Continued...)
Lecture 20 - OpenCap
Lecture 21 - Introduction to Linear and Angular Kinematics
Lecture 22 - Linear Kinematics
Lecture 23 - Projectile Motion
Lecture 24 - Angular Kinematics
Lecture 25 - Application in Sports
Lecture 26 - Introduction to Kinetics in Exercise and Sports Science
Lecture 27 - Forces in motion
Lecture 28 - Dynamics of motion
Lecture 29 - Fundamentals of Mechanics

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Lecture 30 - Principles of Rotational Mechanics
Lecture 31 - Introduction to Lever System
Lecture 32 - Fluid Mechanics
Lecture 33 - Timing Gates
Lecture 34 - Timing Gates
Lecture 35 - Camera Settings
Lecture 36 - Accelerometers
Lecture 37 - Introduction to Optical Imaging Systems
Lecture 38 - Hardware Setup Marker and Camera Placement
Lecture 39 - Experiment With Optical Motion Capture System
Lecture 40 - MOKKA - An Open-Source Software for 3D Analysis
Lecture 41 - Introduction to the Center of Gravity
Lecture 42 - Importance of CoG Control Training
Lecture 43 - Measurement of CoG
Lecture 44 - Demonstration of CoG Measurement
Lecture 45 - Goniometry
Lecture 46 - Introduction to force plate
Lecture 47 - Measurements in force plates
Lecture 48 - Practical application of force plates
Lecture 49 - Practical application of force plates (Continued...)
Lecture 50 - Interpretation of Force Data
Lecture 51 - Introduction to force transducers and Isokinetic
Lecture 52 - Biomechanical parameters in Isokinetic testing
Lecture 53 - Isokinetic demonstration
Lecture 54 - Pressure Plate System
Lecture 55 - Digital Resistance Sprint Device
Lecture 56 - Introduction to EMG
Lecture 57 - Practical Application of EMG in Sports
Lecture 58 - Expert Discussion with Dr. Saju Joseph
Lecture 59 - Expert Discussion with Dr. Saju Joseph (Continued...)
Lecture 60 - Expert Discussion with Dr. R.Natarajan

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NPTEL Video Course - Humanities and Social Sciences - NOC:Level-O Certificate Course in Cricket Coaching

Subject Co-ordinator - Prof. Abhijit Thander

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - How to Grip a Bat (Set-up)
Lecture 2 - How to take Stance in Batting
Lecture 3 - Back-Lift in Batting
Lecture 4 - Front Foot Drive in Batting
Lecture 5 - Role of The Coach - Part 1
Lecture 6 - Role of the Coach - Part 2
Lecture 7 - Front Foot Defence
Lecture 8 - Leg Glance
Lecture 9 - Skill Acquisition
Lecture 10 - Basic Laws of Cricket
Lecture 11 - Key Points
Lecture 12 - Back Foot Defense
Lecture 13 - Back Foot Drive
Lecture 14 - Warming up and Cooling down
Lecture 15 - Back foot Leg Glance
Lecture 16 - Pitch Dimension
Lecture 17 - Key Points
Lecture 18 - Step Out
Lecture 19 - Sweep Shot
Lecture 20 - Traditions and Etiquettes of Cricket
Lecture 21 - Traditions and Etiquettes of Cricket (Continued...)
Lecture 22 - Key Points
Lecture 23 - Square Cut
Lecture 24 - Pull Shot
Lecture 25 - Hook Shot
Lecture 26 - Running Between the Wickets
Lecture 27 - Goal Setting
Lecture 28 - Key Points
Lecture 29 - Goal Setting English

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Lecture 30 - How to Coach
Lecture 31 - Grip of Basic Bowling Action
Lecture 32 - Key Points Pace Bowling
Lecture 33 - Run Up
Lecture 34 - Sports Parents
Lecture 35 - Off Spin Basics
Lecture 36 - Off Spin Stock and Variations
Lecture 37 - Inswing
Lecture 38 - Out Swing
Lecture 39 - Off Cutter and Leg Cutter
Lecture 40 - Key Points
Lecture 41 - Leg Spin
Lecture 42 - Base Up and Two Hand Pick Up
Lecture 43 - Long Barrier and Rettrib
Lecture 44 - Key Points Wrist Spin, Stock and Variations
Lecture 45 - Key points ground fielding base up and attacking
Lecture 46 - Key points ground fielding defensive and retrieve
Lecture 47 - Underarm Overarm and Crowhop Throw
Lecture 48 - Importance of Fitness
Lecture 49 - Fitness
Lecture 50 - Key Points Throwing
Lecture 51 - Weight Training for Cricketers
Lecture 52 - Catching Techniques
Lecture 53 - Catching Parallel and High Catch
Lecture 54 - Key Points Catching
Lecture 55 - Key Points Catching Parallel and High Catch
Lecture 56 - Pitch Preparation
Lecture 57 - Wicket Keeping Standing UP
Lecture 58 - Wicket Keeping Standing Back
Lecture 59 - Key points of wicket keeping skill
Lecture 60 - How to coach
Lecture 61 - Efficient Conduct of a Practice Session
Lecture 62 - How to Shoot Videos
Lecture 63 - Methods and Approach of Batting
Lecture 64 - Tactics in Cricket
Lecture 65 - Chucking in cricket
Lecture 66 - Myth and true in Cricket
Lecture 67 - Diet Chart
Lecture 68 - Beat the Heat

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Lecture 69 - Motivation
Lecture 70 - How to conduct Fielding Drill
Lecture 71 - Warmup and Cooling Down Exercises
Lecture 72 - Revisions of Batting Setup and Front Foot Shorts
Lecture 73 - Revisions of Cut,Pull and Hook Shots
Lecture 74 - Revisions of Bowling Skill

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NPTEL Video Course - Humanities and Social Sciences - NOC:Mastering Speaking and Presentations: A Case Based

Subject Co-ordinator - Prof. Seema Singh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Pre-Assessment
Lecture 3 - Vocabulary Made Easy
Lecture 4 - The Power of Words
Lecture 5 - Case Studies 1 - Mr. Akshat Ranjit Kumar and Mr. Vijendra Singh Shyam
Lecture 6 - Spoken English Part 1: Introduction to Word Accent
Lecture 7 - Word Accent: Disyllabic Words
Lecture 8 - Word Accent: Shift of Accent in Disyllabic Words
Lecture 9 - Word Accent: Polysyllabic Words
Lecture 10 - Case Studies 2 - Ms. Pooja Saini and Mr. Akshath Surwase
Lecture 11 - Spoken English Part 2: Introduction to Rhythm
Lecture 12 - Introduction to Rhythm
Lecture 13 - Rising Intonation
Lecture 14 - Falling Intonation
Lecture 15 - Case Studies 3 - Aditya Raj, A Rohith Kumar and Naini Suhas Reddy
Lecture 16 - Spoken English Part 3 - Introduction to Spoken English in Specific Scenarios
Lecture 17 - How to Speak in Formal Settings
Lecture 18 - How to Speak with People Lower in Hierarchy than You
Lecture 19 - Telephone Skills: Taking and Making Calls, Voice, Intonation, and Language
Lecture 20 - Case Studies 4 - Devansh Gupta, Om Jain and Sujesh Sheshadri
Lecture 21 - Impactful Presentations Part 1 - Introduction to Body Langauge and Voice Modulation
Lecture 22 - The role of Nonverbal Communication in delivering impactful Presentations
Lecture 23 - Body Language: Mechanics and Style
Lecture 24 - Voice Modulation - Voice Projection, Replacing Fillers, and Emphasis
Lecture 25 - Case Studies 5 - Anuj Kumar, Yash Gupta and Pawan Sharma
Lecture 26 - Impactful Presentations Part 2: The Power of Pause
Lecture 27 - Pause to engage audience in a conversation
Lecture 28 - Combine Pause and Repetition Techniques
Lecture 29 - Demonstrate Confidence and Control to Establish your Presence

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Lecture 30 - Case Studies 6 - Soumyashree Nayak,Vedant Sharma, D S Ram and Yogesh Kushwaha
Lecture 31 - Impactful Presentations Part 3: Introduction to Empathy
Lecture 32 - The Role of Empathy in Delivering Impactful Presentations
Lecture 33 - How to make your Presentations have an Impact on your Audiences
Lecture 34 - Key Takeaways on Impactful Presentations that leave lasting Impressions
Lecture 35 - Case Studies 7 - S Ayush, Akshit Goyal, Shivang Devina and Raunak Dariyal
Lecture 36 - Case Studies on Effective Speaking and Impactful Presentations - Part I
Lecture 37 - Case Studies on Effective Speaking and Impactful Presentations - Part II
Lecture 38 - Case Observation 1 - Tatoo History, Art, and Culture - by Crow
Lecture 39 - Case Observation 2 - Effective Presentations by Ms. Akriti Agarwal
Lecture 40 - Course Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Modernisation and Creative Communication

Subject Co-ordinator - Prof. Saswat Samay Das, Prof. Ananya Roy Pratihar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Modernisation: Introduction and Contemporaneity - Part 1
Lecture 2 - Modernisation: Introduction and Contemporaneity - Part 2
Lecture 3 - Modernisation and Creativity
Lecture 4 - Modernisation Theory: Evolution, Analysis and Applications
Lecture 5 - Tools of Modernisation
Lecture 6 - Modernity, Modernism and Modernisation
Lecture 7 - Historical Context of Modernisation: Premodern Societies to Enlightenment Phase
Lecture 8 - Socio-Cultural Model of Modernisation: Liberalism and Socialism
Lecture 9 - Modernity as an Unfinished Project
Lecture 10 - Dematerialisation of Communication
Lecture 11 - Critiques of Modernisation
Lecture 12 - Altermodernities
Lecture 13 - Modernism, Modernisation and Postcolonial India
Lecture 14 - Machines, Animals and Aliens: Horizons of Incommunicability
Lecture 15 - The New Space of Homo Digitalis
Lecture 16 - Modernisation as a Communicative Practice
Lecture 17 - Shift from Traditional to Modern Communicative Paradigms
Lecture 18 - Socio-Cultural Impact of Communication Practices
Lecture 19 - Storytelling as a Tool of Creative Communication
Lecture 20 - Future Trajectories of Modernisation Through Innovative Communicative Practices
Lecture 21 - Speaking into the Air - Part 1
Lecture 22 - From Matter to Mind
Lecture 23 - Communication with the Dead
Lecture 24 - Hegel, Marx, Kierkegaard: Self, Communication and Society
Lecture 25 - Dead Letters
Lecture 26 - The Telephonic Uncanny: Communication, Identity and Disconnection
Lecture 27 - Radio Broadcasting and Communication
Lecture 28 - The Communication Gap: Fragments, Misunderstanding, and Dialogic Challenges
Lecture 29 - The Dark Side of Communication

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Lecture 30 - Relevance of Speaking into the Air
Lecture 31 - Media, Market and Creative Communication
Lecture 32 - Shifts from the Print to the Digital
Lecture 33 - Marketizing Media or Mediatizing Market ?
Lecture 34 - Creative Communication in the Digital Age
Lecture 35 - Trends and the Future of Creative Communication
Lecture 36 - Dominion of Communication Barriers
Lecture 37 - Decolonising Communication
Lecture 38 - Ethical and Sustainable Communicative Practices
Lecture 39 - Translation and World-Making
Lecture 40 - Reimagining Communication: One Planet, Many Worlds

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NPTEL Video Course - Humanities and Social Sciences - NOC:Inclusive Education

Subject Co-ordinator - Prof. Umakant Prasad

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Inclusive Education : Concept and Definition
Lecture 2 - Inclusive Education : Need and Objective
Lecture 3 - Inclusive Education : Nature and Principles
Lecture 4 - Inclusive Education : Meaning and Definitions
Lecture 5 - Special Education : Nature and Objectives
Lecture 6 - Principles of Special Education
Lecture 7 - Historical Perspective of Inclusive Education
Lecture 8 - Global Perspective of Special Education
Lecture 9 - Development of Special and Inclusive Education in Pre-Independent India
Lecture 10 - Inclusive Education in India after Independence
Lecture 11 - Policy Perspective and Legal Frameworks at Global Level
Lecture 12 - Special,Integrated and Inclusive Education
Lecture 13 - Exceptional Children: Meaning,Concept and Types
Lecture 14 - Understanding Impairment, Disability and Handicap
Lecture 15 - Models of Disability
Lecture 16 - Integrated Education: Concept and Needs
Lecture 17 - Early Identification and Intervention
Lecture 18 - Individualized Education Programme
Lecture 19 - Universal Design and Learning (UDL)
Lecture 20 - Classroom Management
Lecture 21 - Curriculum Adaptation
Lecture 22 - Inclusive Education under Indian Constitution
Lecture 23 - The Rehabilitation Council of India (RCI) Act 1992
Lecture 24 - The National Trust Act 1999
Lecture 25 - Persons with Disabilities Act 1995
Lecture 26 - The Right of Children to Free and Compulsory Education Act 2009
Lecture 27 - The Rights of Persons with Disabilities (RPWD) Act 2016
Lecture 28 - National Institutes for Persons with Disabilities
Lecture 29 - The National Handicapped Finance and Development Corporation

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Lecture 30 - Department of Empowerment of Persons with Disabilities
Lecture 31 - Recommendations of Various Commissions and Committees before 1947
Lecture 32 - Recommendations of Various Commissions and Committees after
Lecture 33 - The National Policies on Education and Inclusive Education
Lecture 34 - The National Policy for Persons with Disabilities 2006
Lecture 35 - The National Policy for Persons with Disabilities 2006 (Continued...)
Lecture 36 - National Education Policy 2020 and Inclusive Education
Lecture 37 - Educational Status of SCs, STs, and Schemes for their Empowerment
Lecture 38 - Present Educational Status and Schemes for OBCs
Lecture 39 - Educational Problems faced by SCs , STs and OBCs
Lecture 40 - National Commission for Scheduled Tribes (NCST)
Lecture 41 - National Commission for Backward Classes (NCBC)
Lecture 42 - National Commission for Scheduled Castes
Lecture 43 - Educational Challenges faced by Minority Communities
Lecture 44 - Present Educational Status of Minorities and Schemes for them
Lecture 45 - National Commissions for Minorities (NCM) and The Ministry of Minority Affairs
Lecture 46 - Constitutional Safeguards and Legal Framework for Minorities in India
Lecture 47 - Women Education in India : A Historical Review
Lecture 48 - Introduction to Women Empowerment
Lecture 49 - Educational Schemes and Programs for Girls and Women
Lecture 50 - Present Educational Status of Women
Lecture 51 - National Policies and Educational Empowerment of Women
Lecture 52 - Constitutional and Legal Frameworks for Women Empowerment in India
Lecture 53 - Understanding Transgender Identities and Issues
Lecture 54 - Social and Educational Status of Transgender Communities
Lecture 55 - Gender and Education: Theoretical Frameworks
Lecture 56 - Legal Recognition: Historical Context to Contemporary India
Lecture 57 - Making a Gender Neutral Educational Space
Lecture 58 - Stakeholders of Inclusive Education - Part 1
Lecture 59 - Stakeholders of Inclusive Education - Part 2
Lecture 60 - Role of the School Headmaster in Inclusive Education
Lecture 61 - Role of Teachers in Inclusive Education
Lecture 62 - Role of Family and Community in Inclusive Education

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NPTEL Video Course - Humanities and Social Sciences - NOC:Effective Learning for Professional Development

Subject Co-ordinator - Prof. Atasi Mohanty, Prof. Manas Kumar Mandal

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Effective Learning
Lecture 2 - Learning Goals
Lecture 3 - Learning Pathways
Lecture 4 - Learning Outcomes
Lecture 5 - Learning Application
Lecture 6 - Cognitive Processing - Part I
Lecture 7 - Cognitive Processing - Part II
Lecture 8 - Innovation and Intuition: creating ideas for change
Lecture 9 - Design Thinking
Lecture 10 - Learning Environment
Lecture 11 - Knowing Self
Lecture 12 - Skill Development
Lecture 13 - Career Oppurtunities
Lecture 14 - Experiential Learning
Lecture 15 - Career Progression
Lecture 16 - Emotional Intelligence
Lecture 17 - Stress and Coping
Lecture 18 - Procrastination
Lecture 19 - Professional obsolescence
Lecture 20 - Failure Management
Lecture 21 - Introduction
Lecture 22 - Mapping Paths to Mastery
Lecture 23 - Professional Code of Ethics
Lecture 24 - Citizenship Behavior
Lecture 25 - Sustainability Competences
Lecture 26 - Mentoring
Lecture 27 - Leadership
Lecture 28 - Positive Behaviour
Lecture 29 - Life Skills

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Lecture 30 - Resilience
Lecture 31 - Lifelong-learning and Wellbeing
Lecture 32 - Workplace Learning and Engagements
Lecture 33 - PERMA Model
Lecture 34 - Self-awareness
Lecture 35 - Nudging and Decision making
Lecture 36 - Introduction to Professional Excellence
Lecture 37 - Competency development
Lecture 38 - Designing Training Programmes
Lecture 39 - Continuing Education
Lecture 40 - Work-Life Balance

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NPTEL Video Course - Humanities and Social Sciences - NOC:Foundational Course: Child's Growth and Development

Subject Co-ordinator - Prof. Sharmila Yadav

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Meaning, Definitions, characteristics, and nature of Growth and Development
Lecture 2 - Principles of Development, Distinction between Growth and Development, and Educational Implicatio
Lecture 3 - Stages of Development (Infancy, Early Childhood, Late Childhood, Puberty, and Adolescence)
Lecture 4 - Nature of the Problems of Adolescents
Lecture 5 - Importance of knowing the concept Growth and Development for Teachers and Educators
Lecture 6 - Meaning, Nature, and Scope of Physical Development
Lecture 7 - Physical Growth from Infancy to Adolescence
Lecture 8 - Motor Development and Coordination
Lecture 9 - Factors Affecting Physical Development
Lecture 10 - Educational Implications of Physical Development
Lecture 11 - Meaning, Definition, Nature and Principles of Motor Development
Lecture 12 - Essentials in Learning Motor Skills and Sequence of Motor Development
Lecture 13 - Some Common Motor Skills of Childhood and Conditions that Influence the rate of Motor Developmer
Lecture 14 - Development of Muscle Dexterity, Co-ordination, Gross and Fine Motor Skills
Lecture 15 - Development of Handedness, Development of Leg Skills, Key Contributions of Motor Development: In
Lecture 16 - Meaning, Definition, Basic Nature and Functions of Language
Lecture 17 - Development of language, Milestones in the language development of child and Stages of language
Lecture 18 - Language and thought, Bilingualism, Multilingualism, NEP-2020 and Regional languages
Lecture 19 - Theories of Language development
Lecture 20 - Educational implications of language development
Lecture 21 - Structure of Brain and Functions of its Various Parts
Lecture 22 - Factors affecting language development
Lecture 23 - Government Initiatives for Promoting Indian Languages
Lecture 24 - Role of teachers in enhancing language and communication skills in children with special emphasi
Lecture 25 - Foundations of Social Development and Childhood Patterns
Lecture 26 - Social Development in Puberty
Lecture 27 - Social Development in Adolescence
Lecture 28 - Eriksonâ s Stages of Psychosocial Development and Educational Implications
Lecture 29 - Role of Home, School and Community in Social Development and Adjustment

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Lecture 30 - Concept and Definitions of Emotional Development, Patterns of Emotional Development from Infancy
Lecture 31 - Characteristics and Conditions of Emotional Development, Learning Method involved in Emotional D
Lecture 32 - Factors affecting Emotional Development
Lecture 33 - Socio-cultural Influences in Emotional Development
Lecture 34 - Role of Family, School and Community in Emotional Development
Lecture 35 - Meaning, Definition and Concept of Moral Development
Lecture 36 - Meaning, Definition and Concept of Moral Development
Lecture 37 - Kohlbergâ s theory of Moral Development
Lecture 38 - Influence of Family, Educational Institutions, Culture, and Environment on Moral Development
Lecture 39 - Meaning and Definitions of Cognitive Development, The Brain and Cognitive Development and Import
Lecture 40 - Piagetâ s Views of Cognitive Development and Basic Concepts like, Schema, Organisation, Adaptat
Lecture 41 - Piagetâ s theory of Cognitive Development - Part 1
Lecture 42 - Piagetâ s stages of Cognitive Development - Part 2
Lecture 43 - Information Processing Approach and its Educational Implications
Lecture 44 - Role of the Teachers and Schools in Enhancing the Cognitive Development of Children
Lecture 45 - Introduction to Vygotsky and the Socio-cultural Views of Cognitive Development
Lecture 46 - Core Concepts of Language, Thought, and Cultural Tools
Lecture 47 - Educational Significance of Vygotskyâ s Theory
Lecture 48 - The Role of Family, School, and Community in the Cognitive Development of the Child
Lecture 49 - Concept, Definition and Nature of Intelligence
Lecture 50 - Theories of Intelligence - Part 1
Lecture 51 - Theories of Intelligence - Part 2
Lecture 52 - Measurement of Intelligence
Lecture 53 - Concept, Meaning and Nature of Creativity Characteristics of Creative Person and Fostering of Cr
Lecture 54 - Measurement of Creativity and Role of teacherâ s in Promoting Creativity among the Children
Lecture 55 - Introduction to Personality
Lecture 56 - Factors Affecting Personality Development
Lecture 57 - Theories of Personality Type and Trait theories of Personality
Lecture 58 - Freudâ s Psychoanalytical Theory of Personality and its Educational Implications
Lecture 59 - Assessment of Personality
Lecture 60 - Role of Home, School, and Community in All-round Development of the Personality of the Child

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NPTEL Video Course - Humanities and Social Sciences - NOC:Methodology of Educational Research

Subject Co-ordinator - Prof. Sarita Anand

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Meaning and Purposes of Educational Research
Lecture 3 - Basic Research in Education
Lecture 4 - Concept of Applied Research in Education
Lecture 5 - Action Research in Education
Lecture 6 - Concept of Research
Lecture 7 - Processes of Educational Research
Lecture 8 - Research Problem in Education
Lecture 9 - Research Questions and Objectives in Educational Research
Lecture 10 - Hypotheses in Educational Research
Lecture 11 - Quantitative Methods of Research - Part I
Lecture 12 - Quantitative Methods of Research - Part II
Lecture 13 - Experimental Research
Lecture 14 - Experimental Research: Controlling of Extraneous Variables
Lecture 15 - Experimental Research Design: Process and Types
Lecture 16 - True and Quasi-Experimental Research Designs
Lecture 17 - Non-Experimental Research
Lecture 18 - Causal-Comparative (Ex-post-Facto) Research Design
Lecture 19 - Correlational Studies
Lecture 20 - Descriptive Research and Survey Studies
Lecture 21 - Qualitative Methods of Research - Part I
Lecture 22 - Qualitative Methods of Research - Part II: Design strategy and Themes of Qualitative inquiry
Lecture 23 - Mixed Methods Research
Lecture 24 - Historical Research
Lecture 25 - Case Studies
Lecture 26 - Phenomenological Inquiry or Research
Lecture 27 - Ethnographic Studies
Lecture 28 - Grounded Theory
Lecture 29 - Narrative Analysis

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Lecture 30 - Rationale and steps conducting a Mixed Methods Research in Education
Lecture 31 - Sampling Designs - Part I: Meaning and Concept in Educational Research
Lecture 32 - Sampling Designs - Part II: Concept of Population and Sample
Lecture 33 - Sampling Designs - Part III: Sampling Unit and Sampling Frame
Lecture 34 - Sampling Designs - Part III: Criteria of Sampling Design and Principles of Sampling
Lecture 35 - Quantitative Research and Sampling
Lecture 36 - Types of Sampling - Part I: Probability Sampling Designs - Random Sampling
Lecture 37 - Types of Sampling - Part II: Probability Sampling Designs - Stratified and Cluster Sampling
Lecture 38 - Non-Probability Sampling Designs
Lecture 39 - Mixed Sampling design: Systematic Sampling
Lecture 40 - Determination of Sample Size and Concept of Sampling Error and Sampling Bias
Lecture 41 - Research Tools and Techniques
Lecture 42 - Test and Inventories
Lecture 43 - Scales (Rating scales and Attitude scales)
Lecture 44 - Questionnaire and Schedule
Lecture 45 - Check Lists and Measurement Scales
Lecture 46 - Process of Tool Construction and Standardization
Lecture 47 - Interview as a Tool and Technique of data collection
Lecture 48 - Observation Method
Lecture 49 - Triangulation in Quantitative, Qualitative and Mixed method research
Lecture 50 - AI tools for Research
Lecture 51 - Review of the Related Literature
Lecture 52 - Online Sources for Review of the Related Literature
Lecture 53 - Research Proposal (Academic)
Lecture 54 - Format and style of Project Research Proposals
Lecture 55 - Format and Style of Research Report Writing
Lecture 56 - Citation through References, Bibliography and Annotated References
Lecture 57 - Reference Management System
Lecture 58 - Code of Ethics
Lecture 59 - CC Licensing
Lecture 60 - Plagiarism

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NPTEL Video Course - Humanities and Social Sciences - NOC:Theory and Practice: International Trade in the Cor

Subject Co-ordinator - Prof. Anwesha Aditya

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Course Outline
Lecture 2 - Nature and Scope of International Economics
Lecture 3 - International Trade: A Historical Perspective
Lecture 4 - Basis of Trade
Lecture 5 - Concept of Comparative Advantage
Lecture 6 - Public Policy and Comparative Advantage
Lecture 7 - Gains from Trade Theorem
Lecture 8 - Gains from Trade: Resource Reallocation
Lecture 9 - Technology and Trade: Ricardian Model
Lecture 10 - Heckscher-Ohlin-Samuelson Model - Part I
Lecture 11 - Heckscher-Ohlin-Samuelson Model - Part II
Lecture 12 - Leontief Paradox and Extensions of Heckscher-Ohlin Model
Lecture 13 - Factor Content of Trade
Lecture 14 - Intra Industry Trade
Lecture 15 - Intra-industry Trade: Love-for-Variety Approach
Lecture 16 - Intra Industry Trade: Strategic Trade Model and Measurement Issues
Lecture 17 - Trade Policy: An Overview
Lecture 18 - Tariff: The Gains and Losses
Lecture 19 - Optimum Tariff
Lecture 20 - Tariff Retaliation
Lecture 21 - India-US Trade Crisis
Lecture 22 - Quota and Export subsidies
Lecture 23 - Non-Tariff Barriers
Lecture 24 - Role of institutions: GATT, WTO, IMF
Lecture 25 - TRIPS and Service Trade
Lecture 26 - Regional Integration; Trade Agreement
Lecture 27 - Export composition and Measurement
Lecture 28 - Trade and Geopolitical Tensions
Lecture 29 - Russia-Ukraine Conflict and Sanctions on Russia

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Lecture 30 - BREXIT
Lecture 31 - Trade and Gender
Lecture 32 - Trade and MSMEs
Lecture 33 - Digital Services Taxes
Lecture 34 - Global Container Shipping Crisis
Lecture 35 - Trade in the Era of GVC - Part I
Lecture 36 - Trade in the Era of GVC - Part II
Lecture 37 - Strategies For Risk Mitigation: Rerouting, Insurance, and Supply Chain Diversification
Lecture 38 - Digital Trade, AI, and E-commerce
Lecture 39 - Climate Change and Sustainable Trade
Lecture 40 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:English for Thesis Writing

Subject Co-ordinator - Prof. Seema Singh

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Course Outline
Lecture 2 - Basic Elements of English Grammar
Lecture 3 - Avoiding Common Grammatical Errors
Lecture 4 - Crafting Sentences to Convey Your Research
Lecture 5 - Rhetoric, Style, and the Craft of Academic Writing
Lecture 6 - Rules and Conventions of Academic Writing - Part I
Lecture 7 - Rules and Conventions of Academic Writing - Part II
Lecture 8 - How to Write Proposals for Conference, Dissertation, and Thesis
Lecture 9 - Academic Writing for Multilingual Students
Lecture 10 - Writing Strategies for Multilingual Graduate Students
Lecture 11 - Grammar for Academic Writing: Making Your Writing More Readable - Part I
Lecture 12 - Grammar for Academic Writing: Making Your Writing More Readable - Part II
Lecture 13 - Language: The Way We Use Words
Lecture 14 - Structure: The Strategy of Style
Lecture 15 - Academic Writing for Multilingual Writers: Practices, Issues, and Strategies
Lecture 16 - Useful Phrases for Writing Research Papers - Part I
Lecture 17 - Useful Phrases for Writing Research Papers - Part II
Lecture 18 - Useful Phrases for Writing Research Papers - Part III
Lecture 19 - Academic Phrase Bank: Writing the Methods Section
Lecture 20 - Drafting and Revising for Publication
Lecture 21 - Academic Writing and Ethical Issues in Research - Part I
Lecture 22 - Academic Writing and Ethical Issues in Research - Part II
Lecture 23 - Structure and Introduction
Lecture 24 - Plagiarism and Citations
Lecture 25 - What is Plagiarism and How to Avoid It
Lecture 26 - The Literature Review
Lecture 27 - Methodology
Lecture 28 - Data Chapter(s)
Lecture 29 - The Final Chapter

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Lecture 30 - The First Few Pages
Lecture 31 - A Sample Research Proposal (with Comments)
Lecture 32 - Academic Style - I
Lecture 33 - Academic Style - II
Lecture 34 - Guidelines for Writing a Dissertation / Thesis
Lecture 35 - Sample Passage for Study IV: From Proposal to Thesis
Lecture 36 - Segmenting, Scheduling, and Rewarding: Tips to Satisfactorily Writing a PhD Thesis
Lecture 37
Lecture 38 - Course Summary and Conclusion - I
Lecture 39 - Course Summary and Conclusion - II
Lecture 40 - Course Summary and Conclusion - III

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Indian Psychology

Subject Co-ordinator - Prof. Anuradha Choudry

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Indian Psychology: Course Overview
Lecture 2 - Psychology: Its Etymology
Lecture 3 - Psychology: Its Evolution
Lecture 4 - Psychology: Its Definitions
Lecture 5 - Psychology: Research Methods
Lecture 6 - Structuralism and Functionalism
Lecture 7 - Indian Psychology: Behaviorism
Lecture 8 - Psychoanalysis
Lecture 9 - Humanism
Lecture 10 - Brain-Mind-Consciousness Connect: Modern Science and Ancient Indian Wisdom
Lecture 11 - Introduction to Indian Psychology
Lecture 12 - Schools of VedÄ•nta
Lecture 13 - SÄ•á¹•khya and Yoga
Lecture 14 - Ä yurveda
Lecture 15 - Research Approaches in Indian Psychology
Lecture 16 - Self and Identity
Lecture 17 - Spectrum and Map of Consciousness
Lecture 18 - States of Consciousness and Types of Knowledge
Lecture 19 - Vedic Triad: satyam, á¹ tam, bá¹ hat and dharma
Lecture 20 - praká¹ ti, svabhÄ•va and svadharma
Lecture 21 - Puruá¹£Ä•rthas and CaturÄ•Å rama
Lecture 22 - The Vará¹ a System
Lecture 23 - DaivÄ«sampat and Ä surÄ«sampat
Lecture 24 - The Theory of Karma and The Importance of Vivekabuddhi
Lecture 25 - á¹ á¹ a (à¤ à¤£) and YajÃ±a (à¤¯à¤ à¥•à¤)
Lecture 26 - Concepts of Mind and Mind++ Revision: 'Being' and 'Becoming'
Lecture 27 - Concepts of Mind and Mind++
Lecture 28 - Concept of the Mind in VedÄ•nta
Lecture 29 - Concepts of Mind and Mind++

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Lecture 30 - NyÄ•ya-VaiÅ eá¹£ika and PÅ«rvamÄ«mÄ•á¹ sÄ• Concept of Mind
Lecture 31 - Conception of Mind: Buddhism and Jainism
Lecture 32 - Integrated Human â Systemâ Through the Quantum Lens
Lecture 33 - The Three Guá¹ Ä•s of the GÄ«tÄ•
Lecture 34 - Mind and Senses in the GÄ«tÄ•
Lecture 35 - Mind and its Processes in Ä yurveda
Lecture 36 - Aá¹£á¹-Ä•á¹ ga-Yoga of PataÃ±jali
Lecture 37 - Cognition, Emotion and Volition in Indian Psychology
Lecture 38 - Definitions of Yoga
Lecture 39 - Streams of Yoga: Their Practical Implications
Lecture 40 - Tantra Yoga: The Psychology of Being
Lecture 41 - Cakras and Their Influence
Lecture 42 - Techniques of Consciousness - 1 PrÄ•á¹ Ä•yÄ•ma (à¤ªà¥•à¤°à¤¾à¤£à¤¾à¤¯à¤¾à¤®)
Lecture 43 - Techniques of Consciousness - 2 Indriyajaya (à¤ à¤¨à¥•à¤¦à¥•à¤°à¤¿à¤¯ à¤): Mastery of Senses
Lecture 44 - Techniques of Consciousness - 3 VÄ•ksaá¹ yama: Mastery Over Speech
Lecture 45 - Techniques of Consciousness - 4 DhÄ•raá¹ Ä• (à¤§à¤¾à¤°à¤£) and DhyÄ•na (à¤§à¥•à¤¯à¤¾à¤¨): Master
Lecture 46 - Techniques of Consciousness - 5 Bhakti (à¤-à¤ à¥•à¤¤à¤¿): Sublimation of Emotions
Lecture 47 - Sukha and Self-Architecture
Lecture 48 - SvÄ•sthya (à¤¸à¥•à¤µà¤¸à¥•à¤¥à¥•à¤¯): Integral Well-Being
Lecture 49 - SthitaprajÃ±a (à¤¸à¥•à¤¥à¤¿à¤¤à¤ªà¥•à¤°à¤ à¥•à¤): Being Established in the Self
Lecture 50 - YogÄ« / YoginÄ«: Possessing â Yogaâ
Lecture 51 - SvarÄ•á¹- to SamrÄ•á¹-: Mastery of the Individual to the Collective
Lecture 52 - The Culmination of Human Life
Lecture 53 - SadÄ•Å iva Brahmendra SarasvatÄ« and Å rÄ« Ramaá¹ a Maharáá¹£i
Lecture 54 - Sri Ramakáá¹ ishna Paramahamsa and Swami Vivekananda
Lecture 55 - Sri Aurobindo and The Mother
Lecture 56 - Ma Anandamayi and Neem Karoli Baba
Lecture 57 - Living Masters of Indian Psychology
Lecture 58 - Applications of Indian Psychology - The Tripuá¹-i of Health: An Indic Perspective
Lecture 59 - Applications of Indian Psychology - The Tripuá¹-i of Parenting
Lecture 60 - Applications of Indian Psychology - The Tripuá¹-i of Education
Lecture 61 - Applications of Indian Psychology - Tripuá¹-i of Organiztion, Governance, Nation and Leadership
Lecture 62 - Course Summary and the Path Forward

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NPTEL Video Course - Humanities and Social Sciences - Aspects of Western Philosophy

Subject Co-ordinator - Dr. Sreekumar Nellickappilly

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Greek Philosophy
Lecture 2 - Sophists, Socrates; philosophy of man; relativism and subjectivism; the idea of good
Lecture 3 - Platos idealism
Lecture 4 - Plato
Lecture 5 - Aristotles criticism of Platonic idealism and the concepts of Form and Matter
Lecture 6 - Aristotles theory of causation; potentiality and actuality
Lecture 7 - Medieval philosophy
Lecture 8 - Modern Philosophy
Lecture 9 - Descartes
Lecture 10 - Descartes
Lecture 11 - Spinoza
Lecture 12 - Spinozas pantheism-God and nature
Lecture 13 - Leibniz
Lecture 14 - The empiricism of John Locke
Lecture 15 - John Locke
Lecture 16 - Berkeley
Lecture 17 - Berkeleys critique of abstract ideas, esse est percipi,
the problem of solipsism; God and self
Lecture 18 - Hume
Lecture 19 - The external world and the self, personal identity, rejection of metaphysics,
scepticism, reason and the passions.
Lecture 20 - Critical Philosophy
Lecture 21 - Kant
Lecture 22 - The Ideas of Reason-soul, God and world as a whole; antinomies; rejection of
speculative metaphysics.
Lecture 23 - Kants ethics; freedom and immortality, problems with Kant.
Lecture 24 - Hegel
Lecture 25 - Absolute idealism; consciousness, self consciousness and reason.
Lecture 26 - Karl Marx

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Lecture 27 - Nietzsche
Lecture 28 - Linguistic turn in British philosophy
Lecture 29 - Wittgenstein
Lecture 30 - Later Wittgensteins conception of language games and forms of life; meaning and use.
Lecture 31 - Logical positivism; against metaphysics and a scientific conception of philosophy; the limitation of logical positivism
Lecture 32 - Husserl
Lecture 33 - Phenomenological reduction, eidetic reduction and transcendental reduction; transcendental subjectivity; the pure subject.
Lecture 34 - Heidegger
Lecture 35 - Authentic and inauthentic existence; Truth as disclosure
Lecture 36 - Existentialism
Lecture 37 - Sartres conception of human existence; man is condemned to be free; rejection of essentialism
Lecture 38 - The concept of being-in-itself, being-for-itself and being-for-others
Lecture 39 - Postmodernism
Lecture 40 - Deconstruction, feminism, discourse theory etc.

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NPTEL Video Course - Humanities and Social Sciences - Contemporary Literature

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Drama
Lecture 2 - Harold Pinter
Lecture 3 - The Dumb Waiter
Lecture 4 - The Dumb Waiter (Continued...)
Lecture 5 - Six Degrees of Separation
Lecture 6 - Six Degrees of Separation
Lecture 7 - Six Degrees of Separation
Lecture 8 - Six Degrees of Separation
Lecture 9 - Six Degrees of Separation
Lecture 10 - Tom Stoppard - Dogg's Hamlet, Cahoot's Macbeth
Lecture 11 - Tom Stoppard - Dogg's Hamlet, Cahoot's Macbeth
Lecture 12 - Tom Stoppard - Dogg's Hamlet, Cahoot's Macbeth
Lecture 13 - Tom Stoppard - Dogg's Hamlet, Cahoot's Macbeth
Lecture 14 - Tom Stoppard - Dogg's Hamlet, Cahoot's Macbeth
Lecture 15 - Tom Stoppard - Dogg's Hamlet, Cahoot's Macbeth
Lecture 16 - Arthur Miller Clara
Lecture 17 - Arthur Miller Clara
Lecture 18 - Arthur Miller Clara
Lecture 19 - Albert Camus The Fall
Lecture 20 - Albert Camus The Fall
Lecture 21 - Albert Camus The Fall
Lecture 22 - Girish Karnad - Nagamandala
Lecture 23 - Girish Karnad - Nagamandala
Lecture 24 - Girish Karnad - Nagamandala
Lecture 25 - Short Story - Salman Rushdie's
Lecture 26 - Short Story2 - Hanif Kureishi's
Lecture 27 - Modernism Post
Lecture 28 - Kazuo Ishiguro - Remains of the Day
Lecture 29 - Kazuo Ishiguro - Remains of the Day

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Lecture 30 - Kazuo Ishiguro - Remains of the Day
Lecture 31 - Kazuo Ishiguro - Remains of the Day
Lecture 32 - Michael Ondaatje - The English Patient
Lecture 33 - Michael Ondaatje - The English Patient
Lecture 34 - Michael Ondaatje - The English Patient
Lecture 35 - Asian-American Writing
Lecture 36 - Amy Tan's - The Joy Luck Club
Lecture 37 - Amy Tan's - The Joy Luck Club
Lecture 38 - Amy Tan's - The Joy Luck Club
Lecture 39 - Poetry
Lecture 40 - Poetry

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NPTEL Video Course - Humanities and Social Sciences - History of Economic Theory

Subject Co-ordinator - Prof. S.S. SivaKumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Socio-Economic Role of Scarcity and Uncertainty
Lecture 2 - The Process of Construction of Knowledge
Lecture 3 - The Roles of Faith and Experience
Lecture 4 - From Orphism to the Milesians in ancient Greece
Lecture 5 - Pythagoras and Heraclitus
Lecture 6 - From Parmenides to the atomists
Lecture 7 - From the ancient Greece to the emergence of Feudalism
Lecture 8 - Feudalism and the growth of the Church
Lecture 9 - The age of Faith
Lecture 10 - The beginnings of modernity
Lecture 11 - Scholasticism and St.Thomas
Lecture 12 - Transformation of Europe towards modernity
Lecture 13 - Birth of political economy
Lecture 14 - The debate over mercantilism
Lecture 15 - A postscript to mercantilism
Lecture 16 - â Natural Orderâ and the market
Lecture 17 - Smith
Lecture 18 - Smith
Lecture 19 - Ricardo-Malthus debate
Lecture 20 - Ricardian economics and more
Lecture 21 - Equilibrium of the market
Lecture 22 - More on Equilibrium
Lecture 23 - Socialists and Marx
Lecture 24 - The economics of Marx
Lecture 25 - Marx as an ideologue of revolution
Lecture 26 - Arrival of modern universals in Economics
Lecture 27 - Economic Theory at the time arrival of Keynes
Lecture 28 - The centrality of the idea of efficiency in the study of market
Lecture 29 - Keynesian Revolution

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Lecture 30 - Keynesian economics
Lecture 31 - Economics of Institutions
Lecture 32 - Transaction cost and Economic Anthropology approaches
Lecture 33 - Evolutionary Economics
Lecture 34 - From Schumpeter to neo Schumpetarian evolutionism
Lecture 35 - The social construction of knowledge
Lecture 36 - The social construction of knowledge

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NPTEL Video Course - Humanities and Social Sciences - Indian Philosophy

Subject Co-ordinator - Dr. Satya Sundar Sethy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Indian Philosophy
Lecture 2 - A Brief Discussion on the Vedas & the Upanishads
Lecture 3 - The CÄ•rvÄ•ka School - I
Lecture 4 - The CÄ•rvÄ•ka School - II
Lecture 5 - The SÄ•á¹ khya School - I
Lecture 6 - The SÄ•á¹ khya School - II
Lecture 7 - The SÄ•á¹ khya School - III
Lecture 8 - The SÄ•á¹ khya School - IV
Lecture 9 - The SÄ•á¹ khya School - V
Lecture 10 - The SÄ•á¹ khya School - VI
Lecture 11 - The Yoga School - I
Lecture 12 - The Yoga School - II
Lecture 13 - The Yoga School - III
Lecture 14 - The Yoga School - IV
Lecture 15 - The NyÄ•ya School - I
Lecture 16 - The NyÄ•ya School - II
Lecture 17 - The NyÄ•ya School - III
Lecture 18 - The NyÄ•ya School - IV
Lecture 19 - The NyÄ•ya School - V
Lecture 20 - The NyÄ•ya School - VI
Lecture 21 - The NyÄ•ya School - VII
Lecture 22 - The NyÄ•ya School - VIII
Lecture 23 - The NyÄ•ya School - IX
Lecture 24 - Buddhism - I
Lecture 25 - Buddhism - II
Lecture 26 - Buddhism - III
Lecture 27 - Buddhism - IV
Lecture 28 - Buddhism - V
Lecture 29 - Jainism - I

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Lecture 30 - Jainism - II
Lecture 31 - Jainism - III
Lecture 32 - The VaiÅ eá¹£ika School - I
Lecture 33 - The VaiÅ eá¹£ika School - II
Lecture 34 - The VaiÅ eá¹£ika School - III
Lecture 35 - The VaiÅ eá¹£ika School - IV
Lecture 36 - The VaiÅ eá¹£ika School - V
Lecture 37 - The VaiÅ eá¹£ika School - VI
Lecture 38 - The MimÄ•nsÄ• School - I
Lecture 39 - The MimÄ•nsÄ• School - II
Lecture 40 - The MimÄ•nsÄ• School - III
Lecture 41 - The MimÄ•nsÄ• School - IV
Lecture 42 - The MimÄ•nsÄ• School - V

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NPTEL Video Course - Humanities and Social Sciences - Better Spoken English

Subject Co-ordinator - Prof. Shreesh Chaudhary

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Student Presentations - I
Lecture 3 - Feedback on Presentations - I
Lecture 4 - Stage Manners
Lecture 5 - Tempo of Speech
Lecture 6 - Some Reasons for Mishearing
Lecture 7 - Topics for Presentations - II
Lecture 8 - Message
Lecture 9 - Tables, Charts, Graphs
Lecture 10 - Power Point Slides
Lecture 11 - Criteria for Evaluation
Lecture 12 - Student Presentations - II
Lecture 13 - Feedback on Presentation - II
Lecture 14 - Topics for Presentation - III
Lecture 15 - On â Saying â Please!â â •
Lecture 16 - English Rhythm - I
Lecture 17 - English Rhythm - II
Lecture 18 - Phrasal Pause in English - I
Lecture 19 - Phrasal Pause in English - II
Lecture 20 - Units of Time, Weight, Distance
Lecture 21 - Stress in English - I
Lecture 22 - Stress in English - II
Lecture 23 - Stress in English - III
Lecture 24 - Stress in English - IV
Lecture 25 - Stress in English - V
Lecture 26 - Stress in English - VI
Lecture 27 - Student Presentations - III
Lecture 28 - Student Presentations - III
Lecture 29 - Student Presentations - III (Continued...)

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Lecture 30 - Feedback on Presentations - III
Lecture 31 - Some Non-standard Sounds
Lecture 32 - Some â Difficultâ • Sounds in English
Lecture 33 - Some â Vowelâ • Sounds in English
Lecture 34 - Some â Consonantsâ • in English
Lecture 35 - Student Presentations - IV
Lecture 36 - Student Presentations - IV
Lecture 37 - Student Presentations - IV (Continued...)
Lecture 38 - Final Tips

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NPTEL Video Course - Humanities and Social Sciences - Introduction to Film Studies

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Cinema & Semiotics
Lecture 3 - Cinema & Semiotics (Continued...)
Lecture 4 - Plot in Cinema
Lecture 5 - Plot in Cinema (Continued...)
Lecture 6 - Character as a plot element
Lecture 7 - Editing in Cinema
Lecture 8 - Realism in Cinema
Lecture 9 - Colour
Lecture 10 - Intertextuality
Lecture 11 - Intertextuality (Continued...)
Lecture 12 - Intertextuality (Continued...)
Lecture 13 - Cinema & Modernism
Lecture 14 - Cinema and Modernism (Continued...)
Lecture 15 - The French Masters
Lecture 16 - The French Masters (Continued...)
Lecture 17 - The French Masters (Continued...)
Lecture 18 - Canonical Text
Lecture 19 - Canonical Text (Continued...)
Lecture 20 - Canonical Text (Continued...)
Lecture 21 - The Academy Awards
Lecture 22 - Classic Hollywood
Lecture 23 - Classic Hollywood (Continued...)
Lecture 24 - Classic Hollywood (Continued...)
Lecture 25 - Case study
Lecture 26 - Stars as Icons
Lecture 27 - Cinema and the Counterculture Movement
Lecture 28 - Italian cinema
Lecture 29 - Japanese Cinema

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Lecture 30 - Auteur Theory in the USA
Lecture 31 - Auteur Theory in the USA (Continued...)
Lecture 32 - New Hollywood
Lecture 33 - New Hollywood (Continued...)
Lecture 34 - New Hollywood (Continued...)
Lecture 35 - New Hollywood (Continued...)
Lecture 36 - Cinema and Genres
Lecture 37 - Cinema and Genres (Continued...)
Lecture 38 - Postmodernism and Cinema
Lecture 39 - Postmodernism & Cinema (Continued...)
Lecture 40 - The Western

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NPTEL Video Course - Humanities and Social Sciences - Introduction to Modern Linguistics

Subject Co-ordinator - Prof. Rajesh Kumar, Prof. Shreesh Chaudhary

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Design Features of Language - 1
Lecture 3 - Design Features of Language - 2
Lecture 4 - Design Features of Language - 3
Lecture 5 - Design Features of Language - 4
Lecture 6 - Design Features of Language - 5
Lecture 7 - Production of Speech Sounds
Lecture 8 - Organs of Articulation
Lecture 9 - Functions of Vocal Cords
Lecture 10 - Production of Speech Sounds, Cardinal Vowels
Lecture 11 - English Vowels
Lecture 12 - Diphthong
Lecture 13 - Production of Consonants
Lecture 14 - Consonants
Lecture 15 - Consonants-2
Lecture 16 - Review
Lecture 17 - What is Phonology
Lecture 18 - Phonemes & Allophones
Lecture 19 - Phonological Phenomena
Lecture 20 - Syllable Template
Lecture 21 - Syllable
Lecture 22 - Syllable - Based Generalization
Lecture 23 - Syllable - Based Generalization
Lecture 24 - Morphology
Lecture 25 - Units of Word Formation
Lecture 26 - Affixation
Lecture 27 - Syntax
Lecture 28 - Syntax
Lecture 29 - Syntax

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Lecture 30 - Syntax
Lecture 31 - Syntax
Lecture 32 - Syntax
Lecture 33 - Syntax
Lecture 34 - Syntax
Lecture 35 - Syntax
Lecture 36 - Syntax
Lecture 37 - Syntax
Lecture 38 - Word Formation-3
Lecture 39 - Discourse
Lecture 40 - Discourse..
Lecture 41 - Concluding Remarks

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NPTEL Video Course - Humanities and Social Sciences - Principles and Parameters in Natural Language

Subject Co-ordinator - Prof. Rajesh Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of the Course
Lecture 2 - What is linguistics? What is Language?
Lecture 3 - Language and Arbitrariness, Language and Dialect
Lecture 4 - E vs I Language, Language as a rule governed system
Lecture 5 - Language Faculty, Language in Human Mind
Lecture 6 - How do we learn language?
Lecture 7 - Language Acquisition
Lecture 8 - Innateness
Lecture 9 - Structure of Language at the Level of Sounds
Lecture 10 - Sounds (Vocal Apparatus)
Lecture 11 - Places and Manners of Articulation
Lecture 12 - Word Formation/Phonotactic Rules
Lecture 13 - Rules of Word Formation (Singular-Plural)
Lecture 14 - Sentence
Lecture 15 - Making of a Sentence (Components)
Lecture 16 - Grammaticality and Acceptability
Lecture 17 - Subject and Verb in a Sentence
Lecture 18 - Sentence
Lecture 19 - Phrase Structure
Lecture 20 - X-Bar Theory
Lecture 21 - Specifier and Complement
Lecture 22 - Complements and Adjuncts
Lecture 23 - VP Components
Lecture 24 - Categorial Selections, Selectional Restrictions on verbs
Lecture 25 - Thematic Relations
Lecture 26 - Case
Lecture 27 - Morphological and Abstract Case
Lecture 28 - Structural Case
Lecture 29 - Exceptional Case Marking

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Lecture 30 - Movement
Lecture 31 - Motivations for Movement
Lecture 32 - Questions and Movement
Lecture 33 - Guest Lecture
Lecture 34 - Passives and NP Movement
Lecture 35 - NP Movement and Raising
Lecture 36 - Binding Theory and NP Interpretations
Lecture 37 - Principles of Binding Theory
Lecture 38 - Constraints on Movements
Lecture 39 - Structure of Language and Negation
Lecture 40 - Negation and Negative Polarity Items
Lecture 41 - Structure, Language, Cognition and Pragmatics

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NPTEL Video Course - Humanities and Social Sciences - NOC:Literary Criticism and Literary Theory

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Lecture 1 - Introduction & Course Overview - Lecture 1 - Part A
Lecture 2 - Introduction & Course Overview - Lecture 1 - Part B
Lecture 3 - Key terms and Concepts - 1 - Lecture 2
Lecture 4 - Key terms and Concepts - 2 - Lecture 3
Lecture 5 - Key terms and Concepts - 3 - Lecture 4
Lecture 6 - Classical Theory - Lecture 5 - Part C
Lecture 7 - Classical Theory - Lecture 5 - Part A
Lecture 8 - Classical Theory - Lecture 5 - Part B
Lecture 9 - Classical Theory - Lecture 6 - Part A
Lecture 10 - Neoclassicism - Lecture 6 - Part B
Lecture 11 - Romanticism - Early Romanticism - Lecture 7 - Part A
Lecture 12 - Romanticism - Romanticism - Lecture 7 - Part C
Lecture 13 - Romanticism - Romanticism - Lecture 7 - Part D
Lecture 14 - Romanticism - Early Romanticism - Lecture 7 Part B
Lecture 15 - Late 19th Century - Lecture 9 - Late 19th century
Lecture 16 - Lecture 10 A - Marxism
Lecture 17 - Lecture 10 B - Marxism
Lecture 18 - Twentieth Century Criticism - Lecture 11 A - Formalism
Lecture 19 - Twentieth Century Criticism - Lecture 11 B - New criticism
Lecture 20 - Psychoanalysis and Psychoanalytic Criticism - PART A
Lecture 21 - Psychoanalysis and Psychoanalytic Criticism - PART B
Lecture 22 - Psychoanalysis and Psychoanalytic Criticism - PART C
Lecture 23 - Structuralism - Lecture 12 Part A structuralism
Lecture 24 - Structuralism - Lecture 12 Part B structuralism
Lecture 25 - Archetypal Criticism - Lecture 13 - Archetypal Criticism
Lecture 26 - Post Structuralism - Part A
Lecture 27 - Post Structuralism - Part B
Lecture 28 - Post Colonialism - Part A
Lecture 29 - New Historicism and Cultural Materialism - Part A
Lecture 30 - New Historicism and Cultural Materialism - Part B
Lecture 31 - Reader Response criticism
Lecture 32 - Semiotics theory - PART A
Lecture 33 - Semiotics theory - PART B

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Lecture 34 - Film studies - Part A
Lecture 35 - Film studies - Part B
Lecture 36 - Postmodernism - Part A
Lecture 37 - Postmodernism - Part B
Lecture 38 - Ecocriticism - Part A
Lecture 39 - Ecocriticism - Part B
Lecture 40 - Post theory - Part A
Lecture 41 - Post theory - Part B

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NPTEL Video Course - Humanities and Social Sciences - NOC:Language and Mind

Subject Co-ordinator - Prof. Rajesh Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - On Language - What is language
Lecture 2 - On Language - How do we learn language
Lecture 3 - On Language - Learning language
Lecture 4 - On Language - Acquiring language
Lecture 5 - On Language - Language evolution
Lecture 6 - Language in Mind - Language and language learning
Lecture 7 - Language in Mind - Language in mind
Lecture 8 - Language in Mind - Grammar
Lecture 9 - Language in Mind - Language and human mind
Lecture 10 - Language in Mind - Mechanism of sound production
Lecture 11 - Patterns in Sounds and Words - Consonants
Lecture 12 - Patterns in Sounds and Words - Features of sounds
Lecture 13 - Patterns in Sounds and Words - Words
Lecture 14 - Patterns in Sounds and Words - Words II
Lecture 15 - Patterns in Sounds and Words - Words III
Lecture 16 - Words and Sentences - Words IV
Lecture 17 - Words and Sentences - Words V
Lecture 18 - Words and Sentences - Structure of a sentence
Lecture 19 - Words and Sentences - Nature of sentences and phrases
Lecture 20 - Words and Sentences - Syntax
Lecture 21 - Grammar - Structure of sentence (agreement)
Lecture 22 - Grammar - Sentence (categories and phrase)
Lecture 23 - Grammar - Sentence (phrase structure)
Lecture 24 - Grammar - Sentence (X bar and IP)
Lecture 25 - Grammar - Sentence (inflectional phrase)
Lecture 26 - Advanced Grammar - Sentence (compliment and adjunct)
Lecture 27 - Advanced Grammar - Sentence (restrictions)
Lecture 28 - Advanced Grammar - Sentence (semantic relations)
Lecture 29 - Advanced Grammar - Sentence (case)
Lecture 30 - Advanced Grammar - Sentence (movement)

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Lecture 31 - Levels of Representation and Principles of Grammar - CP and displacement
Lecture 32 - Levels of Representation and Principles of Grammar - Sentence (CP in subject and object positior
Lecture 33 - Levels of Representation and Principles of Grammar - Sentence (passivization and NP movement)
Lecture 34 - Levels of Representation and Principles of Grammar - Sentence (referential expressions)
Lecture 35 - Levels of Representation and Principles of Grammar - Sentence (binding)
Lecture 36 - Language and Cognition - Sentence Dependencies
Lecture 37 - Language and Cognition - Language and cognition
Lecture 38 - Language and Cognition - Language, cognition and computers
Lecture 39 - Language and Cognition - Language and computers
Lecture 40 - Language and Cognition - Language and mind

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NPTEL Video Course - Humanities and Social Sciences - NOC:Film Appreciation

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Key Concepts
Lecture 3 - Key Concepts
Lecture 4 - Lecture
Lecture 5 - Lecture
Lecture 6 - Lecture
Lecture 7 - Lecture
Lecture 8 - Lecture
Lecture 9 - Lecture
Lecture 10 - Lecture
Lecture 11 - Lecture
Lecture 12 - Action Cinema
Lecture 13 - Lecture
Lecture 14 - Melodrama
Lecture 15 - Formalism in Cinema
Lecture 16 - The Language of Cinema
Lecture 17 - Devdas
Lecture 18 - City Cinema
Lecture 19 - The Semiotics of Cinema
Lecture 20 - Raging Bull
Lecture 21 - Robert Bresson
Lecture 22 - Studio Cinema
Lecture 23 - Studio Cinema
Lecture 24 - New Hollywood Cinema
Lecture 25 - New Hollywood Cinema
Lecture 26 - History of Hindi Cinima
Lecture 27 - History of Hindi Cinima
Lecture 28 - History of Hindi Cinema
Lecture 29 - Ideology in Cinema

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Lecture 30 - Character in Cinema
Lecture 31 - Mythological Cinema in India
Lecture 32 - The Cinema of Satyajit Ray
Lecture 33 - Hindi Film Music
Lecture 34 - The Hollywood musicals
Lecture 35 - African cinema
Lecture 36 - Iranian cinema
Lecture 37 - Canadian Cinema
Lecture 38 - Eastern European Cinema
Lecture 39 - European Cinema Hungary, Sweden, Greece
Lecture 40 - Postmodernism and cinema
Lecture 41 - Mall towns in cinema
Lecture 42 - Film sequels, remakes and cult films
Lecture 43 - Parallel Cinema From India

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NPTEL Video Course - Humanities and Social Sciences - NOC:Appreciating Carnatic Music

Subject Co-ordinator - Dr. Lakshmi Sreeram

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Body of Music
Lecture 2 - Music everywhere finding the classical
Lecture 3 - Classical Music Art Music
Lecture 4 - Music through Melody & Music through Harmony
Lecture 5 - Musical Material A Hard Look
Lecture 6 - Musical material Mo2
Lecture 7 - Carnatic Music as Raga Music
Lecture 8 - Understanding Raga - Part I
Lecture 9 - Understanding Raga - Part II (Raga and Swara)
Lecture 10 - Understanding Raga - Part III A Glimpse into Gamaka (Ornamentation) and Phraseology
Lecture 11 - Swara in the Sanskrit Textual Tradition
Lecture 12 - Sruti in Sanskrit Textual tradition
Lecture 13 - Tambura
Lecture 14 - Gamaka I
Lecture 15 - Gamaka II
Lecture 16 - Gamaka III
Lecture 17 - Gamakas IV
Lecture 18 - Raga and Phraseology
Lecture 19 - Raga - some basic expectations
Lecture 20 - A string of Ragas and a teaser
Lecture 21 - Raga in the textual tradition
Lecture 22 - Classification of Ragas I
Lecture 23 - Classification of Ragas II
Lecture 24 - Mela system of classifying raga-s
Lecture 25 - Generating the 72 mela-s
Lecture 26 - Application of 72 mela
Lecture 27 - Katapayadi Naming the 72 melas
Lecture 28 - Vivadi I
Lecture 29 - Vivadi II

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Lecture 30 - Raga - Circles and Triangles
Lecture 31 - Laya
Lecture 32 - Tala an Introduction to the Concept
Lecture 33 - More on Tala and laya
Lecture 34 - Aspects of Tala - I
Lecture 35 - Aspects of Tala - II
Lecture 36 - Aspects of Tala - III
Lecture 37 - Aspects of IV
Lecture 38 - Composition in Carnatic Music
Lecture 39 - An Introduction
Lecture 40 - Varnam and laya intricacies
Lecture 41 - Kriti the premier compositional form in Carnatic music
Lecture 42 - Kriti some basic features
Lecture 43 - Precursors to the Kriti
Lecture 44 - Bhakti and Carnatic Music
Lecture 45 - Tanjavur and the Carnatic Trinity
Lecture 46 - Tyagaraja, the Vaggeyakara
Lecture 47 - Tyagaraja and His Many Moods -I
Lecture 48 - Tyagaraja and His Many Moods II
Lecture 49 - Muthuswami Dikshitar an overview
Lecture 50 - Muthuswami Dikshitar the Sanskirt Scholar and Advaitin
Lecture 51 - Muthuswami Dikshitar Some Other Aspects of his Work.
Lecture 52 - Syama Sastri
Lecture 53 - Tamil Composers before the trinity
Lecture 54 - Post trinity Composers
Lecture 55 - Swathi Tirunal - the Versatile Royal Composer
Lecture 56 - The Romance of Padam and Javali
Lecture 57 - Tillana
Lecture 58 - Improvisation in Carnatic Music - Alapana
Lecture 59 - ALAPANA
Lecture 60 - Neraval and Swaraprastara
Lecture 61 - TANAM
Lecture 62 - An expostion of Balagopala,a kriti in the rega Bhairavi with alapana, neraval and swaraprastara
Lecture 63 - Accompaniment in Carnatic Music - The Violin
Lecture 64 - Percussive Accompaniment - the Mridangam
Lecture 65 - Subsidiary Accompaniment - Interaction Among Accompanists
Lecture 66 - The Typical carnatic Concert And Ragam Tanam Pallavi - RTP

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NPTEL Video Course - Humanities and Social Sciences - NOC:Infrastructure Economics

Subject Co-ordinator - Prof.Nalin Bharti

Co-ordinating Institute - IIT - Patna

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38

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NPTEL Video Course - Humanities and Social Sciences - NOC:Language and Society

Subject Co-ordinator - Prof. Rajesh Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to language and society
Lecture 2 - Language and India
Lecture 3 - Language and a language
Lecture 4 - Language, dialect and variety
Lecture 5 - Dialect and standard language
Lecture 6 - How do children learn language?
Lecture 7 - First language acquisition
Lecture 8 - Critical period and SLA
Lecture 9 - Sounds and words
Lecture 10 - Sentence
Lecture 11 - India as a linguistic area
Lecture 12 - Language variation
Lecture 13 - Language and culture
Lecture 14 - Language and power- politics
Lecture 15 - Indian english
Lecture 16 - Fluidity and continuum
Lecture 17 - Language in education
Lecture 18 - Language and scholastic achievement
Lecture 19 - Language and language teaching
Lecture 20 - Concluding remarks

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NPTEL Video Course - Humanities and Social Sciences - NOC:Issues in Bioethics

Subject Co-ordinator - Dr. Sreekumar Nellickappilly

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1 - Unit 1 - Overview of Bioethics
Lecture 2 - Module 1 - Unit 2 - Historical Evolution of Bioethics-I
Lecture 3 - Module 1 - Unit 3 - Historical Evolution of Bioethics-II
Lecture 4 - Module 1 - Unit 4 - Historical Evolution of Bioethics-III
Lecture 5 - Module 1 - Unit 5 - Bioethics Today
Lecture 6 - Module 2 - Unit 1 - Ethical theories and Bioethical Issues
Lecture 7 - Module 2 - Unit 2 - Other ethical theories
Lecture 8 - Module 2 - Unit 3 - Hedonistic Approaches in Ethical Theories
Lecture 9 - Module 2 - Unit 4 - Deontological Approach
Lecture 10 - Module 2 - Unit 5 - Priniciple-Based Theories
Lecture 11 - Module 3 - Unit 1 - Challenges to the Person of the Individual
Lecture 12 - Module 3 - Unit 2 - Challenges to Dignity and the Human Rights Approach in Bioethics
Lecture 13 - Module 3 - Unit 3 - Problems in Resource Allocation
Lecture 14 - Module 3 - Unit 4 - End of Life Issues
Lecture 15 - Module 3 - Unit 5 - Ethics of Care, Gender Concerns and Feminist Perspectives
Lecture 16 - Module 4 - Unit 1 - Technological Advancements and Bioethical concerns
Lecture 17 - Module 4 - UNIT 2 - The challenges posed by Genetic Engineering and Gener Therapy Not Started
Lecture 18 - Module 4 - Unit 3 - The challenges posed by Epidemic Threats
Lecture 19 - Module 4 - Unit 4 - Religious Traditions and Contemporary Bioethics
Lecture 20 - Module 4 - Unit 5 - Towards a Phronetic Bioethics

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NPTEL Video Course - Humanities and Social Sciences - NOC:Technical English for Engineers

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to the Course
Lecture 2 - Parts of Speech - Nouns
Lecture 3 - Parts of Speech - Preposition and Noun Phrases
Lecture 4 - Countable and Uncountable Nouns
Lecture 5 - Reading (Identifying main ideas) and Listening
Lecture 6 - What is a Sentence
Lecture 7 - What is a Sentence (Continued...)
Lecture 8 - Subject Verb Agreement
Lecture 9 - Articles
Lecture 10 - Verbs
Lecture 11 - Comparatives
Lecture 12 - Modals and Voices
Lecture 13 - Passive Voice (Continued...)
Lecture 14 - Tenses
Lecture 15 - Tenses (Continued...)
Lecture 16 - Effective Speaking
Lecture 17 - Formal Presentation
Lecture 18 - Punctuation
Lecture 19 - Punctuation (Continued...)
Lecture 20 - Reading Â SQW3R Method and Note-taking
Lecture 21 - Phrasal Verbs
Lecture 22 - Collocation
Lecture 23 - Word Formation
Lecture 24 - Understanding the text organization
Lecture 25 - Writing Emails
Lecture 26 - Academic Writing and Linking Words
Lecture 27 - Paragraph Writing
Lecture 28 - Describing/Explaining Processes
Lecture 29 - Essay Writing

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Lecture 30 - Essay Writing and Formal Letters
Lecture 31 - Letter Writing and Usage
Lecture 32 - Understanding the Mechanics of Publishable Essays
Lecture 33 - Writing Publishable Essays and Usage
Lecture 34 - Report
Lecture 35 - Everyday Usage
Lecture 36 - Writing a Statement of Purpose
Lecture 37 - CV/Resume and Cover Letters
Lecture 38 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Health Research Fundamentals

Subject Co-ordinator - Dr. P GaneshKumar, Dr. P. Manickam, Dr. Prabhdeep Kaur, Dr. Tarun Bhatnagar, Dr. R Ram

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Health Research
Lecture 2 - Formulating research question, hypothesis and objectives
Lecture 3 - Literature review
Lecture 4 - Measurement of disease frequency
Lecture 5 - Descriptive study designs
Lecture 6 - Analytical study designs
Lecture 7 - Experimental study designs
Lecture 8 - Validity of epidemiological studies
Lecture 9 - Qualitative research methods
Lecture 10 - Measurement of study variables
Lecture 11 - Sampling methods
Lecture 12 - Calculating sample size and power
Lecture 13 - Selection of study population
Lecture 14 - Study plan and project management
Lecture 15 - Designing data collection tools
Lecture 16 - Principles of data collection
Lecture 17 - Data management
Lecture 18 - Overview of data analysis
Lecture 19 - Ethical framework for health research
Lecture 20 - Conducting clinical trials
Lecture 21 - Preparing a concept paper for research projects
Lecture 22 - Elements of a protocol for research studies

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NPTEL Video Course - Humanities and Social Sciences - NOC:American Literature and Culture

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1 - Introduction to the course on American Literature and Culture
Lecture 2 - Lecture 2 - Henry James
Lecture 3 - Lecture 3 - Henry James
Lecture 4 - Lecture 4 - Henry James
Lecture 5 - Lecture 5 - Henry James
Lecture 6 - Lecture 6 - Henry James
Lecture 7 - Lecture 7 - Henry James
Lecture 8 - Lecture 8a - Henry James
Lecture 9 - Lecture 8b - Henry James
Lecture 10 - Lecture 9a - Theodore Dreiser
Lecture 11 - Lecture 9b - Theodore Dreiser
Lecture 12 - Lecture 10a - Theodore Dreiser
Lecture 13 - Lecture 10b - Theodore Dreiser
Lecture 14 - Lecture 10c - Theodore Dreiser
Lecture 15 - Lecture 11 - Herman Melville
Lecture 16 - Lecture 12 - Herman Melville
Lecture 17 - Lecture 12a - Herman Melville
Lecture 18 - Lecture 13a - Short Story
Lecture 19 - Lecture 13b - Flannery O'Connor
Lecture 20 - Lecture 14 - Flannery O'Connor
Lecture 21 - Lecture 15 - Ernest Hemingway
Lecture 22 - Lecture 16 - Ernest Hemingway
Lecture 23 - Lecture 17 - Ernest Hemingway
Lecture 24 - Lecture 18 - Ernest Hemingway
Lecture 25 - Lecture 19 - Ernest Hemingway
Lecture 26 - Lecture 20 - F. Scott Fitzgerald
Lecture 27 - Lecture 21 - Romanticism
Lecture 28 - Lecture 22 - Edgar Allen Poe
Lecture 29 - Lecture 23 - American Drama

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Lecture 30 - Lecture 24 - Lillian Hellman
Lecture 31 - Lecture 25 - Lillian Hellman
Lecture 32 - Lecture 26 - Lillian Hellman
Lecture 33 - Lecture 27 - Lillian Hellman
Lecture 34 - Lecture 28 - Arthur Miller
Lecture 35 - Lecture 29 - Arthur Miller
Lecture 36 - Lecture 30 - Arthur Miller
Lecture 37 - Lecture 31 - Arthur Miller
Lecture 38 - Lecture 32 - Eugene O'Neill
Lecture 39 - Lecture 33 - Eugene O'Neill
Lecture 40 - Lecture 34 - Edith Wharton
Lecture 41 - Lecture 35 - Edith Wharton
Lecture 42 - Lecture 36 - Edith Wharton
Lecture 43 - Lecture 37 - Edith Wharton
Lecture 44 - Lecture 38 - Christopher Hitchens
Lecture 45 - Lecture 39 - Hart Crane

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NPTEL Video Course - Humanities and Social Sciences - NOC:Economics of IPR

Subject Co-ordinator - Prof.Nalin Bharti

Co-ordinating Institute - IIT - Patna

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to IPR - Historical Overview from GATT to WTO
Lecture 2 - Why IPR Matters
Lecture 3 - Application of IPR in the Global World
Lecture 4 - Economic Perspective on IPR
Lecture 5 - Types of IPR Its introduction and objectives
Lecture 6 - Globalization of IPR
Lecture 7 - Economics of Copyright
Lecture 8 - Economics of Patent
Lecture 9 - Economics of Trademarks
Lecture 10 - Economics of Trade Secrets
Lecture 11 - Economics of Industrial Design
Lecture 12 - Issues in Contemporary Patent
Lecture 13 - Critical Issues in Copyright and Related Rights
Lecture 14 - Issues in Traditional Knowledge
Lecture 15 - Plant Varieties Protection and Biotechnology
Lecture 16 - Commercialization of Intellectual Property and Unfair Competition
Lecture 17 - Disputes related to Patent in WTO
Lecture 18 - Disputes related to copyright, etc. in WTO
Lecture 19 - IP and Development
Lecture 20 - Summarizing the course

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NPTEL Video Course - Humanities and Social Sciences - NOC:Applied Linguistics

Subject Co-ordinator - Prof. Rajesh Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Language
Lecture 3 - Language in Society
Lecture 4 - Acquisition
Lecture 5 - Vocal Apparatus
Lecture 6 - Places and Manners of Articulation
Lecture 7 - Word Formation Phonotactic Rules
Lecture 8 - Rules of Word Formation
Lecture 9 - Sentences- an introduction
Lecture 10 - Components of a Sentence
Lecture 11 - Grammaticality and Acceptability
Lecture 12 - Subject and Verb in a sentence
Lecture 13 - Sentence
Lecture 14 - Application of linguistic structure in social theory
Lecture 15 - Second Language Acquisition
Lecture 16 - Language and Multilingualism
Lecture 17 - Language, Culture and Cognition
Lecture 18 - Classroom discussion on Language, Culture and Cognition
Lecture 19 - Language and Gender
Lecture 20 - Language, Media and Network society
Lecture 21 - Language Teaching
Lecture 22 - Language Teaching Methods - I
Lecture 23 - Language Teaching Methods - II
Lecture 24 - Materials and Assessment in Teaching Language
Lecture 25 - Disability and Learning Disorder
Lecture 26 - Language Development and Specific Difficulties
Lecture 27 - Dyslexia
Lecture 28 - Specific Learning Difficulties
Lecture 29 - Language and Computers

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Lecture 30 - Language, Computers and Applications
Lecture 31 - Language and Education
Lecture 32 - Language and Application

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NPTEL Video Course - Humanities and Social Sciences - NOC:English Language for Competitive Exams

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Reading Comprehension?
Lecture 2 - Literature and reading comprehension
Lecture 3 - Scientific passages and reading comprehension
Lecture 4 - Analyze a task - 1
Lecture 5 - Analyze a task - 2
Lecture 6 - Reading - Comprehending Scientific Passages
Lecture 7 - Comprehending Literary Passages - 1
Lecture 8 - Comprehending Literary Passages - 2
Lecture 9 - Academic writing
Lecture 10 - Text - Completion
Lecture 11 - Analogy
Lecture 12 - Writing
Lecture 13 - Writing
Lecture 14 - Listening
Lecture 15 - Writing
Lecture 16 - Listening for Specific Information
Lecture 17 - Reading Comprehension
Lecture 18 - (Lecture Missing)
Lecture 19 - Reading Comprehension
Lecture 20 - Verbal Analogy and Vocabulary
Lecture 21 - Vocabulary
Lecture 22 - Vocabulary
Lecture 23 - Vocabulary
Lecture 24 - Vocabulary
Lecture 25 - Vocabulary
Lecture 26 - Vocabulary
Lecture 27 - Text Completion
Lecture 28 - Text Completion (Continued...)
Lecture 29 - Analogy and Text Completion

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Lecture 30 - Text Completion (Continued...)
Lecture 31 - Text Completion - Part 4
Lecture 32 - Names and Vocabulary
Lecture 33 - Latin Terms in English Vocabulary
Lecture 34 - Greek Mythology and Vocabulary
Lecture 35 - Green Names and Foreign Words
Lecture 36 - Vocabulary Practice Test
Lecture 37 - Analogy
Lecture 38 - Foreign Words and Names
Lecture 39 - Suffixes and Reference Words
Lecture 40 - Uncommon Words - Part 1
Lecture 41 - Uncommon Words - Part 2
Lecture 42 - More Uncommon Words
Lecture 43 - More Uncommon Words (Continued...)
Lecture 44 - Vocabulary and Analogy
Lecture 45 - Vocabulary
Lecture 46 - Subject-Verb Agreement and Sentence Correction
Lecture 47 - Sentence Correction
Lecture 48 - Conditional Clauses, Prepositions and Reported Speech
Lecture 49 - Clauses
Lecture 50 - Modifiers, Active Voice and Passive Voice
Lecture 51 - Gerunds and Infinitives
Lecture 52 - Coordinators and Conjunctions - Part 1
Lecture 53 - Coordinators and Conjunctions - Part 2
Lecture 54 - Grammar
Lecture 55 - Grammar
Lecture 56 - Punctuation
Lecture 57 - Punctuation (Continued...)
Lecture 58 - Revision - Vocabulary
Lecture 59 - Revision - Subject verb agreement
Lecture 60 - Read and Revise

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NPTEL Video Course - Humanities and Social Sciences - NOC:Ethics

Subject Co-ordinator - Dr. Sreekumar Nellickappilly

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Ethics and Morals
Lecture 2 - Different Approaches to Ethics
Lecture 3 - Historical Perspectives
Lecture 4 - Medieval and Modern Moral Theories
Lecture 5 - Socratic Framework in Morla Philosophy
Lecture 6 - Eudaimonism to Divine Command
Lecture 7 - Divine Command Theory and the Euthyphro Dilemma
Lecture 8 - Different Types of Ethical Theory
Lecture 9 - Thomas Hobbes
Lecture 10 - Contractarianism
Lecture 11 - Contractarianism and its Moral Implications
Lecture 12 - Introduction to Deontological Approaches
Lecture 13 - Kantian Deontologism
Lecture 14 - Egoism and its Ethical Implications
Lecture 15 - Motivational and Ethical Hedonism
Lecture 16 - Utilitarianism and its Moral Position
Lecture 17 - The Individual and the Whole
Lecture 18 - Critique of Moral Absolutism
Lecture 19 - Existentialism and Ethics
Lecture 20 - Ethics in the Present Age

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Renaissance and Shakespeare

Subject Co-ordinator - Prof. Shormishtha Panja

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Renaissance An Introduction - Part-1
Lecture 2 - The Renaissance An Introduction - Part-2
Lecture 3 - Shakespeare's Life and Times
Lecture 4 - Shakespeare's, William Shakespeare The Merchant of Venice performance
Lecture 5 - Shakespeare's, William Shakespeare The Merchant of Venice Panel Discussion
Lecture 6 - Othello Part-1
Lecture 7 - Othello Part-2
Lecture 8 - Lecture on A Midsummer Night's Dream
Lecture 9 - A Midsummer Night's Dream Performance
Lecture 10 - A Midsummer Night's Dream Panel Discussion
Lecture 11 - Shakespeare's History Plays
Lecture 12 - Lecture on Macbeth
Lecture 13 - Shakespeare's Romances or The Last Plays
Lecture 14 - Twelfth Night
Lecture 15 - Whose Shakespeares?? Colonial Encounters/Post Colonial Negotiations
Lecture 16 - Global Shakespeare
Lecture 17 - Global Shakespeare (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Literature for Competitive Exams

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview of the History of English Literature
Lecture 2 - An Overview of the History of English Literature (Continued...)
Lecture 3 - Landmarks of the English literature
Lecture 4 - The Novel
Lecture 5 - Landmarks in the English History
Lecture 6 - The Elizabethan Age
Lecture 7 - The Elizabethan Period (Part 1)
Lecture 8 - Key Figures of the Renaissance and the Elizabethan Age
Lecture 9 - 17 and early 18th century landmark events and literature
Lecture 10 - Literature and major events in 18 and 19 century
Lecture 11 - 18 and 19 century European masters
Lecture 12 - The English Poets
Lecture 13 - The Romantic Period
Lecture 14 - The English Romanticism
Lecture 15 - The English Poets (Continued...)
Lecture 16 - New Criticism
Lecture 17 - The American Romanticism
Lecture 18 - American Literature
Lecture 19 - Henry James
Lecture 20 - American literature
Lecture 21 - The American Novel
Lecture 22 - American Drama and Poetry
Lecture 23 - American Drama
Lecture 24 - American poets and Dramatists
Lecture 25 - Practice Test (Continued...)
Lecture 26 - Indian Writing in English
Lecture 27 - Postcolonialism
Lecture 28 - Asian American Writing
Lecture 29 - South Asian Writing in English

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Lecture 30 - World Literature
Lecture 31 - World Literature (Continued...)
Lecture 32 - Goethe Faust
Lecture 33 - Goethe Faust (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:History of English Language and Literature

Subject Co-ordinator - Prof. Merin Simi Raj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Locating the Starting Points
Lecture 3 - Old English period
Lecture 4 - Middle English Period
Lecture 5 - The Age of Chaucer
Lecture 6 - Middle English period after Chaucer
Lecture 7 - Middle English period after Chaucer
Lecture 8 - The Development of English Language - Tracing the Origins and Early Influences
Lecture 9 - The Development of English Language - Old English to Middle English
Lecture 10 - Introducing the Elizabethan Era - The English Reformation
Lecture 11 - The Elizabethan Age
Lecture 12 - Elizabethan Age
Lecture 13 - The Emergence of Elizabethan 'Romantic' Drama
Lecture 14 - The University Wits
Lecture 15 - The University Wits
Lecture 16 - William Shakespeare
Lecture 17 - William Shakespeare
Lecture 18 - Elizabethan Theatre
Lecture 19 - Elizabethan Poetry and Prose
Lecture 20 - The Jacobean Age
Lecture 21 - The Jacobean Age (Continued...)
Lecture 22 - Jacobean Drama
Lecture 23 - Did Women Have a Renaissance?
Lecture 24 - The Caroline Period / The Age of Milton and The Interregnum
Lecture 25 - The Caroline Period / The Age of Milton and The Interregnum (Continued...)
Lecture 26 - The Age of Milton
Lecture 27 - Changes in Language
Lecture 28 - Early Modern English (Continued...)
Lecture 29 - The Age of Restoration

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Lecture 30 - The Age of Dryden
Lecture 31 - The Restoration Drama
Lecture 32 - The Age of Pope / The Augustan Age
Lecture 33 - The Age of Pope
Lecture 34 - The Age of Pope
Lecture 35 - The Age of Pope Conclusion
Lecture 36 - Scottish Enlightenment of the 18th Century
Lecture 37 - The Age of Johnson (1745 - 1798)
Lecture 38 - The Age of Johnson (Continued...)
Lecture 39 - The Rise of the Novel
Lecture 40 - The Rise of the Novel
Lecture 41 - The Rise of the Novel (Continued...)
Lecture 42 - The Rise of the Woman Writer in the 18th Century
Lecture 43 - The Revival of Romance
Lecture 44 - The Revival of Romance (Continued...)
Lecture 45 - The Revival of Romance
Lecture 46 - The Age of Romanticism
Lecture 47 - The Age of Wordsworth
Lecture 48 - Age of Wordsworth (Continued...)
Lecture 49 - Age of Wordsworth (Continued...)
Lecture 50 - Prose in the age of Romanticism
Lecture 51 - Drama in the age of Romanticism
Lecture 52 - Novel in the age of Romanticism
Lecture 53 - Women writers in the Romantic age
Lecture 54 - The Age of Tennyson
Lecture 55 - The Age of Tennyson
Lecture 56 - The Age of Tennyson
Lecture 57 - The Age of Tennyson
Lecture 58 - The Age of Tennyson
Lecture 59 - Prose in the Victorian Age
Lecture 60 - Drama in the Victorian Age
Lecture 61 - Victorian Novel and the Late Victorian Period
Lecture 62 - Towards Modernism
Lecture 63 - Modernist Literature
Lecture 64 - Modernist Poetry
Lecture 65 - Modernist Prose and Fiction
Lecture 66 - Post-1945

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NPTEL Video Course - Humanities and Social Sciences - NOC:Patent Drafting for Beginners

Subject Co-ordinator - Prof. Feroze Ali

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - PDB-What are Inventions?
Lecture 2 - Background
Lecture 3 - Field of Invention
Lecture 4 - Prior Art
Lecture 5 - Patent Classification
Lecture 6 - Technical Advance
Lecture 7 - What are not inventions
Lecture 8 - Why People Invent
Lecture 9 - How Inventions Look
Lecture 10 - Where to Look for Inventions
Lecture 11 - How to Catch an Invention
Lecture 12 - Getting a working disclosure
Lecture 13 - Searching with the disclosure
Lecture 14 - Outcome of search
Lecture 15 - What is a Patentability Search
Lecture 16 - Reasons for Ordering a Patentability Search
Lecture 17 - When a Patentability Search is Not Required
Lecture 18 - How to Order a Patentability Search
Lecture 19 - Limits of Patentability Search
Lecture 20 - Patentability Search Report
Lecture 21 - How to pitch an invention
Lecture 22 - Identifying the inventive concept
Lecture 23 - Problem Solution Statement
Lecture 24 - Problem-Solution to Claim
Lecture 25 - How to Search for a Granted Patent
Lecture 26 - Provisions relating to claim
Lecture 27 - Some Exceptions to patentability
Lecture 28 - Structure of Claims
Lecture 29 - Preamble

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Lecture 30 - Transition
Lecture 31 - Body
Lecture 32 - Form and Punctuation of Claims
Lecture 33 - Omnibus Claims
Lecture 34 - Structural and Functional Definitions
Lecture 35 - Cooperation
Lecture 36 - Types of Claims
Lecture 37 - Dependent claims
Lecture 38 - Apparatus Claims
Lecture 39 - Methods or Process Claims
Lecture 40 - Claim Drafting Best Practices
Lecture 41 - Claims Drafting What to Avoid
Lecture 42 - How to Download Copy of Patent Specification
Lecture 43 - Amendment to Claims
Lecture 44 - Claim Analysis Combo Pen with Marker
Lecture 45 - Introduction to Specification Drafting
Lecture 46 - Enabling Disclosure
Lecture 47 - Best method
Lecture 48 - Parts of the specification
Lecture 49 - Background and Summary
Lecture 50 - Detailed description
Lecture 51 - Parts of the Application
Lecture 52 - Evolution of Patent Specifications
Lecture 53 - Live Session

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NPTEL Video Course - Humanities and Social Sciences - NOC:Business English Communication

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Reading Comprehension - 1
Lecture 2 - Reading Comprehension - 2
Lecture 3 - Reading Comprehension - 3
Lecture 4 - Reading Comprehension - 4
Lecture 5 - Reading Comprehension - 5
Lecture 6 - Vocabulary - 1
Lecture 7 - Vocabulary - 2
Lecture 8 - Vocabulary - 3
Lecture 9 - Vocabulary - 4
Lecture 10 - Vocabulary - 5
Lecture 11 - Grammar (subject verb agreement)
Lecture 12 - Grammar (Tenses)
Lecture 13 - Grammar (Clauses, Gerund and Infinitives, Coordinating conjunctions)
Lecture 14 - Grammar (Prepositions, Reported Speech, Active Voice and Passive Voice)
Lecture 15 - Grammar (Punctuations and Types of sentences
Lecture 16 - Writing (Emails and Memos)
Lecture 17 - Writing (Official letters and Presentation scripts)
Lecture 18 - Writing (Different business writing genres)
Lecture 19 - Writing (Business writing and vocabulary for specific situations)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Postmodernism in Literature

Subject Co-ordinator - Prof. Merin Simi Raj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Part - 1
Lecture 2 - Introduction Part - 2
Lecture 3 - Introduction Part - 3
Lecture 4 - The Genealogy of Postmodernism
Lecture 5 - The Genealogy of Postmodernism
Lecture 6 - The Death of the author and it's Postmodern implications
Lecture 7 - The Death of the author and it's Postmodern implications (Continued...)
Lecture 8 - The Death of the author and it's Postmodern implications (Continued...)
Lecture 9 - What is an Author ?
Lecture 10 - What is an Author ? (Continued...)
Lecture 11 - Postmodern Theories and Frameworks
Lecture 12 - Lyotard's Postmodern condition
Lecture 13 - Lyotard's Postmodern condition
Lecture 14 - Baudrillard,Hyperreality and Postmodern representations
Lecture 15 - Baudrillard,Hyperreality and Postmodern representations (Continued...)
Lecture 16 - Derrida,Deconstruction and Postmodern texts
Lecture 17 - Derrida,Deconstruction and Postmodern texts (Continued...)
Lecture 18 - Derrida,Deconstruction and Postmodern texts (Continued...)
Lecture 19 - Intertextuality,Kristeva and the study of Postmodern Texts
Lecture 20 - Postmodern Feminism
Lecture 21 - Formulation of the Postmodern
Lecture 22 - Minor Literature' and Postmodern Narratives
Lecture 23 - Critiques of Postmodernism
Lecture 24 - Critiques of Postmodernism
Lecture 25 - Feminism and Postmodernism
Lecture 26 - Situating the Postcolonial in the Postmodern
Lecture 27 - Homi K.Bhabha
Lecture 28 - Is the Post-in Postmodernism the Post-in Postcolonial?
Lecture 29 - Can the Subaltern Speak?

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Lecture 30 - Reading Postmodern-Postcolonial Fiction
Lecture 31 - Hyperreality in Delillo's Postmodernist Fiction
Lecture 32 - The Garden of Forking Paths
Lecture 33 - The Garden of Forking Paths
Lecture 34 - Postmodern Fiction by women
Lecture 35 - Postmodern Fiction by women
Lecture 36 - Reading Postmdern Fiction
Lecture 37 - Reading Postmdern Fiction
Lecture 38 - Postmodern Writings
Lecture 39 - Postmodern Writings
Lecture 40 - Postmodern literature today

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Fiction in English

Subject Co-ordinator - Prof. Merin Simi Raj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Indian Fiction in English - Introduction
Lecture 2 - Rushdie and Indian Writing
Lecture 3 - Situating 'fiction' in the history of Indian Writing in English
Lecture 4 - Indian Writing in English
Lecture 5 - Introducing Indian Fiction in English
Lecture 6 - The Critical Tradition of Indian Fiction in English
Lecture 7 - The rise of novel in regional languages
Lecture 8 - Rajmohan's Wife to Kanthapura
Lecture 9 - Kanthapura, Mythmaking and Gandhi
Lecture 10 - Mahatma and Indian novels in English
Lecture 11 - Waiting for the Mahatma - Part I
Lecture 12 - Waiting for the Mahatma - Part II
Lecture 13 - Indian Fiction in English
Lecture 14 - Heat and Dust
Lecture 15 - The Strange Case of Billy Biswas
Lecture 16 - Cry, the Peacock
Lecture 17 - Midnight's children
Lecture 18 - Reading Midnight's Children
Lecture 19 - Salman Rushdie in Indian Fiction in English
Lecture 20 - Midnight's Children
Lecture 21 - Zelaldinus
Lecture 22 - Trotter Nama
Lecture 23 - Shadow Lines
Lecture 24 - Reading the Shadow Lines
Lecture 25 - Caste in Indian English Fiction
Lecture 26 - Caste in Untouchable
Lecture 27 - Reading The God of Small Things - I
Lecture 28 - Reading The God of Small Things - II
Lecture 29 - Other Representations of Caste in IE fiction

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Lecture 30 - All About H.Hatterr
Lecture 31 - Rich Like Us
Lecture 32 - Partition novels
Lecture 33 - White Tiger
Lecture 34 - Notes on the New Indian Novel in English
Lecture 35 - Riot
Lecture 36 - English, August by Upamanyu Chatterjee
Lecture 37 - The Hungry Tide by Amitav Ghosh
Lecture 38 - Remains of the Feast
Lecture 39 - Writings in English from the Northeast
Lecture 40 - The writings of Ruskin Bond
Lecture 41 - Inheritance of Loss by Kiran Desai
Lecture 42 - Indian Fiction in English - Positioning Literary Studies
Lecture 43 - New Writings in Contemporary Indian Fiction in English
Lecture 44 - Graphic Novel in India
Lecture 45 - The city in Indian English Fiction
Lecture 46 - Postcoloniality and its Challenges
Lecture 47 - Commomwealth literature does not exist

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Cultural Studies

Subject Co-ordinator - Prof. Avishek Parui

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Course
Lecture 2 - Different Interpretations Of Culture (Marxism) Lecture 22 - Judith Butler - Gender Trouble V - Co
Lecture 3 - Edward Saidâ s Orientalism Lecture 23 - Judith Butler - Gender Trouble VI - Conclusion Lecture 3
Lecture 4 - Homi Bhabaâ s The Other Question Lecture 24 - Judith Butler - Gender Trouble VII - Conclusion Le
Lecture 5 - The Other Question (Continued...)
Lecture 6 - Goerge Orwellâ s Shooting An Elephant - Part - I
Lecture 7 - Goerge Orwellâ s Shooting An Elephant - Part - II
Lecture 8 - Goerge Orwellâ s Shooting An Elephant - Part - III
Lecture 9 - The Post Modern Condition (Lyotard) - Part I
Lecture 10 - The Post Modern Condition (Lyotard) - Part II
Lecture 11 - The Post Modern Condition (Lyotard) - Part III
Lecture 12 - The Post Modern Condition (Lyotard) - Part IV
Lecture 13 - Fanon - Black Skin,White Masks - Part - I
Lecture 14 - Fanon - Black Skin,White Masks - Part - II
Lecture 15 - Fanon - Black Skin,White Masks - Part - III
Lecture 16 - Fanon - Black Skin,White Masks - Part - IV
Lecture 17 - Fanon - Black Skin,White Masks - Part - V
Lecture 18 - Judith Butler - Gender Trouble I
Lecture 19 - Judith Butler - Gender Trouble II
Lecture 20 - Judith Butler - Gender Trouble III
Lecture 21 - Judith Butler - Gender Trouble IV - Conclusion Lecture 1 - Parody To Politics
Lecture 22 - Judith Butler - Gender Trouble V - Conclusion Lecture 2 - Parody To Politics
Lecture 23 - Judith Butler - Gender Trouble VI - Conclusion Lecture 3 - Parody To Politics
Lecture 24 - Judith Butler - Gender Trouble VII - Conclusion Lecture 4 - Parody To Politics
Lecture 25 - Culture Studies
Lecture 26 - Hannah Arendt - The Human Condition 1
Lecture 27 - Hannah Arendt - The Human Condition 2
Lecture 28 - Hannah Arendt - The Human Condition 3
Lecture 29 - Foucault - What Is An Author 1

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Lecture 30 - Foucault - What Is An Author 2
Lecture 31 - Foucault - What Is An Author 3
Lecture 32 - Foucault - What Is An Author 4
Lecture 33 - Foucault - What Is An Author 5
Lecture 34 - Foucault - What Is An Author 6
Lecture 35 - Ian Hacking - The Social Construction Of What 1
Lecture 36 - Ian Hacking - The Social Construction Of What 2
Lecture 37 - Ian Hacking - The Social Construction Of What 3
Lecture 38 - Ian Hacking - The Social Construction Of What 4
Lecture 39 - Ian Hacking - The Social Construction Of What 5
Lecture 40 - Bell Hooks- Understanding Patriarchy 1
Lecture 41 - Bell Hooks- Understanding Patriarchy 2
Lecture 42 - Bell Hooks- Understanding Patriarchy 3
Lecture 43 - Bell Hooks- Understanding Patriarchy 4
Lecture 44 - Bell Hooks- Understanding Patriarchy 5
Lecture 45 - Bell Hooks- Understanding Patriarchy 6
Lecture 46 - Introduction To Cultural Studies - Summary
Lecture 47 - Dick Hebdige-Subculture The Meaning Of Style 1
Lecture 48 - Dick Hebdige-Subculture The Meaning Of Style 2
Lecture 49 - Dick Hebdige-Subculture The Meaning Of Style 3
Lecture 50 - Dick Hebdige-Subculture The Meaning Of Style 4
Lecture 51 - Catherine Belsey Critical Practice 1
Lecture 52 - Catherine Belsey Critical Practice 2
Lecture 53 - Catherine Belsey Critical Practice 3
Lecture 54 - Stuart Hall - Questions On Cultural Identity 1
Lecture 55 - Stuart Hall - Questions On Cultural Identity 2
Lecture 56 - Slavoj Zizek - Welcome To The Desert Of The Real Ii
Lecture 57 - Slavoj Zizek - Welcome To The Desert Of The Real Ii
Lecture 58 - Introduction to Cultural Studies - Summary and Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Intellectual Property

Subject Co-ordinator - Prof. Feroze Ali

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Week 1 summary
Lecture 2 - An Introduction to Intellectual Property
Lecture 3 - What are Rights?
Lecture 4 - What is Property in IPR?
Lecture 5 - Meaning of Intellectual in IPR
Lecture 6 - Characteristics of IP
Lecture 7 - Defining IPR
Lecture 8 - Kinds of IPRs and their Duration
Lecture 9 - Rights Granted by IP
Lecture 10 - The Origin of Intellectual Property - Part 1
Lecture 11 - The Origin of Intellectual Property - Part 2
Lecture 12 - Growth of Intellectual Property
Lecture 13 - Learning Intellectual Property
Lecture 14 - Intangible Economy
Lecture 15 - The traits Intangibility
Lecture 16 - Policy Challenges in an Intangible Economy
Lecture 17 - Novartis Case
Lecture 18 - Novartis Standard
Lecture 19 - Definition of Start-up
Lecture 20 - Subject Matter
Lecture 21 - Patents in India
Lecture 22 - To file or not to file a patent
Lecture 23 - When and how to file a patent
Lecture 24 - Who can apply for a patent
Lecture 25 - Requirements of a patent application
Lecture 26 - Types of patent application
Lecture 27 - Mercedes Benz TV Commercial Patents
Lecture 28 - Patent Prosecution
Lecture 29 - Patent Prosecution

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Lecture 30 - Rights, Assignment and Licenses - Part 1
Lecture 31 - Rights, Assignment and Licenses - Part 2
Lecture 32 - Opposition to Patents
Lecture 33 - Infringement of Patent
Lecture 34 - Defences to Patent Infringement
Lecture 35 - Intellectual Property Appellate Board
Lecture 36 - Declaratory Suits
Lecture 37 - Limitations of Patent Rights - Compulsory License
Lecture 38 - Limitations of Patent Rights - Govt Use
Lecture 39 - Trade Marks
Lecture 40 - Case Study - Frozen Desserts
Lecture 41 - Amul Advertisement
Lecture 42 - Kwality Wallâ s Advertisement
Lecture 43 - International Arrangements
Lecture 44 - Trade marks in India
Lecture 45 - What can be protected?
Lecture 46 - Registration of Trade Mark
Lecture 47 - Rights and Defences
Lecture 48 - Introduction to Copyright
Lecture 49 - Origin and Evolution of Copyright
Lecture 50 - Copyright in India
Lecture 51 - Criteria of Protection
Lecture 52 - Subject matter
Lecture 53 - Rights and Infringement
Lecture 54 - Educational Exceptions
Lecture 55 - Confidential Information Introduction
Lecture 56 - Confidential Information Requirements
Lecture 57 - Geographical Indications
Lecture 58 - Designs
Lecture 59 - Enforcement of IP
Lecture 60 - Infringement
Lecture 61 - Remedies
Lecture 62 - Alternate Dispute Resolution
Lecture 63 - Compulsory Licenses
Lecture 64 - Managing IP
Lecture 65 - Case Study Dolby
Lecture 66 - Case Study Disney
Lecture 67 - Case Study AstraZeneca
Lecture 68 - IP and Competition

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Lecture 69 - Valuing IP
Lecture 70 - Universities and IP
Lecture 71 - Publish or Patent
Lecture 72 - Managing IP at Universities
Lecture 73 - Indian Universities and Patents
Lecture 74 - IP in Creative and Entertainment Industries
Lecture 75 - Piracy in the Film Industry
Lecture 76 - Government's Role in Fostering IP System
Lecture 77 - Teaching Intellectual Property
Lecture 78 - Q and A - Discussion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Short Fiction in Indian Literature

Subject Co-ordinator - Prof. Divya.A

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Plotting the Story world of In the Flood by Thakazhi Sivasankara Pillai
Lecture 2 - Plotting the Story world of In the Flood by Thakazhi Sivasankara Pillai
Lecture 3 - Narrative Patterns in In the Flood
Lecture 4 - Narrative Patterns in In the Flood
Lecture 5 - Narrative point of View and Setting in In the Flood
Lecture 6 - Close reading Kamala Das Summer Vacation
Lecture 7 - Close reading Kamala Das Summer Vacation
Lecture 8 - Summer Vacation Overview
Lecture 9 - Plotting Tagore's Story Kabuliwala (1892)
Lecture 10 - Plotting Tagore's Story Kabuliwala
Lecture 11 - Plotting the Spatiality of Tagore's Kabuliwala
Lecture 12 - Plotting the spatiality of Tagore's Kabuliwala
Lecture 13 - Realism,Gender in Tagore's Kabuliwala
Lecture 14 - How to write an Effective Paragraph
Lecture 15 - Plotting downfall in Khuswant Singh's Karma
Lecture 16 - Plotting downfall in Khuswant Singh's Karma
Lecture 17 - Narrative aspects in Khuswant Singh's Karma
Lecture 18 - Khuswant Singh's Karma Overview
Lecture 19 - Plotting Sundara Ramaswamy's Reflowering
Lecture 20 - Reading the Plot for themes in Sundara Ramaswamy's Reflowering
Lecture 21 - Reading the Plot for themes in Sundara Ramaswamy's Reflowering (Continued...)
Lecture 22 - Narrative Devices in Sundara Ramaswamy's Reflowering
Lecture 23 - Plotting Sundara Ramaswamy's Reflowering Overview
Lecture 24 - Short Genre and Premchand's The Chess Players
Lecture 25 - Short Story Genre and Premchand's The Chess Players
Lecture 26 - Short Story Structure and Premchand's The Chess Players
Lecture 27 - The Chess Players Overview
Lecture 28 - Psychological Climax in Premchand's The Shroud
Lecture 29 - Psychological Climax in Premchand's The Shroud (Continued...)

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Lecture 30 - Psychological Climax in Premchand's The Shroud (Continued...)
Lecture 31 - Premchand's The Shroud
Lecture 32 - The Shroud Overview
Lecture 33 - Patriarchal Culture in A Kitchen in the Corner of the House - I
Lecture 34 - Patriarchal Culture in A Kitchen in the Corner of the House - II
Lecture 35 - Patriarchal Culture in Ambai's A Kitchen in the Corner of the House - I
Lecture 36 - Patriarchal Culture in Ambai's A Kitchen in the Corner of the House - II
Lecture 37 - Patriarchal Culture in Ambai's A Kitchen in the Corner of the House - III
Lecture 38 - Catharsis in Mulk Raj Anand's The Price of Bananas - I
Lecture 39 - Catharsis in Mulk Raj Anand's The Price of Bananas - II
Lecture 40 - Catharsis in Mulk Raj Anand's The Price of Bananas - III
Lecture 41 - Catharsis in Mulk Raj Anand's The Price of Bananas - Overview
Lecture 42 - Short Fiction in Indian Literature - vignesh - 12
Lecture 43 - Hidden Fractures in Ruskin Bond's The Blue Umbrella - II
Lecture 44 - Hidden Fractures in Ruskin Bond's The Blue Umbrella - III
Lecture 45 - Hidden Fractures in Ruskin Bond's The Blue Umbrella - Overview
Lecture 46 - Plotting and Ideology in RK Narayan's A Horse and Two Goats - I
Lecture 47 - Plotting and Ideology in RK Narayan's A Horse and Two Goats - Overview
Lecture 48 - Plotting and Ideology in RK Narayan's A Horse and Two Goats - Overview
Lecture 49 - Childhood anxiety at Play in Anita Desai's Games at Twilight - I
Lecture 50 - Childhood anxiety at Play in Anita Desai's Games at Twilight - II
Lecture 51 - Childhood anxiety at Play in Anita Desai's Games at Twilight - III
Lecture 52 - Childhood anxiety at Play in Anita Desai's Games at Twilight - Overview
Lecture 53 - Short Fiction In Indian Literature - Overview I
Lecture 54 - Short Fiction In Indian Literature - Overview II

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Nineteenth-Century English Novel

Subject Co-ordinator - Prof. Divya.A

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Nineteenth Century Novel
Lecture 2 - The Nineteenth Century Novel (Continued...)
Lecture 3 - The Nineteenth Century Novel (Continued...)
Lecture 4 - Jane Austen's Persuasion Chapters 1-6
Lecture 5 - Jane Austen's Persuasion
Lecture 6 - Persuasion, Chapter 7-12
Lecture 7 - Austen's Persuasion, Chapter 7-12
Lecture 8 - Austen's Persuasion, Chapter 7-12 (Continued...)
Lecture 9 - Persuasion Vol.II, Chapters 13-18
Lecture 10 - Persuasion Vol.II, Chapters 13-18 (Continued...)
Lecture 11 - Persuasion Vol.II, Chapters 13-18 (Continued...)
Lecture 12 - Persuasion Vol.II, Chapters 13-18 (Continued...)
Lecture 13 - Persuasion, Volume II, Chapters 19-24
Lecture 14 - Persuasion, Volume II, Chapters 19-24 (Continued...)
Lecture 15 - Persuasion, Volume II, Chapters 19-24 (Continued...)
Lecture 16 - Persuasion, Volume II, Chapters 19-24 (Continued...)
Lecture 17 - Jane Austen Seminar
Lecture 18 - Dicken's A Tale of Two Cities, Book I
Lecture 19 - A Tale of Two Cities Book I ; Chapters 4-6
Lecture 20 - Tale of Two Cities Book I
Lecture 21 - Dicken's A Tale of Two Cities Book II
Lecture 22 - Dicken's A Tale of Two Cities Book II
Lecture 23 - Dicken's A Tale of Two Cities Book II
Lecture 24 - Dicken's A Tale of Two Cities Book II
Lecture 25 - Dicken's A Tale of Two Cities Book II
Lecture 26 - Dicken's A Tale of Two Cities Book II
Lecture 27 - Dickens' A Tale of Two Cities Book II
Lecture 28 - Dickens' A Tale of Two Cities Book II
Lecture 29 - Dickens' A Tale of Two Cities Book II

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Lecture 30 - Dickens' A Tale of Two Cities Book II
Lecture 31 - Dickens' A Tale of Two Cities
Lecture 32 - Dickens' A Tale of Two Cities
Lecture 33 - Dickens' A tale of Two Cities Book II
Lecture 34 - Dickens' A tale of Two Cities Book II
Lecture 35 - Dickens' A tale of Two Cities Book III
Lecture 36 - Dickens' A tale of Two Cities Book III
Lecture 37 - Dickens' A Tale of Two cities Book III
Lecture 38 - Dickens' A Tale of Two cities Book III
Lecture 39 - Dickens' A Tale of Two cities Book III
Lecture 40 - Dickens' A Tale of Two cities Book III
Lecture 41 - Dickens' A Tale of Two cities Book III
Lecture 42 - Dickens' A Tale of Two cities Book III
Lecture 43 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapter 1
Lecture 44 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapter 2
Lecture 45 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapter 3
Lecture 46 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapter 4
Lecture 47 - R.L.Stevenson, The Strange Case of Dr. Jekyll and Mr Hyde key Themes and Incident, Chapters 1-4
Lecture 48 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapter 5
Lecture 49 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapter 5 (Continued...)
Lecture 50 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapter 6
Lecture 51 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapters 8-10
Lecture 52 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapters 8.
Lecture 53 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapters 9
Lecture 54 - The Strange Case of Dr. Jekyll and Mr Hyde, Chapters 10
Lecture 55 - Themes and Contexts in R.L.Stevenson, The Strange Case of Dr. Jekyll and Mr Hyde
Lecture 56 - Discussion on Narrative Points of View
Lecture 57 - Discussion on Gender, Class and History

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NPTEL Video Course - Humanities and Social Sciences - NOC:Feminist Writings

Subject Co-ordinator - Prof. Avishek Parui

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Patriarchy - Part 1
Lecture 2 - Understanding Patriarchy - Part 2
Lecture 3 - Understanding Patriarchy - Part 3
Lecture 4 - Understanding Patriarchy - Part 4
Lecture 5 - Understanding Patriarchy - Part 5
Lecture 6 - The Fly - Part 1
Lecture 7 - The Fly - Part 2
Lecture 8 - The Fly - Part 3
Lecture 9 - Tickets, Please! - Part 1
Lecture 10 - Tickets, Please! - Part 2
Lecture 11 - Tickets, Please! - Part 3
Lecture 12 - The Cyborg Manifesto - Part 1
Lecture 13 - The Cyborg Manifesto - Part 2
Lecture 14 - The Cyborg Manifesto - Part 3
Lecture 15 - The Cyborg Manifesto - Part 4
Lecture 16 - The Cyborg Manifesto - Part 5
Lecture 17 - The Goblin Market - Part 1
Lecture 18 - The Goblin Market - Part 2
Lecture 19 - The Goblin Market - Part 3
Lecture 20 - The Goblin Market - Part 4
Lecture 21 - The Goblin Market - Part 5
Lecture 22 - Tulips - Part 1
Lecture 23 - Tulips - Part 2
Lecture 24 - The Yellow Wallpaper - Part 1
Lecture 25 - The Yellow Wallpaper - Part 2
Lecture 26 - The Yellow Wallpaper - Part 3
Lecture 27 - The Yellow Wallpaper - Part 4
Lecture 28 - The Second Sex - Part 1
Lecture 29 - The Second Sex - Part 2

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Lecture 30 - The Second Sex - Part 3
Lecture 31 - The Second Sex - Part 4
Lecture 32 - The Second Sex - Part 5
Lecture 33 - The Iraqi Nights
Lecture 34 - Gender Trouble - Part 1
Lecture 35 - Gender Trouble - Part 2
Lecture 36 - Gender Trouble - Part 3
Lecture 37 - Gender Trouble - Part 4
Lecture 38 - A Temporary Matter - Part 1
Lecture 39 - A Temporary Matter - Part 2
Lecture 40 - A Temporary Matter - Part 3
Lecture 41 - A Temporary Matter - Part 4
Lecture 42 - A Temporary Matter - Part 5
Lecture 43 - Remains of the Feast - Part 1
Lecture 44 - Remains of the Feast - Part 2
Lecture 45 - Remains of the Feast - Part 3
Lecture 46 - Feminist Theory and Criticism
Lecture 47 - The Narratology of the graphic
Lecture 48 - Angela Carter
Lecture 49 - Interactive Session - 1
Lecture 50 - Interactive Session - 2
Lecture 51 - Feminist Writings and Feminism Today

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to World Literature

Subject Co-ordinator - Prof. Merin Simi Raj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Reading World Literature
Lecture 2 - Epic of Gilgamesh
Lecture 3 - Beowulf
Lecture 4 - The Lusiads by Luis De Camoes
Lecture 5 - Challenges and Possibilities for World Literature by Kathleen Shields
Lecture 6 - The Garden of Forking Paths by Borges - Part I
Lecture 7 - The Garden of Forking Paths by Borges - Part II
Lecture 8 - A Rose for Emily by William Faulkner - Part I
Lecture 9 - A Rose for Emily by William Faulkner - Part II
Lecture 10 - Sonnet 130 by Shakespeare and Love Sonnet XVI by Neruda
Lecture 11 - Song of Lawino by Okot p' Bitek
Lecture 12 - Tortures by Wislawa Szymborska
Lecture 13 - Spivak, Gayatri Chakravorty The Politics of translation
Lecture 14 - Othello - 1
Lecture 15 - Othello - 2
Lecture 16 - Othello - 3
Lecture 17 - Doll's House
Lecture 18 - Yellow Wallpaper
Lecture 19 - Toba Tek Singh
Lecture 20 - Oroonoko - I
Lecture 21 - Oroonoko - II
Lecture 22 - Poetics Of Aristotle - I
Lecture 23 - Poetics Of Aristotle - II
Lecture 24 - Longinus on the Subline - I
Lecture 25 - Longinus on the Subline - II
Lecture 26 - Errata in MC
Lecture 27 - From Errata to MC
Lecture 28 - The Third and the final Continent - I
Lecture 29 - The Third and the final Continent - II

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Lecture 30 - Balthazar's Marvellous Afternoon - I by Marquez
Lecture 31 - Balthazar's Marvellous Afternoon - II
Lecture 32 - The Wasteland - I
Lecture 33 - The Wasteland - II
Lecture 34 - The Wall by Sartre - I
Lecture 35 - The Wall by Sartre - II
Lecture 36 - The Applicant
Lecture 37 - Everyday Use
Lecture 38 - Catcher in the Rye - I
Lecture 39 - Catcher in the Rye - II
Lecture 40 - Stage'ing Protests
Lecture 41 - DR Faustus
Lecture 42 - In A Grove
Lecture 43 - Metamorphosis - I
Lecture 44 - Metamorphosis - II
Lecture 45 - Diary Of a Madman
Lecture 46 - Solid Objects
Lecture 47 - Dawn of the New Indian Novel in English
Lecture 48 - Bartleby The Scrivener
Lecture 49 - The Great Gatsby - I
Lecture 50 - The Great Gatsby - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Managing Intellectual Property in Universities

Subject Co-ordinator - Prof. Feroze Ali

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to Intellectual Property
Lecture 2 - What are Rights ?
Lecture 3 - What is Property in IPR ?
Lecture 4 - Meaning of Intellectual in IPR
Lecture 5 - Characteristics of IP
Lecture 6 - Defining IPR
Lecture 7 - Kinds of IPRs and their Duration
Lecture 8 - Rights Granted by IP
Lecture 9 - The Origin of Intellectual Property - Part 1
Lecture 10 - The Origin of Intellectual Property - Part 2
Lecture 11 - Growth of Intellectual Property
Lecture 12 - Learning Intellectual Property
Lecture 13 - Patents in India
Lecture 14 - Who can Apply for a Patent
Lecture 15 - Requirements of a Patent Application
Lecture 16 - Types of Patent Application
Lecture 17 - Trade Marks
Lecture 18 - Trademarks in India
Lecture 19 - What can be Protected
Lecture 20 - Introduction to Copyrights
Lecture 21 - Origin and Evolution of Copyrights
Lecture 22 - Copyrights in India
Lecture 23 - Geographical Indications
Lecture 24 - Designs
Lecture 25 - The Enterpreneurial University
Lecture 26 - Universities and IP
Lecture 27 - Publish or Patent
Lecture 28 - Managing IP at Universities
Lecture 29 - Indian Universities and Patents

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Lecture 30 - Why People Invent
Lecture 31 - How Inventions Look
Lecture 32 - Where to Look for Inventions
Lecture 33 - How to Catch an Invention
Lecture 34 - Getting a working disclosure
Lecture 35 - Searching with the disclosure
Lecture 36 - Outcome of search
Lecture 37 - What is a Patentability Search
Lecture 38 - Reasons for Ordering a Patentability Search
Lecture 39 - When a Patentability Search is Not Required
Lecture 40 - How to Order a Patentability Search
Lecture 41 - Limits of Patentability Search
Lecture 42 - Patentability Search Report
Lecture 43 - Setting up IP Center - Part 1
Lecture 44 - Setting up IP Center - Part 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:English Literature of the Romantic Period, 1798-183

Subject Co-ordinator - Prof. Pramod K Nayar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Publishing, Literacy and Reading - I
Lecture 2 - Publishing, Literacy and Reading - II Literacy, Reading and the Audience
Lecture 3 - Empire
Lecture 4 - Empire - II
Lecture 5 - Science
Lecture 6 - European Romanticism Sensibility
Lecture 7 - Dissent and Revolution
Lecture 8 - The Debate on Rights
Lecture 9 - Nature and the Environment
Lecture 10 - The Self and Imagination
Lecture 11 - Fiction of the Romantic Period
Lecture 12 - Jane Austen
Lecture 13 - Criticism
Lecture 14 - The Historical Novel
Lecture 15 - The Gothic Novel
Lecture 16 - Romantic Poetry 1 - William Blake (1757-1827)
Lecture 17 - Romantic Poetry 1 - Romanticism and sentiment - Introduction
Lecture 18 - Romantic Poetry 1 - Sensibility and Passion
Lecture 19 - Romantic Poetry 2 - William Wordsworth (1770-1850)
Lecture 20 - English Romantic Poetry 1
Lecture 21 - Introduction
Lecture 22 - Wordsworth
Lecture 23 - Coleridge
Lecture 24 - Shelley
Lecture 25 - Keats and Byron
Lecture 26 - Romantic Poetry 3 - Aesthetics Introduction
Lecture 27 - Romantic Poetry 3 - Visual arts and the Romantics
Lecture 28 - Romantic Poetry 3 - Aesthetics Wordsworth
Lecture 29 - Romantic Poetry 3 - Aesthetics Blake

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Lecture 30 - Romantic Poetry 3 - Aesthetics Shelley
Lecture 31 - Romantic Poetry 4 - Politics Introduction Gender and Class
Lecture 32 - Romantic Poetry 4 - Politics
Lecture 33 - Romantic Poetry 4 - Politics Abolitionist Poetry
Lecture 34 - Romantic Poetry 4 - Politics Wordsworth and Shelley
Lecture 35 - Romantic Poetry 4 - Politics John Clare
Lecture 36 - Romantic Literature - Empire and Orientalism Introduction 1
Lecture 37 - Romantic Literature - Empire and Orientalism Introduction 2
Lecture 38 - Romantic Literature - Empire and Orientalism 3 Prose
Lecture 39 - Romantic Literature - Empire and Orientalism 4 Byron
Lecture 40 - Romantic Literature - Empire and Orientalism 5 Felicia Hemans

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NPTEL Video Course - Humanities and Social Sciences - NOC:Appreciating Linguistics: A Typological Approach

Subject Co-ordinator - Prof. Anindita

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Language and Linguistics
Lecture 2 - Introductory concepts
Lecture 3 - Goals of the course
Lecture 4 - Introduction to Language Typology
Lecture 5 - Linguistics as a discipline
Lecture 6 - History of Linguistics
Lecture 7 - Introduction to Morphology - Part 1
Lecture 8 - Introduction to Morphology - Part 2
Lecture 9 - Morphology (Continued...)
Lecture 10 - Simple Compound and Complex Words
Lecture 11 - Morphology - Prefixes, Suffixes and Infixes
Lecture 12 - Introduction to Neologism
Lecture 13 - Word formation rules and Neologism - Part 1
Lecture 14 - Word formation rules and Neologism - Part 2
Lecture 15 - Lexical Typology
Lecture 16 - Lexical Typology (Continued...)
Lecture 17 - Lexical Typology
Lecture 18 - Lexical Typology
Lecture 19 - Lexical Typology
Lecture 20 - Typology of Affixes
Lecture 21 - Morphological Typology
Lecture 22 - Morphological Typology
Lecture 23 - Morphological Typology
Lecture 24 - Morphological Typology
Lecture 25 - Morphological Typology
Lecture 26 - Introduction to Phonetics - Part 1
Lecture 27 - Introduction to Phonetics - Part 2
Lecture 28 - Introduction to Phonetics and Speech sounds - Part 1
Lecture 29 - Introduction to Phonetics and Speech sounds - Part 2

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Lecture 30 - Phonological typology - Part 1
Lecture 31 - Phonological typology - Part 2
Lecture 32 - Introduction to Allophones
Lecture 33 - Introduction to Syntax - Part 1
Lecture 34 - Introduction to Syntax - Part 2
Lecture 35 - Syntactic Structures
Lecture 36 - Prescriptive vs Descriptive approach
Lecture 37 - Introduction to PS rules
Lecture 38 - Deep Structure and Surface Structure
Lecture 39 - Tree diagrams and X - bar structures
Lecture 40 - Movement and Recursion
Lecture 41 - Syntactic Typology - Part 1
Lecture 42 - Syntactic Typology - Part 2
Lecture 43 - Syntactic Typology - Part 3
Lecture 44 - Semantic Typology - Part 1
Lecture 45 - Semantic Typology - Part 2
Lecture 46 - Semantic Typology - Part 3
Lecture 47 - Semantic Typology - Part 4
Lecture 48 - Goals of Language Typology - Part 1
Lecture 49 - Goals of Language Typology - Part 2
Lecture 50 - Pragmatics
Lecture 51 - Pragmatics
Lecture 52 - Pragmatics
Lecture 53 - Pragmatic Typology
Lecture 54 - Typology of language change
Lecture 55 - History of the development Articles
Lecture 56 - Language Change
Lecture 57 - Word Order Typology - Part 1
Lecture 58 - Word Order Typology - Part 2
Lecture 59 - Word Order Typology - Part 3
Lecture 60 - Typology and word change
Lecture 61 - Typology and word change
Lecture 62 - Typology and word change
Lecture 63 - Typology and Universals
Lecture 64 - Typology and Universals (Continued...)
Lecture 65 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Inclusion and Technology Design

Subject Co-ordinator - Prof. Bidisha

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Missing Women in Tech
Lecture 3 - Are Technologies Gender Neutral?
Lecture 4 - ICTs and Gender
Lecture 5 - The Political Nature of Technology Design
Lecture 6 - Accessibility Fundamentals
Lecture 7 - Accessibility Fundamentals
Lecture 8 - Accessibility Fundamentals
Lecture 9 - Designing an Assistive Technology Ecosystem
Lecture 10 - Inclusion in Designing ICT for Development Projects
Lecture 11 - ICTs in Agricultural Markets
Lecture 12 - Inclusion in Designing ICT for Development Projects
Lecture 13 - Digital Labour, Platforms and the Future of Work
Lecture 14 - Assignment Video
Lecture 15 - Assignment Examples Video

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NPTEL Video Course - Humanities and Social Sciences - NOC:Energy Economics and Policy

Subject Co-ordinator - Prof. Shyamasree Dasgupta

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy as an Economic Resource - Introduction
Lecture 2 - Energy as an Economic Resource - Classification of Energy Resource
Lecture 3 - Energy as an Economic Resource - Measurement of Energy
Lecture 4 - Energy as an Economic Resource - Energy Accounting
Lecture 5 - Energy as an Economic Resource - Problem Discussion on Module 1
Lecture 6 - Energy Demand - Part I - Basic concepts in Economics
Lecture 7 - Energy Demand - Part I - Descriptive Analysis of Energy Demand
Lecture 8 - Energy Demand - Part I - Decomposition Analysis and Parametric Approach
Lecture 9 - Energy Demand - Part II - Demand Side Management
Lecture 10 - Energy Demand - Part II - Load Management
Lecture 11 - Energy Demand - Part II - Demand Side Management - Energy Efficiency
Lecture 12 - Energy Demand - Part II - Rebound Effect
Lecture 13 - Energy Supply - Part I - Supply Behaviour of a Producer
Lecture 14 - Energy Supply - Part I - Energy Investment
Lecture 15 - Energy Supply - Part I - Economics of Non-renewable Resources
Lecture 16 - Energy Supply - Part II - Economics of Renewable Energy Supply Setting the context
Lecture 17 - Energy Supply - Part II - Economics of Renewable Energy Supply - Part 1
Lecture 18 - Energy Supply - Part II - Economics of Renewable Energy Supply - Part 2
Lecture 19 - Energy Supply - Part II - Economics of Electricity Supply
Lecture 20 - Energy Market - Prefect Competition as a Market Form
Lecture 21 - Energy Market - Why Energy Market is not Perfectly Competitive?
Lecture 22 - Energy Market - Market Failure and Monopoly
Lecture 23 - Energy Market - Oil Market
Lecture 24 - Energy Market - Oil Market
Lecture 25 - Energy Market - Oil Market
Lecture 26 - Special Topics on Energy - Energy Security
Lecture 27 - Special Topics on Energy - Energy Access
Lecture 28 - Special Topics on Energy - Energy, Environment and Climate Change

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Victorian Gothic Short Story

Subject Co-ordinator - Prof. Divya.A

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - THE GOTHIC - Literary Genre
Lecture 2 - Charles Dickens 'THE SIGNAL - MAN' - I - Close reading and the anxieties of the age
Lecture 3 - Charles Dickens 'THE SIGNAL - MAN' - II - Close reading and the anxieties of the age
Lecture 4 - Charles Dickens 'THE SIGNAL - MAN' - III - Close reading and the anxieties of the age
Lecture 5 - Charles Dickens 'THE SIGNAL - MAN' - IV - Close Reading and the anxieties of the age
Lecture 6 - Charles Dickens 'THE HAUNTED SIGNAL MAN' Lecture Summary and Character Sketches
Lecture 7 - Rudyard Kipling - My own true ghost story
Lecture 8 - Imperial Gothic - Major Characteristics
Lecture 9 - Rudyard Kipling 'My own true ghost story' - Close reading for implications of the imperial Gothic
Lecture 10 - Rudyard Kipling 'My own true ghost story' - Close reading for implications of the imperial Gothi
Lecture 11 - My Own True GhosT STORY - Lecture Summary and Comparison
Lecture 12 - Arthur Conan Doyle - The Red-Headed League - I
Lecture 13 - Arthur Conan Doyle - The Red-Headed League - II
Lecture 14 - Arthur Conan Doyle - The Red-Headed League - III
Lecture 15 - Arthur Conan Doyle 'The Red-Headed League' - A Conversation
Lecture 16 - Arthur Conan Doyle 'The Red-Headed League' - Summary and Interview of the Author
Lecture 17 - H.G. WELLS 'THE RED ROOM' - Close Reading And Its Implications
Lecture 18 - H.G. WELLS 'THE RED ROOM' - Victorian Gothic
Lecture 19 - H.G. WELLS 'THE RED ROOM' - Close Reading And Its Ideological Implications

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NPTEL Video Course - Humanities and Social Sciences - NOC:German-II

Subject Co-ordinator - Prof. Milind Brahme

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Was mochten Sie dieses Semester machen?
Lecture 2 - Wiederholung
Lecture 3 - Wir lernen das Perfekt
Lecture 4 - Wir uben das Perfekt
Lecture 5 - Was hast du in den Ferien gemacht ?
Lecture 6 - Farben und Kleidung
Lecture 7 - Wir lernen PrÃ¤positionen
Lecture 8 - Wir Ã¼ben PrÃ¤positionen
Lecture 9 - PrÃ¤positionen Akkusativ oder Dativ?
Lecture 10 - Was bringt mir der Postbote?
Lecture 11 - Gesundheit
Lecture 12 - Jeder fÃ¼r sich
Lecture 13 - Reflexiv - Akkusativ oder Dativ ?
Lecture 14 - Lektion 1 und Witze und Faust
Lecture 15 - Lektion 2, PrÃ¤teritum von Modalverben, Ordinalzahlen
Lecture 16 - Lektion 2; Detour -- Was ist Geschichte ? | Basic Tenses
Lecture 17 - Was hast du nach der Schule gemacht?
Lecture 18 - Lektion 3
Lecture 19 - Komparativ und Superlativ
Lecture 20 - dass-SÃ¤tze
Lecture 21 - Wir wiederholen Komparativ und Superlativ
Lecture 22 - Imperativ mit 'du' und 'ihr'
Lecture 23 - Wir machen Lektion 5
Lecture 24 - Adjektivdeklination
Lecture 25 - Lektion 6 | Verkehr und Verkehrsmittel
Lecture 26 - Welche Verkehrsmittel benutzt du ? | Indirekte FragesÃ¤tze
Lecture 27 - Lektion 6 -- Aufgaben 4 und 6
Lecture 28 - Lektion 7 -- Es geht ums Lernen
Lecture 29 - Was hast du wann gelernt?

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Lecture 30 - Probleme beim Lernen | Verben mit dem Dativ
Lecture 31 - Welche Probleme hast du beim Lernen ?
Lecture 32 - Perfekt von untrennbaren Verben | Wie lÃ¶se ich meine Probleme beim Lernen ?
Lecture 33 - RatschlÃ¤ge mit sollten | Sprache und Berufe | Wir lesen vor. (Lektion 7)
Lecture 34 - Exkurs ins Absurde! | Generationenprojekte (Lektion 7)
Lecture 35 - Generationenprojekte - wir hÃ¶ren die Texte
Lecture 36 - Welche Sportart mÃ¶chtest du ausprobieren? | deshalb, trotzdem
Lecture 37 - Wiederholung Lektion 7 | Wir machen mit â Lektion 8 weiter.
Lecture 38 - WofÃ¼r entscheiden sich Sandra und Conny ? | Fragewort WO + PrÃ¤position
Lecture 39 - Alles Ã¼ber FragewÃ¶rter
Lecture 40 - Eine Stadt entdecken | Wir beginnen Lektion 9
Lecture 41 - Lektion 9 | Interessante HÃ¤user und Wohnungen
Lecture 42 - Lektion 9 | Die lieben Nachbarn
Lecture 43 - Lektion 9 | HÃ¶fliche Bitte | wenn und als
Lecture 44 - Lektion 9 | Wir Ã¼ben als und wenn. | SÃ¤tze und Wortgruppen
Lecture 45 - Die Deutschen und ihre Haustiere
Lecture 46 - Wir beginnen Lektion 10 | Der Superlativ
Lecture 47 - Welche/r/s und Was fÃ¼r ein/e...
Lecture 48 - Lektion 10 | etwas, man, niemand, jemand...
Lecture 49 - Der Relativsatz | Wir machen Lektion 10 zu Ende
Lecture 50 - Wir machen Lektion 11. | K 2 - Verben und W-Fragen mit PrÃ¤positionen
Lecture 51 - Lektion 12 | Wir sind mit unserem Kurs fertig!

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NPTEL Video Course - Humanities and Social Sciences - NOC:German-I

Subject Co-ordinator - Prof. Milind Brahme

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Herzlich willkommen!
Lecture 2 - Wie ist dein Name ?
Lecture 3 - Ich trinke gern Kaffee
Lecture 4 - Wir konjugieren die Verben
Lecture 5 - A bit of history and ZAHLEN
Lecture 6 - Verben, W-Fragen, Ja-Nein Fragen, Imperativ
Lecture 7 - das Alphabet, die Woche, das Jahr
Lecture 8 - Was sind deine Hobbys ? Formular ausfullen
Lecture 9 - Mein Lehrbuch | Meine personlichen Daten
Lecture 10 - Mein Arbeitsbuch
Lecture 11 - Wir beginnen Lektion 3
Lecture 12 - Wir lesen Lektion 3
Lecture 13 - Kein | Unregelmabige Verben | Ein Lied
Lecture 14 - Wer ist das? | ich-mein; du-dein
Lecture 15 - Lektion 4 Guten Appetit!
Lecture 16 - Das Essen | Some revision
Lecture 17 - mag oder mÃ¶chte | der Akkusativ
Lecture 18 - Ein Lesetext | die Uhr
Lecture 19 - die Uhrzeit | trennbare Verben
Lecture 20 - Familie und Possessiv
Lecture 21 - Wir machen Lektion 6 | Ordinalzahlen
Lecture 22 - Wie feierst du deinen Geburtstag?
Lecture 23 - der Akkusativ | ein WÃ¼rfelspiel
Lecture 24 - das Kaffeehaus |die Kneipe |der Biergarten
Lecture 25 - Lektion 6
Lecture 26 - Sprache, BundeslÃ¤nder, StÃ¤dte | Wir beginnen Lektion 7
Lecture 27 - Akkusativ-Dativ | Annika im BÃ¼ro | Wir machen Kaffee
Lecture 28 - Lektion 7 -- formeller Brief
Lecture 29 - Wie lernst du Deutsch ? Wir hÃ¶ren ein deutsches Lied

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Lecture 30 - Wir lernen die PrÃ¤positionen
Lecture 31 - HÃ¶rverstÃ¤ndnis | Wir beginnen Lektion 8
Lecture 32 - Lektion 8 -- Haus-Wohnung-MÃ¶bel-GerÃ¤te
Lecture 33 - Extra Lektion on Modal Verbs
Lecture 34 - Eine E-Mail schreiben | Eine Wohnung beschreiben
Lecture 35 - Warum ist die Miete so hoch ? | Vorteile und Nachteile
Lecture 36 - Die neue Wohnung -- Was ist wo ? | WechselprÃ¤positionen
Lecture 37 - gefallen, gehÃ¶ren, passen, schmecken
Lecture 38 - Lektion 9 | Wir lernen das Perfekt
Lecture 39 - Lektion 9 | Wir Ã¼ben das Perfekt
Lecture 40 - Was hast du in den Ferien gemacht ?
Lecture 41 - Lektion 9 | Die Jobsuche
Lecture 42 - Lektion 9 | TelefongesprÃ¤che
Lecture 43 - Im Kaufhaus | Welche/Diese
Lecture 44 - Lektion 11 | Korper und Gesundheit
Lecture 45 - Gesund und munter | Wir machen Lektion 11 zu Ende
Lecture 46 - Ab in den Urlaub | Wir machen Lektion 12

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NPTEL Video Course - Humanities and Social Sciences - NOC:Disability Studies: An Introduction

Subject Co-ordinator - Prof. Hemachandran Karah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Disability Definition
Lecture 2 - Medical Model of Disability
Lecture 3 - Social Model of Disability - Part 1
Lecture 4 - Social Model of Disability - Part 2
Lecture 5 - Stigma
Lecture 6 - Stigma and Disability
Lecture 7 - Ableism - Part 1
Lecture 8 - Ableism - Part 2
Lecture 9 - Disability Activism
Lecture 10 - Models of Disability Activism
Lecture 11 - Dependency
Lecture 12 - Interdependence
Lecture 13 - Blindness
Lecture 14 - Blindness as metaphor
Lecture 15 - Eugenics
Lecture 16 - Disability Pride
Lecture 17 - Disability Resilience
Lecture 18 - Disability Passing
Lecture 19 - Coming out
Lecture 20 - Assistive Technology
Lecture 21 - Disability and Ethnography
Lecture 22 - Schizophrenia
Lecture 23 - Autism and the Indian Family
Lecture 24 - Dyslexia and the Modern University
Lecture 25 - Gender and Disability
Lecture 26 - Gender and Disability
Lecture 27 - Lennard Davis, hemachandran karah, normal, normalcy, disability studies
Lecture 28 - The Normal and its End
Lecture 29 - Literary Disability Studies

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Lecture 30 - What is Deaf Culture? An Interview with Dr. Michele Friedner
Lecture 31 - Disability and Life Writing
Lecture 32 - Disability and Metaphor
Lecture 33 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - Introduction to Film Studies (2019)

Subject Co-ordinator - Dr. Aysha Iqbal Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview - Part 1
Lecture 2 - Course Overview - Part 2
Lecture 3 - Cinema and Semiotics - Part 1
Lecture 4 - Cinema and Semiotics - Part 2
Lecture 5 - Cinema and Semiotics - Seven (1995) - Part 1
Lecture 6 - Cinema and Semiotics - Seven (1995) - Part 2
Lecture 7 - Plot in Cinema - Part 1
Lecture 8 - Plot in Cinema - Part 2
Lecture 9 - Plot in CInema - 7 primary types of plot
Lecture 10 - Plot in Cinema - Conflict as a Plot Element
Lecture 11 - Character as a Plot Element - Part 1
Lecture 12 - Character as a Plot Element - Part 2
Lecture 13 - Editing in Cinema - (Montage, Jumpcut) - Part 1
Lecture 14 - Editing in Cinema - (Montage, Jumpcut) - Part 2
Lecture 15 - Realism in Cinema - Part 1
Lecture 16 - Realism in Cinema - Part 2
Lecture 17 - Colour
Lecture 18 - Colour
Lecture 19 - Intertextuality - Casablanca (1942) - Part 1
Lecture 20 - Intertextuality - Casablanca (1942) - Part 2
Lecture 21 - Intertextuality - Blade Runner (1982) - Part 1
Lecture 22 - Intertextuality - Blade Runner (1982) - Part 2
Lecture 23 - Intertextuality - The Matrix (1999) - Part 1
Lecture 24 - Intertextuality - The Matrix (1999) - Part 2
Lecture 25 - Cinema and Modernism - Part 1
Lecture 26 - Cinema and Modernism - Part 2
Lecture 27 - Cinema and Modernism - Part 3
Lecture 28 - Guest Lecture by Sudhish Kamath (Film Critic and Film Maker)
Lecture 29 - The French Masters - Jean Renoir - Part 1

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Lecture 30 - The French Masters - Jean Renoir - Part 2
Lecture 31 - The French Masters - Robert Bresson - Part 1
Lecture 32 - The French Masters - Robert Bresson - Part 2
Lecture 33 - The French Masters - Robert Bresson - Part 3
Lecture 34 - What is a Canon?
Lecture 35 - Canonical Text - Citizen Kane (1941) - Part 1
Lecture 36 - Canonical Text - Citizen Kane (1941) - Part 2
Lecture 37 - Canonical Text - The Godfather (1972/1974) Part 1
Lecture 38 - Canonical Text - The Godfather (1972/1974) Part 2
Lecture 39 - Canonical Text - The Godfather (1972/1974) Part 3
Lecture 40 - Canonical Text - The Godfather (1972/1974) Part 4
Lecture 41 - The Academy Awards Case Study - My Left Foot (1989) and Daniel Day-Lewis Method Acting - Part 1
Lecture 42 - The Academy Awards Case Study - My Left Foot (1989) and Daniel Day-Lewis Method Acting - Part 2
Lecture 43 - Classic Hollywood - HayÃ¢â ¬â ¢s Code, Studio Years, Major Filmmakers - Part 1
Lecture 44 - Classic Hollywood - HayÃ¢â ¬â ¢s Code, Studio Years, Major Filmmakers - Part 2
Lecture 45 - Classic Hollywood - Major Filmmakers, Melodrama - Part 1
Lecture 46 - Classic Hollywood - Major Filmmakers, Melodrama - Part 2
Lecture 47 - Classic Hollywood - Major Filmmakers, Melodrama - Part 3
Lecture 48 - Classic Hollywood - Major Filmmakers, Melodrama - Part 4
Lecture 49 - German Expressionism, Film Noir Case Study
Lecture 50 - German Expressionism, Film Noir Case Study
Lecture 51 - Stars as Icons, Case Study of the Stardom of James Dean and Fandoms - Part 1
Lecture 52 - Stars as Icons, Case Study of the Stardom of James Dean and Fandoms - Part 2
Lecture 53 - Cinema and the Counterculture Movement - Beat Generation, Woodstock Nation, Easy Rider (1968) -
Lecture 54 - Cinema and the Counterculture Movement - Beat Generation, Woodstock Nation, Easy Rider (1968) -
Lecture 55 - Italian Cinema - Part 1
Lecture 56 - Italian Cinema - Part 2
Lecture 57 - Japanese Cinema - Part 1
Lecture 58 - Japanese Cinema - Part 2
Lecture 59 - Auteur Theory in the USA - Part 1
Lecture 60 - Auteur Theory in the USA - Part 2
Lecture 61 - Auteur Theory in the USA - Part 3
Lecture 62 - Auteur Theory in the USA - Part 4
Lecture 63 - New Hollywood - Part 1
Lecture 64 - New Hollywood - Part 2
Lecture 65 - New Hollywood - Part 3
Lecture 66 - New Hollywood - Part 4
Lecture 67 - New Hollywood - Part 5
Lecture 68 - New Hollywood - Part 6

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Lecture 69 - New Hollywood - Part 7
Lecture 70 - New Hollywood - Part 8
Lecture 71 - Cinema and Genres - Part 1
Lecture 72 - Cinema and Genres - Part 2
Lecture 73 - Cinema and Genres - Part 3
Lecture 74 - Cinema and Genres - Part 4
Lecture 75 - Postmodernism and Cinema - Part 1
Lecture 76 - Postmodernism and Cinema - Part 2
Lecture 77 - Postmodernism and Cinema - Part 3
Lecture 78 - Postmodernism and Cinema - Part 4
Lecture 79 - The Western - Part 1
Lecture 80 - The Western - Part 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Literary Criticism (From Plato to Leavis)

Subject Co-ordinator - Prof. Merin Simi Raj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Aristotle's Poetics - Session 1
Lecture 3 - Aristotle's Poetics - Session 2
Lecture 4 - Aristotle's Poetics - Session 3
Lecture 5 - Longinus' Sublimity, Genius, Art
Lecture 6 - Longinus' On the Sublime - Session 2
Lecture 7 - Longinus' On the Sublime - Session 3
Lecture 8 - Scott James' The First Romantic Critic
Lecture 9 - Philip Sidney's - An Apology for Poetry - Session 1
Lecture 10 - Philip Sidney's - An Apology for Poetry - Session 2
Lecture 11 - Philip Sidney's - An Apology for Poetry - Session 3
Lecture 12 - Philip Sidney's - An Apology for Poetry - Session 4
Lecture 13 - The Foundations of Western Philosophy
Lecture 14 - Horace's Ars Poetica
Lecture 15 - John Dryden's 'Preface to The Fables'
Lecture 16 - Critical Importance of Aphra Behn
Lecture 17 - Samuel Johnson's Preface to Shakespeare - Session 1
Lecture 18 - Samuel Johnson's Preface to Shakespeare - Session 2
Lecture 19 - Samuel Johnson's Preface to Shakespeare - Session 3
Lecture 20 - Samuel Johnson's Preface to Shakespeare - Session 4
Lecture 21 - Wordsworth's 'Preface to Lyrical Ballads'
Lecture 22 - Coleridge's 'Biographia Literaria' (Chapter 13 and 14)
Lecture 23 - Shelley's A Defence of Poetry - Part 1
Lecture 24 - Shelley's A Defence of Poetry - Part 2
Lecture 25 - Shelley's A Defence of Poetry - Part 3
Lecture 26 - Shelley's A Defence of Poetry - Part 4
Lecture 27 - Introduction to Peter Barry's Literary Theory
Lecture 28 - Mary Wollstonecraft's A Vindication of the Rights of Women
Lecture 29 - Edgar Allan Poe's The Poetic Principle - Part 1

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Lecture 30 - Edgar Allan Poe's The Poetic Principle - Part 2
Lecture 31 - Leo Tolstoy's What is Art?
Lecture 32 - Matthew Arnold's Study of Poetry
Lecture 33 - Matthew Arnold's Sweetness and Light
Lecture 34 - Russian Formalism
Lecture 35 - Henry James 'The Art of Fiction' (Session 1)
Lecture 36 - T.S. Eliot's 'Tradition and Individual Talent'
Lecture 37 - T.S. Eliot's 'Tradition and Individual Talent' (Session 2)
Lecture 38 - Virginia Woolf's 'Modern Fiction'
Lecture 39 - Virginia Woolf's 'Modern Fiction' (Session 2)
Lecture 40 - Virginia Woolf's 'A Room of One's Own'
Lecture 41 - Virginia Woolf's 'A Room of One's Own' (Session 1)
Lecture 42 - Virginia Woolf's 'A Room of One's Own' (Session 2)
Lecture 43 - Virginia Woolf's 'A Room of One's Own' (Session 3)
Lecture 44 - Rene Wellek's The New Criticism
Lecture 45 - Walter Benjamin's The Work of Art in the Age of Mechanical Reproduction - 1
Lecture 46 - Walter Benjamin's The Work of Art in the Age of Mechanical Reproduction - 2
Lecture 47 - Walter Benjamin's The Work of Art in the Age of Mechanical Reproduction - 3
Lecture 48 - Walter Benjamin's The Work of Art in the Age of Mechanical Reproduction - 4
Lecture 49 - Walter Benjamin's The Storyteller
Lecture 50 - FR Leavis
Lecture 51 - FR Leavis's 'The Great Tradition' (Session 1)
Lecture 52 - FR Leavis's 'The Great Tradition' (Session 2)
Lecture 53 - FR Leavis's 'The Great Tradition' (Session 3)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Twentieth Century Fiction

Subject Co-ordinator - Prof. Avishek Parui

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Postmaster - Part 1
Lecture 2 - The Postmaster - Part 2
Lecture 3 - The Postmaster - Part 3
Lecture 4 - The Fly - 1
Lecture 5 - The Fly - 2
Lecture 6 - Heart of Darkness - Part 1
Lecture 7 - Heart of Darkness - Part 2
Lecture 8 - Heart of Darkness - Part 3
Lecture 9 - Heart of Darkness - Part 4
Lecture 10 - Heart of Darkness - Part 5
Lecture 11 - Heart of Darkness - Part 6
Lecture 12 - Heart of Darkness - Part 7
Lecture 13 - Heart of Darkness - Part 8
Lecture 14 - Heart of Darkness - Part 9
Lecture 15 - Love Song of J. Alfred Prufrock - Part 1
Lecture 16 - Love Song of J. Alfred Prufrock - Part 2
Lecture 17 - Love Song of J. Alfred Prufrock - Part 3
Lecture 18 - Preludes - Part 1
Lecture 19 - Preludes - Part 2
Lecture 20 - The Wasteland - Part 1
Lecture 21 - The Wasteland - Part 2
Lecture 22 - The Wasteland - Part 3
Lecture 23 - Similarity of Myths, Fallen Cities of History, Ganga, Philomel
Lecture 24 - Twentieth century Dublin, Decadance, Focalization, Sexual imagery
Lecture 25 - Biblical marker, Eroticization, Metonymy, Cinematic quality
Lecture 26 - Knightly quest, Fib, Bazar, Epiphany
Lecture 27 - Relativity of universe, Kafkaesque quality, Fetish, Thing theory
Lecture 28 - Material Engagement Theory, Uncanny, Perverse consumption
Lecture 29 - Mimicry, Abandonment, Thingness of objects

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Lecture 30 - Mrs. Dalloway - Part 1
Lecture 31 - Mrs. Dalloway - Part 2
Lecture 32 - Mrs. Dalloway - Part 3
Lecture 33 - Mrs. Dalloway - Part 4
Lecture 34 - Mrs. Dalloway - Part 5
Lecture 35 - Emotion, Medicine, Contrasts of high and low culture, Stiff upper lip
Lecture 36 - Bergson's philosophy of time, Rest cure, Affect, Clock time
Lecture 37 - Power in medical discourse, Shakespeare, Trauma and self-realization, Food
Lecture 38 - Depression, Suicide, Civilization, Courage
Lecture 39 - Ulysses - Part 1
Lecture 40 - Ulysses - Part 2
Lecture 41 - Ulysses - Part 3
Lecture 42 - Ulysses - Part 4
Lecture 43 - Ulysses - Part 5
Lecture 44 - Summary
Lecture 45 - Ulysses - Part 6
Lecture 46 - Ulysses - Part 7
Lecture 47 - Gibraltar, Numbers, Movement, Directionlessness
Lecture 48 - Promiscuity, Writerly text, Narrativity, Postmodernism
Lecture 49 - Toba Tek Singh - Part 1
Lecture 50 - Toba Tek Singh - Part 2
Lecture 51 - Toba Tek Singh - Part 3
Lecture 52 - Toba Tek Singh - Part 4
Lecture 53 - Toba Tek Singh - Part 5
Lecture 54 - Mrs. Dalloway - Part 10
Lecture 55 - Modernist Poetry
Lecture 56 - The Chess Players - Part 1
Lecture 57 - The Chess Players - Part 2
Lecture 58 - The Chess Players - Part 3
Lecture 59 - The Chess Players - Part 4
Lecture 60 - Conclusion
Lecture 61 - Modernist Fiction

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NPTEL Video Course - Humanities and Social Sciences - NOC:Modern Indian Writing in Translation

Subject Co-ordinator - Prof. Divya.A

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Hunger Of Stones
Lecture 2 - Hunger Of Stones (Continued...)
Lecture 3 - Translation (Introduction); Nagamandala and Hunger of Stones
Lecture 4 - Introduction to Literature in Translation in India
Lecture 5 - The Blue Light - Part 1
Lecture 6 - The Blue Light - Part 2
Lecture 7 - The Blue Light - Part 3
Lecture 8 - Gold From the Grave - Part 1
Lecture 9 - Gold From the Grave - Part 2
Lecture 10 - Gold From the Grave - Part 3
Lecture 11 - Toba Tek Singh - Part 1
Lecture 12 - Toba Tek Singh - Part 2
Lecture 13 - Toba Tek Singh - Part 3
Lecture 14 - Crossing the Ravi - Part 1
Lecture 15 - Crossing the Ravi - Part 2
Lecture 16 - Writing Effective Paragraph
Lecture 17 - Stench of Kerosene - Part 1
Lecture 18 - Stench of Kerosene - Part 2
Lecture 19 - Stench of Kerosene - Part 3
Lecture 20 - Stench of Kerosene - Part 4
Lecture 21 - The Man Who Could Not Sleep - Part 1
Lecture 22 - The Man Who Could Not Sleep - Part 2
Lecture 23 - The Man Who Could Not Sleep - Part 3
Lecture 24 - The Man Who Could Not Sleep - Part 4
Lecture 25 - Nagamandala - Part 1
Lecture 26 - Nagamandala - Part 2
Lecture 27 - Nagamandala - Part 3
Lecture 28 - Nagamandala - Part 4
Lecture 29 - Nagamandala - Part 5

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Lecture 30 - Nagamandala - Part 6
Lecture 31 - Nagamandala - Part 7
Lecture 32 - Tamarind History - Part 1
Lecture 33 - Tamarind History - Part 2
Lecture 34 - Tamarind History - Part 3
Lecture 35 - Tamarind History - Part 4
Lecture 36 - Tamarind History - Part 5
Lecture 37 - Tamarind History - Part 6
Lecture 38 - Tamarind History - Part 7
Lecture 39 - Indian poetry - Part 1
Lecture 40 - Indian poetry - Part 2
Lecture 41 - Indian poetry - Part 3
Lecture 42 - Indian poetry - Part 4
Lecture 43 - Indian poetry - Part 5
Lecture 44 - Indian poetry - Part 6

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Political Ideologies: Contexts, Ide

Subject Co-ordinator - Prof. Arvind Sivaramakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fascism Introduction and Main Ideas
Lecture 2 - Fascism - problems. The Hindu right and Nazism
Lecture 3 - Ordinary people's part in fascism. A worked example
Lecture 4 - Background and forms of conservatism
Lecture 5 - Main ideas and main problems in conservatism
Lecture 6 - Short recap. Politics in a conservative society. India survey evidence
Lecture 7 - Worked example
Lecture 8 - Introduction. Main ideas with examples
Lecture 9 - Forms of the liberal state
Lecture 10 - Forms of liberalism
Lecture 11 - Multiculturalism
Lecture 12 - Main problems in liberalism
Lecture 13 - Return to editingBiography. Main concepts lecture 1
Lecture 14 - Marx main concepts lecture 2
Lecture 15 - Contradictions, cyclical crises in capitalism. Problems in Marx
Lecture 16 - Marx - worked examples older and current
Lecture 17 - Historical background; global appeal, recent revival; Catalonia; Occupy
Lecture 18 - Anarchism main ideas and examples. The MondragÃ³n Corporation
Lecture 19 - Mutualism; syndicalism; anarchocapitalism
Lecture 20 - Evaluating anarchism - debates and examples
Lecture 21 - Intro, historical background leading to the present
Lecture 22 - Feminism - main concepts, with examples
Lecture 23 - Feminism and other ideologies
Lecture 24 - Intersectionality and Intersectionality - worked examples
Lecture 25 - Human environmental impact and forms of response. Ecological concepts. Examples and selected cor
Lecture 26 - Ecologism - main concepts, with examples
Lecture 27 - Ecologism and politics
Lecture 28 - Ecologism today. Conceptual problems - the idea of nature. Natural capital - worked example
Lecture 29 - Poststructuralism; Derrida and Foucault; background and explanation. Political engagement

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Lecture 30 - Postmodernism; challenge to and contrast with modernism; wide impact. Postmodern theory. Critici
Lecture 31 - Recap on problems in Derrida and Foucault. Postmodernist theory. Worked example 1
Lecture 32 - Postsrucuralism and postmodernism worked examples 2 and 3
Lecture 33 - Definitions. Theocracy - main themes, main problems, with examples
Lecture 34 - Fundamentalism - contexts for emergence, types of fundamentalism, rejection of modernity, Manich
Lecture 35 - Worked examples
Lecture 36 - Definitions - technocracy and managerialism. Outline of technocracy - long history. Main problem
Lecture 37 - Managerialism - self-conception; efficiency; claim to expertise; problems and failures - concept
Lecture 38 - Technocracy and managerialism - worked examples
Lecture 39 - Nationalism - introduction
Lecture 40 - Nationalism - main themes. The nation; community or organic community; self-determination; ident
Lecture 41 - Identity politics. Forms of nationalism. Nationalism and colonialism
Lecture 42 - Nationalism - conceptual problems. Brexit
Lecture 43 - Worked examples
Lecture 44 - Republicanism and Citizenship Introduction
Lecture 45 - Citizenship as substantive membership of the polity
Lecture 46 - Republicanism and Citizenship problems and conclusion. Worked examples

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NPTEL Video Course - Humanities and Social Sciences - NOC:Feminism: Concepts and Theories

Subject Co-ordinator - Prof. Mathangi Krishnamurthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Feminism
Lecture 2 - Vocabulary
Lecture 3 - Vocabulary (Continued...)
Lecture 4 - Feminism is for everybody
Lecture 5 - Key Concepts
Lecture 6 - Key Concepts
Lecture 7 - Key Concepts
Lecture 8 - Key Concepts
Lecture 9 - Key Concepts
Lecture 10 - Key Concepts
Lecture 11 - Care
Lecture 12 - Key Concepts
Lecture 13 - Key Concepts
Lecture 14 - Key Concepts
Lecture 15 - Feminist Theory
Lecture 16 - Feminist Theory
Lecture 17 - The Feminist Body - Part I
Lecture 18 - The Feminist Body - Part II
Lecture 19 - Feminism in India
Lecture 20 - Feminism in India
Lecture 21 - Feminism in India
Lecture 22 - Feminism of Work and Labor - I
Lecture 23 - Feminism of Work and Labor - II
Lecture 24 - Feminism and Affective/ Emotional Labor
Lecture 25 - Female Impersonators in Parsi Theatre
Lecture 26 - Feminism and Film
Lecture 27 - Feminisms
Lecture 28 - Feminisms
Lecture 29 - Feminisms

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Lecture 30 - Title
Lecture 31 - Title
Lecture 32 - Learnings And Conclusions
Lecture 33 - Summary - Weeks 1-4
Lecture 34 - Summary - Weeks 5-11
Lecture 35 - Final exam structure and suggestions

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NPTEL Video Course - Humanities and Social Sciences - NOC:Poetry

Subject Co-ordinator - Prof. S P Dhanavel

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Relevance of Poetry
Lecture 2 - Approaching Poetry
Lecture 3 - Functions of Poetry
Lecture 4 - Forms of Poetry
Lecture 5 - Poetic Devices
Lecture 6 - The Music of Poetry
Lecture 7 - Geoffrey Chaucer (c. 1343-1400)
Lecture 8 - The Prologue
Lecture 9 - Elizabethan Poetry
Lecture 10 - Sir Thomas Wyatt
Lecture 11 - Henry Howard
Lecture 12 - Sir Philip Sidney
Lecture 13 - Edmund Spenser (1552-1559)
Lecture 14 - Michael Drayton (1563-1631)
Lecture 15 - Samuel Daniel (1563-1619)
Lecture 16 - William Shakespeare (1564-1616)
Lecture 17 - Metaphysical Poetry
Lecture 18 - John Donne - 1
Lecture 19 - John Donne - 2
Lecture 20 - George Herbert
Lecture 21 - Henry Vaughan
Lecture 22 - Andrew Marvell
Lecture 23 - John Milton - 1
Lecture 24 - John Milton - 2
Lecture 25 - Neo-Classical and Pre-Romantic Poetry
Lecture 26 - John Dryden - 1
Lecture 27 - John Dryden - 2
Lecture 28 - Alexander Pope - 1
Lecture 29 - Alexander Pope - 2

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Lecture 30 - Thomas Gray
Lecture 31 - William Collins
Lecture 32 - William Blake
Lecture 33 - Romantic Poetry
Lecture 34 - William Wordsworth - 1
Lecture 35 - William Wordsworth - 2
Lecture 36 - Samuel Taylor Coleridge
Lecture 37 - John Keats
Lecture 38 - Percy Bysshe Shelley
Lecture 39 - Victorian Poetry
Lecture 40 - Alfred, Lord Tennyson
Lecture 41 - Robert Browning
Lecture 42 - Elizabeth Barrett Browning
Lecture 43 - Matthew Arnold
Lecture 44 - Gerard Manley Hopkins
Lecture 45 - Modernist Poetry
Lecture 46 - William Butler Yeats
Lecture 47 - T S Eliot - 1
Lecture 48 - T S Eliot - 2
Lecture 49 - Wilfred Owen
Lecture 50 - Dylan Thomas
Lecture 51 - American Poetry
Lecture 52 - Robert Frost
Lecture 53 - Wallace Stevens
Lecture 54 - William Carlos Williams
Lecture 55 - A R Ammons
Lecture 56 - Langston Hughes
Lecture 57 - Feminist Poetry
Lecture 58 - Maya Angelou
Lecture 59 - Adrienne Rich
Lecture 60 - Sylvia Plath
Lecture 61 - P. K. Page
Lecture 62 - Judith Wright
Lecture 63 - Contemporary British Poetry
Lecture 64 - Seamus Heaney
Lecture 65 - Carol Ann Duffy
Lecture 66 - Simon Armitage
Lecture 67 - Indian Poetry in English
Lecture 68 - Nissim Ezekiel

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Lecture 69 - Kamala Das
Lecture 70 - A K Ramanujan
Lecture 71 - Jayanta Mahapatra
Lecture 72 - Discussion-1 - Part 1
Lecture 73 - Discussion-1 - Part 2
Lecture 74 - Discussion-2 - Part 1
Lecture 75 - Discussion-2 - Part 2
Lecture 76 - Outro to Poetry - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Popular Gothic Novel

Subject Co-ordinator - Prof. Divya.A

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Gothic Elements; Gothic Sublime.
Lecture 3 - Introduction
Lecture 4 - Gothic Forebonding; Affinity with the French Revolution; Types of Gothic Fiction
Lecture 5 - Gothic and identities, Empire, Contemporary Anxieties
Lecture 6 - Ann Radcliffe, The Mystries of Udolpho
Lecture 7 - Gothic Castle, Gothic Energy, Gothic Sensibility
Lecture 8 - Reading the Gothic Novel; Gothic and Family
Lecture 9 - Gothic Domesticity and Patriarchy
Lecture 10 - Gothic and Travel, Marriage, Discussion Questions
Lecture 11 - The Gothic Contexts
Lecture 12 - Plotting the Gothic
Lecture 13 - Feminine Silence and Marginality
Lecture 14 - Gothic Landscape
Lecture 15 - Historical and Literary Contexts
Lecture 16 - Gothic Parody
Lecture 17 - Gothic Terrors and the Education of Catherine Morland
Lecture 18 - Gothic Reading and Mentor Figures
Lecture 19 - Gothic Parody and Female Gothic
Lecture 20 - Parodying the Gothic Villain
Lecture 21 - Introduction to Emily Bronte and Wuthering Heights
Lecture 22 - Gothic terror, Fantasy and Violence
Lecture 23 - Gothic Transgressions
Lecture 24 - Gothic Displacement
Lecture 25 - Gothic Displacement
Lecture 26 - Introduction to Charlotte Bronte, and the plot of Jane Eyre
Lecture 27 - Gothic Plot and Imperial Gothic
Lecture 28 - Gothic Subtexts; Madness and Femininity
Lecture 29 - Gothic Rebellion and Symbols

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Lecture 30 - Gothic Rebellion, The Domestic and the Colony
Lecture 31 - Introduction to the Christmas Ghost Story and Charles Dickens
Lecture 32 - The Gothic Plot, Spectrality, and Commodity
Lecture 33 - The Dark Narrative; The Ghostly Children
Lecture 34 - Gothic City
Lecture 35 - Gothic Structure and The Consciousness
Lecture 36 - Introduction to Dracula, Literary Contexts and Gothic Monsters
Lecture 37 - Gothic Sexuality, Tradition, and Metaphors
Lecture 38 - Gothic Transformations and Narrative Roles
Lecture 39 - Gothic Symbolisms
Lecture 40 - The Urban Gothic, New Woman and Gothic Monsters
Lecture 41 - Introduction to the author; the novel; literary Contexts
Lecture 42 - Plotting and the Female Gothic
Lecture 43 - Imperial Gothic
Lecture 44 - Legacies of Empire and Gothic
Lecture 45 - Imperial Gothic, and the Orient
Lecture 46 - Introduction to Doyle and conrtexts
Lecture 47 - Gothic Plot
Lecture 48 - Anxieties of the Past and the Future
Lecture 49 - Gothic tropes, landscape and cultural anxieties
Lecture 50 - Gothic Crime and Mythical Subtexts
Lecture 51 - Gothic Evil
Lecture 52 - Introduction to Oscar Wilde; Literary Contexts; Plot of the novel
Lecture 53 - Aesthetic Gothic
Lecture 54 - Aestheticism and Degeneracy
Lecture 55 - Gothic Art and Morality
Lecture 56 - Gothic Setting
Lecture 57 - Gothic Setting (Continuation...)
Lecture 58 - Dicken's Realist Gothic 'Bleak House' Women's Writing
Lecture 59 - Lectuer Overview
Lecture 60 - Lectuer Overview
Lecture 61 - Overview of Frankenstein and Jane Eyre
Lecture 62 - Lectuer Overview

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NPTEL Video Course - Humanities and Social Sciences - NOC:Classical Sociological Theory

Subject Co-ordinator - Prof. R. Santhosh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sociology an Overview
Lecture 2 - Sociological perspective
Lecture 3 - C Wrigh Mill's Socioloigcal Imagination
Lecture 4 - Thinking Sociologically
Lecture 5 - Emergence of Sociology
Lecture 6 - Enlightenment
Lecture 7 - Emegernce of nation-state and French Revolution
Lecture 8 - Industrial revolution and the rise of capitalism
Lecture 9 - Discussion with Dr. Roland Part - 1
Lecture 10 - Discussion with Dr. Roland Part - 2
Lecture 11 - Clasical Thinkers of Sociology
Lecture 12 - Auguste Comte
Lecture 13 - Herbert Spencer
Lecture 14 - Marx Durkheim and Weber
Lecture 15 - Factory scene from Modern Times
Lecture 16 - Karl Marx Life
Lecture 17 - Intellectual Influence
Lecture 18 - Historical Materialism
Lecture 19 - Marxian theory of social Change
Lecture 20 - Theory of Capitalism - 1
Lecture 21 - Theory of Capitalism - 2
Lecture 22 - Karl Marx and Alienation
Lecture 23 - Karl Marx and Religion
Lecture 24 - Marx on Democracy, and Colonialism
Lecture 25 - Marx - An Appraisal
Lecture 26 - Emile Durkheim; Life and Intellectual Influences
Lecture 27 - The Rules of the Sociological Method
Lecture 28 - Division of Labour (1893)
Lecture 29 - Division of Labour (Continued...)

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Lecture 30 - Suicide (1897)
Lecture 31 - Elementary forms of Religious Life (1912)
Lecture 32 - Durkheim on Education, Colonialism and Democracy
Lecture 33 - Durkheim An Assessment
Lecture 34 - Max Weber
Lecture 35 - Weberâ s Methodology of the Social Sciences
Lecture 36 - Rationalization and social action
Lecture 37 - Rationalization and Authority
Lecture 38 - The Protestant Ethic and Spirit of Capitalism
Lecture 39 - MODERN RATIONAL CAPITALISM
Lecture 40 - Bureaucracy
Lecture 41 - Social Stratification
Lecture 42 - Comparative Religion and Disenchantment
Lecture 43 - Weber on democracy and colonialism
Lecture 44 - Critical Assessment
Lecture 45 - Ferdinand Tonnies (1885-1936)
Lecture 46 - George Simmel (1858 - 1918)
Lecture 47 - Social Differentiation and Conflict
Lecture 48 - Simmel on Philosophy of Money
Lecture 49 - Mind, Self and Society
Lecture 50 - George Herbert Mead
Lecture 51 - Mead on Self
Lecture 52 - Mead on Society
Lecture 53 - Perkins Gilman and the gender question
Lecture 54 - Dubois and question of race
Lecture 55 - Classical Sociological Theory and Modernity
Lecture 56 - Subsequent Development of Sociological Theory
Lecture 57 - Conflict Theory
Lecture 58 - Interactionist Perspective
Lecture 59 - Theoretical orientations and methodologies
Lecture 60 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Basics of Language Science

Subject Co-ordinator - Prof. Rajesh Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Goals and Objectives
Lecture 3 - Fundamentals of the Course
Lecture 4 - Language and Linguistics
Lecture 5 - Aspects of Language
Lecture 6 - Language of Continuum
Lecture 7 - I-Language and E-Language
Lecture 8 - Language Acquisition
Lecture 9 - Learning and Acquisition
Lecture 10 - Structure of Language (Sounds)
Lecture 11 - Vocal Apparatus and Salient Features of Sounds
Lecture 12 - Places and Manners of Articulations of Sounds
Lecture 13 - Phonotactic Rules and Word Formation
Lecture 14 - Making of a Word: Rules and Constraints
Lecture 15 - What Makes a Sentence?
Lecture 16 - Components of a Sentence
Lecture 17 - Grammaticality vs Acceptability
Lecture 18 - Subject and Predicate
Lecture 19 - Verb and Object
Lecture 20 - Phrase Structure
Lecture 21 - X Bar Theory
Lecture 22 - Specifier and Complement
Lecture 23 - Complements and Adjuncts
Lecture 24 - Components of a Verb Phrase
Lecture 25 - Categories and Selectional Restrictions on Verbs
Lecture 26 - Thematic Relations
Lecture 27 - Concept of Case in Natural Language
Lecture 28 - Morphological and Abstract Case
Lecture 29 - Structural Case

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Lecture 30 - Exceptional Case Marking
Lecture 31 - Movement (Displacement of Constituents) in Natural Language
Lecture 32 - Motivation for Movement of Language Constituents
Lecture 33 - Movement of Constituents in Interrogative Sentences
Lecture 34 - Displacement of Noun Phrases in Passive Constructions
Lecture 35 - NP Movement and Raising of Constituents
Lecture 36 - Noun Phrase Interpretations in Binding Theory
Lecture 37 - Principles of Binding Theory
Lecture 38 - Constraints on Displacement of Constituents
Lecture 39 - Negation in the Structure of Language
Lecture 40 - Negation and Negative Polarity Items in Natural Language
Lecture 41 - Understanding Cognition and Pragmatics in the Structure of Language

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NPTEL Video Course - Humanities and Social Sciences - NOC:Globalization: Theoretical Perspectives

Subject Co-ordinator - Prof. R. Santhosh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Globalization - Key Debates - 1
Lecture 3 - Globalization - Key Debates - 2
Lecture 4 - What is Globalization?
Lecture 5 - Globalization - Major Players
Lecture 6 - Cultural Globalization
Lecture 7 - Cultural Globalization - Introduction II
Lecture 8 - The Clash of Civilizations?
Lecture 9 - The Cultural Construction of Neoliberal Globalization
Lecture 10 - McDonaldization thesis by George Ritzer
Lecture 11 - Arjun Appadurai
Lecture 12 - Arjun Appadurai - II
Lecture 13 - Production of Localities - Arjun Appadurai
Lecture 14 - Appadurai on Violence
Lecture 15 - Rooted Cosmopolitanism: Emerging From a Rivalry of Distinctions
Lecture 16 - Globalization and modernity debate
Lecture 17 - Globalization and modernity: Anthony Giddens the consequences of modernity
Lecture 18 - Globalization and modernity: Anthony Giddens the consequences of modernity (Continued...)
Lecture 19 - Globalization and modernity: Anthony Giddens the consequences of modernity (Continued...)
Lecture 20 - Giddens : Consequences of Modernity Globalization : Key Thinkers by William Jones
Lecture 21 - Giddens and the 'runaway world'
Lecture 22 - David Harvey : Conditions of Postmodernity
Lecture 23 - Reflexive Modernity : Ulrich Beck -1
Lecture 24 - Continuation of Reflexive Modernity : Ulrich Beck - 1
Lecture 25 - Continuation of Reflexive Modernity : Ulrich Beck - 1
Lecture 26 - Space, time, place and flows David Harvey, Saskia Sassen and Manuel Castells
Lecture 27 - Time-Space Compression: David Harvey
Lecture 28 - Saskia Sassen and Spatiality
Lecture 29 - The city: localizations of the global: Saskia Sassen

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Lecture 30 - Manuel Castells: Introduction
Lecture 31 - Manuel Castells: Theory of Space and Flows
Lecture 32 - Manuel Castells: Time of Flows
Lecture 33 - Castells : Information Age
Lecture 34 - Globalized Space Centres Cities - Solly Benjamin
Lecture 35 - Globalized Space Centres Cities - Solly Benjamin
Lecture 36 - Ulrich Beck- The Nation-state and Globalizaation - Part I
Lecture 37 - Ulrich Beck- The Nation-state and Globalizaation - Part II
Lecture 38 - Ulrich Beck- The Risk Society - Part I
Lecture 39 - Ulrich Beck- The Risk Society - Part II
Lecture 40 - Ulrich Beck- The Risk Society - Part III
Lecture 41 - Anti-Globalization: The Empire Thesis - Part I
Lecture 42 - Anti-Globalization: The Empire Thesis - Part II
Lecture 43 - Globalization and its Discontents: Joseph Stigiliz
Lecture 44 - Imaginations of Alternate Globalization - Part I
Lecture 45 - Imaginations of Alternate Globalization - Part II
Lecture 46 - Globalization and the Environment
Lecture 47 - Media and Global Culture
Lecture 48 - Religion and Globalization - Part I
Lecture 49 - Religion and Globalization - Part II
Lecture 50 - Religion and Globalization - Part III
Lecture 51 - The Modernity of caste and the Market Economy - Part I
Lecture 52 - The Modernity of caste and the Market Economy - Part II
Lecture 53 - Gender, Dowry and the Migration System of Indian IT professionals
Lecture 54 - Employment, Exclusion and 'Merit' in the Indian IT Industry
Lecture 55 - Medical Tourism in India: Progress or Predicament?
Lecture 56 - Globalisation, Class and Work in India
Lecture 57 - The New Middle class and Employment
Lecture 58 - Consuming Goa: Tourist site as Dispensable Space
Lecture 59 - The regional identity politics of India's new land wars: Land, Food and Popular Mobilisation in
Lecture 60 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Towards an Ethical Digital Society: From Theory to

Subject Co-ordinator - Prof. Bidisha Chaudhuri

Co-ordinating Institute - IIIT - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Ethics: What, Why and Why not?
Lecture 2 - Technology And Ethics: To Do Good Or To Do No Harm?
Lecture 3 - Centralized Technology, Localized Services: A Case For Selective Inclusion?
Lecture 4 - Smart Cities And Equity
Lecture 5 - Data Or An Anti-Politics Machine?
Lecture 6 - Data, Democracy and Justice
Lecture 7 - Ai And Ethics, Governance, Policy: Landscape And Roadmap
Lecture 8 - On A Materialist Conception Of AI And Ethics
Lecture 9 - Keynote - Technology And Ethics: An Economist's Ruminations
Lecture 10 - Poster Presentations

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NPTEL Video Course - Humanities and Social Sciences - NOC:Literary and Cultural Disability Studies: An Explor

Subject Co-ordinator - Prof. Hemachandran Karah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Module 1: Disability and the Problem of Canon
Lecture 2 - Introduction to LCDS - Part 1
Lecture 3 - Introduction to LCDS - Part 2
Lecture 4 - Autobiography and Disability: A Review via the writings of Ved Mehta
Lecture 5 - Themes of Attachments, Blindness and Infrastructures of Care in Mehtas Intimate Worlds
Lecture 6 - Introduction to Module 2: Disability and Literary Criticism
Lecture 7 - Conversation with Ms. Deepa Kiran
Lecture 8 - Conversation with Dr. Sona Hill Kazemi
Lecture 9 - Introduction to Module 3: Disability and the Multilingual Question
Lecture 10 - Interview with Prof. Amy Shuman
Lecture 11 - Conversation with Prof Ato Quayson: Aesthetic Nervousness and Disability
Lecture 12 - Conversation with Prof. Chithra
Lecture 13 - Introduction to Module 4: Disability and Interdisciplinarity respectively
Lecture 14 - Studying the Notion of Trauma via Cynthia Ozicks Short Story The Shawl
Lecture 15 - Critique of Trauma via Cynthia Ozick's The Shawl
Lecture 16 - Metamorphosis: A Story of Human Predicament
Lecture 17 - Metamorphosis: A Critique of the Politics of Abandonment
Lecture 18 - Anjali: A Watershed Moment in Care Ethics - Part 1
Lecture 19 - Anjali: A Filmic begin in Integration and Inclusion - Part 2
Lecture 20 - Tradition and Individual Madness
Lecture 21 - The Mark On The Wall (Continued...)
Lecture 22 - Intellectual Statism: The Problem of Reality and Magical Realism
Lecture 23 - Busting Fictional and Cognitive Monochromatism
Lecture 24 - Kubla Khan By Samuel Taylor Coleridge: A Classroom Discussion
Lecture 25 - The Most Popular Story Of Christopher Boone, A Fictional Aspergic Detective
Lecture 26 - Neurotypicality, Yet Another Catchment Area of the Bestsellers
Lecture 27 - Introduction To Deaf Ways Of Living As A Linguistic Minority - Part 1
Lecture 28 - Introduction To Deaf Ways Of Living As A Linguistic Minority - Part 2
Lecture 29 - Demonstration Of The Workings Of ISL; Its Beauty And Diversity - Part 1

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Lecture 30 - Demonstration Of The Workings Of ISL; Its Beauty And Diversity - Part 2
Lecture 31 - Sign Vocabulary and the Dictionary of ISL - Part 1
Lecture 32 - Sign Vocabulary and the Dictionary of ISL - Part 2
Lecture 33 - Talk By Prof. Tanmoy Bhattacharya on Sign Language and Linguistics - Part 1
Lecture 34 - Talk By Prof. Tanmoy Bhattacharya on Sign Language and Linguistics - Part 2
Lecture 35 - Teaching Science for Deaf Children: A Personal Experience
Lecture 36 - The Theme Culture Of Hearing In Thirukural, A Classical Tamil Book of Couplets
Lecture 37 - Governmentality
Lecture 38 - Governmentality and Disability Studies: A Special Connection
Lecture 39 - Data, Disability, and Census: An Indian Experience
Lecture 40 - Medical Education And Disability
Lecture 41 - Design, Accommodation, and Disability
Lecture 42 - Medical Humanities and Disability
Lecture 43 - Making Paper Pumpkins Work for DS: Towards a Moral Politics of Vulnerability

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NPTEL Video Course - Humanities and Social Sciences - NOC:Trauma and Literature

Subject Co-ordinator - Prof. Avishek Parui

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Overview
Lecture 2 - Manto's Toba Tek Singh - Part 1
Lecture 3 - Manto's Toba Tek Singh - Part 2
Lecture 4 - Manto's Toba Tek Singh - Part 3
Lecture 5 - Manto's Thanda Gosht
Lecture 6 - Mansfield's The Fly - Part 1
Lecture 7 - Mansfield's The Fly - Part 2
Lecture 8 - Mansfield's The Fly - Part 3
Lecture 9 - Woolf's Mrs. Dalloway - Part 1
Lecture 10 - Woolf's Mrs. Dalloway - Part 2
Lecture 11 - Woolf's Mrs. Dalloway - Part 3
Lecture 12 - Woolf's Mrs. Dalloway - Part 4
Lecture 13 - Woolf's Mrs. Dalloway - Part 5
Lecture 14 - Woolf's Mrs. Dalloway - Part 6
Lecture 15 - Woolf's Mrs. Dalloway - Part 7
Lecture 16 - Malabou's The New Wounded - Part 1
Lecture 17 - Malabou's The New Wounded - Part 2
Lecture 18 - Malabou's The New Wounded - Part 3
Lecture 19 - Malabou's The New Wounded - Part 4
Lecture 20 - Malabou's The Ontology of the Accident - Part 1
Lecture 21 - Malabou's The Ontology of the Accident - Part 2
Lecture 22 - Malabou's The Ontology of the Accident - Part 3
Lecture 23 - Malabou's The Ontology of the Accident - Part 4
Lecture 24 - Malabou's The Ontology of the Accident - Part 5
Lecture 25 - Malabou's The Ontology of the Accident - Part 6
Lecture 26 - Malabou's The Ontology of the Accident - Part 7
Lecture 27 - Malabou's The Ontology of the Accident - Part 8
Lecture 28 - Heller's Catch-22 - Part 1
Lecture 29 - Heller's Catch-22 - Part 2

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Lecture 30 - Heller's Catch-22 - Part 3
Lecture 31 - Heller's Catch-22 - Part 4
Lecture 32 - Heller's Catch-22 - Part 5
Lecture 33 - Heller's Catch-22 - Part 6
Lecture 34 - Heller's Catch-22 - Part 7
Lecture 35 - Heller's Catch-22 - Part 8
Lecture 36 - Heller's Catch-22 - Part 9
Lecture 37 - Butalia's The Other Side of Silence - Part 1
Lecture 38 - Butalia's The Other Side of Silence - Part 2
Lecture 39 - Butalia's The Other Side of Silence - Part 3
Lecture 40 - Butalia's The Other Side of Silence - Part 4
Lecture 41 - Butalia's The Other Side of Silence - Part 5
Lecture 42 - Butalia's The Other Side of Silence - Part 6
Lecture 43 - Butalia's The Other Side of Silence - Part 7
Lecture 44 - Dangarembga's Nervous Conditions - Part 1
Lecture 45 - Dangarembga's Nervous Conditions - Part 2
Lecture 46 - Dangarembga's Nervous Conditions - Part 3
Lecture 47 - Dangarembga's Nervous Conditions - Part 4
Lecture 48 - Dangarembga's Nervous Conditions - Part 5
Lecture 49 - Dangarembga's Nervous Conditions - Part 6
Lecture 50 - Vonnegut's Slaughterhouse-five - Part 1
Lecture 51 - Vonnegut's Slaughterhouse-five - Part 2
Lecture 52 - Vonnegut's Slaughterhouse-five - Part 3
Lecture 53 - Vonnegut's Slaughterhouse-five - Part 4
Lecture 54 - Vonnegut's Slaughterhouse-five - Part 5
Lecture 55 - Toni Morrison's Beloved - Part 1
Lecture 56 - Toni Morrison's Beloved - Part 2
Lecture 57 - Toni Morrison's Beloved - Part 3
Lecture 58 - Toni Morrison's Beloved - Part 4
Lecture 59 - Toni Morrison's Beloved - Part 5
Lecture 60 - Toni Morrison's Beloved - Part 6
Lecture 61 - Carruth's Unclaimed Experience - Part 1
Lecture 62 - Carruth's Unclaimed Experience - Part 2
Lecture 63 - Carruth's Unclaimed Experience - Part 3
Lecture 64 - Ann Whitehead's Trauma Fiction - Part 1
Lecture 65 - Ann Whitehead's Trauma Fiction - Part 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Twentieth Century American Drama

Subject Co-ordinator - Prof. Merin Simi Raj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Lecture
Lecture 2 - Eugene O'Neil's The Emperor Jones - Part 1
Lecture 3 - Eugene O'Neil's The Emperor Jones - Part 2
Lecture 4 - Eugene O'Neil's The Emperor Jones - Part 3
Lecture 5 - Eugene O'Neil's The Emperor Jones - Part 4
Lecture 6 - Arthur Miller's Death of a Salesman - Part 1
Lecture 7 - Arthur Miller's Death of a Salesman - Part 2
Lecture 8 - Arthur Miller's Death of a Salesman - Part 3
Lecture 9 - Arthur Miller's Death of a Salesman - Part 4
Lecture 10 - Arthur Miller's Death of a Salesman - Part 5
Lecture 11 - Arthur Miller's Death of a Salesman - Part 6
Lecture 12 - Arthur Miller's Death of a Salesman - Part 7
Lecture 13 - Arthur Miller's Death of a Salesman - Part 8
Lecture 14 - Arthur Miller's Death of a Salesman - Part 9
Lecture 15 - Arthur Miller's All My Sons - Part 1
Lecture 16 - Arthur Miller's All My Sons - Part 2
Lecture 17 - Arthur Miller's All My Sons - Part 3
Lecture 18 - Arthur Miller's All My Sons - Part 4
Lecture 19 - Arthur Miller's All My Sons - Part 5
Lecture 20 - Arthur Miller's All My Sons - Part 6
Lecture 21 - Arthur Miller's All My Sons - Part 7
Lecture 22 - You Can't Take it with You - Part 1
Lecture 23 - You Can't Take it with You - Part 2
Lecture 24 - You Can't Take it with You - Part 3
Lecture 25 - You Can't Take it with You - Part 4
Lecture 26 - The Glass Menagerie - Part 1
Lecture 27 - The Glass Menagerie - Part 2
Lecture 28 - The Glass Menagerie - Part 3
Lecture 29 - The Glass Menagerie - Part 4

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Lecture 30 - Albee's Who's Afraid of Virginia Woolf - Part 1
Lecture 31 - Albee's Who's Afraid of Virginia Woolf - Part 2
Lecture 32 - Albee's Who's Afraid of Virginia Woolf - Part 3
Lecture 33 - Albee's Who's Afraid of Virginia Woolf - Part 4
Lecture 34 - Albee's Who's Afraid of Virginia Woolf - Part 5
Lecture 35 - Albee's The Zoo Story - Part 1
Lecture 36 - Albee's The Zoo Story - Part 2
Lecture 37 - Albee's The Zoo Story - Part 3
Lecture 38 - Albee's The Zoo Story - Part 4
Lecture 39 - Albee's The Zoo Story - Part 5
Lecture 40 - Hansberry's Day in the Sun - Part 1
Lecture 41 - Hansberry's Day in the Sun - Part 2
Lecture 42 - Hansberry's Day in the Sun - Part 3
Lecture 43 - Hansberry's Day in the Sun - Part 4
Lecture 44 - Hansberry's Day in the Sun - Part 5
Lecture 45 - Post World War II American Theatre: A Historical Perspective
Lecture 46 - American Theatre in Context: 1945- Present - Part 1
Lecture 47 - American Theatre in Context: 1945- Present - Part 2
Lecture 48 - American Theatre in Context: 1945- Present - Part 3
Lecture 49 - August Wilson's The Piano Lesson - Part 1
Lecture 50 - August Wilson's The Piano Lesson - Part 2
Lecture 51 - August Wilson's The Piano Lesson - Part 3
Lecture 52 - August Wilson's The Piano Lesson - Part 4
Lecture 53 - August Wilson's The Piano Lesson - Part 5
Lecture 54 - August Wilson's The Piano Lesson - Part 6
Lecture 55 - August Wilson's The Piano Lesson - Part 7
Lecture 56 - August Wilson's The Piano Lesson - Part 8
Lecture 57 - Modern American Drama 1945-2000: Redefining the Centre

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NPTEL Video Course - Humanities and Social Sciences - NOC:Fundamental Concepts in Sociolinguistics

Subject Co-ordinator - Prof. Om Prakash

Co-ordinating Institute - Gautam Buddha University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Language as a System
Lecture 3 - Design Features
Lecture 4 - Linguistic Relativity
Lecture 5 - Language and Culture
Lecture 6 - Language and Gender
Lecture 7 - Behaviourist paradigm in language acuquisition
Lecture 8 - Innateness Hypothesis [Generative Paradigm] in Language Acquisition
Lecture 9 - Key Concepts in Language Acquisition Lad, Ug, and poverty Stimulus
Lecture 10 - Linguistic Competence
Lecture 11 - Communicative Competence
Lecture 12 - Critical Period Hypothesis
Lecture 13 - Dialects
Lecture 14 - Speech Community
Lecture 15 - Diglossia
Lecture 16 - Systemic Functions of Language
Lecture 17 - SPEAKING Model
Lecture 18 - Register and Style
Lecture 19 - Bilingualism - Part I
Lecture 20 - Bilingualism - Part II
Lecture 21 - Code Mixing and Switching
Lecture 22 - Language Hybridity Case of Hindi-English Mixing
Lecture 23 - Pidgin and Creole
Lecture 24 - Creolization Process and birth of a Language
Lecture 25 - Mixing and Switching: Creative Outcome of Bi/Multilingual Mind
Lecture 26 - Language Policy and Planning
Lecture 27 - Types of Language Planning
Lecture 28 - Official Languages of India
Lecture 29 - The Process of Standardization

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Lecture 30 - Three Language Formula
Lecture 31 - The Eighth Schedule
Lecture 32 - Mother Tongue
Lecture 33 - Linguistic Diversity of India
Lecture 34 - Schedule and Non-Schedule Languages Census of India 2011
Lecture 35 - Multilingualism in India
Lecture 36 - Language and Education Policy
Lecture 37 - English in India
Lecture 38 - Emergence of Sociolinguistics As An Independent Discipline
Lecture 39 - Language and Variations
Lecture 40 - William Labov Martha's Vineyard Island Study
Lecture 41 - William Labov Social Stratification of English in New York City (1966)
Lecture 42 - Observers Paradox and Sociolinguistic Variable
Lecture 43 - Dell Hymes and His Work
Lecture 44 - Basil Bernstein and His Work
Lecture 45 - John J. Gumperz and His Work
Lecture 46 - Joshua Fishman and His Work
Lecture 47 - Uriel Weinriech and his work
Lecture 48 - Susan Ervin M Tripp and her work
Lecture 49 - Charlse A Ferguson and his Work
Lecture 50 - William Bright and his work
Lecture 51 - Allen D Grimshaw and his work
Lecture 52 - MAK Halliday and His Work
Lecture 53 - MAK Halliday and His Work
Lecture 54 - Signific Studies in Language Variation
Lecture 55 - Indian English
Lecture 56 - Multilingual Societies and Multilingual Discourse
Lecture 57 - Language Endangerment
Lecture 58 - Linguistic Identity and Language Movements
Lecture 59 - Liguistic Identity and language Movements in India
Lecture 60 - Ferdinand de Saussure and his Influence
Lecture 61 - Saussureâ s Key Concepts
Lecture 62 - 20th Century Theoretical Developments in Linguistics
Lecture 63 - Varieties of Language
Lecture 64 - Linguistic Landscape
Lecture 65 - Linguistic Allegiance, Identity, and Socialization in Digital Space
Lecture 66 - Recapitulating Language Acquistion
Lecture 67 - Review and Concluding Remarks
Lecture 68 - Significance of Culture in Language Learning/Teaching

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NPTEL Video Course - Humanities and Social Sciences - NOC:Literature and Life

Subject Co-ordinator - Prof. S P Dhanavel

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is literature ?
Lecture 2 - What is Life ?
Lecture 3 - The Relationship between Literature and Life
Lecture 4 - Approaches to Literature and Life
Lecture 5 - Essay
Lecture 6 - Poetry
Lecture 7 - Drama
Lecture 8 - The Novel and the Short Story
Lecture 9 - Abdul Kalams When I Failed
Lecture 10 - Chetan Bhagats My Stupid Suicide Plan
Lecture 11 - R K Narayans Toasted English
Lecture 12 - Amishs Why I Write
Lecture 13 - George Orwells Politics and the English Language
Lecture 14 - William Zinssers Writing English as a Second Language
Lecture 15 - Joan Didions Why I Write
Lecture 16 - Virginia Woolfs The Death of the Moth
Lecture 17 - William Wordsworths Resolution and Independence
Lecture 18 - H W Longfellows A Psalm of Life
Lecture 19 - W H Davies Leisure
Lecture 20 - Robert Frosts Mending Wall
Lecture 21 - Emily Dickinsons A Narrow Fellow in the Grass
Lecture 22 - Kamala Dass Words
Lecture 23 - Louise GlÃ¼cks The Mountain
Lecture 24 - Sujata Bhatts Search for My Tongue
Lecture 25 - Girish Karnads Tughlaq: An Introduction
Lecture 26 - Characters and Characterization in Karnads Tughlaq
Lecture 27 - Sources, Structure, Form, Themes, and Techniques in Tughlaq
Lecture 28 - Irony, Humor and Symbol in Tughlaq
Lecture 29 - Tughlaq: Further Analysis

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Lecture 30 - Anton Chekhovs The Bear
Lecture 31 - The Bear: An Analysis
Lecture 32 - J M Synges Riders to the Sea
Lecture 33 - Riders to the Sea: An Analysis
Lecture 34 - Aravind Adigas The White Tiger: An Introduction
Lecture 35 - Characters and Characterization in Aravind Adigas The White Tiger
Lecture 36 - Themes and Techniques in Aravind Adigas The White Tiger
Lecture 37 - Literary Devices in The White Tiger
Lecture 38 - Aravind Adigas The White Tiger: Further Analysis
Lecture 39 - Guy de Maupassants The Dispenser of Holy Water
Lecture 40 - Katherine Mansfields A Cup of Tea
Lecture 41 - Heinrich Bolls Action Will Be Taken
Lecture 42 - Joao Guimaraes Rosas The Third Bank of the River
Lecture 43 - G G Joshi's The Letter
Lecture 44 - Ruskin Bond's The Boy Who Broke the Bank
Lecture 45 - Anjana Appachana's Sharmaji
Lecture 46 - Isaac Asimovs True Love
Lecture 47 - Discussion 1 - Prose
Lecture 48 - Discussion 2 - Poetry
Lecture 49 - Discussion 3 - Drama
Lecture 50 - Discussion 4 - Novel

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NPTEL Video Course - Humanities and Social Sciences - NOC:German - III

Subject Co-ordinator - Prof. Milind Brahme

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - GUTE REISE. Reisen, Ferien und Urlaub
Lecture 2 - Infinitiv mit zu
Lecture 3 - Wir lernen das Verb lassen
Lecture 4 - Das Verb lassen / Ã ber eine Reise sprechen und schreiben
Lecture 5 - Wir Machen Lektion 1 Zu Ende
Lecture 6 - Wir Sprechen Ã ber Vorlieben Und Abneigungen
Lecture 7 - Mein Lieblingsurlaub
Lecture 8 - Wir beginnen mit Kapitel 2
Lecture 9 - Kapitel 2. Wir Lernen Die Konnektoren -- Weil, Deshalb, Obwohl Und Trotzdem
Lecture 10 - Der Genitiv
Lecture 11 - Der Genitiv -- Die PrÃ¤positionen wegen und trotz -- Wir machen Lektion 2 zu Ende
Lecture 12 - Wir machen Lektion 3.
Lecture 13 - Das PrÃ¤teritum
Lecture 14 - Technik im Alltag
Lecture 15 - Die PrÃ¤positionen vor, nach und wÃ¤hrend.
Lecture 16 - Neue Technologien - Eine Meinung
Lecture 17 - Wir Ã¼ben Konnektoren. Wir beginnen mit Lektion 4
Lecture 18 - Wir machen mit Lektion 4 weiter
Lecture 19 - Wir lernen das PrÃ¤teritum und den Konjunktiv 2
Lecture 20 - Verben mit PrÃ¤positionen - Lektion 4
Lecture 21 - Wir machen Lektion 4 zu Ende
Lecture 22 - Was bedeutet GlÃ¼ck fÃ¼r mich?
Lecture 23 - Umweltfreundlich? Wir machen Lektion 5
Lecture 24 - GlÃ¼cklich sein und umweltfreundlich leben. Lektion 5: Komparativ und Superlativ
Lecture 25 - Wir wiederholen Adjektiv- und n-Deklination
Lecture 26 - Umweltschutz und Tierschutz. Wir machen Lektion 5 zu Ende.
Lecture 27 - Wir bereiten uns auf eine PrÃ¤sentation vor.
Lecture 28 - Relativsatz 1
Lecture 29 - Relativsatz 2. Und wir lesen eine kleine Geschichte.

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Lecture 30 - Zukunftszeichen und VorsÃ¤tze fÃ¼rs neue Jahr: Wir lernen Futur I.
Lecture 31 - Relativsatz - eine Wiederholung | Zukunft: Hamburg 2030
Lecture 32 - Was kann ich fÃ¼r die Umwelt tun? (I)
Lecture 33 - Was kann ich fÃ¼r die Umwelt tun? (II)
Lecture 34 - Was kann ich fÃ¼r die Umwelt tun? (III)
Lecture 35 - Kleines StÃ¤de-Quiz
Lecture 36 - Was kann ich fÃ¼r die Umwelt tun? (IV)
Lecture 37 - Wir lernen und Ã¼ben das Plusquamperfekt.
Lecture 38 - Wir beginnen mit Kapitel 7.
Lecture 39 - Thema Beziehungskisten. Wir lernen dabei temporale NebensÃ¤tze kennen.
Lecture 40 - Wir Ã¼ben temporale NebensÃ¤tze.
Lecture 41 - BerÃ¼hmte Paare. Wir machen Kapitel 7 zu Ende.
Lecture 42 - Wir beginnen mit Kapitel 8.
Lecture 43 - Im Krankenhaus. brauchen nicht und brauchen nur + zu | dass Stze und Infinitiv Stze
Lecture 44 - Wir wiederholen und ben das Reflexiv.
Lecture 45 - Wofr interessierst du dich? | Reflexiv und zweiteilige Konnektoren: Wir machen Kapitel 8 zu Ende
Lecture 46 - Thema: Hotel Mama. Prasentationen der Lernenden. (I)
Lecture 47 - Hotel Mama. Prasentationen der Lernenden. (II)
Lecture 48 - PrÃ¤sentationen der Lernenden zum Thema Hotel Mama (III)
Lecture 49 - ErgÃ¤nzung der Adjektivdeklination. Wir beginnen mit Kapitel 9.
Lecture 50 - PrÃ¤sentationen der Lernenden zum Thema Hotel Mama (IV)
Lecture 51 - Wir sehen einen Film zum Thema Hotel Mama.
Lecture 52 - Stellung von nicht im Satz.| Volkslieder
Lecture 53 - Wir lernen das Passiv.
Lecture 54 - Wir lernen und Ã¼ben das Passiv.
Lecture 55 - Wir Ã¼ben das Passiv. (II) | PrÃ¤positionen mit dem Genitiv | Wir machen Kapitel 10 zu Ende.
Lecture 56 - Adjektivdeklination - Wiederholung | Kapitel 11: ArtikelwÃ¶rter als Pronomen
Lecture 57 - Kapitel 11: Adjektiv als Nomen | SprichwÃ¶rter | ErgÃ¤nzung zu den RelativsÃ¤tzen
Lecture 58 - Kapitel 11: StÃ¤dterankings | RelativsÃ¤tze mit was und wo
Lecture 59 - Wir machen Kapitel 11 zu Ende. | SÃ¤tze mit je...desto
Lecture 60 - Kapitel 12: Verben als Adjektive - Partizip 2 und Partizip 1
Lecture 61 - Wir lernen und ?ben das Passiv.
Lecture 62 - Kapitel 12: Lesetexte zu den Themen Globalisierung und Gewissensfragen
Lecture 63 - Zwei Prasentationen zum Thema: Leben - in der Stadt oder auf dem Land?
Lecture 64 - Kapitel 12: Lesetext -- Die Fuggerei in Augsburg
Lecture 65 - Zwei Prasentationen zum Thema: Leben - in der Stadt oder auf dem Land? (II)
Lecture 66 - Prasentationen zum Thema: Leben - in der Stadt oder auf dem Land? (III)
Lecture 67 - Prasentationen zum Thema: Leben - in der Stadt oder auf dem Land? (IV)
Lecture 68 - Prasentationen zum Thema: Leben - in der Stadt oder auf dem Land? (V) | Wir lernen

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Lecture 69 - Wir lernen, wie man einen informellen Brief oder eine informelle E-Mail schreibt

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NPTEL Video Course - Humanities and Social Sciences - NOC:Appreciating Hindustani Music

Subject Co-ordinator - Prof. Lakshmi Sreeram

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Hindustani Music - A World of Colour, Romance and History
Lecture 2 - Classical or Shastriya - What's in a Name !
Lecture 3 - Dhrupad, Khayal and Instrumental Music: A Bird's-eye View
Lecture 4 - Hindustani Music is Raga Sangeet
Lecture 5 - The Textual Tradition
Lecture 6 - Swara and Shruti: Tone and Microtone
Lecture 7 - Swara and Shruti in the Textual Tradition
Lecture 8 - Tanpura - The King of Overtones
Lecture 9 - Entering the World of Raga â Raga and Swara
Lecture 10 - The World of Raga 2 : Strong and Weak Notes
Lecture 11 - The World of Raga 3 : Ornament
Lecture 12 - The World of Raga 4 : Paths of a Raga
Lecture 13 - Raga and Time Association
Lecture 14 - Raga-Lakshana or Features of Raga
Lecture 15 - Defining Raga
Lecture 16 - Classification of Ragas - The Mela or Thaat System
Lecture 17 - Classification of Ragas - The Raagaanga System
Lecture 18 - Classification of Ragas - Raga Ragini System
Lecture 19 - Extending the Raga Corpus - Winds from the South
Lecture 20 - Extending the Raga Corpus - Jod Ragas
Lecture 21 - Principles of Time in Hindustani Music - Tala and Laya
Lecture 22 - Some Aspects of Tala and a Few Important Talas
Lecture 23 - Tabla as Keeper of Tala in Khayal
Lecture 24 - Khayal, A Compositional Form - 1
Lecture 25 - Khayal, A Compositional Form - 2
Lecture 26 - Khayal Compositions by Contemporary Composers
Lecture 27 - The Vilambit Khayal
Lecture 28 - Tarana and Trivat
Lecture 29 - Raga Vistaar or Badhat - Improvisation in Khayal

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Lecture 30 - Ashtaanga of Khayal - The Many Limbs of a Khayal Presentation
Lecture 31 - A Typical Khayal Concert
Lecture 32 - A Khayal Rendition of Raga Bageshri by Dr. Lakshmi Sreeram
Lecture 33 - Gharanas - Schools/Styles of Khayal
Lecture 34 - Gharanas of Khayal - An Introduction
Lecture 35 - Gharanas of Khayal - Early Masters
Lecture 36 - Gharanas of Khayal - Twentieth Century Masters
Lecture 37 - Gharana - Lectuer Demonstration by Pt. Satyasheel Deshpande
Lecture 38 - Melodic Accompaniment in Khayal
Lecture 39 - The Harmonium as Accompaniment for Khayal - Guest Lectuer
Lecture 40 - Dhrupad and Khayal - Some Comparative Remarks
Lecture 41 - Dhrupad - An Overview
Lecture 42 - Dhrupad - Style and Structure
Lecture 43 - Dhrupad - Aalaap
Lecture 44 - Dhrupad - Song Texts in Different Talas
Lecture 45 - Dhamaar - A Compositional Form
Lecture 46 - Sadra - A Compositional Form
Lecture 47 - The Enchanting World of Thumri
Lecture 48 - Instrumental Music - A Brief Overview
Lecture 49 - The Sitar - The Instrument, Technique and Presentation
Lecture 50 - The Sarod - A Lecdem
Lecture 51 - Art of the Tabla - Introduction
Lecture 52 - Bhakthande and Paluskar - The 20th Century Reformers of Hindustani Music
Lecture 53 - Hindustani Music in a World of Millions of Views

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NPTEL Video Course - Humanities and Social Sciences - NOC:An Introduction to Indian Literary Theory

Subject Co-ordinator - Prof. Sreenath V.S

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Social History of Sanskrit and the Origin of KÃ vya
Lecture 2 - The RÃ mÃ yaÃ¡Â¹â ¡a and Sanskrit Literary Theory
Lecture 3 - The Genesis and Evolution of Sanskrit Literary Theory
Lecture 4 - The Actual Relation Between KÃ vyaÃ â ºÃ stra or KÃ vya
Lecture 5 - Sanskrit KÃ vyaÃ â ºÃ stra in the Medieval Period
Lecture 6 - Sanskrit Literary Theoreticians - Early Period
Lecture 7 - Sanskrit Literary Theoreticians - Medieval Period A
Lecture 8 - Sanskrit Literary Theoreticians - Medieval Period B
Lecture 9 - Sanskrit Literary Theory in the Colonial Period
Lecture 10 - Sanskrit poetics in the Postcolonial Phase
Lecture 11 - Reader in Sanskritic kÃ vya tradition
Lecture 12 - Who is the ideal spectator for nÃ Ã¡Â¹Â-ya?
Lecture 13 - DaÃ â ºarÃ Â«paka: Ten dramatic forms - Part I
Lecture 14 - DaÃ â ºarÃ Â«paka: Ten dramatic forms - Part II
Lecture 15 - UparÃ Â«pakas
Lecture 16 - KÃ vya and the Three Languages
Lecture 17 - KÃ vyasvarÃ Â«pa or the Ontology of Poetry
Lecture 18 - Bharata and the Idea of Rasa
Lecture 19 - The Beginning of Rasa Discourse in Literary Theory
Lecture 20 - Rasa Theory and Ã â ¬nandavardhana
Lecture 21 - Rasa Theory and BhaÃ¡Â¹Â-Ã¡Â¹Â- LollaÃ¡Â¹Â-a
Lecture 22 - Rasa Theory and Ã Å¡ri Ã Å¡aÃ¡Â¹â ¦kuka
Lecture 23 - Rasa Theory and BhaÃ¡Â¹Â-Ã¡Â¹Â-a Tauta
Lecture 24 - Rasa Theory and BhaÃ¡Â¹Â-Ã¡Â¹Â-a NÃ yaka
Lecture 25 - Rasa Theory and Abhinavagupta
Lecture 26 - Rasa Theory, RÃ macandra and GuÃ¡Â¹â ¡acandra
Lecture 27 - Rasa Theory and VidyÃ dhara
Lecture 28 - The Theory of Alamkara
Lecture 29 - The Concept of Aucitya: An Introduction

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Lecture 30 - The Concept of Aucitya and KÃ¡Â¹Â£emendra
Lecture 31 - Two Ways of Implementing Aucitya - Part 1
Lecture 32 - Two Ways of Implementing Aucitya - Part 2
Lecture 33 - Aucitya and KaviÃ â ºikÃ¡Â¹Â£a
Lecture 34 - Aucitya and the Readers
Lecture 35 - Aucitya and the Opinion of Literary Theoreticians
Lecture 36 - Aucitya and Ã â ¬nandavardhana
Lecture 37 - Guna or Poetic Merit: Bharata and Bhamaha
Lecture 38 - Guna or Poetic Merit: DaÃ¡Â¹â ¡Ã¡Â¸in and UdbhaÃ¡Â¹Â-a
Lecture 39 - Guna or Poetic Merit: VÃ man's Contribution
Lecture 40 - Guna or Poetic Merit: Ã â ¬nandavardhana, NamidÃ shu and PratihÃ renduraja
Lecture 41 - Guna or Poetic Merit: Bhoja
Lecture 42 - Guna or Poetic Merit: ViÃ â ºveÃ â ºvara and the author of AgnipurÃ Ã¡Â¹â ¡a
Lecture 43 - Guna or Poetic Merit: MammaÃ¡Â¹Â-'s View
Lecture 44 - RÃ Â«ti or the Theory of Poetic Styles
Lecture 45 - Theory of Dosa or Poetic Blemish: Bharat's View
Lecture 46 - Theory of DoÃ¡Â¹Â£a or Poetic Blemish: BhÃ mah's View
Lecture 47 - Theory of DoÃ¡Â¹Â£a or Poetic Blemish: DaÃ¡Â¹â ¡dinÃ¢â ¬â ¢s View
Lecture 48 - Theory of DoÃ¡Â¹Â£a or Poetic Blemish: VÃ man's View
Lecture 49 - Theory of DoÃ¡Â¹Â£a or Poetic Blemish: Ã â ¬nandavardhana and MammaÃ¡Â¹Â-'s Views
Lecture 50 - Theory of DoÃ¡Â¹Â£a or Poetic Blemish: MammaÃ¡Â¹Â-'s View II
Lecture 51 - Theory of DoÃ¡Â¹Â£a or Poetic Blemish: Ã â ¬nandavardhana and MammaÃ¡Â¹Â-'s View III
Lecture 52 - Vakrokti: An Introduction
Lecture 53 - Vakrokti: Pada-pÃ Â«rvÃ rtha-vakrata - I
Lecture 54 - Vakrokti: Pada-pÃ Â«rvÃ rtha-vakrata - II
Lecture 55 - Vakrokti: Pada-pÃ Â«rvÃ rtha-vakrata - III
Lecture 56 - Vakrokti: PadaparÃ rddha vakratÃ
Lecture 57 - Vakrokti: VÃ kya-vakratÃ
Lecture 58 - Vakrokti: PrakaraÃ¡Â¹â ¡a-vakratÃ
Lecture 59 - Vakrokti: Prabandha vakratÃ
Lecture 60 - Dhvani: AvivakÃ¡Â¹Â£ita-vÃ cya
Lecture 61 - VivakÃ¡Â¹Â£itÃ nya-paravÃ cya

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NPTEL Video Course - Humanities and Social Sciences - NOC:Host-Pathogen Interaction (Immunology)

Subject Co-ordinator - Prof. Himanshu Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Immunology - 1
Lecture 2 - History of Immunology - 2
Lecture 3 - History of Immunology - 3
Lecture 4 - History of Immunology - 4 (Nobel Prizes in Immunology)
Lecture 5 - Branches of Immunology
Lecture 6 - An Introduction of Immune system-immunity properties
Lecture 7 - An Introduction of Immune system-link between innate and adaptive immunity
Lecture 8 - An Introduction of immune organs
Lecture 9 - Immune organs - 1
Lecture 10 - Immune organs - 2
Lecture 11 - Immune organs - 3
Lecture 12 - Cells of Immune System - Hematopoiesis
Lecture 13 - Cells of Immune System - Transgenesis - 1
Lecture 14 - Cells of Immune System - Transgenesis - 2
Lecture 15 - Cells of Immune System and and its role in Host Defense - PBMC isolation
Lecture 16 - Cells of Immune System and and its role in Host Defense - Neutrophils
Lecture 17 - Cells of Immune System and and its role in Host Defense - Eosinophils, Basophils, Mast cells
Lecture 18 - Cells of Immune System and and its role in Host Defense - Dendritic cells
Lecture 19 - Cells of Immune System and and its role in Host Defense - Macrophages
Lecture 20 - Cells of Immune System and and its role in Host Defense - Natural Killer cells and NK T cells
Lecture 21 - Cells of Immune System and and its role in Host Defense - B and T cells
Lecture 22 - Basics of Cytokines
Lecture 23 - Basics of Cytokines-Cytokine function and other Immune Mediators
Lecture 24 - Inflammation and Signature of Inflammation
Lecture 25 - Signatures of Inflammation
Lecture 26 - Application of Interferons in Therapies
Lecture 27 - Application of Cytokines in Therapies and Research
Lecture 28 - Introduction of Innate Immunity
Lecture 29 - Introduction of Innate Immunity - Physical, Bio-chamical and Microbiological Barriers

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Lecture 30 - Introduction of Innate Immunity - skin
Lecture 31 - Introduction of Innate Immunity - Mucosal Surfaces and Microbiological Barrier
Lecture 32 - Concept of Pattern - recognition receptors (PRRs)
Lecture 33 - Pattern-recognition receptors - TLRs and TLR Ligand
Lecture 34 - Pattern-recognition receptors - TLRs Signaling and MyD88 and TRIF-dependent signalling
Lecture 35 - Pattern-recognition receptors - TLRs and Diseases
Lecture 36 - Pattern-recognition receptors - TLRs and Therapeutics
Lecture 37 - Pattern-recognition receptors - RLR
Lecture 38 - Pattern-recognition receptors - RLR Signaling pathways
Lecture 39 - Pattern-recognition receptors - RLR associated-Diseases and therapeutics
Lecture 40 - Pattern-recognition receptors - NLR and NLR Signaling pathways
Lecture 41 - Pattern-recognition receptors - NLR and Diseases
Lecture 42 - Pattern-recognition receptors - Discovery of DNA Sensor
Lecture 43 - Pattern-recognition receptors - DNA Sensor and Signaling pathway
Lecture 44 - Pattern-recognition receptors - DNA Sensor and Diseases
Lecture 45 - Innate Immunity - Complement Introduction
Lecture 46 - Complement - Classical Pathway
Lecture 47 - Complement - Alternative and Lectin Pathway
Lecture 48 - Complement - Regulation and Diseases
Lecture 49 - Introduction to the adaptive Immunity
Lecture 50 - Adaptive Immunity - Antigen
Lecture 51 - Adaptive Immunity - Antigen/Immunogen Properties
Lecture 52 - Adaptive Immunity - B and T cells Antigenic epitopes
Lecture 53 - Adaptive Immunity - Antibodies
Lecture 54 - Adaptive Immunity - Antibody types
Lecture 55 - Adaptive Immunity - Antibody Diversity
Lecture 56 - Adaptive Immunity - T cells and T cell-mediated Immune responses
Lecture 57 - Host-virus interaction
Lecture 58 - Innate Immunity during virus infection - Type I Interferon-dependent
Lecture 59 - Innate Immunity during virus infection - Type I Interferon-independent
Lecture 60 - Innate immune evasion by viruses
Lecture 61 - Adaptive Immune Responses Against Viruses
Lecture 62 - Adaptive immune evasion by viruses
Lecture 63 - Influenza Virus and Disease - 1
Lecture 64 - Influenza Virus and Disease - 2
Lecture 65 - Influenza Virus and Disease - 3
Lecture 66 - Influenza Virus and Disease - 4
Lecture 67 - Influenza Virus and Disease - 5
Lecture 68 - Influenza Virus and Disease - 6

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Lecture 69 - Arbovirus and Aroboviral diseases
Lecture 70 - Arbovirus and Dengue virus infection
Lecture 71 - Arbovirus and Zika virus infection
Lecture 72 - Introduction to Bacterial Infection
Lecture 73 - Virulence factor during Bacterial Infection
Lecture 74 - Bacterial Infection - Tuberculosis - 1
Lecture 75 - Bacterial Infection - Tuberculosis - 2
Lecture 76 - Bacterial Infection - Tuberculosis - 3
Lecture 77 - Fungal Infection - 1
Lecture 78 - Fungal Infection - 2
Lecture 79 - Introduction to the parasite infection and Malaria
Lecture 80 - Parasite infection - Trpanosomiasis (African Sleeping Sickness)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Feminisms: Concepts and Issues

Subject Co-ordinator - Prof. Anandita Pan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Feminism ?
Lecture 2 - Making of Indian Feminism - Part 1
Lecture 3 - Making of Indian Feminism - Part 2
Lecture 4 - Women's Activism
Lecture 5 - Gender and Anti-caste movements
Lecture 6 - Dalit Women's Activism
Lecture 7 - Identity, Difference and Intersectionality - Part 1
Lecture 8 - Identity, Difference and Intersectionality - Part 2
Lecture 9 - Nation and the Construction of Woman
Lecture 10 - Social Reformation - Part 1
Lecture 11 - Social Reformation - Part 2
Lecture 12 - Nationalism and the 'Women's Question
Lecture 13 - Nationalism and the New Patriarchy
Lecture 14 - Concept of Endogamy
Lecture 15 - Nation through the Lens of Women's Autobiographies
Lecture 16 - Gender and Violence
Lecture 17 - Theorising Violence - Dowry
Lecture 18 - Theorising Violence - Domestic Violence
Lecture 19 - Theorising Violence - Rape
Lecture 20 - Theorising Violence - Heteronormativity and Sexuality
Lecture 21 - Resisting Violence
Lecture 22 - Gender and Labour
Lecture 23 - Women's Labour in India - The 20th Century
Lecture 24 - Gender and Class
Lecture 25 - Sexual Harassment in Workplace
Lecture 26 - Gender, Labour, and Agency - Part 1
Lecture 27 - Gender, Labour, and Agency - Part 2
Lecture 28 - Through the Lens of Gender - Textual Analysis
Lecture 29 - Feminist Futures

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NPTEL Video Course - Humanities and Social Sciences - NOC:United Nations Sustainable Development Goals

Subject Co-ordinator - Prof. Shiva Ji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, United Nations and a World in Order
Lecture 2 - Scenario of Current Model of Growth and Development
Lecture 3 - Need for Change
Lecture 4 - Definition of Sustainability, Aspects of Sustainability, Transition from MDGs to SDGs - Part 1
Lecture 5 - Definition of Sustainability, Aspects of Sustainability, Transition from MDGs to SDGs - Part 2
Lecture 6 - The Role of UN and the Need for SDGs and Adoption by the World
Lecture 7 - Scope and Inclusion and Agenda 2030
Lecture 8 - Our Common Future and Philosophy behind SDGs
Lecture 9 - Distinction between Development and Sustainable Development
Lecture 10 - Circular economy
Lecture 11 - Design for sustainability
Lecture 12 - Thinking Alternatives and Innovation
Lecture 13 - Causal Mapping, Systemic Mapping and Problem Identification
Lecture 14 - Identifying probable interventions for SD, Framework and Structuring of Seventeen SDGs
Lecture 15 - No Poverty - Part 1
Lecture 16 - No Poverty - Part 2
Lecture 17 - Zero Hunger - Part 1
Lecture 18 - Zero Hunger - Part 2
Lecture 19 - Good Health and Well-being - Part 1
Lecture 20 - Good Health and Well-being - Part 2
Lecture 21 - Quality Education - Part 1
Lecture 22 - Quality Education - Part 2
Lecture 23 - Gender Equality - Part 1
Lecture 24 - Gender Equality - Part 2
Lecture 25 - Clean Water and Sanitation
Lecture 26 - Affordable and Clean Energy - Part 1
Lecture 27 - Affordable and Clean Energy - Part 2
Lecture 28 - Decent Work and Economic Growth - Part 1
Lecture 29 - Decent Work and Economic Growth - Part 2

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Lecture 30 - Industry, Innovation and Infrastructure - Part 1
Lecture 31 - Industry, Innovation and Infrastructure - Part 2
Lecture 32 - Reduced Inequality
Lecture 33 - Reduced Inequality
Lecture 34 - Sustainable Cities and Communities - Part 1
Lecture 35 - Sustainable Cities and Communities - Part 2
Lecture 36 - Sustainable Cities and Communities - Part 3
Lecture 37 - Responsible Consumption and Production - Part 1
Lecture 38 - Responsible Consumption and Production - Part 2
Lecture 39 - Climate Action - Part 1
Lecture 40 - Climate Action - Part 2
Lecture 41 - Life Below Water - Part 1
Lecture 42 - Life Below Water - Part 2
Lecture 43 - Life on Land - Part 1
Lecture 44 - Life on Land - Part 2
Lecture 45 - Peace and Justice Strong Institutions
Lecture 46 - Partnerships to achieve the Goal - Part 1
Lecture 47 - Partnerships to achieve the Goal - Part 2
Lecture 48 - Analyzing SDG connections, grouped into People, Ecological, and Spiritual categories - Part 1
Lecture 49 - Analyzing SDG connections, grouped into People, Ecological, and Spiritual categories - Part 2
Lecture 50 - Analyzing SDG connections, grouped into People, Ecological, and Spiritual categories - Part 3
Lecture 51 - Analyzing SDG connections, grouped into People, Ecological, and Spiritual categories - Part 4
Lecture 52 - SDGs and Socio Ecological Systems: Economy SDGs ; Society SDGs ; Biosphere SDGs
Lecture 53 - Financing the SDGs and Global Funds, Implementation Planning, Capacity Building and Finance - Pa
Lecture 54 - Financing the SDGs and Global Funds, Implementation Planning, Capacity Building and Finance - Pa
Lecture 55 - Financing the SDGs and Global Funds, Implementation Planning, Capacity Building and Finance - Pa
Lecture 56 - Financing the SDGs and Global Funds, Implementation Planning, Capacity Building and Finance - Pa
Lecture 57 - Financing the SDGs and Global Funds, Implementation Planning, Capacity Building and Finance - Pa
Lecture 58 - Key Climate Conferences and Summits: Rio 92, Kyoto 95, Paris 15, COP26 - Part 1
Lecture 59 - Key Climate Conferences and Summits: Rio 92, Kyoto 95, Paris 15, COP26 - Part 2
Lecture 60 - Key Climate Conferences and Summits: Rio 92, Kyoto 95, Paris 15, COP26 - Part 3
Lecture 61 - Key Climate Conferences and Summits: Rio 92, Kyoto 95, Paris 15, COP26 - Part 4
Lecture 62 - Key Climate Conferences and Summits: Rio 92, Kyoto 95, Paris 15, COP26 - Part 5
Lecture 63 - Case Studies from around the World, Implementation at International Level, Global Reports - Part
Lecture 64 - Case Studies from around the World, Implementation at International Level, Global Reports - Part
Lecture 65 - Case studies from India, Implementation at National Level, National Reports
Lecture 66 - Nodal Agency for Implementation in India
Lecture 67 - Indian implementation strategy: State reports, assessment, and effectiveness checks
Lecture 68 - Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:Learning English in Hindi

Subject Co-ordinator - Prof. Rajesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sounds and Writing Symbols in Engish
Lecture 2 - Speech Sounds in English
Lecture 3 - Consonants and Consonant Clusters in English
Lecture 4 - Syllables and Words
Lecture 5 - Some Features of English Words
Lecture 6 - Plural Words in English
Lecture 7 - Parts of speech - 1
Lecture 8 - Parts of Speech - 2
Lecture 9 - Parts of Speech - 3
Lecture 10 - Parts of Speech - 4
Lecture 11 - Articles
Lecture 12 - Words and Phrases in English
Lecture 13 - Sentences in English
Lecture 14 - Direct and Indirect Objects
Lecture 15 - Verb-be (is, are, am) in English
Lecture 16 - Imperative sentences in English (command or request)
Lecture 17 - Questions in English (Interogative sentences)
Lecture 18 - Negative Sentences in English
Lecture 19 - Agreement in English Sentences
Lecture 20 - Participles in English
Lecture 21 - Relative Clauses in English
Lecture 22 - Functions of Modals
Lecture 23 - Passives in English
Lecture 24 - Mood and Modal Verbs
Lecture 25 - Will/Would
Lecture 26 - Modals Verbs: Can or Could
Lecture 27 - Modals Verbs: Could vs Would
Lecture 28 - Modals Verbs/Auxiliary: Must; Shall and Should
Lecture 29 - Telephone English

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Lecture 30 - Illustrating Clauses and Sentences
Lecture 31 - Describing Clauses and Sentences
Lecture 32 - Sentence, Clause and Complex Sentences
Lecture 33 - Adjectival (Relative) Clause
Lecture 34 - Adverbs
Lecture 35 - Agreement in English Sentences (Subject and Verb in Sentences)
Lecture 36 - Question Tags in English Sentences
Lecture 37 - Questions in English (Interogative sentences)
Lecture 38 - Learning Softening (Knowing vs Using)
Lecture 39 - Rhythm and Pitch in English
Lecture 40 - Punctuation - Pauses - 1
Lecture 41 - Punctuation - Pauses - 2
Lecture 42 - Advanced Vocabulary
Lecture 43 - Innovation in Vocabulary
Lecture 44 - Metaphors
Lecture 45 - Phrases and Idioms You Must Know
Lecture 46 - Make your expressions impreesive
Lecture 47 - Fundamentals of Learning English for Accuracy, Fluency and Communicative Confidence

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NPTEL Video Course - Humanities and Social Sciences - NOC:Social History of Medicine in Colonial India

Subject Co-ordinator - Prof. John Bosco Lourdusamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Significance of Medicine in the Colonial Context
Lecture 2 - Medicine as Cultural and Intellectual Encounter
Lecture 3 - Tutorial 1
Lecture 4 - Colonial Understandings of Indian Landscape, Diseases and Causations; Initial Concerns About Surv
Lecture 5 - Initial Attitudes Towards Indigenous Systems
Lecture 6 - The IMS (Indian Medical Service)
Lecture 7 - Tutorial 2
Lecture 8 - British Settling; Enclavism
Lecture 9 - Consolidation of Medical Measures
Lecture 10 - Medical Education
Lecture 11 - Public Health and Sanitary Measures
Lecture 12 - Sanitary Education; Statistics; Epidemics
Lecture 13 - Tutorial 3
Lecture 14 - Small Pox
Lecture 15 - Malaria
Lecture 16 - Cholera and Plague
Lecture 17 - Epidemics, Colonial Cultural Stereotypes and Accommodative Approaches
Lecture 18 - Epidemics, Cultural Dimensions of Indian Responses and Role of Media
Lecture 19 - Epidemics and International Influences
Lecture 20 - Tutorial 4
Lecture 21 - Tutorial 4 - Part 2
Lecture 22 - Tropical Medicine
Lecture 23 - Kala Azar as Exemplar of Tropical Disease
Lecture 24 - Tropical and Bacteriological Research
Lecture 25 - Malarial Research and Surveys, Vaccine Research and Production
Lecture 26 - Tutorial 5 - Part 1
Lecture 27 - Tutorial 5 - Part 2
Lecture 28 - Women Health: Zenana Mission; Dufferin Fund
Lecture 29 - Association of Medical Women in India; Lock Hospitals; Regulation of Dais

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Lecture 30 - Nursing
Lecture 31 - Women's Medical Education; Womenâ s Medical Service
Lecture 32 - Tutorial 6
Lecture 33 - Colonial State and Medical Volunteerism
Lecture 34 - Role of Missionaries - Part 1
Lecture 35 - Role of Missionaries - Part 2
Lecture 36 - Reforms Movements and Indigenous Voluntary Organisations
Lecture 37 - Role of International Organisationas and Individuals
Lecture 38 - Tutorial 7
Lecture 39 - Western versus Indigenous Systems
Lecture 40 - Indigenous Response to the Domination of Western Medicine
Lecture 41 - Professionalisation of Indigenous Systems
Lecture 42 - Standarisation and Marketing
Lecture 43 - Tutorial 8 - Part 1
Lecture 44 - Tutorial 8 - Part 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Society: Sociological Perspectives

Subject Co-ordinator - Dr. R. Santhosh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sociology: An Overview
Lecture 2 - Anthropology: An Introduction
Lecture 3 - Theoretical Traditions in Sociology and Anthropology
Lecture 4 - Colonialism and Anthropology
Lecture 5 - Orientalism and the Politics of Knowledge Production - I
Lecture 6 - Orientalism and the Politics of Knowledge Production - II
Lecture 7 - Orientalism and the Politics of Knowledge Production - III
Lecture 8 - Orientalism and the Politics of Knowledge Production - IV
Lecture 9 - Orientalism and Its Critics
Lecture 10 - Ronald Inden: Orientalist Constructions of India - I
Lecture 11 - Ronald Inden: Orientalist Constructions of India - II
Lecture 12 - Development of Sociology and Anthropology in India
Lecture 13 - Sociological Traditions in India - I
Lecture 14 - Sociological Traditions in India - II
Lecture 15 - Indological Approach
Lecture 16 - G. S. Ghurye: Introduction
Lecture 17 - G. S. Ghurye: Features of Caste
Lecture 18 - Irawati Karve: Introduction
Lecture 19 - Radhakamal Mukerjee
Lecture 20 - D. N. Majumdar
Lecture 21 - Marxian Perspective: Historical Materialism
Lecture 22 - Marxian Theory of Social Change
Lecture 23 - Gail Omvedt: Towards a Historical Materialist Analysis of the Origin and Development of Caste -
Lecture 24 - Gail Omvedt: Towards a Historical Materialist Analysis of the Origin and Development of Caste -
Lecture 25 - Marxist Sociology of A. R. Desai
Lecture 26 - An Introduction to Structural Functionalism
Lecture 27 - Sociology of M. N. Srinivas
Lecture 28 - Sociology of M. N. Srinivas: Basic Concepts
Lecture 29 - Sociology of M. N. Srinivas: Varna and Jati

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Lecture 30 - Andre Beteille: A Social Stratification Perspective to Indian Society
Lecture 31 - Introduction to Structuralism
Lecture 32 - Sociology of Louis Dumont: Homo Hierarchicus - I
Lecture 33 - Sociology of Louis Dumont: Homo Hierarchicus - II
Lecture 34 - Sociology of Louis Dumont: Homo Hierarchicus - III
Lecture 35 - Criticisms of Louis Dumont
Lecture 36 - Introducing Subaltern Studies - I
Lecture 37 - Introducing Subaltern Studies - II
Lecture 38 - Subaltern Studies as Postcolonial Criticism
Lecture 39 - Critique of Subaltern Studies - I
Lecture 40 - Critique of Subaltern Studies - II
Lecture 41 - Feminist Perspectives and Gender Studies in India - I
Lecture 42 - Feminist Perspectives and Gender Studies in India - II
Lecture 43 - Feminist Research: Redefining Methodology in the Social Sciences
Lecture 44 - Feminist Challenges to Sociology in India
Lecture 45 - Mapping and Marking Feminist Sociologies in India
Lecture 46 - Dalit Sociology and Indian Sociology: On Ambedkar's sociology of Caste
Lecture 47 - Introduction to Sociology of Dalits - I
Lecture 48 - Introduction to Sociology of Dalits - II
Lecture 49 - Dalit Women Talk Differently: Debate Between Gopal Guru and Sharmila Rege - I
Lecture 50 - Dalit Women Talk Differently: Debate Between Gopal Guru and Sharmila Rege - II
Lecture 51 - The Cracked Mirror: Introduction
Lecture 52 - The Cracked Mirror: How Egalitarian are the Social Sciences in India? - I
Lecture 53 - The Cracked Mirror: How Egalitarian are the Social Sciences in India? - II
Lecture 54 - The Cracked Mirror: Experience and Theory From Habermas to Guru - I
Lecture 55 - The Cracked Mirror: Experience and Theory From Habermas to Guru - II
Lecture 56 - Decolonialism in Sociology - I
Lecture 57 - Decolonialism in Sociology - II
Lecture 58 - Globalization and Sociology: Risk Society of Ulrich Beck
Lecture 59 - Globalization and Sociology: The Network Society of Manuel Castells
Lecture 60 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Human Movement Science

Subject Co-ordinator - Prof. Shruti Bhandurge, Prof. Subham Badhyal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Learning outcomes and module design
Lecture 3 - Professional skillset development
Lecture 4 - Skeletal system
Lecture 5 - Muscular system
Lecture 6 - Neuromuscular System
Lecture 7 - Motor control and learning
Lecture 8 - Anatomical planes and axes of motion
Lecture 9 - Major joints and their actions - Part 1
Lecture 10 - Major joints and their actions - Part 2
Lecture 11 - Muscles and movement
Lecture 12 - Posture - static and dynamic
Lecture 13 - Implications of functional anatomy in HMS
Lecture 14 - Introduction to the concepts of biomechanics
Lecture 15 - Review of Basic - Mathematical Concepts
Lecture 16 - Linear Kinematics
Lecture 17 - Angular Kinematics
Lecture 18 - Linear Kinetics
Lecture 19 - Angular Kinetics - Part 1
Lecture 20 - Angular Kinetics - Part 2
Lecture 21 - Angular Kinetics - Part 3
Lecture 22 - Angular Kinetics - Part 4
Lecture 23 - Qualitative analysis - Intro, Data Collection
Lecture 24 - Qualitative analysis - Analysis and Injury
Lecture 25 - Quantitative analysis
Lecture 26 - Coaching implications in HMS
Lecture 27 - Fundamental movement skills - Part 1
Lecture 28 - Fundamental movement skills - Part 2
Lecture 29 - Fundamental movement skills - Part 3

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Lecture 30 - Gait Analysis
Lecture 31 - Exercises - Part 1
Lecture 32 - Exercises - Part 2
Lecture 33 - Exercises - Part 3
Lecture 34 - Injury Patterns - Part 1
Lecture 35 - Injury Patterns - Part 2
Lecture 36 - Sports - Part 1
Lecture 37 - Sports - Part 2
Lecture 38 - Biomechanical characteristics of various sports - Part 1
Lecture 39 - Biomechanical characteristics of various sports - Part 2
Lecture 40 - Data Science
Lecture 41 - AI and ML
Lecture 42 - Technological advancements and Research in HMS - Part 1
Lecture 43 - Technological advancements and Research in HMS - Part 2
Lecture 44 - Career Opportunities

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sports and Performance Nutrition

Subject Co-ordinator - Prof. Geetha Ghaliyavar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to sports and performance nutrition
Lecture 2 - Introduction to energy availability
Lecture 3 - Fundamentals of carbohydrates
Lecture 4 - Carbohydrate manipulation for sports performance
Lecture 5 - Myths around carbohydrates
Lecture 6 - Dr Sola Athletes with celiac disease and gluten sensitivity
Lecture 7 - Importance of proteins in performance
Lecture 8 - Introduction to protein and protein supplements
Lecture 9 - Introduction to fats and its importance in performance
Lecture 10 - Hydration and electrolytes
Lecture 11 - Practical implications of hydration
Lecture 12 - Mineral - Iron
Lecture 13 - Minerals - Calcium, Magnesium Zinc and Selenium
Lecture 14 - Antioxidants
Lecture 15 - Water soluble vitamins
Lecture 16 - Fat soluble vitamins
Lecture 17 - Energy systems and biochemical pathways
Lecture 18 - Anabolic window period for nutrient intake
Lecture 19 - Introduction to nutrient periodization
Lecture 20 - Applied aspects of nutrient periodization
Lecture 21 - Competition nutrition
Lecture 22 - Carbohydrate loading for sports performance
Lecture 23 - Weight making and weight cycling
Lecture 24 - Travel guidelines for athletes
Lecture 25 - Supplements and ergogenic aids
Lecture 26 - Three R principal
Lecture 27 - Lifestyle practices to enhance recovery
Lecture 28 - Sleep hygiene
Lecture 29 - Immunity and gut health

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Lecture 30 - Sports injury and dietary interventions
Lecture 31 - Vegetarian and vegan athletes
Lecture 32 - Diabetic athletes
Lecture 33 - Female athletes
Lecture 34 - Young and adolescent athletes
Lecture 35 - Food intolerances in athletes
Lecture 36 - Sports nutrition in Indian context
Lecture 37 - Nutrigenomics
Lecture 38 - Personal hygiene and sanitation
Lecture 39 - Connections of sports nutrition
Lecture 40 - Food psychology

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sports Psychology

Subject Co-ordinator - Prof. Chaitanya Sridhar, Prof. Nivedita Rajan, Prof. Priyanka Prabhakar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Becoming a Sport Psychologist: Lessons from the field An introduction to field of Sports Psycholo
Lecture 2 - Becoming a Sport Psychologist: Lessons from the field Mental health issues in athletes
Lecture 3 - Lessons from the field Learning Sport Science - An integrated approach to learning Sport Psycholo
Lecture 4 - Becoming a Sport Psychologist: Lessons from the field Challenges faced by sport psychologists
Lecture 5 - Becoming a Sport Psychologist: Lessons from the field Sport psychology - Working with coaches
Lecture 6 - Introduction to flow
Lecture 7 - Flow in sport and competition
Lecture 8 - Practical approach to flow state: Discussion
Lecture 9 - Developing a Champion mindset: Tools to aid competitive mindset
Lecture 10 - Discussion on Champion and Competitive Mindset
Lecture 11 - Psychological Skills training and Goal setting
Lecture 12 - Goal setting - Part 1
Lecture 13 - Goal setting - Part 2
Lecture 14 - Developing Goal setting systems
Lecture 15 - Discussion on Mental training and Goal setting
Lecture 16 - Imagery in sport - Introduction
Lecture 17 - Models of Imagery and usefulness of Imagery
Lecture 18 - Psychological factors important for PST
Lecture 19 - Imagery in Team - A practical demonstration
Lecture 20 - Discussion on Goal setting and Imagery in sports
Lecture 21 - Communication in sports
Lecture 22 - Intracommunication with self: instinct and animal lessons, body language and tactile communicati
Lecture 23 - Discussion on communication and performance
Lecture 24 - Resilience in Sports Teams and Organizations
Lecture 25 - Resilience and Mindfulness in sports
Lecture 26 - Psychological factors in sport
Lecture 27 - Strategies to work with young athletes
Lecture 28 - Working with young children
Lecture 29 - Burnout in sports

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Lecture 30 - Burnout in coaches, Discussion with coach
Lecture 31 - Building teams and team culture
Lecture 32 - Discussion on building high performance teams
Lecture 33 - Channeling emotions in sports
Lecture 34 - Discussion on transformational leadership
Lecture 35 - Stress management in sports
Lecture 36 - Psychology of Injury - Introduction
Lecture 37 - Psychological Strategies for Injury
Lecture 38 - Integrated approach to injury - A discussion
Lecture 39 - Career transition in sports - Sports retirement and coping
Lecture 40 - Discussion on Sports career transition
Lecture 41 - Conclusion Video

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NPTEL Video Course - Humanities and Social Sciences - NOC:Strength and Conditioning for the Indian Populatior

Subject Co-ordinator - Prof. Varun Suresh Kumar, Prof. Deckline Leitao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Sports Performance
Lecture 2 - Major Components of Fitness
Lecture 3 - Difference between Fitness and Sport
Lecture 4 - Defining S&C and Sports S&C
Lecture 5 - Defining S&C and Physios Roles and Responsibilities
Lecture 6 - Player Interview - Lakshya Sen
Lecture 7 - Player Interview - Avani Prashanth
Lecture 8 - Principle of Individuality
Lecture 9 - Principle of Progressive Overload
Lecture 10 - Principle of Specificity
Lecture 11 - Principle of -Indianization-
Lecture 12 - Principle of Reversibility
Lecture 13 - Sports Specific Training
Lecture 14 - Safety in the Gym
Lecture 15 - Exercise and the Female Athlete
Lecture 16 - Working with Female Athletes - Do's and Dont's
Lecture 17 - Training Youth Athletes - Part 1
Lecture 18 - Training Youth Athletes - Part 2
Lecture 19 - Training Masters Athletes
Lecture 20 - Training Para Athletes
Lecture 21 - Bodybuilding
Lecture 22 - Powerlifting
Lecture 23 - Weightlifting
Lecture 24 - Effective over Impressive Excercises
Lecture 25 - Anabolic Steriods, Muscle Building, and Sports Performance
Lecture 26 - Free Weight Training
Lecture 27 - Warm Up and Cool Down
Lecture 28 - Free Weights Training (Demonstration) - Part 1
Lecture 29 - Free Weights Training (Demonstration) - Part 2

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Lecture 30 - Free Weights Training (Demonstration) - Part 3
Lecture 31 - Free Weights Training (Demonstration) - Part 4
Lecture 32 - Warm up Demonstration
Lecture 33 - Cool Down Demonstration
Lecture 34 - Weight Training Using Machines
Lecture 35 - Training with Machines (Demonstration) - Part 1
Lecture 36 - Training with Machines (Demonstration) - Part 2
Lecture 37 - Training with Machines (Demonstration) - Part 3
Lecture 38 - Training with Machines (Demonstration) - Part 4
Lecture 39 - Training with Machines (Demonstration) - Part 5
Lecture 40 - Bodyweight and Functional Training
Lecture 41 - Bodyweight and Functional Training Demonstration
Lecture 42 - Plyometrics Training
Lecture 43 - Plyometrics Demonstration
Lecture 44 - Cardiovascular Training
Lecture 45 - Cardiovascular Training Demonstration - Part 1
Lecture 46 - Cardiovascular Training Demonstration - Part 2
Lecture 47 - Cardiovascular Training Demonstration - Part 3
Lecture 48 - Stability and Endurance Training
Lecture 49 - Stability and Endurance Training Demonstration - Part 1
Lecture 50 - Stability and Endurance Training Demonstration - Part 2
Lecture 51 - Flexibility training and types of stretches - Part 1
Lecture 52 - Flexibility training and types of stretches - Part 2
Lecture 53 - Periodization of Indian Athlete
Lecture 54 - Sports Specific Program Design
Lecture 55 - Assessments- How, When, Why
Lecture 56 - Opportunities and Challenges of an S&C
Lecture 57 - Training Celebrities/Elite Athletes
Lecture 58 - Role of Social Media in Sport
Lecture 59 - Scope of Technology in Sport

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NPTEL Video Course - Humanities and Social Sciences - NOC:Essentials of Sports Injury Prevention and Rehabili

Subject Co-ordinator - Prof. Col (Dr) Anup Krishnan (Retd), Prof. Wg Cdr (Dr) CS Guru, Prof. Lt Col (Dr) Atul

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sports Injuries and Prevention
Lecture 2 - Rehabilitation and Reconditioning
Lecture 3 - Joints of the Upper Limb
Lecture 4 - Joints of the Lower Limb
Lecture 5 - The Back In Sports
Lecture 6 - Pre Medical Examination
Lecture 7 - Lab Investigations
Lecture 8 - Flexibility
Lecture 9 - Conditioning
Lecture 10 - Anatomy of Upper Limb
Lecture 11 - Anatomy of Lower Limb
Lecture 12 - Common Injuries Of Lower Limb
Lecture 13 - Common Causes of Upper Limb and Lower Limb
Lecture 14 - Treatments for Various Injuries
Lecture 15 - Head, Face and Neck Injuries
Lecture 16 - Spine Injuries
Lecture 17 - Concussion in Sports
Lecture 18 - Management of Sports Concussion
Lecture 19 - Emergency Action Plan
Lecture 20 - Risk Factors in Injury
Lecture 21 - Prehabilitation and Rehabilitation
Lecture 22 - Periodisation of Rehabilitation - I
Lecture 23 - Periodisation of Rehabilitation - II
Lecture 24 - Team Roles in Sports Injuries
Lecture 25 - Sport-Specific Rehabilitation, Principles and Techniques - I
Lecture 26 - Sport-Specific Rehabilitation, Principles and Techniques - II
Lecture 27 - Sport-Specific Rehabilitation, Principles and Techniques - III
Lecture 28 - Rehabilitation
Lecture 29 - Management of common sports injuries

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Lecture 30 - Injury prevention in adolescent athletes and Women athletes - Part 1
Lecture 31 - Injury prevention in adolescent athletes and Women athletes - Part 2
Lecture 32 - Injury prevention in adolescent athletes and Women athletes - Part 3
Lecture 33 - Injury prevention in adolescent athletes and Women athletes - Part 4
Lecture 34 - Injury prevention in adolescent athletes and Women athletes - Part 5
Lecture 35 - Psychological aspects of injury and Rehabilitation - Part 1
Lecture 36 - Psychological aspects of injury and Rehabilitation - Part 2
Lecture 37 - Return to sports and long term injury prevention - Part 1
Lecture 38 - Return to sports and long term injury prevention - Part 2
Lecture 39 - Return to sports and long term injury prevention - Part 3

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Exercise Physiology and Sports Perf

Subject Co-ordinator - Prof. Col (Dr) Anup Krishnan (Retd), Prof. Wg Cdr (Dr) CS Guru, Prof. Lt Col (Dr) Atul

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Focus of Exercise and Sports Physiology
Lecture 2 - Evolution of Exercise Physiology
Lecture 3 - Acute and Chronic response to Exercise
Lecture 4 - Functional Anatomy of Skeletal muscle
Lecture 5 - Skeletal muscle and Exercise
Lecture 6 - Bioenergetics - Part 1
Lecture 7 - Bioenergetics - Part 2
Lecture 8 - Cardiovascular System and Exercise - Part 1
Lecture 9 - Cardiovascular System and Exercise - Part 2
Lecture 10 - Cardiovascular System and Exercise - Part 3
Lecture 11 - Respiratory System and Exercise - Part 1
Lecture 12 - Respiratory System and Exercise - Part 2
Lecture 13 - Respiratory System and Exercise - Part 3
Lecture 14 - Neurophysiology and Exercise - Part 1
Lecture 15 - Neurophysiology and Exercise - Part 2
Lecture 16 - Endocrine responses to Exercise - Part 1
Lecture 17 - Endocrine responses to Exercise - Part 2
Lecture 18 - Endocrine responses to Exercise - Part 3
Lecture 19 - Exercise in Children and Adolescents - Part 1
Lecture 20 - Exercise in Children and Adolescents - Part 2
Lecture 21 - Exercise Prescription and Training principles - Part 1
Lecture 22 - Exercise Prescription and Training principles - Part 2
Lecture 23 - Adaptations to aerobic and anaerobic training - Part 1
Lecture 24 - Adaptations to aerobic and anaerobic training - Part 2
Lecture 25 - Adaptations to aerobic and anaerobic training - Part 3
Lecture 26 - Body temperature regulation
Lecture 27 - Physiological response to Exercise in Heat and Cold
Lecture 28 - Acclimation to Heat and Cold
Lecture 29 - Health Risks during Exercise in Heat and Cold

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Lecture 30 - Exercise and Sports performance at Altitude
Lecture 31 - Hydration and Fluid Balance - Part 1
Lecture 32 - Hydration and Fluid Balance - Part 2
Lecture 33 - Body composition and its Implications - Part 1
Lecture 34 - Body composition and its Implications - Part 2
Lecture 35 - Body composition and its Implications - Part 3
Lecture 36 - Role of performance testing
Lecture 37 - Performance testing in aerobic sports
Lecture 38 - Performance testing in anaerobic sports
Lecture 39 - Role of exercise in disease prevention
Lecture 40 - Role of exercise in Disease management

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NPTEL Video Course - Humanities and Social Sciences - NOC:Fundamentals of Sports Training, Load Management ar

Subject Co-ordinator - Prof. Col (Dr) Anup Krishnan (Retd), Prof. Wg Cdr (Dr) CS Guru, Prof. Kaustubh Shedjal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fitness Vocabulary
Lecture 2 - Types of FItness
Lecture 3 - Health Specific Fitness Acute Training varibales - Part 1
Lecture 4 - Health Specific Fitness Acute Training varibales - Part 2
Lecture 5 - Application of Acute Training variables
Lecture 6 - Principle of Training - 1
Lecture 7 - Principle of Training - 2
Lecture 8 - Principle of Training - 3
Lecture 9 - Periodization in sports - 1
Lecture 10 - Periodization in sports - 2
Lecture 11 - Concept of Load Training - 1
Lecture 12 - Concept of Load Training - 2
Lecture 13 - Concept of Load Training - 3
Lecture 14 - Load monitoring in Sports - 1
Lecture 15 - Load monitoring in Sports - 2
Lecture 16 - Aerobic Training Methods - 1
Lecture 17 - Aerobic Training Methods - 2
Lecture 18 - Aerobic Training Methods - 3
Lecture 19 - Anerobic Training Method - 1
Lecture 20 - Anerobic Training Method - 2
Lecture 21 - Load Monitoring Methods in HSF - 1
Lecture 22 - Load Monitoring Methods in HSF - 2
Lecture 23 - Load Monitoring Methods in SSF - 1
Lecture 24 - Load Monitoring Methods in SSF - 2
Lecture 25 - Load Monitoring Methods in SSF - 3
Lecture 26 - Fatigue in Sports Training
Lecture 27 - Overtraining and Overreaching
Lecture 28 - Diagnosis and management of OTS
Lecture 29 - Recovery in sports

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Lecture 30 - Recovery Technique
Lecture 31 - Training Program Design - 1
Lecture 32 - Training Program Design - 2
Lecture 33 - Training Program Design - 3
Lecture 34 - Training Program Design - 4
Lecture 35 - Training Program Design - 5
Lecture 36 - Technoloy in Performance Analysis
Lecture 37 - Technoloy in Performance Enchanmnet
Lecture 38 - Waerables in Sports
Lecture 39 - Future of technology in sports
Lecture 40 - Sports Training Technology and Innovation

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NPTEL Video Course - Humanities and Social Sciences - NOC:Forensic Linguistics

Subject Co-ordinator - Prof. Deepak Mashru

Co-ordinating Institute - National Forensic Sciences University (INI)

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Week 1
Lecture 2 - Evolution and concept of Linguistics
Lecture 3 - Defining Linguistics and its branches
Lecture 4 - The role of linguistics in understanding human communication
Lecture 5 - Application of linguistic theories in various fields
Lecture 6 - The Crucial Role of Linguistic Analysis in Legal Settings
Lecture 7 - Impact of Forensic Linguistics and Case Studies
Lecture 8 - Current Trends and Emerging Areas in Forensic Linguistics
Lecture 9 - Introduction to Week 2 - The Confluence of Language and Law
Lecture 10 - Exploring the Interplay Between Language and Law
Lecture 11 - Analysis of Courtroom Discourse
Lecture 12 - Impact of Linguistic Diversity on Legal Processes
Lecture 13 - Interdisciplinary Nature of Forensic Linguistics
Lecture 14 - Ethical Considerations in Forensic Linguistic Analysis
Lecture 15 - Impact on Understanding Legal and Cultural Contexts
Lecture 16 - Analysing Language as Vital Evidence in Legal Contexts
Lecture 17 - Challenges in Presenting Linguistic Evidence in Court
Lecture 18 - Introduction to Week 3
Lecture 19 - Illuminating Authorship Analysis and Its Nuances
Lecture 20 - Navigating Through Forensic Phonetics
Lecture 21 - Discourse Analysis: A Journey through Linguistic Structures
Lecture 22 - Exploring the Depths of Threat and Deception Analysis
Lecture 23 - Unveiling the Secrets of Language Profiling
Lecture 24 - Introduction to Week 4
Lecture 25 - Investigating Real-World Case Studies in Forensic Linguistics
Lecture 26 - Tackling the Challenges and Obstacles Within Forensic Linguistics
Lecture 27 - Upholding Ethics and Professionalism in Forensic Linguistics
Lecture 28 - Envisioning the Future: Prospective Pathways in Forensic Linguistics
Lecture 29 - Linguistic Traces in Phishing, Cyberbullying and Hate Speech

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Lecture 30 - Stylometry and Online Anonymity
Lecture 31 - Deepfakes, Synthetic Voice and Linguistic Integrity
Lecture 32 - WhatsApp Chats and Online Grooming
Lecture 33 - Algorithmic Spread and Linguistic Escalation
Lecture 34 - Threat Language in Cyber Contexts
Lecture 35 - Compliance Engineering in Online Fraud
Lecture 36 - Ideological Framing in Digital Spaces
Lecture 37 - Discourse Patterns in Sustained Harassment
Lecture 38 - Digital Linguistic Evidence in Court
Lecture 39 - Limits of Linguistic Inference Online
Lecture 40 - Integrating Digital Linguistic Evidence
Lecture 41 - Section 39 Bharatiya Sakshya Adhiniyam
Lecture 42 - Language in FIRs and Charge Sheets
Lecture 43 - Testimonial Language and Inconsistency
Lecture 44 - Code Switching and Translation Challenges
Lecture 45 - Linguistic Distortion in Criminal Trials
Lecture 46 - Statement Transformation Across Stages
Lecture 47 - Courtroom Narrative Construction
Lecture 48 - Standards for Linguistic Testimony
Lecture 49 - Bilingual Speech in Court
Lecture 50 - Linguistic Evidence in Indian Trials
Lecture 51 - Responsibility of Linguistic Experts
Lecture 52 - Language and Justice Integration
Lecture 53 - Linguistic Framing in Crime Reporting
Lecture 54 - Language and Presumption in Media
Lecture 55 - Linguistic Architecture of Misinformation
Lecture 56 - Linguistic Verification in Media
Lecture 57 - Ideological Construction in Reporting
Lecture 58 - Repetition and Persuasion Techniques
Lecture 59 - Platform Amplification of Language
Lecture 60 - Institutional Fact-Checking Models
Lecture 61 - High-Profile Media Analysis
Lecture 62 - Boundaries in Crime Reporting
Lecture 63 - Media Literacy through Forensic Tools
Lecture 64 - Media and Linguistic Accountability
Lecture 65 - Linguistic Forgery in Threat Notes
Lecture 66 - Authorship in Wills and Legal Writings
Lecture 67 - Stylometric Identification
Lecture 68 - Typed vs Handwritten Language

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Lecture 69 - Masked Authorship Techniques
Lecture 70 - Hidden Authorship Analysis
Lecture 71 - Genuine vs Fabricated Texts
Lecture 72 - Categorising Threat Language
Lecture 73 - Presenting Authorship Findings
Lecture 74 - Data-Driven Authorship Support
Lecture 75 - Responsible Authorship Inference
Lecture 76 - Authorship and Document Forensics
Lecture 77 - Guilt and Deception in Interrogative Discourse
Lecture 78 - Influence of Question Structure on Suspect Speech
Lecture 79 - Language and Fabricated Admissions
Lecture 80 - Psycholinguistics in Offender Profiling
Lecture 81 - Linguistic Structure in Criminal Networks
Lecture 82 - Linguistic Fragmentation in Trauma Narratives
Lecture 83 - Pragmatics of Trauma Communication
Lecture 84 - Misinterpretation of Non-Standard Speech
Lecture 85 - Authority Influence in Recorded Statements
Lecture 86 - Applied Linguistic Analysis in Criminal Trials
Lecture 87 - Limits of Predictive Linguistic Models
Lecture 88 - Integrating Psychology and Forensic Linguistics
Lecture 89 - Designing and Annotating Forensic Corpora
Lecture 90 - Keyword and Frequency Analysis
Lecture 91 - Contextual Interpretation via Concordance
Lecture 92 - Cross-Linguistic Data in Indian Legal Systems
Lecture 93 - Corpus-Based Threat Classification
Lecture 94 - Quantitative Models in Attribution
Lecture 95 - Combining Corpus Data with Discourse Analysis
Lecture 96 - Court Acceptance of Corpus Evidence
Lecture 97 - Social Media and Big Data Constraints
Lecture 98 - Applied Corpus Analysis in Authorship Disputes
Lecture 99 - Privacy and Anonymisation in Corpus Work
Lecture 100 - Corpus Linguistics in Justice Delivery
Lecture 101 - Ethical Boundaries in FL Practice
Lecture 102 - Courtroom Conduct and Accountability
Lecture 103 - Social Bias in Linguistic Interpretation
Lecture 104 - Consent and Digital Evidence
Lecture 105 - Limits of Linguistic Profiling
Lecture 106 - Analytical Objectivity in Investigation
Lecture 107 - Method Disclosure in Court

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Lecture 108 - Professional Ethical Frameworks
Lecture 109 - Language Surveillance and Rights
Lecture 110 - Controversial Linguistic Testimony
Lecture 111 - Automated Tools and Ethical Judgment
Lecture 112 - Integrity in Forensic Linguistics
Lecture 113 - Global Frameworks of Forensic Linguistics
Lecture 114 - Institutionalising Forensic Linguistics in India
Lecture 115 - Certification Ecosystems in Forensic Linguistics
Lecture 116 - AI NLP and Future of Linguistic Surveillance
Lecture 117 - Surveillance Ethics and Linguistic Monitoring
Lecture 118 - Global Accountability Models
Lecture 119 - Policy Integration and Digital Governance
Lecture 120 - Institutional Frameworks for Forensic Linguistics
Lecture 121 - Next Decade of Forensic Linguistics
Lecture 122 - Global Collaboration in Forensic Linguistics
Lecture 123 - Emerging Technologies Reshaping Forensic Linguistics
Lecture 124 - Integrated Future of Forensic Linguistics

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NPTEL Video Course - Humanities and Social Sciences - NOC:Korean-I

Subject Co-ordinator - Prof. Soo Jin Shim

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Hangeul
Lecture 2 - Introduction to Hangeul, Korean Consonants and Vowels
Lecture 3 - Features of Hangeul, Korean Consonants 1 and Vowels 1
Lecture 4 - Korean Vowels 2
Lecture 5 - Korean Consonants 2 and 3
Lecture 6 - Korean Vowels 3
Lecture 7 - Korean Batchim (ë° ì¹¨)
Lecture 8 - ì ë í ì¸ì Vocabulary, Grammar 1
Lecture 9 - ì ë í ì¸ì Grammar 2, Speaking 1
Lecture 10 - ì ë í ì¸ì Speaking 1, Grammar 3, 4
Lecture 11 - ì ë í ì¸ì Speaking 2, Self-Introduction
Lecture 12 - ì ë í ì¸ì Listening, Reading, Writing, Pronunciation, Culture Note, Self-Check
Lecture 13 - ì•´ê±°ë ë-•ì ì ? Vocabulary, Grammar 1
Lecture 14 - ì•´ê±°ë ë-•ì ì ? Grammar 2, Speaking 1
Lecture 15 - ì•´ê±°ë ë-•ì ì ? Grammar 3, 4, Speaking 2
Lecture 16 - ì•´ê±°ë ë-•ì ì ? Speaking 2, Listening
Lecture 17 - ì•´ê±°ë ë-•ì ì ? Reading, Writing, Pronunciation, Self-Check
Lecture 18 - í êµ-ì ´ë¥¼ ê³µë¶ í ´ì . Vocabulary, Grammar 1
Lecture 19 - í êµ-ì ´ë¥¼ ê³µë¶ í ´ì . Grammar 2, Speaking 1
Lecture 20 - í êµ-ì ´ë¥¼ ê³µë¶ í ´ì . Speaking 1, Grammar 3, 4
Lecture 21 - í êµ-ì ´ë¥¼ ê³µë¶ í ´ì . Speaking 2, More practice
Lecture 22 - í êµ-ì ´ë¥¼ ê³µë¶ í ´ì . Listening, Reading
Lecture 23 - í êµ-ì ´ë¥¼ ê³µë¶ í ´ì . Writing, Pronunciation, Culture Note, Self-Check
Lecture 24 - ì ´ë ì • ì ì ´ì ? Vocabulary, Grammar 1
Lecture 25 - ì ´ë ì • ì ì ´ì ? Grammar 2, Speaking 1
Lecture 26 - ì ´ë ì • ì ì ´ì ? Speaking 1, Grammar 3, 4
Lecture 27 - ì ´ë ì • ì ì ´ì ? Exercise, Speaking 2
Lecture 28 - ì ´ë ì • ì ì ´ì ? Speaking 2, Listening, Reading
Lecture 29 - ì ´ë ì • ì ì ´ì ? Writing, Pronunciation, Culture Note, Self-Check

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Lecture 30 - ì£¼ë§•ì • ì¹ êµ¬ë¥¼ ë§ ¬ì ´ì . Vocabulary, Grammar 1
Lecture 31 - ì£¼ë§•ì • ì¹ êµ¬ë¥¼ ë§ ¬ì ´ì . Grammar 2, Exercise, Speaking 1
Lecture 32 - ì£¼ë§•ì • ì¹ êµ¬ë¥¼ ë§ ¬ì ´ì . Speaking 1, Grammar 3
Lecture 33 - ì£¼ë§•ì • ì¹ êµ¬ë¥¼ ë§ ¬ì ´ì . Grammar 4, Exercise, Speaking 2
Lecture 34 - ì£¼ë§•ì • ì¹ êµ¬ë¥¼ ë§ ¬ì ´ì . Listening, Reading
Lecture 35 - ì£¼ë§•ì • ì¹ êµ¬ë¥¼ ë§ ¬ì ´ì . Writing, Pronunciation, Culture Note, Self-Check
Lecture 36 - ì ¼ë§ ì ì ? Vocabulary, Grammar 1
Lecture 37 - ì ¼ë§ ì ì ? Grammar 2, Speaking 1
Lecture 38 - ì ¼ë§ ì ì ? Speaking 1, Grammar 3
Lecture 39 - ì ¼ë§ ì ì ? Grammar 3, 4, Exercise
Lecture 40 - ì ¼ë§ ì ì ? Speaking 2, Listening
Lecture 41 - ì ¼ë§ ì ì ? Reading, Writing, Pronunciation, Culture Note, Self-Check

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NPTEL Video Course - Humanities and Social Sciences - NOC:Performance Traditions of the Mahabharata in Tamilr

Subject Co-ordinator - Prof. Sashikanth Ananthachari, Prof. Rajesh Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Brief Introduction To The Mahabharata
Lecture 2 - A Brief Introduction To The Mahabharata Festivals Of Tamil Nadu
Lecture 3 - The Idea Of The Chariot
Lecture 4 - The Custodians Of The Festival
Lecture 5 - The Festivals As Total Theatre
Lecture 6 - Potturaja And The Anti-War Nature Of The Festival
Lecture 7 - Kelai Draupadai (Listen Draupadi!) - Documentary
Lecture 8 - A brief introduction to Koothu as a theatrical form
Lecture 9 - Vil Valaippu, or The bending of the bow
Lecture 10 - Draupadi Kalayanam or The Marriage ritual of Draupadi
Lecture 11 - Subhadra Kalyanam
Lecture 12 - Rajasuya Yaagam
Lecture 13 - Draupadiyin Thugilum, Parandhamanin Arulum
Lecture 14 - Arjunaâ s Tapas
Lecture 15 - Kichaka Vadham
Lecture 16 - Krishnan Thoodu
Lecture 17 - Aravan Kalabali
Lecture 18 - Karna Moksham
Lecture 19 - Pathinettam Por or the Eighteenth Dayâ s War
Lecture 20 - Dharumarin Pattabhishekam and Ashwamedha Yaagam

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NPTEL Video Course - Humanities and Social Sciences - NOC:Posthumanism: An Introduction

Subject Co-ordinator - Prof. Pramod K Nayar

Co-ordinating Institute - University of Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Posthumanism: Contexts I : Technologies
Lecture 2 - Contexts II : Humanism and its Critiques
Lecture 3 - Contexts III : the Environment and the Anthropocene
Lecture 4 - Transhumanism
Lecture 5 - Popular Posthumanism
Lecture 6 - Critical Posthumanism. Genealogies - 1 : New Materialisms
Lecture 7 - Critical Posthumanism. Genealogies - 2 : Human-Animal Studies - I
Lecture 8 - Critical Posthumanism. Genealogies - 2 : Human-Animal Studies - II
Lecture 9 - Critical Posthumanism. Genealogies - 3 : Consciousness and Cognition Studies
Lecture 10 - Critical Posthumanism. Genealogies - 4 : Feminist Epistemologies, Ethics and Posthumanism
Lecture 11 - Critical Posthumanism. Genealogies - 5 : Disability Studies
Lecture 12 - Posthuman Bodies: Cyborgs 1
Lecture 13 - Posthuman Bodies: Cyborgs 2 - Gender and Cyborgs
Lecture 14 - Posthuman Biology
Lecture 15 - Biotech, Biocapitalism and Posthuman Bodies/Biology - I
Lecture 16 - Biotech, Biocapitalism and Posthuman Bodies/Biology - II
Lecture 17 - Biopolitics and Biocapitalism in Contemporary Literature
Lecture 18 - The Question of the Nonhuman - I
Lecture 19 - The Question of the Nonhuman - II
Lecture 20 - Companion Species and Multispecies
Lecture 21 - Transcorporeal Trauma
Lecture 22 - Multispecies in Contemporary Literature
Lecture 23 - BioArt
Lecture 24 - Posthuman Performance Arts
Lecture 25 - Literary Posthumanisms 1
Lecture 26 - Literary Posthumanisms 2 : Feminist Speculative Fiction
Lecture 27 - Literary Posthumanisms 3 : Group Discussion
Lecture 28 - Posthuman Subjects - I
Lecture 29 - Posthuman Subjects - II

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Lecture 30 - Posthuman Subjects and Ethics - I
Lecture 31 - Posthuman Subjects and Ethics - II
Lecture 32 - Posthuman Vulnerability, Ethics and Contemporary Literature
Lecture 33 - The Environment and Posthumanism
Lecture 34 - The Posthuman, the Anthropocene and the Post-natural in Contemporary Literature - I
Lecture 35 - The Posthuman, the Anthropocene and the Post-natural in Contemporary Literature - II
Lecture 36 - Posthumanism and Care
Lecture 37 - Posthumanism and the Anthropocene: Group Discussion
Lecture 38 - Human Enhancement - I
Lecture 39 - Human Enhancement - II
Lecture 40 - Human Enhancement - III
Lecture 41 - Moral Enhancement
Lecture 42 - Posthuman Sports
Lecture 43 - Moral Enhancement and Contemporary Literature: Octavia Butlerâ s Hyperempaths
Lecture 44 - Literary Posthumanism IV : Group Discussion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Popular Culture

Subject Co-ordinator - Prof Bibhuti Mary Kachhap

Co-ordinating Institute - IIT - Thirupathi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Culture, Definitions of Popular Culture
Lecture 2 - History and development of Popular Culture
Lecture 3 - Mass Culture
Lecture 4 - Sub Culture
Lecture 5 - Sub Cultures and Counterculture
Lecture 6 - History and Understanding of India Popular Culture
Lecture 7 - Implications of Cultural Studies in India
Lecture 8 - Desire for Cultural Studies in India
Lecture 9 - Iconography
Lecture 10 - Print Culture
Lecture 11 - Pre-history of Comics
Lecture 12 - Regional Comic Space and Web Comics
Lecture 13 - Cartoons - Emergence and History
Lecture 14 - Regional Space for Comics
Lecture 15 - Emergence of Graphic Narratives
Lecture 16 - Indian Cinema - History
Lecture 17 - Modernity and Popular
Lecture 18 - Globalization and Hindi Cinema
Lecture 19 - contemporary popular and Celebrity Culture
Lecture 20 - Celebrity Studies and Indian Cinema
Lecture 21 - Visual Narrative: Advertisements
Lecture 22 - Indianness after 1960s
Lecture 23 - Advertisement campaigns
Lecture 24 - Advertisements: Political influence of brands
Lecture 25 - Constructing the Indian Consumer
Lecture 26 - History of Television in India
Lecture 27 - Telefilms and Indian TV Serials
Lecture 28 - Television and OTT series for 21st Century
Lecture 29 - Benevolent Sexism on Screen

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Lecture 30 - Ambivalent Sexism and Sexual Violence
Lecture 31 - History of OTT platforms
Lecture 32 - Impact of OTTs
Lecture 33 - Art Vs Content
Lecture 34 - Creative Economy Powering OTTs
Lecture 35 - Webseries
Lecture 36 - History of the term, different theories on conflict, Hobbsian Social Contract Theory
Lecture 37 - Cyberculture and different types of digital divides, ethnographic methods
Lecture 38 - Features of Cyberculture and Cyberactivism
Lecture 39 - Cyberpolitics and the Millenials of India
Lecture 40 - Cyberactivism and its impact on Social Movements

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NPTEL Video Course - Humanities and Social Sciences - NOC:Contemporary Literature

Subject Co-ordinator - Prof. Aysha Viswamohan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Novel and Change

Subject Co-ordinator - Prof. Avishek Parui

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Robinson Crusoe - Part 1
Lecture 3 - Robinson Crusoe - Part 2
Lecture 4 - Robinson Crusoe - Part 3
Lecture 5 - Robinson Crusoe - Part 4
Lecture 6 - Robinson Crusoe - Part 5
Lecture 7 - The Rise of the Novel - Part 1
Lecture 8 - The Rise of the Novel - Part 2
Lecture 9 - The Rise of the Novel - Part 3
Lecture 10 - The Rise of the Novel - Part 4
Lecture 11 - The Rise of the Novel - Part 5
Lecture 12 - Frankenstein - Part 1
Lecture 13 - Frankenstein - Part 2
Lecture 14 - Frankenstein - Part 3
Lecture 15 - Frankenstein - Part 4
Lecture 16 - Frankenstein - Part 5
Lecture 17 - Frankenstein - Part 6
Lecture 18 - Frankenstein - Part 7
Lecture 19 - Frankenstein - Part 8
Lecture 20 - Frankenstein - Part 9
Lecture 21 - Frankenstein - Part 10
Lecture 22 - Great Expectations - Part 1
Lecture 23 - Great Expectations - Part 2
Lecture 24 - Great Expectations - Part 3
Lecture 25 - Great Expectations - Part 4
Lecture 26 - Great Expectations - Part 5
Lecture 27 - Great Expectations - Part 6
Lecture 28 - Heart of Darkness - Part 1
Lecture 29 - Heart of Darkness - Part 2

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Lecture 30 - Heart of Darkness - Part 3
Lecture 31 - Heart of Darkness - Part 4
Lecture 32 - Heart of Darkness - Part 5
Lecture 33 - Heart of Darkness - Part 6
Lecture 34 - R. K. Narayan's The Guide - Part 1
Lecture 35 - R. K. Narayan's The Guide - Part 2
Lecture 36 - R. K. Narayan's The Guide - Part 3
Lecture 37 - R. K. Narayan's The Guide - Part 4
Lecture 38 - R. K. Narayan's The Guide - Part 5
Lecture 39 - R. K. Narayan's The Guide - Part 6
Lecture 40 - R. K. Narayan's The Guide - Part 7
Lecture 41 - R. K. Narayan's The Guide - Part 8
Lecture 42 - R. K. Narayan's The Guide - Part 9
Lecture 43 - R. K. Narayan's The Guide - Part 10
Lecture 44 - R. K. Narayan's The Guide - Part 11
Lecture 45 - Chinua Achebe's Things Fall Apart - Part 1
Lecture 46 - Chinua Achebe's Things Fall Apart - Part 2
Lecture 47 - Chinua Achebe's Things Fall Apart - Part 3
Lecture 48 - Chinua Achebe's Things Fall Apart - Part 4
Lecture 49 - Chinua Achebe's Things Fall Apart - Part 5
Lecture 50 - Tsitsi Dangarembga's Nervous Conditions and Chinua Achebe's Things Fall Apart - Part 1
Lecture 51 - Tsitsi Dangarembga's Nervous Conditions and Chinua Achebe's Things Fall Apart - Part 2
Lecture 52 - Tsitsi Dangarembga's Nervous Conditions and Chinua Achebe's Things Fall Apart - Part 3
Lecture 53 - Tsitsi Dangarembga's Nervous Conditions and Chinua Achebe's Things Fall Apart - Part 4
Lecture 54 - Tsitsi Dangarembga's Nervous Conditions and Chinua Achebe's Things Fall Apart - Part 5
Lecture 55 - Tsitsi Dangarembga's Nervous Conditions and Chinua Achebe's Things Fall Apart - Part 6
Lecture 56 - Tsitsi Dangarembga's Nervous Conditions - Part 1
Lecture 57 - Tsitsi Dangarembga's Nervous Conditions - Part 2
Lecture 58 - Tsitsi Dangarembga's Nervous Conditions - Part 3
Lecture 59 - Jhumpa Lahiri's The Lowland - Part 1
Lecture 60 - Jhumpa Lahiri's The Lowland - Part 2
Lecture 61 - Jhumpa Lahiri's The Lowland - Part 3
Lecture 62 - Jhumpa Lahiri's The Lowland - Part 4
Lecture 63 - Gabriel GarcÃ-a MÃ¡rquezâ s One Hundred Years of Solitude - Part 1
Lecture 64 - Gabriel GarcÃ-a MÃ¡rquezâ s One Hundred Years of Solitude - Part 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Complete Guide for Campus Interviews: Step by Step

Subject Co-ordinator - Prof. Vinod Aravindakshan, Prof. Vibin Aravindakshan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - The hiring process
Lecture 3 - Dealing with job uncertainty
Lecture 4 - Choosing Companies
Lecture 5 - Labor Markets
Lecture 6 - What are skills
Lecture 7 - Customizing resume
Lecture 8 - How to network
Lecture 9 - Linkedin optimization
Lecture 10 - Midsession review
Lecture 11 - How interviews work
Lecture 12 - STAR interview preparation
Lecture 13 - Answers to tough Tech and HR questions
Lecture 14 - Campus interview guide
Lecture 15 - Body language
Lecture 16 - Long term career strategy
Lecture 17 - Getting ready for industry
Lecture 18 - Value of Masters Programs
Lecture 19 - PhD and jobs in academia
Lecture 20 - Complete review

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NPTEL Video Course - Humanities and Social Sciences - NOC:Gender Inclusive Urban Spaces: Issues and Questions

Subject Co-ordinator - Prof. Binitha V Thampi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Gender Inclusive Urban Housing
Lecture 2 - Women and the Urban Transport Systems
Lecture 3 - Women and the Urban Labour Informal Market
Lecture 4 - Migrant Women Workers in Urban Centres
Lecture 5 - Inclusive Cities and Disabled Women and Children
Lecture 6 - Cities and the Marginalization of Sexual Minorities
Lecture 7 - Women and Urban Resettlement Programs
Lecture 8 - Women Leaders in Urban Governance
Lecture 9 - Women and Self-Help Group Programs in Urban Locales
Lecture 10 - Engendering Urban Sustainability and Livelihood Programs

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NPTEL Video Course - Humanities and Social Sciences - NOC:Anti-Doping Awareness in Sports

Subject Co-ordinator - Prof. Ankush Gupta, Prof. Jay Singh, Col (Dr) Anup Krishnan (Retd), Prof. Dobson Domir

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - World History of Doping
Lecture 2 - Indian Scenario in Doping
Lecture 3 - Doping in Olympics
Lecture 4 - WADA Code and Anti-Doping Organizations
Lecture 5 - WADA Code
Lecture 6 - WADA - Prohibited List
Lecture 7 - WADA - Prohibited in Competition Only
Lecture 8 - WADA - Prohibited Methods
Lecture 9 - Prohibited Substances Side Effects
Lecture 10 - Side Effects of Prohibited Methods
Lecture 11 - ADRV as per WADA Code
Lecture 12 - ADRV 11 Articles
Lecture 13 - Rights and Responsibilities
Lecture 14 - ADRV Indian Case Scenarios
Lecture 15 - ADRV Prevention Strategies
Lecture 16 - The Doping Control Process - 1
Lecture 17 - The Doping Control Process - 2
Lecture 18 - The Doping Control Station
Lecture 19 - The Doping Control Staff
Lecture 20 - ADAMS and ADEL
Lecture 21 - The Sample Transport Process
Lecture 22 - The WADA Accredited Laboratories
Lecture 23 - Result Management as per WADA Code
Lecture 24 - Therapeutic Use Exemptions (TUE)
Lecture 25 - Common TUE Cases
Lecture 26 - The Anti-Doping Investigation System
Lecture 27 - Intelligence Gathering
Lecture 28 - Sanctions as per the WADA Code
Lecture 29 - Sanctions for Repeat Violations

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Lecture 30 - The Appeal Process
Lecture 31 - Doping Control Way Ahead
Lecture 32 - Athelete Biological Passport
Lecture 33 - Genetic Doping Control
Lecture 34 - Court of Arbitration in Sports
Lecture 35 - Arbitration in Doping
Lecture 36 - Dietary Supplements
Lecture 37 - Supplement Issues
Lecture 38 - Safe Supplement Use
Lecture 39 - The National Anti Doping Act 2022 - Part 1
Lecture 40 - The National Anti Doping Act 2022 - Part 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Toolkit of PE Teachers: Basic

Subject Co-ordinator - Prof. Sunil Purohit, Prof. Divyadeep Hada, Prof. Azad Khan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Role of a PE Teacher
Lecture 2 - Child Safety and Anti Child Abuse Policies
Lecture 3 - Planning of Physical Education Program - Part 1
Lecture 4 - Planning of Physical Education Program - Part 2
Lecture 5 - Implementation of Physical Education Program - Part 1
Lecture 6 - Implementation of Physical Education Program - Part 2
Lecture 7 - Implementation of Physical Education Program - Part 3
Lecture 8 - Implementation of Physical Education Program - Part 4
Lecture 9 - Skill and Fitness Assessment - Part 1
Lecture 10 - Skill and Fitness Assessment - Part 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Advanced Course in Performance Traditions of the Ma

Subject Co-ordinator - Prof. Sashikanth Ananthachari

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - A Brief Introduction to the Mahabharata
Lecture 2 - A Brief Introduction to the Mahabharata Traditions of Tamil Nadu
Lecture 3 - The Idea of the Chariot
Lecture 4 - The Custodians of the Festival
Lecture 5 - The Festivals as Total Theatre
Lecture 6 - Potturaja and the Anti-War Nature of the Festival
Lecture 7 - The Birth of Vyasa
Lecture 8 - Chandra Vamsam or the Birth of the Lunar Dynasty
Lecture 9 - The Birth of Yayati
Lecture 10 - The Story of Shakuntala and Dushyanta
Lecture 11 - Shantanu and the Birth of Bhishma or Viduman
Lecture 12 - Birth of Dhritarashtra, Pandu and Vidura
Lecture 13 - Birth of Krishna
Lecture 14 - Birth of Dharmaraja
Lecture 15 - Gurukula Parva
Lecture 16 - Birth of Draupadi
Lecture 17 - Hidimbi Kuri or Hidimbi the Fortune Teller
Lecture 18 - The Killing of Bakasura
Lecture 19 - A Brief Introduction to Koothu as a Theatrical Form
Lecture 20 - Vil Valaippu or the Bending of the Bow
Lecture 21 - The Marriage of Draupadi
Lecture 22 - Subhadra Kalyanam or the Marriage of Subhadra
Lecture 23 - Rajasuya Yaagam
Lecture 24 - Draupadiyin Thugilum Parandhamanin Arulum or the Attempted Disrobing of Draupadi and Krishna
Lecture 25 - Arjunaâ s Tapas
Lecture 26 - Kichaka Vadham or the Killing of Kichaka
Lecture 27 - Krishnan Thoodhu or Krishna as the Emissary of the Pandavas
Lecture 28 - Aravan Kalabali and the Beginning of the Great War
Lecture 29 - Karna Mosham

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Lecture 30 - The Eighteenth Dayâ s War or Duryodhanaâ s Lament
Lecture 31 - The Coronation of Dharmaraja and the Ashwamedha Yaagam

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NPTEL Video Course - Humanities and Social Sciences - NOC:Korean - II

Subject Co-ordinator - Prof. Soo Jin Shim

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - êµ•ì ¤ í êµ-ì ´ (Classroom Korean), Unit 9 ì•´ë¶ ì• ë êµ¬ì ¸ì ? Vocabulary
Lecture 2 - ì•´ë¶ ì• ë êµ¬ì ¸ì ? Vocabulary game, Grammar 1: N(ì•) n, Grammar 2: Nì• /ë¥¼ ì í ë ¤(ì ë
Lecture 3 - ì•´ë¶ ì• ë êµ¬ì ¸ì ? Exercises, Speaking 1: Introducing friends
Lecture 4 - ì•´ë¶ ì• ë êµ¬ì ¸ì ? Speaking 1, Grammar 3: N(ì•´)ì ¸ì , Grammar 4: A/V-(ì ¼)ì -
Lecture 5 - ì•´ë¶ ì• ë êµ¬ì ¸ì ? Practice: -(ì ¼)ì -, Speaking 2: Introducing family members
Lecture 6 - ì•´ë¶ ì• ë êµ¬ì ¸ì ? Speaking 2: Introducing family members, Listening
Lecture 7 - ì•´ë¶ ì• ë êµ¬ì ¸ì ? Reading: A blog entry about family members, Writing, Pronunciation, Self-
Lecture 8 - ì§ ê¸ ëª ì ì ì ? Vocabulary: The time, Verb 2, Grammar 1: ì ê° , Grammar 2: Në¶ í ° Nê¹ ì§
Lecture 9 - ì§ ê¸ ëª ì ì ì ? Practice, Speaking 1: Deciding what time to meet, Grammar 3: V-ì ì /ì ´ì
Lecture 10 - ì§ ê¸ ëª ì ì ì ? Exercises, Grammar 4: V-(ì ¼)ã ¹ ê±°ì ì , Speaking 2: Asking/responding
Lecture 11 - ì§ ê¸ ëª ì ì ì ? Speaking 2: Asking/responding to questions about a schedule, Listening
Lecture 12 - ì§ ê¸ ëª ì ì ì ? Practice, Reading: An e-mail about weekend plans
Lecture 13 - ì§ ê¸ ëª ì ì ì ? Writing, Task, Pronunciation, Self-Check
Lecture 14 - ê°•ê¸°ì • ê±¸ ¸ì ´ì . Vocabulary: Body, Symptoms, Grammar 1: í ë•½
Lecture 15 - ê°•ê¸°ì • ê±¸ ¸ì ´ì . Grammar 2: V-ì§ ë§ ì ¸ì , Speaking 1: Expressing symptoms and prohibit
Lecture 16 - ê°•ê¸°ì • ê±¸ ¸ì ´ì . Speaking 1: Expressing symptoms and prohibition, Grammar 3: Në§ , Gramma
Lecture 17 - ê°•ê¸°ì • ê±¸ ¸ì ´ì . Practice, Exercises, Speaking 2: Expressing obligation
Lecture 18 - ê°•ê¸°ì • ê±¸ ¸ì ´ì . Speaking 2: Expressing obligation, Listening
Lecture 19 - ê°•ê¸°ì • ê±¸ ¸ì ´ì . Reading: A passage about worries, Writing, Pronunciation, Self-Check
Lecture 20 - ì ¬ë³´ì ¸ì . Vocabulary: Telephone (number), Grammar 1: A/V-ì§ ì ? N(ì•´)ì§ ì ?
Lecture 21 - ì ¬ë³´ì ¸ì . Grammar 2: V-ê³ ì ë ¤, Exercises, Speaking 1: Talking on the phone
Lecture 22 - ì ¬ë³´ì ¸ì . Speaking 1: Talking on the phone, Grammar 3: ëª»V, Grammar 4: A/V-ì ì /ì ´ì
Lecture 23 - ì ¬ë³´ì ¸ì . Practice, Exercises, Speaking 2: Expressing reasons
Lecture 24 - ì ¬ë³´ì ¸ì . Speaking 2: Expressing reasons, Practice, Listening 1
Lecture 25 - ì ¬ë³´ì ¸ì . Listening 2, Reading: A text message, Writing, Pronunciation, Culture Note, Self-C
Lecture 26 - ì ì ¸ì -ì ¼ë¡ ê° ì£¼ì ¸ì . Vocabulary: Traffic, Grammar 1: V-(ì ¼)ë ¤ê³ í ë ¤, Grammar 2:
Lecture 27 - ì ì ¸ì -ì ¼ë¡ ê° ì£¼ì ¸ì . Exercises, Speaking 1: Expressing school vacation plans
Lecture 28 - ì ì ¸ì -ì ¼ë¡ ê° ì£¼ì ¸ì . Grammar 3: V-ì /ì ´ ì£¼ë ¤, Exercises, Grammar 4: N(ì ¼)ë¡
Lecture 29 - ì ì ¸ì -ì ¼ë¡ ê° ì£¼ì ¸ì . Speaking 2: Requesting, Practice

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Lecture 30 - ì ì ¸ì -ì ¼ë¡ ê° ì£¼ì ¸ì . Listening, Practice, Reading: A passage about thankful experience
Lecture 31 - ì ì ¸ì -ì ¼ë¡ ê° ì£¼ì ¸ì . Writing, Task, Pronunciation, Culture Note, Self-Check
Lecture 32 - ì•´ ì ·ì• ì ì ´ ë³´ì ¸ì . Vocabulary: Clothes, Adjective 2, Grammar 1: 'ã ¹' í ë•½
Lecture 33 - ì•´ ì ·ì• ì ì ´ ë³´ì ¸ì . Grammar 2: A-(ì ¼)ã ´ N, Exercises, Speaking 1: Describing someone'
Lecture 34 - ì•´ ì ·ì• ì ì ´ ë³´ì ¸ì . Speaking 1: Describing someone's appearance, Grammar 3: Ní í (ê»
Lecture 35 - ì•´ ì ·ì• ì ì ´ ë³´ì ¸ì . Exercises, Speaking 2: Recommending
Lecture 36 - ì•´ ì ·ì• ì ì ´ ë³´ì ¸ì . Listening, Reading: A blog entry about birthday gifts
Lecture 37 - ì•´ ì ·ì• ì ì ´ ë³´ì ¸ì . Writing, Pronunciation, Culture Note, Self-Check, Poems

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NPTEL Video Course - Humanities and Social Sciences - China in Contemporary Global Politics

Subject Co-ordinator - Prof. Joe Thomas Karackattu

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Traditional Chinese worldview
Lecture 3 - Traditional Chinese worldview - 1 (Continued...)
Lecture 4 - Traditional Chinese worldview - 2 (Continued...)
Lecture 5 - Modern China
Lecture 6 - Modern China (Continued...)
Lecture 7 - Early Mao Period
Lecture 8 - Early Mao Period (Continued...)
Lecture 9 - Cultural Revolution
Lecture 10 - Cultural Revolution (Continued...)
Lecture 11 - China - Opening up and reforms
Lecture 12 - Economic reforms
Lecture 13 - Deng Xiaoping and economic strategies
Lecture 14 - Features of economic reform process
Lecture 15 - Third wave of reforms
Lecture 16 - Impact of opening up
Lecture 17 - Major long term challenges to China's growth
Lecture 18 - US-China relations
Lecture 19 - South China Sea disputes
Lecture 20 - South China Sea disputes (Continued...)
Lecture 21 - India China political relations
Lecture 22 - India China economic relations
Lecture 23 - China and the BRICS+
Lecture 24 - China and the BRICS+ (Continued...)
Lecture 25 - China and Energy security
Lecture 26 - China and Energy security (Continued...)
Lecture 27 - Cross-Strait relations
Lecture 28 - Cross-Strait relations - 1 (Continued...)
Lecture 29 - Cross-Strait relations - 2 (Continued...)

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Lecture 30 - China in Africa
Lecture 31 - China Dream and future outlook
Lecture 32 - China Dream (Continued...)

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Literature of Climate Crisis

Subject Co-ordinator - Prof. Pramod K Nayar

Co-ordinating Institute - University of Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Literature and the Enviroment
Lecture 2 - Why Literature in the age of climate crisis - I
Lecture 3 - Why Literature in the age of climate crisis - II
Lecture 4 - The Poetics of Unsettlement
Lecture 5 - Poetry as Response to Enviroment Crisis
Lecture 6 - Poscolonial Enviromental Novel
Lecture 7 - Postcolonial Enviromental Crisis in the Novels of Amitav Ghosh
Lecture 8 - The Enviromental Memoir
Lecture 9 - Indian Graphic Novels and Enviromental Consciousness
Lecture 10 - Group Discussion
Lecture 11 - The Idea of Wilderness
Lecture 12 - Carnal Geographies - I
Lecture 13 - Carnal Geographies - II
Lecture 14 - Bogs, Swaps and Watery Bodies
Lecture 15 - The post natural
Lecture 16 - Anthropocentrism and Speciesism
Lecture 17 - Writing Extinction
Lecture 18 - The world is Ending - I
Lecture 19 - The world is ending - II
Lecture 20 - Rewilding
Lecture 21 - Creaturescapes Multispecies Vulnerabilities
Lecture 22 - Multispecies Writing
Lecture 23 - Introduction to Concepts and a Recent Overview of Contects
Lecture 24 - Discussion of case studies and Reflections Enabled by Biomutation Narratives
Lecture 25 - Group Discussion
Lecture 26 - Habitats and Habitation - I
Lecture 27 - Habitats and Habitation - II
Lecture 28 - Ecological Grief
Lecture 29 - The RE Enchantment of the World

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Lecture 30 - Group Discussion
Lecture 31 - Colonialism Neocolonialism and the Environment
Lecture 32 - Waste Toxic Enviroments and 'Sacrifice Zones'
Lecture 33 - Nature Care and Stewardship in Postcolonial Poetry
Lecture 34 - The Literature of Extractivism
Lecture 35 - Postcolonialism and Ecological Thought
Lecture 36 - The oceanic experience of Indian Indenture
Lecture 37 - The Neo Slave Novel
Lecture 38 - The Literature of Animal Rights: Justice
Lecture 39 - Why Ecopedagogy is Important ?
Lecture 40 - Enviromentality

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian National Movement

Subject Co-ordinator - Prof. Santhosh Abraham

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Emergence of British Rule in India and the Early Orientalist Policies
Lecture 2 - Land Revenue Plans and Legal Changes
Lecture 3 - Educational Reforms, Criticisms and Ideological Justification of Colonial Rule
Lecture 4 - Social Reform Movements in 19th-Century British India - Part 1
Lecture 5 - Social Reform Movements in 19th-Century British India - Part 2
Lecture 6 - Religious Reform Movements in 19th-Century British India
Lecture 7 - Anti-Colonial Resistance in India / Civil and Tribal Uprisings
Lecture 8 - Anti-Colonial Resistance in India / British Indian Army and 1857 Revolt / Causes - Part 1
Lecture 9 - Anti-Colonial Resistance in India / British Indian Army and 1857 Revolt / Causes - Part 2
Lecture 10 - 1857 Revolt : Military Causes, Course and the Reasons for its Failure
Lecture 11 - 1857 Revolt : Scholarly Interpretations
Lecture 12 - Anti-Colonial Resistance in India / Peasant Uprisings
Lecture 13 - Economic Impacts in British India: Decline of Traditional Industries
Lecture 14 - Economic Impacts in British India: Deindustrialisation, Agriculture Decline and Famines
Lecture 15 - Nationalist Critiques of Colonialism: Economists in British India
Lecture 16 - Public Criticisms against the British State: Growth of Press in India
Lecture 17 - Middle Class Responses in British India
Lecture 18 - Rise of Indian Nationalism: History and Types - Part 1
Lecture 19 - Rise of Indian Nationalism: History and Types - Part 2
Lecture 20 - Theories of the Origin of Indian National Movement
Lecture 21 - The First National Organisation and Early Nationalism
Lecture 22 - The Rise of the Extremists and Swadeshi Movement - Part 1
Lecture 23 - The Rise of the Extremists and Swadeshi Movement - Part 2
Lecture 24 - Early Nationalist Phase: Revolutionary Secret Societies
Lecture 25 - Early Nationalist Phase: The Establishment of All India Muslim League
Lecture 26 - Early Nationalist Phase: Hindu Mahasabha
Lecture 27 - Early Nationalist Phase: Council Reforms: Indian Councils Acts of 1861, 1892 and 1909
Lecture 28 - Early Nationalist Phase: Post 1909 Indian Nationalist Developments
Lecture 29 - Gandhian Era of Indian Nationalism: Gandhi Before Mahatma

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Lecture 30 - Early Satyagrahas of Gandhi (1915-1919)
Lecture 31 - Early Nationalist Phase: Home Rule Movement in India
Lecture 32 - Council Reforms: Indian Councils Act of 1919 - Part 1
Lecture 33 - Council Reforms: Indian Councils Act of 1919 - Part 2
Lecture 34 - Gandhian Era: The Khilafat Movement
Lecture 35 - Gandhian Era: Malabar Rebellion of 1921
Lecture 36 - Gandhian Era: The Non-cooperation Movement
Lecture 37 - Gandhian Era: Non-cooperation Constructive Programmes
Lecture 38 - Peasant Movements and Nationalism in the 1920s
Lecture 39 - The Struggles for Gurdwara Reforms
Lecture 40 - Post Non-Co-operation Active Politics: Arrival of Simon Commission and Reactions
Lecture 41 - Post Non-Co-operation Active Politics: Nehru Report and Jinnah's 14 Points
Lecture 42 - The Return of Gandhi to Active Politics
Lecture 43 - Post Non-Co-operation Active Politics: Revolutionary Terrorism
Lecture 44 - Emergence of Socialist Ideas and Communists and Working Class
Lecture 45 - Gandhi's 11 Points of Demand and the Idea of Civil Disobedience
Lecture 46 - Dandi March and Civil Disobedience Movement
Lecture 47 - 1930-34: Gandhi-Irwin Pact and Round Table Conferences
Lecture 48 - 1930-34: Communal Award and Poona Pact
Lecture 49 - Depressed Classes and the Rise of Ambedkar - Part 1
Lecture 50 - Depressed Classes and the Rise of Ambedkar - Part 2
Lecture 51 - Gandhi's Harijan Campaigns and Reactions in India
Lecture 52 - 1934: Indian National Congress and Return to Council Politics
Lecture 53 - Gandhian Struggle Vs Nehruvian Struggle
Lecture 54 - The Government of India Act of 1935
Lecture 55 - 1937 Elections to Provincial Legislatures
Lecture 56 - Indian National Congress and the Provincial Legislatures 1937-1939
Lecture 57 - Indian Nationalism during the late 1930s: From Liberal to Extreme Communalism
Lecture 58 - Freedom Movements in Princely India
Lecture 59 - The Kisan Sabha and Peasant Movements
Lecture 60 - Growth of Women's Organisations
Lecture 61 - 1939-1945 - Ideological and Leadership Crisis in the INC in 1939
Lecture 62 - 1939-1945 - World War, New Politics in India and August Offer
Lecture 63 - 1939-1945 - Cripps Mission in India
Lecture 64 - Quit India Movement of 1942 - Part 1
Lecture 65 - Quit India Movement of 1942 - Part 2 - Different Phases
Lecture 66 - Alternate Road to Freedom: Subas Chandra Bose
Lecture 67 - Negotiations for Self-Governance: Lord Wavell, Gandhi and Jinnah
Lecture 68 - 1946 Elections in India

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Lecture 69 - Anti-Imperialist Activities of 1946 : RIN Mutiny
Lecture 70 - Peasant Agitations of 1946 : Tebhaga, Telangana and Punnapra-Vayalar Movements
Lecture 71 - Cabinet Mission to India and the Interim Government in India
Lecture 72 - Transfer of Power, Mountbatten Plan, Freedom and Partition in India
Lecture 73 - Post Independence: Partition Migration and Communal Violence
Lecture 74 - The Accession and the Integration of the Princely States
Lecture 75 - India after Independence: Constitution, Personal Laws, Caste, Centre and State Relations
Lecture 76 - Indian National Movement - Concluding Remarks

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NPTEL Video Course - Humanities and Social Sciences - NOC:Nation and Narration

Subject Co-ordinator - Prof. Sreenath V.S, Prof. Anandita Pan

Co-ordinating Institute - IIT Madras, IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview of the Lectuers - Week 1
Lecture 2 - Origins of the Nation: Western Foundations and Influences
Lecture 3 - Print Capitalism and the Making of Nation States
Lecture 4 - Nation, Nationalism, and Modernity: Their Journey to the Colonies
Lecture 5 - The Civilizing Mission: Justifying Empire through European Values
Lecture 6 - Orientalism in Practice: Reading Kiplingâ s The Mark of the Beast
Lecture 7 - Gods, Power, and Representation: Orientalism in The Mark of the Beast
Lecture 8 - Understanding Modernity: Ideas and Origins in the European Context
Lecture 9 - Civilizing Mission and Colonial Mimicry in Khushwant Singhâ s Karma
Lecture 10 - From Western to Alternative Modernity: Nationalist Reimaginings of the Modern
Lecture 11 - An Overview of the Lectuers - Week 2
Lecture 12 - Negotiating Modernity: Tradition and the Public-Private Divide in Colonial India
Lecture 13 - Colonial Encounters with Classical Knowledge: Power, Authority, and Interpretation
Lecture 14 - Women and Reform: Empowerment or Patriarchal Continuity?
Lecture 15 - The Colonial Prison: Punishment, Power, and Institutional Transformation
Lecture 16 - Colonial Time and the Advent of Punctuality
Lecture 17 - An Overview of the Lectuers - Week 3
Lecture 18 - Forging an Alternative Modernity: Reform and Cultural Synthesis
Lecture 19 - The Bhadramahila and the Nation: Gender, Reform, and Representation
Lecture 20 - Bhadramahila on Screen: Gender, Nation, and Modernity in Ghare Baire
Lecture 21 - Textile Prison: Shame, Femininity, and the Bhadramahila in Colonial Bengal
Lecture 22 - Modernity and the Remaking of the Domestic Sphere
Lecture 23 - An Overview of the Lectuers - Week 4
Lecture 24 - The Social History of the Sari: Sartorial Politics in Colonial Bengal
Lecture 25 - Colonial Modernity and the Transformation of Friendship: Reading Sibnath Sastryâ s Autobiograph
Lecture 26 - Colonialism and the Birth of the Indian Novel
Lecture 27 - The Paradox of Restoration: Nationalism and the Colonial Presence
Lecture 28 - Nationalism and the 'Good' Empire: Reading Lagaan and the Legacy of Colonial Administration
Lecture 29 - The Anglicistâ Orientalist Debate: A Shared Justification for Empire

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Lecture 30 - Vande Mataram and the Making of Mother India
Lecture 31 - Language as Mother: Tamil, Nationalism, and Emotional Belonging
Lecture 32 - Secularism and the Nation: Religion, Reform, and the State in Colonial and Postcolonial India
Lecture 33 - Secularism and the Postcolonial Indian State: Reform, Religion, and 'Principled Distance'
Lecture 34 - Caste and the Making of Nation
Lecture 35 - Subaltern Studies and Methods of Historiography
Lecture 36 - Dalit Politics and Dalit Historiography
Lecture 37 - Anti-Caste Movements and Jotirao Phule
Lecture 38 - Anti-Caste Movements and Dr. B.R. Ambedkar
Lecture 39 - Anti-Caste Movements and E.V.R. Periyar
Lecture 40 - Caste in Bengal
Lecture 41 - Women and Nation
Lecture 42 - Women's Autobiographies and Identity Formation
Lecture 43 - Women's Writing as Representation
Lecture 44 - Women in Politics
Lecture 45 - Women in Ambedkarite Movements
Lecture 46 - Women in Periyar's Self Respect Movement
Lecture 47 - Nation and Popular Culture
Lecture 48 - Nation and Representation
Lecture 49 - Nation and Queer Desire
Lecture 50 - Emergence of Publishing Houses

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Physical Medicine and Rehabilitatic

Subject Co-ordinator - Col (Dr) Anup Krishnan, Wg Cdr (Dr) CS Guru

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Physical Medicine and Rehabilitation
Lecture 2 - Principles of Injury Prevention in Sports
Lecture 3 - Common Soft Tissue Sports Injuries
Lecture 4 - Overuse Injuries in Athletes
Lecture 5 - Rehabilitation for Common Sports Injuries
Lecture 6 - Overview of the Musculoskeletal System
Lecture 7 - Functional Anatomy of Lower extremity
Lecture 8 - Functional Anatomy of Upper extremity
Lecture 9 - Introduction to Biomechanics and Injury Mechanism
Lecture 10 - Common Mechanism of acute and overuse injuries
Lecture 11 - Acute Sports injuries and the Injury assessment protocol
Lecture 12 - Immediate treatment and first aid in sports injuries
Lecture 13 - Imaging techniques in Sports injuries
Lecture 14 - Clinical and functional testing in sports injuries
Lecture 15 - Advances in Diagnostic technologies in Sports injuries
Lecture 16 - Overview of Phases of Rehabilitation
Lecture 17 - Acute Phase of Rehabilitation - Goals and Strategies
Lecture 18 - Subacute and Functional Phases of Rehabilitation
Lecture 19 - Introduction to Physical Therapy in Sports Rehabilitation
Lecture 20 - Adavanced Physical Therapy Techniques
Lecture 21 - Foundation of Strength Training
Lecture 22 - Periodization in Strength Training
Lecture 23 - Strength Training for Different Sports
Lecture 24 - Key components of Sports Conditioning
Lecture 25 - Designing a Sports specific Conditioning Program
Lecture 26 - Flexibility and Its Role in Athletic Performance
Lecture 27 - Types of Stretching and Their Effect on Injury Prevention
Lecture 28 - Joint Mobility and Flexibility: Difference and Significance
Lecture 29 - Techniques for Improving Joint Mobility

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Lecture 30 - Assessing and Monitoring Joint Mobility
Lecture 31 - Physical Modalities in Rehabilitation
Lecture 32 - Electrical Stimulation and Ultrasound in Rehabilitation
Lecture 33 - Alternative Therapies in Sports Rehabilitation
Lecture 34 - Acupuncture and Dry Needling in Sports Rehabilitation
Lecture 35 - Integrating Complementary Therapies into Rehab Programs
Lecture 36 - Principles of Injury Prevention in sports
Lecture 37 - Designing a Sports-specific Injury Prevention Program
Lecture 38 - Role of monitoring and load management in injury Prevention
Lecture 39 - Psychological impact of Sports Injuries
Lecture 40 - Strategies for psychological rehabilitation post-injury

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Writing in English

Subject Co-ordinator - Prof. Umasankar Patra

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Week 1 Overview
Lecture 2 - Gauri Vishwanathan's 'The Beginnings of English Literary Study' - Part 1
Lecture 3 - Gauri Vishwanathan's 'The Beginnings of English Literary Study' - Part 2
Lecture 4 - Ram Mohan Royâ s 'The Need for Modern Education'
Lecture 5 - Macaulayâ s Minute on Education - Part 1
Lecture 6 - Macaulayâ s Minute on Education - Part 2
Lecture 7 - Week 2 Overview
Lecture 8 - Vinay Dharwadkerâ s 'The Historical Formation of Indian English Literature' - Part 1
Lecture 9 - Vinay Dharwadkerâ s 'The Historical Formation of Indian English Literature' - Part 2
Lecture 10 - The Travels of Din Muhammed - Part 1
Lecture 11 - The Travels of Din Muhammed - Part 2
Lecture 12 - The Travels of Din Muhammed - Part 3
Lecture 13 - Week 3 Overview
Lecture 14 - The Rise of the Novel
Lecture 15 - The Novelâ s Arrival in India
Lecture 16 - Evolution of the Indian English Novel
Lecture 17 - Introduction to Rajmohanâ s Wife by Bankim Chandra Chatterjee
Lecture 18 - Week 4 Overview
Lecture 19 - Rajmohanâ s Wife - Part 1
Lecture 20 - Rajmohanâ s Wife - Part 2
Lecture 21 - Rajmohanâ s Wife - Part 3
Lecture 22 - Rajmohanâ s Wife - Part 4
Lecture 23 - Rajmohanâ s Wife - Part 5
Lecture 24 - Week 5 Overview
Lecture 25 - AK Ramanujanâ s 'Is There an Indian Way of Thinking?' - Part 1
Lecture 26 - AK Ramanujanâ s 'Is There an Indian Way of Thinking?' - Part 2
Lecture 27 - AK Ramanujanâ s 'Is There an Indian Way of Thinking?' - Part 3
Lecture 28 - RK Narayanâ s 'A Horse and Two Goats' - Part 1
Lecture 29 - RK Narayanâ s 'A Horse and Two Goats' - Part 2

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Lecture 30 - Week 6 Overview
Lecture 31 - Early Indian English Poetry - Part 1
Lecture 32 - Early Indian English Poetry - Part 2
Lecture 33 - Early Indian English Poetry - Part 3
Lecture 34 - Evolution of Indian English Poetry
Lecture 35 - Indian English Poetry - Nissim Ezekiel
Lecture 36 - Week 7 - Overview
Lecture 37 - Indian English Poetry - Arun Kolatkar - Part 1
Lecture 38 - Indian English Poetry - Arun Kolatkar - Part 2
Lecture 39 - Indian English Poetry - Arun Kolatkar - Part 3
Lecture 40 - Indian English Poetry - Arun Kolatkar - Part 4
Lecture 41 - Indian English Poetry - Arun Kolatkar - Part 5
Lecture 42 - Indian English Poetry - Jayanta Mahapatra and Kamala Das
Lecture 43 - Week 8 - Overview
Lecture 44 - Evolution of Indian English Drama
Lecture 45 - Mahesh Dattaniâ s Dance Like a Man - Part 1
Lecture 46 - Mahesh Dattaniâ s Dance Like a Man - Part 2
Lecture 47 - Mahesh Dattaniâ s Dance Like a Man - Part 3
Lecture 48 - Mahesh Dattaniâ s Dance Like a Man - Part 4
Lecture 49 - Week 9 - Overview
Lecture 50 - Introduction to the Writings of the Indian Diaspora
Lecture 51 - Jhumpa Lahiriâ s 'When Mr Pirzada Came to Dine' - Part 1
Lecture 52 - Jhumpa Lahiriâ s 'When Mr Pirzada Came to Dine' - Part 2
Lecture 53 - Rohinton Mistryâ s 'The Ghost of Firozsha Baag'
Lecture 54 - Salman Rushdieâ s Imaginary Homelands - Part 1
Lecture 55 - Salman Rushdieâ s Imaginary Homelands - Part 2
Lecture 56 - Week 10 - Overview
Lecture 57 - Bhimayana - Part 1
Lecture 58 - Bhimayana - Part 2
Lecture 59 - Bhimayana - Part 3
Lecture 60 - Bhimayana - Part 4
Lecture 61 - Bhimayana - Part 5
Lecture 62 - Week 11 - Overview
Lecture 63 - Hansda Sowvendra Shekharâ s 'They Eat Meat!'
Lecture 64 - Hansda Sowvendra Shekharâ s 'November is the Month of Migrations'
Lecture 65 - Hansda Sowvendra Shekharâ s 'Eating with the Enemy'
Lecture 66 - Hansda Sowvendra Shekharâ s 'The Adivasi Will Not Dance'
Lecture 67 - Week 12 - Overview
Lecture 68 - Ulka Anjariaâ s 'Notes on the Indian Contemporary' - Part 1

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Lecture 69 - Ulka Anjariaâ s 'Notes on the Indian Contemporary' - Part 2
Lecture 70 - Anuja Chauhanâ s Those Pricey Thakur Girls - Part 1
Lecture 71 - Anuja Chauhanâ s Those Pricey Thakur Girls - Part 2
Lecture 72 - Anuja Chauhanâ s Those Pricey Thakur Girls - Part 3

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NPTEL Video Course - Humanities and Social Sciences - NOC:Science Fiction Studies

Subject Co-ordinator - Prof. Gigy J Alex

Co-ordinating Institute - IISST Trivandrum

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Science Fiction Studies
Lecture 3 - Origin and Development of Science Fiction
Lecture 4 - Precursors to Science Fiction
Lecture 5 - Definitions of Science Fiction
Lecture 6 - Theoretical Foundations of Science Fiction
Lecture 7 - The Copernican Revolution
Lecture 8 - The Gothic Origins of Science Fiction
Lecture 9 - Science Fiction
Lecture 10 - Frankenstein; or, The Modern Prometheus - I
Lecture 11 - Frankenstein; or, The Modern Prometheus - II
Lecture 12 - Frankenstein; or, The Modern Prometheus - III
Lecture 13 - Moxon's Master
Lecture 14 - Introduction: A History of Social Science Fiction
Lecture 15 - Science Fiction and Cultural History
Lecture 16 - The Flowering
Lecture 17 - 2 B R 0 2 B
Lecture 18 - Science Fiction and Cultural History
Lecture 19 - Cinematic Fantasies of Becoming-Cyborg
Lecture 20 - La Jetee
Lecture 21 - 2001: A Space Odyssey
Lecture 22 - Solaris
Lecture 23 - Interstellar
Lecture 24 - Mason's Rats
Lecture 25 - The Convergence of Postmodern Innovative Fiction and Science Fiction: An Encounter with Samuel R
Lecture 26 - Racism and Science Fiction
Lecture 27 - Gattaca
Lecture 28 - Bloodchild
Lecture 29 - Come Home to Atropos

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Lecture 30 - Gender Identity and Science Fiction
Lecture 31 - The Matter of Seggri
Lecture 32 - All You Zombies
Lecture 33 - Sophia the Robot Contemplates Beauty
Lecture 34 - Gender in Science Fiction
Lecture 35 - Colonizing the Universe: Science Fictions Then, Now, and in the (Imagined) Future
Lecture 36 - District 9
Lecture 37 - Harvest
Lecture 38 - The Calcutta Chromosome
Lecture 39 - Post-Colonial Perspectives of Science Fiction
Lecture 40 - The Critical Reception of Speculative Fiction
Lecture 41 - Science Fiction as Mythology
Lecture 42 - Sitaâ s Descent
Lecture 43 - Black Panther
Lecture 44 - Fahrenheit 451
Lecture 45 - If Only We Had Taller Been and A Martian Sends a Postcard Home
Lecture 46 - Introduction to Science Fiction and Post Humanism
Lecture 47 - Dystopia, Science Fiction, Posthumanism, and Liquid Modernity
Lecture 48 - Akira
Lecture 49 - Big Hero 6
Lecture 50 - Klara and the Sun
Lecture 51 - Cyborg Manifesto
Lecture 52 - Cyborg Manifesto (Continued...)
Lecture 53 - Bodies That Matter: Science Fiction, Technoculture, and the Gendered Body
Lecture 54 - Her
Lecture 55 - Poem Rocket and Robot Baby
Lecture 56 - From Science Fiction to Reality: How Digital Humans are Forging New Realities
Lecture 57 - Nosedive
Lecture 58 - Bandersnatch
Lecture 59 - The Matrix
Lecture 60 - Augment
Lecture 61 - Post-Capitalist Futures: A Report on Imagination
Lecture 62 - Avatar
Lecture 63 - A Different Sea
Lecture 64 - Oryx and Crake
Lecture 65 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sports Injuries of Knee: Rehabilitation

Subject Co-ordinator - Col (Dr) Hrishikesh Pande Surg, Cdr (Dr) Jerrin Shaji, Maj (Dr) Amar Singh, Maj (Dr) A

Co-ordinating Institute - AFMC Pune

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functional anatomy and biomechanics of knee
Lecture 2 - Mechanisms and Types of Soft Tissue Knee Injuries
Lecture 3 - Clinical evaluation of knee injuries
Lecture 4 - Radiological Evaluation
Lecture 5 - Definitive management principles of soft tissue injuries of knee
Lecture 6 - Prehabilitation, Surgical Decision Making and Planning for Rehabilitation
Lecture 7 - Objectives and Physiological Rationale for Prehabilitation in Knee Injuries
Lecture 8 - Prehabilitation Exercise Design - ROM, Strength and Neuromuscular Control
Lecture 9 - Surgical Considerations Impacting Postoperative Rehabilitation Planning
Lecture 10 - Principles of Criteria-Based Progression
Lecture 11 - ACL Reconstruction Rehabilitation Phases and Key clinical milestones
Lecture 12 - Postoperative Pain, Swelling and Wound Management Strategies
Lecture 13 - Early ROM, Gait Training and Weight Bearing Guidelines
Lecture 14 - Initial Strengthening Approaches Closed Vs Open Chain Exercises
Lecture 15 - Introduction to Balance and Proprioceptive Training
Lecture 16 - Core and Hip Stabilization Techniques to Support Knee Function
Lecture 17 - Weight-Bearing Progression and Role of Hydrotherapy in Mid-Rehab
Lecture 18 - Maintaining Cardiovascular Fitness During ACL Rehabilitation
Lecture 19 - Progressive Strength and Power Development in the ACL-Injured Athlete
Lecture 20 - Kinetic Chain Deficits and Psychological Readiness During ACL Recovery
Lecture 21 - Return-to-Running Progression Based on Functional Criteria
Lecture 22 - Integration of Agility, Plyometrics, and Reactive Drills
Lecture 23 - Designing Sport-Specific Functional Drills for Late-Stage ACL Rehab
Lecture 24 - Functional Testing for Return-to-Play Decision-Making
Lecture 25 - Long-Term ACL Outcomes - Reinjury Prevention and Follow-Up Monitoring
Lecture 26 - MCL Injury Grading and Phase-Wise Conservative and Surgical Rehabilitation
Lecture 27 - Rehabilitation Strategies for LCL and Posterolateral Corner Injuries
Lecture 28 - Challenges in PCL Injury Rehabilitation - Conservative vs Surgical Pathways
Lecture 29 - Meniscal Repair vs Meniscectomy - Evidence-Based Rehab Protocols

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Lecture 30 - Comprehensive Approach to Combined and Multi-Ligament Knee Injuries
Lecture 31 - Functional Movement Screening for Identifying Biomechanical Deficits
Lecture 32 - Development of Sport-Specific Training Programs
Lecture 33 - Periodization and Progression Models in Athletic Rehabilitation
Lecture 34 - Monitoring Training Load, Fatigue and Injury Risk in Athletes
Lecture 35 - Interdisciplinary Coordination - Role of Coaches, Trainers and Therapists in RTP
Lecture 36 - Evidence-Based Return-to-Play Guidelines for Knee Ligament Injuries
Lecture 37 - Functional and Objective Testing for Safe Return-to-Play
Lecture 38 - Secondary Injury Prevention and Neuromuscular Training Post-RTP
Lecture 39 - Case-Based Review - Rehab Protocol Application in Elite and Amateur Athletes
Lecture 40 - Long-Term Joint Preservation and Osteoarthritis Prevention Strategies

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NPTEL Video Course - Humanities and Social Sciences - NOC:Migration, Mobility and Development

Subject Co-ordinator - Prof. Amrita Datta

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Class (Week-wise introduction to the course)
Lecture 2 - Disciplinary Considerations in Migration Studies
Lecture 3 - Theoretical Foundations in Migration Studies: Ravenstein (1885, 1889) and Lee (1966)
Lecture 4 - Neoclassical Economic Theories and Migration
Lecture 5 - New Economics of Labour Migration
Lecture 6 - Transitional Theories of Migration
Lecture 7 - Migration Systems Theory
Lecture 8 - Migration Networks and Network Theory in Migration Studies
Lecture 9 - Migration Infrastructure and Migration Industry
Lecture 10 - Understanding Global Migration: A Social Transformation Perspective, Stephen Castles (2010)
Lecture 11 - Migration and Development - I
Lecture 12 - Migration and Development - II
Lecture 13 - Structure and Agency in Migration Studies
Lecture 14 - Aspirations in Migration Studies
Lecture 15 - Theorizing Migration in Anthropology, Caroline Brettell (2014)
Lecture 16 - Units of Analysis and Methodological Nationalism
Lecture 17 - Transnational Migration Studies: Past Developments and Future Trends, Peggy Levitt and Nadia Jaw
Lecture 18 - Transnational Migration Studies: Past Developments and Future Trends, Peggy Levitt and Nadia Jaw
Lecture 19 - Transnationalism in Migration Studies (Guest Lectuer titled Being a Khadamma: Narratives from th
Lecture 20 - Gender in Migration Studies - I
Lecture 21 - Gender in Migration Studies - II
Lecture 22 - Gender and Labour Migration (Guest Lectuer by Professor Neetha N)
Lecture 23 - Migration and Human Rights
Lecture 24 - Migrant Housing (Guest lecture titled Housing as a 'foothold' for migrants in the city by Dr Muk
Lecture 25 - Climate Migration (Guest lecture titled Migration in the Context of Climate Change by Dr Chandni
Lecture 26 - Internal Migration (Guest lecture titled Internal Migration and Temporary Labour Circulation in
Lecture 27 - Migration and Urbanisation (Guest lecture titled Circular Migration and Localised Urbanisation i
Lecture 28 - Migration and Livelihoods (Guest lecture titled Migration, Livelihoods and Well Being in India b
Lecture 29 - Empirics of Migration: Kerala (Guest lecture titled Kerala Migration Surveys, 1998-2023 by Profe

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Lecture 30 - Empirics of Migration: Odisha (Guest lecture titled Migration Scenario in Odisha by Professor Ja
Lecture 31 - Empirics of Migration: Migration and Development in India: The Bihar Experience
Lecture 32 - Internal Migration in Contemporary India: A Political Economy Perspective (Guest Lectuer by Prof
Lecture 33 - Internal Labour Migration in India and Evolving Trends (Guest Lectuer by Dr Benoy Peter)
Lecture 34 - Interrogating the Circular in Circular Labour Migration: The Case of Internal Labour Migration i
Lecture 35 - Migrant Construction Labour (Guest Lectuer titled Mobilizing Value: Migration and Labour Contrac
Lecture 36 - Emotions in Migration Research
Lecture 37 - Social Costs of Migration
Lecture 38 - Migration Policy (Guest Lectuer titled Indexing Policies for Internal Migrants in India: The Int
Lecture 39 - International Student Migration (Guest lecture by S Irudaya Rajan, International Institute of Mi
Lecture 40 - Understanding International Migration of the Highly Skilled From India in the Global Context (Gu
Lecture 41 - Refugees, Migrants and the Nation State: The â Insider-Outsiderâ Paradox (Guest lecture by Pr
Lecture 42 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Conditioning Program Designing

Subject Co-ordinator - Prof. Deckline Lietao, Prof. Mr.Kaustubh Shedjale, Prof Dr. Guru CS, Prof. Pralay Maju

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Conditioning and It's Types
Lecture 2 - ATP and Energy System 1
Lecture 3 - ATP and Energy System 2
Lecture 4 - Improving the Efficiency of the Aerobic System 1
Lecture 5 - Improving the Efficiency of the Anaerobic System 2
Lecture 6 - Adaptations to Conditioning Training
Lecture 7 - Program Design Methodology
Lecture 8 - Periodization: Concepts and Application
Lecture 9 - Principles of Periodization
Lecture 10 - Fitness Training Principles
Lecture 11 - Applied Programming Vs Periodization
Lecture 12 - Need Analysis
Lecture 13 - SMART Goal Setting
Lecture 14 - Designing a Periodized Plan
Lecture 15 - Designing a Fitness Program
Lecture 16 - Designing a Workout Program
Lecture 17 - Introduction to Fitness and Assessment
Lecture 18 - Conditioning Fitness Test 1
Lecture 19 - Conditioning Fitness Test 2
Lecture 20 - Introduciton to Load Monitoring
Lecture 21 - Technology and Sensor Application in Conditioning Load Monitoring
Lecture 22 - Badminton Needs Analysis
Lecture 23 - Badminton Needs Analysis 1
Lecture 24 - Badminton Needs Analysis 2
Lecture 25 - Tennis Needs Analysis
Lecture 26 - Tennis Conditioning Program Design
Lecture 27 - Hockey Needs Analysis
Lecture 28 - Hockey Conditioning Program Design: Case 1
Lecture 29 - Football Need Analysis

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Lecture 30 - Football Conditioning Program Design: Case 1
Lecture 31 - Football Conditioning Program Design: Case 2
Lecture 32 - Wrestling Conditioning Programme Design
Lecture 33 - Wrestling Conditioning Programme Design
Lecture 34 - Boxing Needs Analysis
Lecture 35 - Boxing Conditioning Programme Design
Lecture 36 - Boxing Conditioning Programme Design
Lecture 37 - Cricket Need Analysis
Lecture 38 - Cricket Conditioning Programme Design, Case 1
Lecture 39 - Swimming Conditioning Programme Design
Lecture 40 - Swimming Needs Analysis
Lecture 41 - Cricket Conditioning Programme Design, Case 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Dietary Supplements and Ergogenic Aids in Sports

Subject Co-ordinator - Prof. Aradhana Sharma, Prof. Vibha Acharya, Prof. Prasanna Choudhari Wg Cdr, Dr. C.S.G

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Supplements
Lecture 2 - Dietary Supplements
Lecture 3 - Sports Supplements and Ergogenic Aids
Lecture 4 - Psychology Behind Supplements - Part I
Lecture 5 - Psychology Behind Supplements - Part II
Lecture 6 - Electrolyte Drinks
Lecture 7 - Sports Drinks
Lecture 8 - Protein Supplements - Part I
Lecture 9 - Protein Supplements - Part II
Lecture 10 - Mass Gainers
Lecture 11 - Amino Acids - Part I
Lecture 12 - Amino Acids - Part II
Lecture 13 - Caffeine
Lecture 14 - Creatine
Lecture 15 - Nitrate
Lecture 16 - Beta alanine
Lecture 17 - Sodium Bicarbonate
Lecture 18 - Omega 3
Lecture 19 - Multi ingredients preworkout supplements
Lecture 20 - Single ingredient preworkout supplement
Lecture 21 - Supplement for Joint Health
Lecture 22 - Spirulina Supplement
Lecture 23 - Fat Soluble Vitamins
Lecture 24 - Water Soluble Vitamins
Lecture 25 - Mineral Supplements
Lecture 26 - Weight Loss Supplement
Lecture 27 - Pre and probiotic Supplement
Lecture 28 - Herbal Supplements - Part 1
Lecture 29 - Herbal Supplements - Part 2

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Lecture 30 - Meal Replacers
Lecture 31 - Foundational Nutrition, Athlete needs and Supplement philosophy
Lecture 32 - Ergogenic Aid - Creatine
Lecture 33 - Ergogenic Aid - Proteins and Amino Acids
Lecture 34 - Ergogenic Aid - Buffers, Stimulants and Stacks
Lecture 35 - Recovery Aids, Health Supplements and Risk Management
Lecture 36 - Foundation and Core Nutritional Interventions - Endurance sports
Lecture 37 - Core Ergogenic Aids - Endurance sports
Lecture 38 - Sports Supplements, Combinations and Conclusion - Endurance sports
Lecture 39 - Sports Specific Supplements - Skill Based Sports
Lecture 40 - Sports Specific Supplements - Racquet Sports
Lecture 41 - Foundational and established ergogenic aids in Team Sports
Lecture 42 - Recovery aids and case scenario in Team Sports
Lecture 43 - Supplements for Injury Prevention
Lecture 44 - Foundational concepts and Supplements in Rehab nutrition
Lecture 45 - Other supplements for Muscle and Connections tissue
Lecture 46 - Sports Supplements and Anti Doping Rule Violations (ADRV's)
Lecture 47 - Athlete's Responsibility
Lecture 48 - Precautionary Measures to Avoid ADRV's
Lecture 49 - Do Athletes need Supplements ? - Part 1
Lecture 50 - Do Athletes need Supplements ? - Part 2
Lecture 51 - Ergogenic Aids in Sports and Exercise: Protocols, Efficacy, Safety and Regulatory Aspects Part 1
Lecture 52 - Ergogenic Aids in Sports and Exercise: Protocols, Efficacy, Safety and Regulatory Aspects Part 2
Lecture 53 - Industrial Manufacturing Aspects of Sports Supplements: A Drug-Free Model
Lecture 54 - Product Manufacturing aspects of Sports Supplements: A Drug-Free Model
Lecture 55 - Do'S and Don'ts for Buying and using Sports Supplements
Lecture 56 - Sports Supplements industry - career pathway - Part 1
Lecture 57 - Sports Supplements industry - career pathway - Part 2
Lecture 58 - Moducle Recap and Summary (Week 1-12)
Lecture 59 - Science to Practice-Case Studies
Lecture 60 - Key Takeaways and Closing Notes

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NPTEL Video Course - Humanities and Social Sciences - International Relations: Theory and Practice

Subject Co-ordinator - Prof. Joe Thomas Karackattu

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to International Relations (IR) Theory and Practice
Lecture 2 - What is theory in IR?
Lecture 3 - Major theoretical approaches in IR
Lecture 4 - Application of Theory
Lecture 5 - Classical Realism (Continued...)
Lecture 6 - Realism (from Classical to Neo Realism)
Lecture 7 - Bipolarity versus Multipolarity
Lecture 8 - Realism to Liberalism
Lecture 9 - Liberalism within IR
Lecture 10 - Liberalism within IR (Continued...)
Lecture 11 - Game Theory
Lecture 12 - Game Theory (Continued...)
Lecture 13 - Game specification in IR
Lecture 14 - Introduction to International Political Economy (IPE)
Lecture 15 - Softpower (Continued...) and Intro to conflict
Lecture 16 - Why neighbours fight a lot
Lecture 17 - Variations in War and Peace
Lecture 18 - Levels of Analysis (LOA) in IR
Lecture 19 - Levels of Analysis (Continued...)
Lecture 20 - Prospect theory (Continued...)
Lecture 21 - LOA (conclusion) and introduction to Economic interdependence
Lecture 22 - Economic Interdependence and Conflict
Lecture 23 - Conceptualizing and measuring economic interdependence
Lecture 24 - Economic Interdependence (Continued...)
Lecture 25 - Crescenzi's framework of Economic Interdependence
Lecture 26 - Crescenzi's framework (Continued...)
Lecture 27 - Crescenzi's framework (conclusion)
Lecture 28 - Introduction to Post-positivism and Foreign Policy
Lecture 29 - Foreign policy analysis

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Lecture 30 - Globalization
Lecture 31 - Globalization (conclusion)

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NPTEL Video Course - Humanities and Social Sciences - NOC:Time value of money-Concepts and Calculations

Subject Co-ordinator - Dr.Bikash Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Interest Rate
Lecture 3 - Simple interest
Lecture 4 - Compounding techniques - I & II
Lecture 5 - Discrete annually compounding - I & II
Lecture 6 - Continuous compounding
Lecture 7 - Comparison of all compounding methods
Lecture 8 - Present value
Lecture 9 - Future Value
Lecture 10 - Annuities - I & II
Lecture 11 - Perpetuity
Lecture 12 - Amortization
Lecture 13 - Multiple cash flow - I & II
Lecture 14 - Valuation of bond - I & II
Lecture 15 - Valuation of ordinary shares

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NPTEL Video Course - Humanities and Social Sciences - NOC:Depreciation, Alternate Investment and Profitabilit

Subject Co-ordinator - Prof. Bikash Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to course
Lecture 2 - Introduction to depreciation and Straight line method
Lecture 3 - Declining balance method
Lecture 4 - Double-declining balance method
Lecture 5 - Sum-of-the-digits method
Lecture 6 - Sinking fund method and Repair provision method
Lecture 7 - Accelerated cost recovery method - I
Lecture 8 - Accelerated cost recovery method - II
Lecture 9 - Introduction to alternate investment
Lecture 10 - Introduction to alternate investment
Lecture 11 - Present worth method
Lecture 12 - Rate of return method
Lecture 13 - Incremental rate of return
Lecture 14 - Perpetuity method
Lecture 15 - Minimum return as cost
Lecture 16 - Introduction to profitability analysis and Payback period
Lecture 17 - Return on investment
Lecture 18 - Net Return
Lecture 19 - Discounted cash flow - I
Lecture 20 - Discounted cash flow - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Soft Skills

Subject Co-ordinator - Prof. Binod Mishra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Soft Skills
Lecture 2 - Aspects of Soft Skills
Lecture 3 - Effective Communication Skills
Lecture 4 - Classification of Communication
Lecture 5 - Personality Development
Lecture 6 - Positive Thinking
Lecture 7 - Telephonic Communication Skills - Part I
Lecture 8 - Telephonic Communication Skills - Part II
Lecture 9 - Communicating Without Words
Lecture 10 - Paralanguage
Lecture 11 - Proxemics
Lecture 12 - Haptics
Lecture 13 - Meta-communication
Lecture 14 - Listening Skills
Lecture 15 - Types of Listening
Lecture 16 - Negotiation Skills - I
Lecture 17 - Negotiation Skills - II
Lecture 18 - Culture as Communication
Lecture 19 - Communicating across Cultures
Lecture 20 - Organizational Communication
Lecture 21 - Communication Breakdown - Part I
Lecture 22 - Communication Breakdown - Part II
Lecture 23 - Advanced Writing Skills
Lecture 24 - Principles of Business Writing
Lecture 25 - Types of Business Writing - Part I
Lecture 26 - Types of Business Writing - Part II
Lecture 27 - Business Letters
Lecture 28 - Business Letters
Lecture 29 - Types of Business Letters - Part I

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Lecture 30 - Types of Business Letters - Part II
Lecture 31 - Report Writing
Lecture 32 - Types of Reports
Lecture 33 - Strategies for Report Writing - Part I
Lecture 34 - Strategies for Report Writing - Part II
Lecture 35 - Evaluation and Organization of Data
Lecture 36 - Structure of Reports - Part I
Lecture 37 - Structure of Reports - Part II
Lecture 38 - Report Style - Part I
Lecture 39 - Report Style - Part II
Lecture 40 - Group Communication
Lecture 41 - Leadership Skills
Lecture 42 - Group Discussion - Part I
Lecture 43 - Group Discussion - Part II
Lecture 44 - Meeting Management
Lecture 45 - Adaptability and Work Ethics
Lecture 46 - Advanced Speaking Skills
Lecture 47 - Oral Presentations, Speeches, and Debates
Lecture 48 - Combating Nervousness
Lecture 49 - Patterns and Methods of Presentation
Lecture 50 - Oral Presentation
Lecture 51 - Making Effective Presentations
Lecture 52 - Speeches for Various Occasions
Lecture 53 - Interviews
Lecture 54 - Planning and Preparation - Part I
Lecture 55 - Planning and Preparation - Part II
Lecture 56 - Drafting an Effective RÃ©sumÃ©
Lecture 57 - Facing Job Interviews - Part I
Lecture 58 - Facing Job Interviews - Part II
Lecture 59 - Emotional Intelligence and Critical Thinking
Lecture 60 - Applied Grammar

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NPTEL Video Course - Humanities and Social Sciences - NOC:Sociology of Science

Subject Co-ordinator - Dr. Aninday Jayant Mishra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sociology
Lecture 2 - Sociology
Lecture 3 - History of Science
Lecture 4 - HSS in Technology Institutes
Lecture 5 - HSS in Technology Institutes
Lecture 6 - Ethos of Science - I
Lecture 7 - Ethos of Science - II
Lecture 8 - Science and Economy of 17th Century England
Lecture 9 - Matthew Effect - Part 1
Lecture 10 - Matthew Effect - Part 2
Lecture 11 - Matthew Effect - Part 3
Lecture 12 - Thomas Kuhn - Part 1
Lecture 13 - Thomas Kuhn - Part 2
Lecture 14 - Karl Popper - Part 1
Lecture 15 - Karl Popper - Part 2
Lecture 16 - Scientist as Indexical Reasoner - Part 1
Lecture 17 - Scientist as Indexical Reasoner - Part 2
Lecture 18 - Science technology and Colonial Power - Part 1
Lecture 19 - Science Technology and Colonial Power - Part 2
Lecture 20 - Large Community but Few Peers

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NPTEL Video Course - Humanities and Social Sciences - NOC:Perspectives on Neurolinguistic

Subject Co-ordinator - Prof. Smita Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Scope of Neurolinguistic Programming
Lecture 3 - NLP Communicating Model
Lecture 4 - NLP Filters
Lecture 5 - Causes and Effect
Lecture 6 - Four Pillars of NLP
Lecture 7 - Sensory Acuity
Lecture 8 - Rapport
Lecture 9 - Flexibility
Lecture 10 - Useful NLP Techniques
Lecture 11 - Presuppositions of NLP
Lecture 12 - Four Stages of Competence
Lecture 13 - Metacognition
Lecture 14 - Outcome and Ecology
Lecture 15 - Introducing Frames
Lecture 16 - Negotiation
Lecture 17 - Persuasion
Lecture 18 - Emotionality
Lecture 19 - Stage Fear - I
Lecture 20 - Stage Fear - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Literature, Culture and Media

Subject Co-ordinator - Prof. Rashmi Gaur

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Aims and Objectives
Lecture 2 - Defining Literature
Lecture 3 - Defining Culture
Lecture 4 - Relationship between Literature and Culture
Lecture 5 - Literature, Culture and Media
Lecture 6 - Introduction to Cultural Studies
Lecture 7 - Cultural Studies I
Lecture 8 - Cultural Studies II
Lecture 9 - High Culture and Popular Culture
Lecture 10 - Subculture and Counterculture
Lecture 11 - Modernism and Postmodernism - I
Lecture 12 - Modernism and Postmodernism - II
Lecture 13 - Lyotards The Postmodern Condition
Lecture 14 - FoucaultÃ¢â ¬â ¢s Notion of Knowledge and Power
Lecture 15 - Poststructuralism and Deconstruction
Lecture 16 - Introduction to Feminism - I
Lecture 17 - Introduction to Feminism - II
Lecture 18 - Theories of Gender
Lecture 19 - Men's and Masculinity Studies
Lecture 20 - Queer Studies and Representations of Gender in Media
Lecture 21 - Intersectionality
Lecture 22 - Introduction to Postcolonial Theory
Lecture 23 - Key Concepts in Postcolonial theory
Lecture 24 - Said, Spivak and Bhabha
Lecture 25 - Postcolonial Reading of Achebe and Amitav Ghosh
Lecture 26 - Theories of Ideology
Lecture 27 - Adorno and Horkheimer on Culture
Lecture 28 - 1. Culture Industry and Mass Deception; 2. Walter Benjamin
Lecture 29 - Interconnections between Literature, Culture and Identity

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Lecture 30 - Interconnections between Literature, Culture and Identity
Lecture 31 - The Evolution of Media
Lecture 32 - Media and Culture - I
Lecture 33 - Media and Culture - II
Lecture 34 - Media, Culture and Technology
Lecture 35 - Harold Innis
Lecture 36 - Introduction to Marshall McLuhan
Lecture 37 - Media and the Electric Age
Lecture 38 - Hot and Cool Media
Lecture 39 - Postmodern Media - I
Lecture 40 - Postmodern Media - II and Formation of Public Opinion
Lecture 41 - Word and the Image
Lecture 42 - Film and Literature - I
Lecture 43 - Film and Literature - II
Lecture 44 - Language of Films
Lecture 45 - Reading of 12 Years a Slave
Lecture 46 - Development of Media
Lecture 47 - Development of Media
Lecture 48 - Film, Television and Literature
Lecture 49 - Impact of Technology on Literary Genres
Lecture 50 - Media in the 21st Century
Lecture 51 - Approaches to Digital Forms of Media
Lecture 52 - Literature, Internet and Culture
Lecture 53 - Digital Culture, Media, and Literature
Lecture 54 - Representation of Partition in Different Media
Lecture 55 - Representation of Partition in Different Media
Lecture 56 - Game Studies - I
Lecture 57 - Game Studies - II
Lecture 58 - Body Culture Studies and Representation of Women in the Media
Lecture 59 - Media and Gender
Lecture 60 - Media and Language, Glass Ceiling in Media

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NPTEL Video Course - Humanities and Social Sciences - NOC:Body Language: Key to Professional Success

Subject Co-ordinator - Prof. Rashmi Gaur

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Defining Body Language, Scope and Relevance
Lecture 2 - Defining Proxemics, Four Zones
Lecture 3 - Proxemics
Lecture 4 - Oculesics - I
Lecture 5 - Oculesics - II
Lecture 6 - Haptics - I
Lecture 7 - Haptics - II
Lecture 8 - Kinesics
Lecture 9 - Facial Expressions
Lecture 10 - Macro and Micro Facial Expressions
Lecture 11 - Mouth and Smiles
Lecture 12 - Cultural Differences in Smiles; Head Nods
Lecture 13 - Hand Movements
Lecture 14 - Understanding Finger Movements
Lecture 15 - Movements of Feet and Legs
Lecture 16 - Paralanguage
Lecture 17 - Chronemics
Lecture 18 - Chromatics, Olfactics and Physical Appearance
Lecture 19 - Digital Body Language
Lecture 20 - Gustorics and Silence

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NPTEL Video Course - Humanities and Social Sciences - NOC:Interpersonal Skills

Subject Co-ordinator - Prof. Smita Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Interpersonal Skills
Lecture 2 - What are the Important Interpersonal Skills
Lecture 3 - How Can I Develop Interpersonal Skills
Lecture 4 - Practice Makes Interview Perfect
Lecture 5 - Personal Attributes
Lecture 6 - Interpersonal Attributes
Lecture 7 - Technical Communication Skills
Lecture 8 - What is Technical Communication
Lecture 9 - Body Language - 1
Lecture 10 - Body Language - 2
Lecture 11 - Decision making - 1
Lecture 12 - Decision making - 2
Lecture 13 - Pronunciation - 1
Lecture 14 - Pronunciation - 2
Lecture 15 - Creative Problem Solving - 1
Lecture 16 - Creative problem solving - 2
Lecture 17 - Time Management - 1
Lecture 18 - Time Management - 2
Lecture 19 - Leadership skills - 1
Lecture 20 - Leadership skills - 2
Lecture 21 - Group Dynamics - 1
Lecture 22 - Group Dynamics - 2
Lecture 23 - Reducing Stage Fright - 1
Lecture 24 - Reducing Stage Fright - 2
Lecture 25 - Death by Power Point - 1
Lecture 26 - Death by Power Point - 2
Lecture 27 - Negotiation - 1
Lecture 28 - Negotiation - 2
Lecture 29 - Assertiveness - 1

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Lecture 30 - Assertiveness - 2
Lecture 31 - Emotional Intelligence - 1
Lecture 32 - Emotional Intelligence - 2
Lecture 33 - Brain Storming Technique - 1
Lecture 34 - Brain Storming Technique - 2
Lecture 35 - Group Discussion - 1
Lecture 36 - Group Discussion - 2
Lecture 37 - Persuasion - 1
Lecture 38 - Persuasion - 2
Lecture 39 - Glossophobia - 1
Lecture 40 - Glossophobia - 2

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NPTEL Video Course - Humanities and Social Sciences - NOC:Introduction to Environmental Economics

Subject Co-ordinator - Prof. Diptimayee Nayak, Prof. S. P. Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Meaning, Rationale and Evolution
Lecture 2 - Basic Concepts and Tools from Micro and Welfare Economics
Lecture 3 - Environmental Economics and Other Sub-disciplines
Lecture 4 - Study Specific in Environmental Economics, Major Problems, and Key Concerns
Lecture 5 - Commons and Collective Actions Problem
Lecture 6 - Commons and Collective Actions Problem
Lecture 7 - Commons and Collective Actions Problem
Lecture 8 - Mancur Olson's Theory of Collective Action
Lecture 9 - Collective Action and Prisoner's Dilemma Game
Lecture 10 - Governing the Commons
Lecture 11 - Governing the Commons
Lecture 12 - Environmental Goods and Ecosystem Services - I
Lecture 13 - Environmental Goods and Ecosystem Services - II
Lecture 14 - Ecological Footprint - I
Lecture 15 - Ecological Footprint - II
Lecture 16 - Poverty and Environment Linkages - I
Lecture 17 - Poverty and Environment Linkages - II
Lecture 18 - Poverty and Environment Linkages - III
Lecture 19 - Environment and Economic Growth Linkages - I
Lecture 20 - Environment and Economic Growth Linkages - II
Lecture 21 - Environmental Sustainability - I
Lecture 22 - Environmental Sustainability - II
Lecture 23 - Environmental Performance Index
Lecture 24 - Benefit-Cost Analysis and The Environment - I
Lecture 25 - Benefit-Cost Analysis and The Environment - II
Lecture 26 - Consumer Demand for Environmental Goods - I
Lecture 27 - Consumer Demand for Environmental Goods - II
Lecture 28 - Welfare Effects of Price Change
Lecture 29 - Non-market Environment Valuation

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Lecture 30 - Hedonic Pricing Method
Lecture 31 - Household Production Function
Lecture 32 - Household Production Function
Lecture 33 - Damage Costs/Costs of Illness and Lost Output Approach
Lecture 34 - Travel Cost Method
Lecture 35 - Contingent Valuation Method
Lecture 36 - Choice Experiment Method
Lecture 37 - Market Efficiency and Optimality - I
Lecture 38 - Market Efficiency and Optimality - II
Lecture 39 - Market Efficiency and Optimality - III
Lecture 40 - Market Efficiency and Optimality - IV
Lecture 41 - Consumer and Producer Surplus - I
Lecture 42 - Consumer and Producer Surplus - II
Lecture 43 - Optimal Provision of Public Goods and Bads - I
Lecture 44 - Optimal Provision of Public Goods and Bads - II
Lecture 45 - Optimal Provision of Public Goods and Bads - III
Lecture 46 - Externality and Market Failure
Lecture 47 - Pigouvian Fees
Lecture 48 - Property Rights and Coase Theorem - I
Lecture 49 - Property Rights and Coase Theorem - II
Lecture 50 - Environmental Regulation and Basic Regulatory Instruments - I
Lecture 51 - Environmental Regulation and Basic Regulatory Instruments - II
Lecture 52 - Command and Control Approach
Lecture 53 - Command and Control Approach
Lecture 54 - Command and Control Approach
Lecture 55 - Environmental Regulation and Basic Regulatory Instruments - Market-based Instruments - I
Lecture 56 - Environmental Regulation and Basic Regulatory Instruments - Market-based Instruments - II
Lecture 57 - Environmental Regulation and Basic Regulatory Instruments - Market-based Instruments - III
Lecture 58 - Environmental Regulation and Basic Regulatory Instruments - Market-based Instruments - IV
Lecture 59 - Environmental Regulation and Basic Regulatory Instruments - Market Trading Systems - I
Lecture 60 - Environmental Regulation and Basic Regulatory Instruments - Market Trading Systems - II

Get Digi-MAT (Digital Media Access Terminal) For High-Speed Video Streaming of NPTEL and Educational Video Courses in LAN

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NPTEL Video Course - Humanities and Social Sciences - NOC:Effective Writing

Subject Co-ordinator - Prof. Binod Mishra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Effective Writing
Lecture 2 - Effective Writing as an Art
Lecture 3 - Principles of Effective Writing
Lecture 4 - Types and Stages of Effective Writing
Lecture 5 - Notions of Correctness and Appropriateness - Part I
Lecture 6 - Notions of Correctness and Appropriateness - Part II
Lecture 7 - Notions of Correctness and Appropriateness - Part III
Lecture 8 - Essay Writing
Lecture 9 - Types of Essay
Lecture 10 - Essentials of Academic Writing - Part I
Lecture 11 - Essentials of Academic Writing - Part II
Lecture 12 - Writing Effective Proposals
Lecture 13 - Writing Effective Research Proposal
Lecture 14 - Drafting Effective Grant Proposals
Lecture 15 - Research Writing
Lecture 16 - Writing for the Internet
Lecture 17 - Content Writing
Lecture 18 - Writing Effective Advertisements
Lecture 19 - Creating Effective Blogs
Lecture 20 - Business Writing and its Functions
Lecture 21 - Mechanics of Business Writing
Lecture 22 - Business Letters and Memos
Lecture 23 - Format of Business Letters and Memos
Lecture 24 - Types of Business Letters
Lecture 25 - Sales, Complaint and Adjustment Letters
Lecture 26 - Writing Manuals
Lecture 27 - SOP Writing and Cover Letter Writing
Lecture 28 - Drafting Effective Resume
Lecture 29 - Report Writing

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Lecture 30 - Strategies and Structure of Reports
Lecture 31 - Style of Report Writing
Lecture 32 - Drafting Short Reports
Lecture 33 - Drafting Long Reports
Lecture 34 - Creative Writing
Lecture 35 - Poetry and Its Types
Lecture 36 - Fiction and its Types
Lecture 37 - Requisites of Fictional Writing
Lecture 38 - Writing Short Stories
Lecture 39 - Writing for the Stage
Lecture 40 - Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:International Trade - Theory and Empirics

Subject Co-ordinator - Prof. Pratap C. Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Strategic Trade and Protectionism
Lecture 2 - Introduction to Protectionism and Strategic Trade
Lecture 3 - India's International Trade: Latest Facts and Figures
Lecture 4 - Facts on Trade Policies and Facilitations
Lecture 5 - Introduction to Trade Theories: What, Why and for Whom?
Lecture 6 - Mercantilism
Lecture 7 - From Mercantilism to Adam Smith
Lecture 8 - Theory of Comparative Cost Advantage
Lecture 9 - Static to Dynamic Comparative Advantage Theory
Lecture 10 - Empirical Testing of Comparative Advantage Theory
Lecture 11 - Neoclassical Trade Theory - Standard Trade Model
Lecture 12 - Heckscher-Ohlin Theory of Trade
Lecture 13 - H-O-S Model in Trade and Income Distribution
Lecture 14 - Empirical Testing of H-O Theory
Lecture 15 - Extension to H-O Theory
Lecture 16 - Imperfect Competition and Trade
Lecture 17 - Monopolistic Competition and Trade
Lecture 18 - Intra-Industry versus Inter-Industry Trade
Lecture 19 - Measuring Intra-Industry Trade - I
Lecture 20 - Measuring Intra-Industry Trade - II
Lecture 21 - Partial Equilibrium Analysis of Trade
Lecture 22 - Offer Curves in Trade Analysis
Lecture 23 - Terms of Trade with Cases
Lecture 24 - Measurement of Terms of Trade
Lecture 25 - Terms of Trade: Determinants and Impacts
Lecture 26 - Trade Protectionism
Lecture 27 - Types of Protections
Lecture 28 - Welfare Effects of Tariffs
Lecture 29 - Effective Protections

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Lecture 30 - Effective Protections - Latest Facts and Figures
Lecture 31 - Non-Tariff Measures: Recent Facts
Lecture 32 - Types of Non-Tariff Barriers
Lecture 33 - Effects of Non-Tariffs Barriers
Lecture 34 - Technical Barriers to Trade (TBTs)
Lecture 35 - Sanitary and Phytosanitary Measures (SPS)
Lecture 36 - Economic Integration: Blocs and Blocks
Lecture 37 - Theory of Customs Union
Lecture 38 - Structure and Functions of WTO
Lecture 39 - India and WTO
Lecture 40 - Strategic Trade - Summary and Conclusion
Lecture 41 - Trade and Balance of Payment
Lecture 42 - Trends of India's BoP
Lecture 43 - Foreign Exchange Market
Lecture 44 - Types of Foreign Exchange market
Lecture 45 - Exchange Rate Determination
Lecture 46 - Monetary Approach to the Balance of Payments and Exchange Rates
Lecture 47 - Exchange Rate Dynamics
Lecture 48 - Exchange Rate in the Short run
Lecture 49 - Exchange Rate in the Long run
Lecture 50 - Capital Mobility and the Trilemma of the Exchange Rate Regime
Lecture 51 - Adjustment with Fixed and Flexible Exchange Rates
Lecture 52 - Stability of Foreign Exchange Markets
Lecture 53 - J-Curve Effect
Lecture 54 - Exchange Rate Pass-through
Lecture 55 - Optimum Currency Area
Lecture 56 - Import Substitution versus Export Orientation
Lecture 57 - East Asian Miracle - I
Lecture 58 - East Asian Miracle - II
Lecture 59 - Trade and Development - Post Covid-I
Lecture 60 - Trade and Development - Post Covid-II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Handling Large Scale Unit Level Data Using STATA

Subject Co-ordinator - Prof. Pratap C. Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Data
Lecture 2 - Introduction to Unit Level Data
Lecture 3 - Understanding Unit Level Data: NSSO
Lecture 4 - Understanding Unit Level Data: IHDS
Lecture 5 - Understanding Unit Level Data: NFHS
Lecture 6 - Review of Sample Techniques - I
Lecture 7 - Review of Sample Techniques - II
Lecture 8 - Sample Size
Lecture 9 - Sample Size Determination - I
Lecture 10 - Sample Size Determination - II
Lecture 11 - Introduction to Stata
Lecture 12 - Exploring Data in Stata
Lecture 13 - Managing Data in Stata - I
Lecture 14 - Managing Data in Stata - II
Lecture 15 - Managing Data in Stata - III
Lecture 16 - Questionnaire Design
Lecture 17 - Tabulation and Creation of New Variables in Stata - I
Lecture 18 - Tabulation and Creation of New Variables in Stata - II
Lecture 19 - Tabulation and Creation of New Variables in Stata - III
Lecture 20 - Variable and Value Labels
Lecture 21 - Extraction in Stata - I
Lecture 22 - Extraction in Stata - II
Lecture 23 - Combining Datasets in Stata - I
Lecture 24 - Combining Datasets in Stata - II
Lecture 25 - Review of Commands
Lecture 26 - Factor Analysis with Stata - I
Lecture 27 - Factor Analysis with Stata - II
Lecture 28 - Linear Regression Analysis in Stata - I
Lecture 29 - Linear Regression Analysis in Stata - II

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Lecture 30 - Linear Regression Analysis in Stata - III
Lecture 31 - Introduction to Qualitative Variables
Lecture 32 - Binary Response Model - I
Lecture 33 - Binary Response Model - II
Lecture 34 - Binary Response Model - III
Lecture 35 - Binary Response Model - IV
Lecture 36 - Introduction to Panel Data
Lecture 37 - Panel Data Models
Lecture 38 - Pooled Cross-sectional Data
Lecture 39 - Construction of Panel Data
Lecture 40 - Analysis of Panel Data in Stata

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NPTEL Video Course - Humanities and Social Sciences - NOC:Indian Poetry in English

Subject Co-ordinator - Prof. Binod Mishra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Indian English Poetry - Part I
Lecture 2 - Introduction to Indian English Poetry - Part II
Lecture 3 - Toru Dutt
Lecture 4 - Rabindranath Tagore
Lecture 5 - Sri Aurobindo - Part 1
Lecture 6 - Sri Aurobindo - Part 2
Lecture 7 - Sarojni Naidu
Lecture 8 - Nissim Ezekiel
Lecture 9 - Jayanta Mahapatra
Lecture 10 - K. N Daruwalla
Lecture 11 - Shiv K. Kumar
Lecture 12 - Arun Kolatkar
Lecture 13 - Arvind K. Mehrotra
Lecture 14 - Kamala Das
Lecture 15 - Adil Jussawalla
Lecture 16 - Gieve Patel
Lecture 17 - Pritish Nandy
Lecture 18 - A.K. Ramanujan - Part I
Lecture 19 - A.K. Ramanujan - Part II
Lecture 20 - Agha Shahid Ali
Lecture 21 - Meena Alexander
Lecture 22 - Vikram Seth
Lecture 23 - Sujata Bhatt
Lecture 24 - Eunice de Souza
Lecture 25 - Lakshmi Kannan
Lecture 26 - Tara Patel
Lecture 27 - Menka Shivdasani
Lecture 28 - Niranjan Mohanty
Lecture 29 - Charu Sheel Singh

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Lecture 30 - Bibhu Padhi
Lecture 31 - Gopi Kottoor
Lecture 32 - T V Reddy
Lecture 33 - R. K. Singh
Lecture 34 - R. Parthasarathy
Lecture 35 - Mamang Dai
Lecture 36 - Temsula Ao and Easterine Kire
Lecture 37 - Hoshang Merchant
Lecture 38 - Jeet Thayil
Lecture 39 - Meena Kandasamy
Lecture 40 - Summary

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NPTEL Video Course - Humanities and Social Sciences - NOC:Exploring Survey Data on Health Care

Subject Co-ordinator - Prof. Pratap C. Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Problem Statement and Research Questions
Lecture 2 - Data, Measurement and Scaling
Lecture 3 - Understanding Healthcare Database: NSSO
Lecture 4 - Understanding Healthcare Database: NFHS
Lecture 5 - Understanding Healthcare Database: LASI
Lecture 6 - Understanding Sampling Base and Design
Lecture 7 - Preparing Schedule and Questionnaire
Lecture 8 - Sample Size Determination - Observational Study
Lecture 9 - Sample Size Determination and Probability Proportional to Size Sampling
Lecture 10 - Focus Group Discussion (FGD)
Lecture 11 - Pre-testing of Sample
Lecture 12 - Weights and Representative Sampling
Lecture 13 - Normalizing Data
Lecture 14 - Deal with Missing Values
Lecture 15 - Validity, Reliability, Accuracy and Precision of Sample
Lecture 16 - Basic Understanding of STATA
Lecture 17 - Syntax and Do File
Lecture 18 - Making Dictionary File
Lecture 19 - Data Browse and Basic Statistics - I
Lecture 20 - Data Browse and Basic Statistics - II
Lecture 21 - Basic Understanding of SPSS and Data Filtration in STATA
Lecture 22 - Data Extraction from ASCII Format
Lecture 23 - Merging Blocks of Information after Extraction
Lecture 24 - Composite Index
Lecture 25 - Measure of Variation- r2, R2, Adjusted R2, Pseudo R2
Lecture 26 - Regression Models of Quantitative Healthcare Variables
Lecture 27 - Regression Models of Qualitative Dependent Variables
Lecture 28 - Relative Risk Ratio Estimation
Lecture 29 - Generalized Linear Model

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Lecture 30 - Independence of Irrelevant ALternatives
Lecture 31 - Balanced and Unbalanced Panel in Healthcare
Lecture 32 - Common Constant Model in Healthcare
Lecture 33 - Fixed Effect Model in Healthcare
Lecture 34 - Random Effect Model in Healthcare
Lecture 35 - Construction of Pseudo Panel
Lecture 36 - Need for Evaluation
Lecture 37 - Propensity Score Matching (PSM)
Lecture 38 - Difference-in-Difference Method (DID)
Lecture 39 - Randomized Control Trial (RCT)
Lecture 40 - Regression Discontinuity Method

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NPTEL Video Course - Humanities and Social Sciences - NOC:Contextualizing Gender

Subject Co-ordinator - Prof. Rashmi Gaur

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Aims and Objectives
Lecture 2 - Introduction to Gender Studies
Lecture 3 - Feminist Consciousness and Gendered Experiences in Simone de Beauvoir
Lecture 4 - Gender Perspectives in Simone de Beauvoirs The Second Sex (Volume 1)
Lecture 5 - Gender Perspectives in Simone de Beauvoirs The Second Sex (Volume 2)
Lecture 6 - Gender and Race Consciousness - I
Lecture 7 - Gender and Race Consciousness - II
Lecture 8 - Intersectionality
Lecture 9 - Gender and Power Politics in bell hooks
Lecture 10 - Gender and Power Politics in Audre Lorde
Lecture 11 - Gender-Blurring in Toni Morrison - I
Lecture 12 - Gender-Blurring in Toni Morrison - II
Lecture 13 - Gender-Blurring in Toni Morrison - III
Lecture 14 - Unmasking Heterosexual Assumptions in Nancy Chodorow
Lecture 15 - Technologies of Gender in Teresa de Lauretis
Lecture 16 - Introduction to Queer Theory
Lecture 17 - Sex/Gender System in Gayle Rubin
Lecture 18 - Thinking Gender and Homosexuality in Gayle Rubin
Lecture 19 - Queer Theory and Literature in Eve Sedgwick
Lecture 20 - Eve Sedgwicks Epistemology of the Closet
Lecture 21 - Introduction to Queer Literature
Lecture 22 - 21st Century Queer Fiction
Lecture 23 - Queer Cinema - I
Lecture 24 - Queer Cinema - II
Lecture 25 - Queer Representation in OTT Platforms
Lecture 26 - Introduction to Judith Butler
Lecture 27 - Gender Trouble - I
Lecture 28 - Gender Trouble - II
Lecture 29 - Bodies that Matter - I

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Lecture 30 - Bodies that Matter - II
Lecture 31 - Speech and Subjectivity
Lecture 32 - Gender in Translation
Lecture 33 - Undoing Gender - I
Lecture 34 - Undoing Gender - II
Lecture 35 - Judith Butler and the Unaccountable Subject
Lecture 36 - Performativity, Precarity and Sexual Politics
Lecture 37 - Gender Politics and the Right to Appear
Lecture 38 - Global Gender Movements
Lecture 39 - Mapping the Theories of Social Movements
Lecture 40 - #MeToo and the Politics of Social Change
Lecture 41 - Hegemonic Masculinity: Rethinking the Concept - I
Lecture 42 - Hegemonic Masculinity: Rethinking the Concept - II
Lecture 43 - Feminism and Men/Masculinities Scholarship by Chris Beasley
Lecture 44 - Postcolonial Masculinities by Fataneh Farahani and Suruchi Thapar-Bjorkert
Lecture 45 - Engaging Men for Gender Justice by Tal Peretz
Lecture 46 - Cyborg and Feminism in Anne Balsamos Technologies of the Gendered Body - I
Lecture 47 - Cyborg and Feminism in Anne Balsamos Technologies of the Gendered Body - II
Lecture 48 - Female Bodybuilding, Cosmetic Surgery and New Imaging Technologies in Anne Balsamo
Lecture 49 - The Virtual body in Anne Balsamos Technologies of the Gendered Body
Lecture 50 - Feminist Cultural Studies of Science and Technology in Anne Balsamo
Lecture 51 - Introduction to Biopolitics and Gender by Jemima Repo
Lecture 52 - Women or Womankind? by Jemima Repo - I
Lecture 53 - Women or Womankind? by Jemima Repo - II
Lecture 54 - Gender for a Marxist Dictionary from Simians, Cyborgs and Women by Donna J. Haraway
Lecture 55 - Biopolitics, Gender Representation and Video Games
Lecture 56 - Introduction to the Literary Posthuman: Narratives of Becoming Post
Lecture 57 - A Cyborg Manifesto by Donna Harroway
Lecture 58 - Ex-Machina and The Female Cyborg
Lecture 59 - Re-figuring the Subject by Rosi Braidotti
Lecture 60 - A Gender Perspective on COVID-19 Pandemic

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NPTEL Video Course - Humanities and Social Sciences - NOC:Public Speaking

Subject Co-ordinator - Prof. Binod Mishra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Public Speaking
Lecture 2 - Communication Process and Roadblocks
Lecture 3 - Use of Rhetoric in Public Speaking
Lecture 4 - Role of Listening in Public Speaking
Lecture 5 - Role of Ethics in Public Speaking
Lecture 6 - Relevance of Public Speaking
Lecture 7 - Audience Awareness and Creating Credibility
Lecture 8 - Content Creation and Organization
Lecture 9 - Role of Personality in Public Speaking
Lecture 10 - Use of Technology in Public Speaking
Lecture 11 - Cultural Awareness in Public Speaking
Lecture 12 - Breaking the Ice: Impress to Express
Lecture 13 - Glossophobia
Lecture 14 - Emotional Intelligence
Lecture 15 - Role of Positivity in Public Speaking
Lecture 16 - Significance of Citations in Public Speaking
Lecture 17 - Digression: Usage and Concerns
Lecture 18 - Forms and Stages of Public Speaking - Part I
Lecture 19 - Forms and Stages of Public Speaking - Part II
Lecture 20 - Classroom Interaction
Lecture 21 - Classroom Lectuers
Lecture 22 - Kinesics
Lecture 23 - Proxemics
Lecture 24 - Chronemics
Lecture 25 - Haptics
Lecture 26 - Paralanguage
Lecture 27 - Meta-communication
Lecture 28 - Conversation
Lecture 29 - Negotiations

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Lecture 30 - Debates
Lecture 31 - Elocution and Recitation
Lecture 32 - Group Discussion
Lecture 33 - Speeches
Lecture 34 - Types of Speeches
Lecture 35 - Speeches for Special Occasions
Lecture 36 - Use of Humour in Speeches
Lecture 37 - Interviews
Lecture 38 - Types of Interviews - I
Lecture 39 - Types of Interviews - II
Lecture 40 - Preparing for Interviews
Lecture 41 - Facing the Interview
Lecture 42 - Conference Presentations - Part I
Lecture 43 - Conference Presentations - Part II
Lecture 44 - Meeting Management
Lecture 45 - Leadership Skills - Part I
Lecture 46 - Leadership Skills - Part II
Lecture 47 - Oral Presentation - Part I
Lecture 48 - Oral Presentation - Part II
Lecture 49 - Use of Visual Aids in Oral Presentation
Lecture 50 - Use of Connectives in Oral Presentation
Lecture 51 - Effective use of Language in Public Speaking
Lecture 52 - Handling Feedback and Criticism
Lecture 53 - Role of Creative Thinking in Pubic Speaking
Lecture 54 - Some Other Forums of Public Speaking
Lecture 55 - Etiquettes and Mannerisms in Public Speaking
Lecture 56 - Online Interactions and their Challenges
Lecture 57 - Sample Interviews
Lecture 58 - Analysis of Sample Interviews
Lecture 59 - Sample Speeches and their Analysis
Lecture 60 - Summary and Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Partition of India in Print Media and Cinema

Subject Co-ordinator - Prof. Sarbani Banerjee

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of the Partition of India - I
Lecture 2 - History of the Partition of India - II
Lecture 3 - History of the Partition of India - III
Lecture 4 - History of the Partition of India - IV
Lecture 5 - History of the Partition of India - V
Lecture 6 - History of the Partition of India - VI
Lecture 7 - History of the Partition of India - VII
Lecture 8 - History and Alternative Memory Writings - I
Lecture 9 - History and Alternative Memory Writings - II
Lecture 10 - History and Alternative Memory Writings - III
Lecture 11 - History and Alternative Memory Writings - IV
Lecture 12 - History and Alternative Memory Writings - V
Lecture 13 - Caste Politics and The Bengal Chapter - I
Lecture 14 - Caste Politics and The Bengal Chapter - II
Lecture 15 - Caste Politics and The Bengal Chapter - III
Lecture 16 - Caste Politics in Punjab Partition Micro-societies and Sub-Cultures
Lecture 17 - Womanhood and Motherhood - I
Lecture 18 - Womanhood and Motherhood - II
Lecture 19 - Womanhood and Motherhood - III
Lecture 20 - Womanhood and Motherhood - IV
Lecture 21 - Woman in the Context of Partition - I
Lecture 22 - Woman in the Context of Partition - II
Lecture 23 - Woman in the Context of Partition - III
Lecture 24 - Accounts of the Survivor - I
Lecture 25 - Accounts of the Survivor - II
Lecture 26 - Accounts of the Survivor - III
Lecture 27 - Accounts of the Survivor - IV
Lecture 28 - Accounts of the Survivor - V
Lecture 29 - Accounts of the Survivor - VI

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Lecture 30 - Accounts of the Survivor - VII
Lecture 31 - Accounts of the Survivor - VIII
Lecture 32 - Accounts of the Survivor - IX
Lecture 33 - Home and Nostalgia - I
Lecture 34 - Home and Nostalgia - II
Lecture 35 - Home and Nostalgia - III
Lecture 36 - Home and Nostalgia - IV
Lecture 37 - Home and Nostalgia - V
Lecture 38 - Refugee, Desh and Nation - I
Lecture 39 - Refugee, Desh and Nation - II
Lecture 40 - Refugee, Desh and Nation - III
Lecture 41 - Refugee, Desh and Nation - IV
Lecture 42 - Refugee, Desh and Nation - V
Lecture 43 - Refugee, Desh and Nation - VI
Lecture 44 - Refugee, Desh and Nation - VII
Lecture 45 - Refugee, Desh and Nation - VIII - Agency/Lack thereof for the Immigrant Women
Lecture 46 - Displaced People, Abandoned Homes - I
Lecture 47 - Displaced People, Abandoned Homes - II
Lecture 48 - Displaced People, Abandoned Homes - III
Lecture 49 - Displaced People, Abandoned Homes - IV
Lecture 50 - Displaced People, Abandoned Homes - V
Lecture 51 - Displaced People, Abandoned Homes - VI
Lecture 52 - Refuge Women and Patriarchal Society - I
Lecture 53 - Refuge Women and Patriarchal Society - II
Lecture 54 - Refuge Women and Patriarchal Society - III
Lecture 55 - Refuge Women and Patriarchal Society - IV
Lecture 56 - Refuge Women and Patriarchal Society - V
Lecture 57 - Refuge Women and Patriarchal Society - VI
Lecture 58 - Partition Literature in the 21st Century - I
Lecture 59 - Partition Literature in the 21st Century - II
Lecture 60 - Immigrant Populace in the Diaspora - I
Lecture 61 - Immigrant Populace in the Diaspora - II
Lecture 62 - Immigrant Populace in the Diaspora - III

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NPTEL Video Course - Humanities and Social Sciences - NOC:Narrative Mode and Fiction

Subject Co-ordinator - Prof. Sarbani Banerjee

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Genealogy of Genre - I
Lecture 2 - Genealogy of Genre - II
Lecture 3 - Genealogy of Genre - III
Lecture 4 - Fiction and Different Modes of Narrative - I
Lecture 5 - Fiction and Different Modes of Narrative - II
Lecture 6 - Fiction and Different Modes of Narrative - III
Lecture 7 - Fiction and Different Modes of Narrative - IV
Lecture 8 - Commentary on the Genre of Novel - I
Lecture 9 - Commentary on the Genre of Novel - II
Lecture 10 - Commentary on the Genre of Novel - III
Lecture 11 - Commentary on the Genre of Novel - IV
Lecture 12 - Commentary on the Genre of Novel - V
Lecture 13 - Commentary on the Genre of Novel - VI
Lecture 14 - Novel and Existence - I
Lecture 15 - Novel and Existence - II
Lecture 16 - Novel and Existence - III
Lecture 17 - Novel and Existence - IV
Lecture 18 - Novel and Existence - V
Lecture 19 - Novel and Existence - VI
Lecture 20 - Features of the Novel - I
Lecture 21 - Features of the Novel - II
Lecture 22 - Features of the Novel - III
Lecture 23 - Features of the Novel - IV
Lecture 24 - Features of the Novel - V
Lecture 25 - Features of the Novel - VI
Lecture 26 - Features of the Novel - VII
Lecture 27 - Tragedy and Comic Absurdity in Novel - I
Lecture 28 - Tragedy and Comic Absurdity in Novel - II
Lecture 29 - Tragedy and Comic Absurdity in Novel - III

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Lecture 30 - Tragedy and Comic Absurdity in Novel - IV
Lecture 31 - The Modern Novel - I
Lecture 32 - The Modern Novel - II
Lecture 33 - The Modern Novel - III
Lecture 34 - The Modern Novel - IV
Lecture 35 - The Modern Novel - V
Lecture 36 - Short Story in the Modern and Post-modern Era - I
Lecture 37 - Short Story in the Modern and Post-modern Era - II
Lecture 38 - Short Story in the Modern and Post-modern Era - III
Lecture 39 - Short Story in the Modern and Post-modern Era - IV
Lecture 40 - Short Story in the Modern and Post-modern Era - V
Lecture 41 - Short Story in the Modern and Post-modern Era - VI
Lecture 42 - Short Story in the Modern and Post-modern Era - VII
Lecture 43 - Short Story in the Modern and Post-modern Era - VIII
Lecture 44 - Short Story and Novel - I
Lecture 45 - Short Story and Novel - II
Lecture 46 - Short Story and Novel - III
Lecture 47 - Short Story and Novel - IV
Lecture 48 - Science Fiction - I
Lecture 49 - Science Fiction - II
Lecture 50 - Science Fiction - III
Lecture 51 - Science Fiction - IV
Lecture 52 - Science Fiction - V
Lecture 53 - Science Fiction - VI
Lecture 54 - Science Fiction - VII
Lecture 55 - Magical Realism - I
Lecture 56 - Magical Realism - II
Lecture 57 - Magical Realism - III
Lecture 58 - Magical Realism - IV
Lecture 59 - Magical Realism - V
Lecture 60 - Future of Fictional Writing - I
Lecture 61 - Future of Fictional Writing - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Group Dynamics

Subject Co-ordinator - Prof. Pooja Garg

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Groups - Part I
Lecture 2 - Introduction of Groups - Part II
Lecture 3 - Introduction of Groups - Part III
Lecture 4 - Introduction of Groups - Part IV
Lecture 5 - Group Process - Part I
Lecture 6 - Group Process - Part II
Lecture 7 - Interpersonal Attraction and Social Relationship - Part I
Lecture 8 - Interpersonal Attraction and Social Relationship - Part II
Lecture 9 - Group Communication - Part I
Lecture 10 - Group Communication - Part II
Lecture 11 - Group Communication - Part III
Lecture 12 - Interactive Behavior - Part I
Lecture 13 - Interactive Behavior - Part II
Lecture 14 - Interactive Behavior - Part III
Lecture 15 - Interactive Behavior - Part IV
Lecture 16 - Group Leadership - Part I
Lecture 17 - Group Leadership - Part II
Lecture 18 - Group Leadership - Part III
Lecture 19 - Group Leadership - Part IV
Lecture 20 - Group Leadership - Part V
Lecture 21 - Group Leadership - Part VI
Lecture 22 - Group Leadership - Part VII
Lecture 23 - Organizational Justice, Ethics and Corporate Social Responsibility - Part I
Lecture 24 - Organizational Justice, Ethics and Corporate Social Responsibility - Part II
Lecture 25 - Organizational Justice, Ethics and Corporate Social Responsibility - Part III
Lecture 26 - Organizational Justice, Ethics and Corporate Social Responsibility - Part IV
Lecture 27 - Organizational Justice, Ethics and Corporate Social Responsibility - Part V
Lecture 28 - Positive Organizational Scholarship - Part I
Lecture 29 - Positive Organizational Scholarship - Part II

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Lecture 30 - Positive Organizational Scholarship - Part III
Lecture 31 - Positive Organizational Scholarship - Part IV
Lecture 32 - Positive Organizational Scholarship - Part V
Lecture 33 - Positive Organizational Scholarship - Part VI
Lecture 34 - Positive Organizational Scholarship - Part VII
Lecture 35 - Positive Organizational Scholarship - Part VIII
Lecture 36 - Positive Organizational Scholarship - Part IX

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NPTEL Video Course - Humanities and Social Sciences - NOC:Countering Stage Fright

Subject Co-ordinator - Prof. Smita Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course - I
Lecture 2 - Introduction to the Course - II
Lecture 3 - Definition with Symptoms - I
Lecture 4 - Definition with Symptoms - II
Lecture 5 - Is Stage Fright Common ? - I
Lecture 6 - Is Stage Fright Common ? - II
Lecture 7 - When and Where Does Performance Anxiety Happen ? - I
Lecture 8 - When and Where Does Performance Anxiety Happen ? - II
Lecture 9 - Symptoms of Performance Anxiety - I
Lecture 10 - Symptoms of Performance Anxiety - II
Lecture 11 - Causes of Stage Fright - I
Lecture 12 - Causes of Stage Fright - II
Lecture 13 - Types of Stage Fright - I
Lecture 14 - Types of Stage Fright - II
Lecture 15 - Can Stage Fright be Cured ? - I
Lecture 16 - Can Stage Fright be Cured ? - II
Lecture 17 - Systematic Desensitization as Countering Stage Fright - I
Lecture 18 - Systematic Desensitization as Countering Stage Fright - II
Lecture 19 - Systematic Desensitization as Countering Stage Fright - III
Lecture 20 - Systematic Desensitization as Countering Stage Fright - IV

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NPTEL Video Course - Humanities and Social Sciences - NOC:Advance Course in Social Psychology

Subject Co-ordinator - Prof. Pooja Garg

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Social Psychology - Part I
Lecture 2 - Introduction to Social Psychology - Part II
Lecture 3 - Methods Adopted in Social Psychology - Part I
Lecture 4 - Methods Adopted in Social Psychology - Part II
Lecture 5 - Methods Adopted in Social Psychology - Part III
Lecture 6 - Methods Adopted in Social Psychology - Part IV
Lecture 7 - Methods Adopted in Social Psychology - Part V
Lecture 8 - Methods Adopted in Social Psychology - Part VI
Lecture 9 - Interpersonal Attraction - Part I
Lecture 10 - Interpersonal Attraction - Part II
Lecture 11 - Prosocial Behavior - Part I
Lecture 12 - Prosocial Behavior - Part II
Lecture 13 - Attitudes - Part I
Lecture 14 - Attitudes - Part II
Lecture 15 - Attitudes - Part III
Lecture 16 - Attitudes - Part IV
Lecture 17 - Attitudes - Part V
Lecture 18 - Attitudes - Part VI
Lecture 19 - Social Influence - Part I
Lecture 20 - Social Influence - Part II
Lecture 21 - Social Influence - Part III
Lecture 22 - Social Influence - Part IV
Lecture 23 - Distributive, Procedural and Interactional Justice
Lecture 24 - Conflicting Behavior - Part I
Lecture 25 - Conflicting Behavior - Part II
Lecture 26 - Conflicting Behavior - Part III
Lecture 27 - Conflicting Behavior - Part IV
Lecture 28 - Communication - Part I
Lecture 29 - Communication - Part II

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Lecture 30 - Communication - Part III
Lecture 31 - Communication - Part IV
Lecture 32 - Communication - Part V
Lecture 33 - Communication - Part VI
Lecture 34 - Group Behaviour - Part I
Lecture 35 - Group Behaviour - Part II
Lecture 36 - Group Behaviour - Part III
Lecture 37 - Group Behaviour - Part IV
Lecture 38 - Group Behaviour - Part V
Lecture 39 - Group Behaviour - Part VI
Lecture 40 - Group Behaviour - Part VII
Lecture 41 - Group Behaviour - Part VIII
Lecture 42 - Group Leadership - Part I
Lecture 43 - Group Leadership - Part II
Lecture 44 - Group Leadership - Part III
Lecture 45 - Group Leadership - Part IV
Lecture 46 - Group Leadership - Part V
Lecture 47 - Group Leadership - Part VI
Lecture 48 - Group Leadership - Part VII
Lecture 49 - Group Leadership - Part VIII
Lecture 50 - Group Leadership - Part IX
Lecture 51 - Group Leadership - Part X
Lecture 52 - Group Leadership - Part XI
Lecture 53 - Interactive Behaviour - Part I
Lecture 54 - Interactive Behaviour - Part II
Lecture 55 - Interactive Behaviour - Part III

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NPTEL Video Course - Humanities and Social Sciences - NOC:Performative Gender and Religions in South Asia

Subject Co-ordinator - Prof. Sarbani Banerjee

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introducing Performance and its Characteristics in the South Asian Context - I
Lecture 2 - Introducing Performance and its Characteristics in the South Asian Context - II
Lecture 3 - Introducing Performance and its Characteristics in the South Asian Context - III
Lecture 4 - Introducing Performance and its Characteristics in the South Asian Context - IV
Lecture 5 - Sanskrit Dramaturgy and Rasa Theory - I
Lecture 6 - Sanskrit Dramaturgy and Rasa Theory - II
Lecture 7 - Sanskrit Dramaturgy and Rasa Theory - III
Lecture 8 - Sanskrit Dramaturgy and Rasa Theory - IV
Lecture 9 - Sanskrit Dramaturgy and Rasa Theory - V
Lecture 10 - Bhakti Tradition - I
Lecture 11 - Bhakti Tradition - II
Lecture 12 - Bhakti Tradition - III
Lecture 13 - Bhakti Tradition - IV
Lecture 14 - Bhakti Tradition - V
Lecture 15 - Sufi Tradition - I
Lecture 16 - Sufi Tradition - II
Lecture 17 - Sufi Tradition - III
Lecture 18 - Sufi Tradition - IV
Lecture 19 - Bhakti Mysticism and Poetics - I
Lecture 20 - Bhakti Mysticism and Poetics - II
Lecture 21 - Bhakti Mysticism and Poetics - III
Lecture 22 - Bhakti Mysticism and Poetics - IV
Lecture 23 - Bhakti Mysticism and Poetics - V
Lecture 24 - Bhakti Mysticism and Poetics - VI
Lecture 25 - Gender and Performance in Bhakti Movement - I
Lecture 26 - Gender and Performance in Bhakti Movement - II
Lecture 27 - Gender and Performance in Bhakti Movement - III
Lecture 28 - Gender and Performance in Bhakti Movement - IV
Lecture 29 - Sufi Mysticism and Poetics - I

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Lecture 30 - Sufi Mysticism and Poetics - II
Lecture 31 - Sufi Mysticism and Poetics - III
Lecture 32 - Sufi Mysticism and Poetics - IV
Lecture 33 - Sufi Mysticism and Poetics - V
Lecture 34 - Sufi Mysticism and Poetics - VI
Lecture 35 - Gender and Performance in Sufi Movement - I
Lecture 36 - Gender and Performance in Sufi Movement - II
Lecture 37 - Gender and Performance in Sufi Movement - III
Lecture 38 - Gender and Performance in Sufi Movement - IV
Lecture 39 - Folk Traditions and Performances - I
Lecture 40 - Folk Traditions and Performances - II
Lecture 41 - Folk Traditions and Performances - III
Lecture 42 - Folk Traditions and Performances - IV
Lecture 43 - Folk Traditions and Performances - V
Lecture 44 - Folk Traditions and Performances - VI
Lecture 45 - Folk Traditions and Performances - VII
Lecture 46 - Classical Traditions and Performances - I
Lecture 47 - Classical Traditions and Performances - II
Lecture 48 - Classical Traditions and Performances - III
Lecture 49 - Classical Traditions and Performances - IV
Lecture 50 - Classical Traditions and Performances - V
Lecture 51 - Classical Traditions and Performances - VI
Lecture 52 - Tribal Traditions and Performances - I
Lecture 53 - Tribal Traditions and Performances - II
Lecture 54 - Tribal Traditions and Performances - III
Lecture 55 - Tribal Traditions and Performances - IV
Lecture 56 - Tribal Traditions and Performances - V
Lecture 57 - Tribal Traditions and Performances - VI
Lecture 58 - Bhakti, Sufi, and Cinema - I
Lecture 59 - Bhakti, Sufi, and Cinema - II
Lecture 60 - Bhakti, Sufi, and Cinema - III
Lecture 61 - Bhakti, Sufi, and Cinema - IV
Lecture 62 - Bhakti, Sufi, and Cinema - V
Lecture 63 - Secularism in the Western and Indian Context

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NPTEL Video Course - Humanities and Social Sciences - NOC:Online Communication in the Digital Age

Subject Co-ordinator - Prof. Rashmi Gaur

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Aims and Objectives
Lecture 2 - Computer Mediated Communication
Lecture 3 - Impersonal Computer - Mediated Communication
Lecture 4 - Interpersonal Communication Theories of CMC
Lecture 5 - Interpersonal Computer-Mediated Communication
Lecture 6 - Intrapersonal Computer-Mediated Communication
Lecture 7 - Digital Identity - I
Lecture 8 - Digital Identity - II
Lecture 9 - Embodiment and Digital Identity
Lecture 10 - Digital Identity in the Workplace
Lecture 11 - Introduction to Technical Communication
Lecture 12 - Workplace Communication
Lecture 13 - Need of Specific Audiences
Lecture 14 - Persuading your Audience
Lecture 15 - Teamwork and Global Considerations
Lecture 16 - Virtual Teams and Virtual Presentations
Lecture 17 - Digital Writing
Lecture 18 - Evolution of Digital Literary Practices
Lecture 19 - Evolving Landscape of Cybernetic Writing
Lecture 20 - The Digital Literary Domain
Lecture 21 - Introduction to the Digital Humanities
Lecture 22 - Digital Humanities and Literary Analyses
Lecture 23 - Towards an Intersectional Approach to Digital Humanities
Lecture 24 - Introduction to Postcolonial Digital Humanities
Lecture 25 - Feminism and Future of Digital Humanities
Lecture 26 - Professional Communication, Digital Rhetoric and Digital Literacy
Lecture 27 - Professional Communication, Digital Rhetoric and Digital Literacy (Continued...)
Lecture 28 - New Literacies in Multimodality and Multimedia
Lecture 29 - Evolution of Social Software

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Lecture 30 - Artificial Intelligence and Online Communication
Lecture 31 - Artificial Intelligence and Online Communication (Continued...)
Lecture 32 - Introduction to Social Media
Lecture 33 - Social Networking Sites
Lecture 34 - Blogging and Microblogging
Lecture 35 - Online Social Support and Social Media
Lecture 36 - Social Media Marketing
Lecture 37 - Advertising Strategies and Social Media Marketing
Lecture 38 - Social Media Entertainment and Media Studies
Lecture 39 - Digital Storytelling
Lecture 40 - Playing with Stories: Interactive Digital Storytelling in Film and Games
Lecture 41 - Digital Ethics
Lecture 42 - Fundamentals of Ethical Behaviour
Lecture 43 - The Social Network: Navigating Ethics in Entrepreneurship
Lecture 44 - Digital Deception: Introduction
Lecture 45 - Linguistic Style of Liars
Lecture 46 - Scammers and Swindlers in Online Spaces
Lecture 47 - Perils and Pitfalls of Online Communication - Part I
Lecture 48 - Perils and Pitfalls of Online Communication - Part II
Lecture 49 - Deceptive Realities: Cinematic Exploration of Digital Deception
Lecture 50 - Cyberbullying
Lecture 51 - Gender and Online Communication
Lecture 52 - Theories of Gender in Digital Spaces
Lecture 53 - Digital Feminist Interventions
Lecture 54 - Cyberfeminism and Cyborg Metaphors
Lecture 55 - Transforming Stereotypes: Evolving Portrayals of Gender in Video Games
Lecture 56 - The Future of Communication Technology
Lecture 57 - Augmented Reality
Lecture 58 - Virtual Reality and the Metaverse
Lecture 59 - Exploring the Digital Persona: The World of Avatars
Lecture 60 - Online Communication: Summative Insights

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NPTEL Video Course - Humanities and Social Sciences - NOC:Energy Resources, Economics and Sustainability

Subject Co-ordinator - Prof. Pratham Arora

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Fossil Fuels
Lecture 3 - Introduction to Renewable Energy
Lecture 4 - Energy Consumption in Different Countries
Lecture 5 - Energy Consumption in Different Sectors
Lecture 6 - Energy Consumption
Lecture 7 - Energy Flow Diagram - I
Lecture 8 - Energy Flow Diagram - II
Lecture 9 - Fossil Fuel Resources - I
Lecture 10 - Fossil Fuel Resources - II
Lecture 11 - Energy Economics - I
Lecture 12 - Energy Economics - II
Lecture 13 - Energy Economics - III
Lecture 14 - Energy Economics - IV
Lecture 15 - Wind Farm Financial Model - I
Lecture 16 - Wind Farm Financial Model - II
Lecture 17 - Economic Decision Making
Lecture 18 - Economic Decision Making and Project Financing
Lecture 19 - Economic and Environment
Lecture 20 - Business and the Environment
Lecture 21 - Energy, Ecology and Environment
Lecture 22 - Recent Successes in Environmental Stewardship - I
Lecture 23 - Recent Successes in Environmental Stewardship - II
Lecture 24 - Global Climate Change
Lecture 25 - Global Climate Change Mitigation - I
Lecture 26 - Global Climate Change Mitigation - II
Lecture 27 - Global Climate Change Mitigation: International Protocols
Lecture 28 - Global Climate Change Myths
Lecture 29 - Nuclear Waste and Thermal Pollution

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Lecture 30 - Environmental Impacts of Different Energy Pathways - I
Lecture 31 - Environmental Impacts of Different Energy Pathways - II
Lecture 32 - Understanding Sustainability
Lecture 33 - Introduction to Life Cycle Assessment (LCA)
Lecture 34 - LCA Phases
Lecture 35 - LCA System, Boundary, and Allocation
Lecture 36 - LCA: Life Cycle Stages
Lecture 37 - LCA: Data and Impact Assessment
Lecture 38 - LCA: Impact Categories
Lecture 39 - LCA Computational Structure
Lecture 40 - SimaPro Tutorial
Lecture 41 - Case Studies - I
Lecture 42 - Case Studies - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Cognitive Ergonomics

Subject Co-ordinator - Prof. M. K. Asthana

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cognitive Ergonomics - I
Lecture 2 - Introduction to Cognitive Ergonomics - II
Lecture 3 - Human Cognitive Abilities and Skills - I
Lecture 4 - Human Cognitive Abilities and Skills - II
Lecture 5 - Human Cognitive Abilities and Skills - III
Lecture 6 - Human Cognitive Abilities and Skills - IV
Lecture 7 - Human Cognitive Abilities and Skills - V
Lecture 8 - Human Cognitive Abilities and Skills - VI
Lecture 9 - Human Computer Interaction - I
Lecture 10 - Human Computer Interaction - II
Lecture 11 - Human Computer Interaction - III
Lecture 12 - Human Computer Interaction - IV
Lecture 13 - Usability - I
Lecture 14 - Usability - II
Lecture 15 - Usability - III
Lecture 16 - Human Error - I
Lecture 17 - Human Error - II
Lecture 18 - Human Error - III
Lecture 19 - Cognitive Safety - I
Lecture 20 - Cognitive Safety - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:The English Novel: Interdisciplinary Approaches

Subject Co-ordinator - Prof. Aruni Mahapatra, Prof. Smita Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Why Study a Novel
Lecture 2 - The Art of Fiction
Lecture 3 - Classical Narrative Theory
Lecture 4 - Rhetorical Narrative Theory
Lecture 5 - Adaptation
Lecture 6 - How to Read a Novel
Lecture 7 - The Novel After Theory : Introduction
Lecture 8 - The Novel After Theory : Gender
Lecture 9 - The Novel After Theory : Class
Lecture 10 - Environment and Literature
Lecture 11 - Disability
Lecture 12 - Pride and Prejudice I : Scholarly Approaches
Lecture 13 - Pride and Prejudice II : Author Background and Context - I
Lecture 14 - Pride and Prejudice III : Author Background and Context - II
Lecture 15 - Pride and Prejudice IV : Theme, Form and Style - I
Lecture 16 - Pride and Prejudice V : Theme, Form and Style - II
Lecture 17 - Pride and Prejudice VI : Textual Analysis
Lecture 18 - Pride and Prejudice VII : Scholarly Approaches
Lecture 19 - Jane Eyre: Background (Author and Context)
Lecture 20 - Jane Eyre: Theme, Form and Style - I
Lecture 21 - Theme, Form and Style - II
Lecture 22 - Jane Eyre: Scholarly Debates
Lecture 23 - Jane Eyre: Textual Analysis
Lecture 24 - Intertextual Connections
Lecture 25 - Dracula by Bram Stoker : A Discussion - I
Lecture 26 - Dracula by Bram Stoker : A Discussion - II
Lecture 27 - Mrs Dalloway: Author Background and Context
Lecture 28 - Mrs Dalloway II : Theme, Form and Style
Lecture 29 - Mrs Dalloway III : Scholarly Debates

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Lecture 30 - Mrs Dalloway IV : Textual Analysis - I
Lecture 31 - Mrs Dalloway V : Intertextual Connections - I
Lecture 32 - Mrs Dalloway VI : Textual Analysis - II
Lecture 33 - Mrs Dalloway VII : Intertextual Connections - II
Lecture 34 - Mrs Dalloway VIII : Textual Analysis - III
Lecture 35 - Atonement: Background (Author and Context)
Lecture 36 - Atonement: Theme, Form and Style
Lecture 37 - Atonement: Intertextual Connections
Lecture 38 - Atonement: Scholarly Debates
Lecture 39 - The Reluctant Fundamentalist I : Theme, Form and Style
Lecture 40 - The Reluctant Fundamentalist II : Textual Analysis

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NPTEL Video Course - Humanities and Social Sciences - NOC:Memory

Subject Co-ordinator - Prof. M. K. Asthana

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Memory and Models of Memory
Lecture 2 - Introduction to Memory
Lecture 3 - Methods of Studying Memory - I
Lecture 4 - Methods of Studying Memory - II
Lecture 5 - Methods of Studying Memory - III
Lecture 6 - Neuropsychology of Memory, Research Methods in Memory
Lecture 7 - Neuropsychology of Memory - I
Lecture 8 - Neuropsychology of Memory - II
Lecture 9 - Research Methods in Memory
Lecture 10 - Methods in Memory Modulation
Lecture 11 - Retrieval of Memory - I
Lecture 12 - Retrieval of Memory - II
Lecture 13 - Retrieval of Memory - III
Lecture 14 - Retrieval of Memory - IV
Lecture 15 - Retrieval of Memory - V
Lecture 16 - Working Memory - I
Lecture 17 - Working Memory - II
Lecture 18 - Working Memory - III
Lecture 19 - Working Memory - IV
Lecture 20 - Episodic and Semantic Memory
Lecture 21 - Episodic Memory
Lecture 22 - Episodic Memory Processing
Lecture 23 - Semantic and Lexical Memory - I
Lecture 24 - Semantic and Lexical Memory - II
Lecture 25 - Forgetting - I
Lecture 26 - Forgetting - II
Lecture 27 - Forgetting - III
Lecture 28 - Forgetting - IV
Lecture 29 - Forgetting - V

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Lecture 30 - Memory Disorders - Amnesia - I
Lecture 31 - Memory Disorders - Amnesia - II
Lecture 32 - Memory Disorders - Amnesia - III
Lecture 33 - Memory Disorders
Lecture 34 - Memory Disorders - Alzheimerâ s Disease
Lecture 35 - Eyewitness Testimony
Lecture 36 - Metamemory - I
Lecture 37 - Metamemory - II
Lecture 38 - Mnemonics
Lecture 39 - Memory Reconsolidation - I
Lecture 40 - Memory Reconsolidation - II

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NPTEL Video Course - Humanities and Social Sciences - NOC:Refugee, Migration, Diaspora

Subject Co-ordinator - Prof. Sarbani Banerjee

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Migration Studies
Lecture 2 - Theories Related with Migration Studies
Lecture 3 - Politics of Space in Migration
Lecture 4 - Understanding of Refugee Agency and Identities
Lecture 5 - Alienation and Affect in context of Migration
Lecture 6 - Immigration and Integration
Lecture 7 - Understanding the Borderland Discourse
Lecture 8 - Home and Uncanny - I
Lecture 9 - Home and Uncanny - II
Lecture 10 - Contextualizing Partition and Saadat Hasan Mantos Toba Tek Singh
Lecture 11 - Understanding Migration through Khushwant Singhs Train to Pakistan
Lecture 12 - Understanding South Asian Migration Taslima Nasrins Lajja Narayan Wagles Palpassa Cafe
Lecture 13 - South Asian Migration and Sunil Gangulys East and West - I
Lecture 14 - Decoding Sunil Gangulys East and West - II
Lecture 15 - Border Dynamics and South Asian Migration
Lecture 16 - Crossing Borders (India-Sri Lanka) - I
Lecture 17 - Crossing Borders (India-Sri Lanka and India-Myanmar) - II
Lecture 18 - Crossing Borders (India-Myanmar) - III
Lecture 19 - Crossing Borders (India-Tibet) - IV
Lecture 20 - Understanding Gendered Borderlands and Amar Mitra's Wild Goose Country
Lecture 21 - Identity Politics in South Asia and Ismat Chughtai's 'Roots' - I
Lecture 22 - Understanding Ismat Chughtai's 'Roots'
Lecture 23 - Understanding Bapsi Sidhwa's Cracking India
Lecture 24 - Understanding Amrita Pritam's Pinjar
Lecture 25 - Diaspora: An Introduction
Lecture 26 - The South Asian Diaspora
Lecture 27 - Transnational Lives and Identities
Lecture 28 - Understanding Diaspora and its Various Dimensions
Lecture 29 - Historicizing and Defining Global Diaspora

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Lecture 30 - Theorizing Diaspora: Home and Identity
Lecture 31 - Salman Rushdie's 'Imaginary Homelands'
Lecture 32 - Historicizing Bangladeshi Diaspora: Reading Monica Ali's Brick Lane
Lecture 33 - Case Study: Reading Pakistani Diaspora and Partition in Kamila Shamsie's Kartography
Lecture 34 - Case Study Sri Lankan Diaspora: Reading Romesh Gunesekera's Reef
Lecture 35 - Nepal Diaspora: Reading Manjushree Thapa's Seasons of Flight
Lecture 36 - South Asian Diaspora Post 9/11: Reading Marina Budhosâ Ask Me No Questions
Lecture 37 - Diasporic Consciousness in Mistry's A Fine Balance
Lecture 38 - Diasporic Identity and Tahmima Anamâ s â Golden Age'
Lecture 39 - Elements of Double Diaspora in Mistry's Tales from Firozsha Baag
Lecture 40 - Introducing Multiculturalism
Lecture 41 - Hybrid Identity in Jhumpa Lahiri's 'Mrs Sen' and Shani Mootoo's Out in the Main Street
Lecture 42 - Introducing Digital Diaspora
Lecture 43 - Culture Shock in Gauri Shinde's English Vinglish
Lecture 44 - Diaspora and Cinema: The Mistress of Spices
Lecture 45 - Transnationalism and Cultural Hybridity in Bride and Prejudice
Lecture 46 - Culture Conflict and Culture Clash in Mrs. Chatterjee vs Norway and Christmas As Usual
Lecture 47 - Multiculturalism and Biculturalism in Never Have I Ever
Lecture 48 - Transculturality and Culture Navigators in Gurinder Chadha's Bend It Like Beckham - I
Lecture 49 - Transculturality and Culture Navigators in Gurinder Chadha's Bend It Like Beckham - II
Lecture 50 - Diaspora and Cinema: Mira Nair's The Namesake
Lecture 51 - Coolie Migration
Lecture 52 - The Swinging Bridge
Lecture 53 - Third Space and Hybridity in M. G. Vassanji's No New Land
Lecture 54 - Displacement and Alienation in V. S. Naipaul's A House for Mr Biswas
Lecture 55 - Internal Migration in South Asia: Santal Tribe in 'November is the Month of Migration'
Lecture 56 - Internal Migration and Tribal Conflict in South Asia in Regina Marandi's Becoming Me
Lecture 57 - South Asian Women and Multicultural Society - I
Lecture 58 - South Asian Women and Multicultural Society - II
Lecture 59 - Cultural Entrepreneurs and Digital Diaspora
Lecture 60 - Refugee Agencies and Humanitarian Aid

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NPTEL Video Course - Humanities and Social Sciences - NOC:Victorian Literature: An Interdisciplinary Introduc

Subject Co-ordinator - Prof. Aruni Mahapatra, Prof. Smita Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Victorian Literature: A Historical Overview
Lecture 2 - Introduction to Victorian Literature: John Stuart Mill and Thomas Carlyle
Lecture 3 - Theoretical Approaches to Victorian Literature: Edward Saidâ s Orientalism
Lecture 4 - Edward Saidâ s Orientalism: Why Victorian Literature Matters Today
Lecture 5 - Understanding The History of Imperialism and Contrapuntal Reading
Lecture 6 - Beginnings: Jane Eyre
Lecture 7 - The Angel in the House
Lecture 8 - Vocation, Gender, and Labor
Lecture 9 - Companionate Marriage
Lecture 10 - Circulating Objects in the Victorian Novel
Lecture 11 - Beginning Victorian Poetry: In Memoriam (1850)
Lecture 12 - The Victorian Epic
Lecture 13 - Geology, Ruins, and Mourning
Lecture 14 - Between Men: On Victorian Friendship
Lecture 15 - Form, Content, and the Victorian Aesthetic
Lecture 16 - Victorian Industry: Hard Times
Lecture 17 - Hard Times: Background (Author and Context)
Lecture 18 - The Dickensian Worldview
Lecture 19 - Utilitarianism and its Discontents
Lecture 20 - Class in Victorian England
Lecture 21 - Labor, Gender, and Economy
Lecture 22 - Contrapuntal Reading, Manifest Orientalism: The Case of Thomas Macaulayâ s 'Minutes'
Lecture 23 - Thomas Macaulayâ s 'Minutes'
Lecture 24 - Implications of Macaulayâ s Minutes: The Case of Toru Dutt
Lecture 25 - 'Baugmaree': The Unique Subjectivity of Toru Dutt
Lecture 26 - 'Baugmaree': The Canonization of Toru Dutt in Victorian Literature
Lecture 27 - The Other Victorians: Wonderful Adventures of Mrs Seacole in Many Lands (1857)
Lecture 28 - Wonderful Adventures of Mrs Seacole in Many Lands: Background (Author and Context)
Lecture 29 - Race, Gender, and Victorian Identity

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Lecture 30 - Nursing and Care in Victorian Wars
Lecture 31 - Victorianism and its English Borders
Lecture 32 - Infrastructures of Care in Victorian Time
Lecture 33 - Aurora Leigh: Cultural, Social, and Economic Background
Lecture 34 - Aurora Leigh: Historical Context of Victorian England of the 1840s and the early 1850s
Lecture 35 - Aurora Leigh: Authorâ s Immediate Contexts
Lecture 36 - Aurora Leigh: Reading the Text
Lecture 37 - Aurora Leigh: Education
Lecture 38 - 'Goblin Market': Background (Author and Context)
Lecture 39 - 'Goblin Market': Religion
Lecture 40 - 'Goblin Market': Intertextual Connections
Lecture 41 - 'Goblin Market': Allegory
Lecture 42 - Major events in the 1890s
Lecture 43 - The Sense of an Ending: Far From the Madding Crowd
Lecture 44 - Far From the Madding Crowd: Background (Author and Context)
Lecture 45 - The Fin de Siecle
Lecture 46 - The Country and The City
Lecture 47 - Labor and Land
Lecture 48 - Nature and Industry
Lecture 49 - Decadence: The Strange Case of Dr Jekyll and Mr Hyde (1886)
Lecture 50 - The Strange Case of Dr Jekyll and Mr Hyde: Background (Author and Context)
Lecture 51 - The Self and the City
Lecture 52 - Crime and the Urban
Lecture 53 - The Victorian Senses
Lecture 54 - The Novel and Entertainment
Lecture 55 - Popular periodical press in the Victorian era
Lecture 56 - The Picture of Dorian Gray: Background (Author and Context)
Lecture 57 - The Picture of Dorian Gray: 'Yellow Book' and its implications
Lecture 58 - The Picture of Dorian Gray: Evolution of the Novel
Lecture 59 - Dracula: Background (Author and Context)
Lecture 60 - Dracula: England and its European Others
Lecture 61 - Dracula: The Anxiety of Reverse Colonization
Lecture 62 - The Mill on the Floss: Background (Author and Context)
Lecture 63 - The Mill on the Floss: Religion, Science, and Extraction
Lecture 64 - The Mill on the Floss: Nature, Extraction, and Economy

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NPTEL Video Course - Humanities and Social Sciences - NOC:The Fiction of Indian Diaspora

Subject Co-ordinator - Prof. Nagendra Kumar

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Diaspora
Lecture 2 - Development and Evolution of Diaspora
Lecture 3 - Challenges and Opportunities in Diaspora
Lecture 4 - Characteristics of Diaspora Writing
Lecture 5 - Literatures of Diaspora
Lecture 6 - Indian Diaspora: An Introduction
Lecture 7 - Demography and Geography of Indian Diaspora
Lecture 8 - Language, Identity and Heritage in the Indian Diaspora
Lecture 9 - Socio-Economic and Political Aspects of Indian Diaspora
Lecture 10 - Phases of Indian Diaspora
Lecture 11 - Colonial Diaspora
Lecture 12 - Post-colonial Indian Diaspora
Lecture 13 - Government Initiatives for Indian Diaspora
Lecture 14 - The Fiction of Indian Diaspora
Lecture 15 - Narrative Techniques in Indian Diasporic Writing
Lecture 16 - Theorizing Diaspora: Homi K. Bhabha and Concepts
Lecture 17 - Key Concepts - Mimicry and Third Space
Lecture 18 - Theorizing Diaspora: Edward Said and Aijaz Ahmad
Lecture 19 - Key Concepts: Orientalism
Lecture 20 - Theorizing Diaspora: Frantz Fanon and Gayatri C. Spivak
Lecture 21 - Theorizing Diaspora: Vijay Mishra and Sudesh Mishra
Lecture 22 - Theorizing Diaspora: Stuart Hall and Paul Gilroy
Lecture 23 - Theorizing Diaspora: James Clifford, William Safran and Steven Vertovec
Lecture 24 - Theorizing Diaspora: Rey Chow and Avtar Brah
Lecture 25 - Concepts: Double Consciousness, Cultural Mapping, Contrapuntal Reading
Lecture 26 - Concepts: Melting Pot, Cultural Mosaic and Salad Bowl
Lecture 27 - Concepts- Transnationalism and Unhomely
Lecture 28 - Concepts Related to Diaspora: Migration, Deculturation, Acculturation and Assimilation
Lecture 29 - Key Concepts Related to Diaspora

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Lecture 30 - Key Concepts: Digital Diaspora
Lecture 31 - V.S. Naipaul
Lecture 32 - A House for Mr Biswas (1961) by V.S. Naipaul (1961)
Lecture 33 - In a Free State (1971) by V.S. Naipaul
Lecture 34 - The Mimic Men (1967) by V.S. Naipaul
Lecture 35 - Kamala Markandaya
Lecture 36 - Salman Rushdie as an Indian Diasporic Writer
Lecture 37 - Midnightâ s Children (1981)
Lecture 38 - The Moorâ s Last Sigh (1995)
Lecture 39 - Anita Desai
Lecture 40 - Bye-Bye Blackbird (1971)
Lecture 41 - Anita Desaiâ s Baumgartnerâ s Bombay
Lecture 42 - Bharati Mukherjee
Lecture 43 - Jasmine (1989)
Lecture 44 - Bharati Mukherjeeâ s Jasmine
Lecture 45 - Bharati Mukherjeeâ s Desirable Daughters
Lecture 46 - Jhumpa Lahiri
Lecture 47 - The Namesake (2003) by Jhumpa Lahiri
Lecture 48 - Interpreter of Maladies (1999) by Jhumpa Lahiri
Lecture 49 - Chitra Banerjee Divakaruni
Lecture 50 - Arranged Marriage (1995) by Chitra Banerjee Divakaruni
Lecture 51 - The Mistress of Spices (1997) by Chitra Banerjee Divakaruni
Lecture 52 - Kiran Desaiâ s The Inheritance of Loss
Lecture 53 - Rohinton Mistry
Lecture 54 - Anita Nairâ s Lessons in Forgetting
Lecture 55 - M.G. Vassanji
Lecture 56 - Amitav Ghosh
Lecture 57 - Amitav Ghoshâ s The Circle of Reason
Lecture 58 - Meena Alexander
Lecture 59 - Contemporary Indian Diasporic Writers
Lecture 60 - Recapitulating The Course

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NPTEL Video Course - Humanities and Social Sciences - NOC:Tribal Studies in India: Interdisciplinary Perspect

Subject Co-ordinator - Prof. Roluahpuia, Prof. Sarbani Banerjee

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Understanding the Concept of Tribe - Historicizing the Concept of Tribe
Lecture 2 - Introduction: De-notified, Nomadic and Semi-Nomadic Tribes; PVTGs
Lecture 3 - Introduction: Indigenous People, Adivasi, Janjati
Lecture 4 - Understanding Tribes in India: Social Organization of Tribes
Lecture 5 - Understanding Tribes in India: Tribal Economy
Lecture 6 - Understanding Tribes in India: Political Institutions in Tribal Societies
Lecture 7 - Women in Tribal Societies
Lecture 8 - Assimilation and Integration of Indian Tribes
Lecture 9 - Sociological and Anthropological Perspectives of Tribes in India
Lecture 10 - Tribe-Caste Continuum
Lecture 11 - Tribe as Peasant
Lecture 12 - Tribe as Ethnic Group
Lecture 13 - Problems of Categories and Classifications - Part I
Lecture 14 - Problems of Categories and Classifications - Part II
Lecture 15 - Methods and Approaches to the Study of Tribes
Lecture 16 - Tribes During Colonial Rule
Lecture 17 - Tribal Uprisings during Colonial Rule in the Chota Nagpur Region
Lecture 18 - Tribal Uprising During Colonial Rule in Central and Southern India
Lecture 19 - Tribal Uprisings during Colonial Rule in the Northeastern Region
Lecture 20 - Case Study on Lushai Hills - Part I
Lecture 21 - Case Study on Lushai Hills - Part II
Lecture 22 - Tribes and the Indian National Movement
Lecture 23 - Tribes During the Colonial Rule: Administration of Tribal Areas: Laws and Legislations - I
Lecture 24 - Tribes During the Colonial Rule: Administration of Tribal Areas: Laws and Legislations - II
Lecture 25 - Resource Rights: Land
Lecture 26 - Resource Rights: Forests
Lecture 27 - Resource Rights: Water
Lecture 28 - Dispossession and Conflict
Lecture 29 - Exploitation, Indentureship and Plantation Economy

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Lecture 30 - Tribes in Post-Colonial India I: Constitution Making and the Role of Tribes - Part I
Lecture 31 - Tribes in Post Colonial India I: Constitution Making and the Role of Tribes - Part II
Lecture 32 - Tribes in Post Colonial India I: Constitution Making and the Role of Tribes - Part III
Lecture 33 - Constitutional Provisions, Protective Discrimination and Welfare of Tribes in India - Part I
Lecture 34 - Constitutional Provisions, Protective Discrimination and Welfare of Tribes in India - Part II
Lecture 35 - Tribes in Post-Colonial India II: Tribal Administration and Autonomy Provisions - Part I
Lecture 36 - Tribes in Post-Colonial India II: Tribal Administration and Autonomy Provisions - Part II
Lecture 37 - Tribes in Post-Colonial India II: Tribal Administrative and Autonomy Provisions - Part III
Lecture 38 - Tribes in Post-Colonial India II: Tribal Politics and Political Parties - Part IV
Lecture 39 - Tribes in Post-Colonial India II: Tribal Politics and Political Parties - Part V
Lecture 40 - Tribal Politics and Political Parties: Case Study of Jharkhand
Lecture 41 - Tribal Politics and Political Parties: Case Studies from North-East India (Mizoram)
Lecture 42 - Development and Tribes
Lecture 43 - Tribal Migration
Lecture 44 - Social and Cultural Changes in Tribes
Lecture 45 - Tribal Middle Class
Lecture 46 - Social Exclusion and Socio-Economic Status of the Tribes in Post-reform Era
Lecture 47 - Tribal Narratives
Lecture 48 - Oral Traditions of Tribes in India
Lecture 49 - Tribal Performance and Festivals
Lecture 50 - Tribal Literature in India - Part I
Lecture 51 - Tribal Literature in India - Part II
Lecture 52 - Social Movements: Tribal Activism and Tribal Rights - I
Lecture 53 - Social Movements: Tribal Activism and Tribal Rights - II
Lecture 54 - Social Movements: Environmental Movements
Lecture 55 - Case Studies on Tribal Social and Environmental Movements
Lecture 56 - Globalisation and Tribes in India
Lecture 57 - Social Media and Tribes in India
Lecture 58 - Tribal Cultural Entrepreneurs and Influencers in India
Lecture 59 - Tribal Studies and Humanities and Social Sciences
Lecture 60 - The Future of Tribal Studies in India: Current Trends and Scopes
Lecture 61 - Tribal Myths, Ecology and Nature Worship
Lecture 62 - Role of Performance in Tribal Rituals
Lecture 63 - Tribal Religion and Gender
Lecture 64 - Tribal Religion and Socio-Political Set Up

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NPTEL Video Course - Humanities and Social Sciences - NOC:Twentieth-Century English Poetry: Between Lyric and

Subject Co-ordinator - Prof. Aruni Mahapatra

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to 20th-Century Poetry
Lecture 2 - The Transnational Origins of 20th-Century Poetry
Lecture 3 - Make It New: Aesthetic Revolution
Lecture 4 - William Butler Yeats: Biographical Context
Lecture 5 - William Butler Yeats: The Lake Isle of Innisfree
Lecture 6 - William Butler Yeats: Nationalism in The Lake Isle of Innisfree
Lecture 7 - Modernist Elegy
Lecture 8 - Poetry and the Authenticity of Mourning
Lecture 9 - Wallace Stevens: The Emperor of Ice-Cream
Lecture 10 - Thomas Hardy: Elegist
Lecture 11 - Thomas Hardy: Poems 1912-1913
Lecture 12 - Thomas Hardy Concluded
Lecture 13 - Hilda Doolittle (H.D.)
Lecture 14 - H.D.: Eurydice
Lecture 15 - Robert Frost: Biographical Context
Lecture 16 - Robert Frost: North of Boston
Lecture 17 - Robert Frost: Home Burial
Lecture 18 - Robert Frost: The Death of the Hired Man
Lecture 19 - Edna St. Vincent Millay: Biographical Context
Lecture 20 - Edna St. Vincent Millay: Renascence
Lecture 21 - Edna St. Vincent Millay: Blight
Lecture 22 - Edna St. Vincent Millay: The Sonnet
Lecture 23 - Edna St. Vincent Millay and Vanity Fair
Lecture 24 - Edna St. Vincent Millay: Spring and Other Poems
Lecture 25 - Edna St. Vincent Millay: Concluded; T. S. Eliot: Introduced
Lecture 26 - T. S. Eliot - 'Tradition and the Individual Talent'
Lecture 27 - T. S. Eliot - 'The Metaphysical Poets'
Lecture 28 - Late Style in Four Quartets
Lecture 29 - Four Quartets Concluded

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Lecture 30 - Robert Lowell - Life Studies
Lecture 31 - W. H. Auden: Introduction
Lecture 32 - Marxism, Psychoanalysis, and Elegy in Auden
Lecture 33 - Auden and Influence: Wilfred Owen and W. B. Yeats
Lecture 34 - September 1913
Lecture 35 - In Memory of W. B. Yeats
Lecture 36 - Auden on Sigmund Freud
Lecture 37 - Langston Hughes - Introduction
Lecture 38 - Elegy, Blues, and Blackness
Lecture 39 - Blues and Negritude - Proem
Lecture 40 - The Weary Blues and The Negro Artist
Lecture 41 - Blues Fantasy and 'Fine Clothes for the Jew'
Lecture 42 - Lynch Poems - Bitter Fruit, Song for a Dark Girl
Lecture 43 - Silhouette and Blue Bayou
Lecture 44 - The Negro Speaks of Rivers and Bitter River
Lecture 45 - The Moose - Introducing Elizabeth Bishop
Lecture 46 - The Moose Continued - Motion and Imagination in Bishop's poems
Lecture 47 - Elizabeth Bishop - Biographical Contexts and The Map
Lecture 48 - Questions of Travel
Lecture 49 - One Art
Lecture 50 - Sylvia Plath: The Fraught Background to 'Ariel'
Lecture 51 - Sylvia Plath - The Rabbit Catcher
Lecture 52 - Ted Hughes - The Rabbit Catcher
Lecture 53 - American Family Elegy - Full Fathom Five
Lecture 54 - Electra on Azalea Path and The Colossus
Lecture 55 - The Colossus and Daddy
Lecture 56 - Concluding Plath, Introducing Walcott
Lecture 57 - Walcott - Ruins of a Great House
Lecture 58 - Walcott - 'Omeros'
Lecture 59 - Mythic Method and Introduction to Arun Kolatkar
Lecture 60 - Turnaround, 'Kala Ghoda' poems, and 'Jejuri'

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NPTEL Video Course - Humanities and Social Sciences - NOC:Advance Course in Organizational Behavior

Subject Co-ordinator - Prof. Pooja Garg

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organizational Behavior - Part I
Lecture 2 - Introduction to Organizational Behavior - Part II
Lecture 3 - Diversity in Organizations - Part I
Lecture 4 - Diversity in Organizations - Part II
Lecture 5 - Diversity Management
Lecture 6 - Personality
Lecture 7 - Personality Frameworks
Lecture 8 - Personality Frameworks and Attributes of Personality
Lecture 9 - Personality and Situations
Lecture 10 - Shaping Behavior through Learning
Lecture 11 - Shaping Behavior through Conditioning - Part I
Lecture 12 - Shaping Behavior through Conditioning - Part II
Lecture 13 - Behavior Modification
Lecture 14 - Meaning of Emotions, Moods, and its aspects
Lecture 15 - Emotional Intelligence and It's Model - Part I
Lecture 16 - Emotional Intelligence and It's Model - Part II
Lecture 17 - Emotional Regulation and Techniques
Lecture 18 - OB Applications of Emotions and Moods
Lecture 19 - Introduction to Motivation
Lecture 20 - Contemporary Theories of Motivation - Part I
Lecture 21 - Contemporary Theories of Motivation - Part II
Lecture 22 - Contemporary Theories of Motivation - Part III
Lecture 23 - Contemporary Theories of Motivation - Part IV
Lecture 24 - Job Characteristics Model (JCM) and Job Redesign
Lecture 25 - Job-redesign
Lecture 26 - Alternative Work Arrangements - Part I
Lecture 27 - Alternative Work Arrangements - Part II
Lecture 28 - Group Leadership; Conceptualizing Leadership and Leadership and Styles
Lecture 29 - Contemporary Theories of Leadership - Part I

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Lecture 30 - Contemporary Theories of Leadership - Part II
Lecture 31 - Types of Leadership
Lecture 32 - Evolving Perspectives on Indian Leadership
Lecture 33 - Theories of Group Formation
Lecture 34 - Structural Dynamics of Groups - Part I
Lecture 35 - Structural Dynamics of Groups - Part II
Lecture 36 - Types of Group
Lecture 37 - Verbal Communication
Lecture 38 - Nonverbal Communication - Part I
Lecture 39 - Nonverbal Communication - Part II
Lecture 40 - Nonverbal Communication - Part III
Lecture 41 - Communication Networks
Lecture 42 - Formal and Informal Communication and its Types
Lecture 43 - Sociometry
Lecture 44 - Meaning, Stages, and Sources of Conflict
Lecture 45 - Conflict Resolution Strategies
Lecture 46 - Impression Management and its Tactics
Lecture 47 - Meaning and Forms of Organizational Justice
Lecture 48 - Ethical Behavior in Organizations
Lecture 49 - Factors promoting Ethical and Unethical Behavior
Lecture 50 - Corporate Social Responsibility and its Types
Lecture 51 - Meaning of Change and Factors Promoting Change
Lecture 52 - Overcoming Resistance to Change
Lecture 53 - Approaches to Managing Change
Lecture 54 - Organizational Development
Lecture 55 - JOHARI Window
Lecture 56 - Transactional Analysis (TA) - Part I
Lecture 57 - Transactional Analysis (TA) - Part II
Lecture 58 - Positive Organizational Scholarship: Definition, Principles and Scope
Lecture 59 - Scope of Positive Organizational Scholarship - Part I
Lecture 60 - Scope of Positive Organizational Scholarship - Part II
Lecture 61 - Scope of Positive Organizational Scholarship - Part III
Lecture 62 - Scope of Positive Organizational Scholarship - Part IV
Lecture 63 - Appreciative Inquiry
Lecture 64 - Workplace Spirituality and Work Engagement
Lecture 65 - Flow and Learning Organizations

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NPTEL Video Course - Humanities and Social Sciences - NOC:Research Methodology in Humanities and Social Scier

Subject Co-ordinator - Prof. Smita Jha

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Research Philosophy
Lecture 3 - Research Paradigm
Lecture 4 - Different Aspects of Research Paradigm
Lecture 5 - Types of Research
Lecture 6 - Epistemological Aspect of Research
Lecture 7 - Relevance of Epistemology in Research
Lecture 8 - Ontological Aspect of Research
Lecture 9 - Relevance of Ontology in Research
Lecture 10 - Epistemology and Ontology in Research
Lecture 11 - Phenomenological Aspect of Research
Lecture 12 - Relevance of Phenomenology in Research
Lecture 13 - What are Methods in Research ?
Lecture 14 - What is Methodology in Research ?
Lecture 15 - Difference Between Methods and Methodology
Lecture 16 - Hypothesis in Research
Lecture 17 - How to Form Research Questions - I
Lecture 18 - How to Form Research Questions - II
Lecture 19 - How to Decide Objectives of the Research - I
Lecture 20 - How to Decide Objectives of the Research - II
Lecture 21 - Finalizing Topic/Title in Research
Lecture 22 - What is a Thesis Statement ?
Lecture 23 - Various Steps of Literature Review
Lecture 24 - Primary and Secondary Sources
Lecture 25 - MLA 9 Documentation and Formatting
Lecture 26 - What is a Container ?
Lecture 27 - What is a Parenthesis ?
Lecture 28 - Using URLs
Lecture 29 - Citing DOI

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Lecture 30 - Works Cited and Bibliography
Lecture 31 - Research Process
Lecture 32 - How to Develop Papers
Lecture 33 - Selection of Journals
Lecture 34 - Types of Journals
Lecture 35 - Ethics of Writing and Plagiarism
Lecture 36 - Interdisciplinary Approaches in Research
Lecture 37 - Major Trends in Research
Lecture 38 - Major Critical Theories - I
Lecture 39 - Major Critical Theories - II
Lecture 40 - Post-research Activities

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NPTEL Video Course - Humanities and Social Sciences - NOC:Twentieth-Century Womenâ s Novels

Subject Co-ordinator - Prof. Aruni Mahapatra

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Feminist Literary History: An Overview - I
Lecture 2 - Feminist Literary History: An Overview - II
Lecture 3 - Feminist Literary History: An Overview - III and Introduction to Nella Larsenâ s Passing
Lecture 4 - Nella Larsenâ s Passing: Biographical Overview and Social and Cultural Contexts - I
Lecture 5 - Nella Larsenâ s Passing: Biographical Overview and Social and Cultural Contexts - II
Lecture 6 - Nella Larsenâ s Passing: Biographical Overview and Social and Cultural Contexts - III
Lecture 7 - Nella Larsenâ s Passing: Textual Analysis - I
Lecture 8 - Nella Larsenâ s Passing: Textual Analysis - II
Lecture 9 - Nella Larsenâ s Passing: Textual Analysis - III
Lecture 10 - Nella Larsenâ s Passing: Textual Analysis - IV
Lecture 11 - Nella Larsenâ s Passing: Textual Analysis - V
Lecture 12 - Nella Larsenâ s Passing: Textual Analysis - VI
Lecture 13 - Nella Larsenâ s Passing: Textual Analysis - VII
Lecture 14 - Nella Larsenâ s Passing: Textual Analysis - Conclusion
Lecture 15 - Djuna Barnesâ   Nightwood: Biographical Overview and Social and Cultural Contexts - I
Lecture 16 - Djuna Barnesâ   Nightwood: Biographical Overview and Social and Cultural Contexts - II
Lecture 17 - Djuna Barnesâ   Nightwood: Textual Analysis - I
Lecture 18 - Djuna Barnesâ   Nightwood: Textual Analysis - II
Lecture 19 - Djuna Barnesâ   Nightwood: Textual Analysis - III
Lecture 20 - Djuna Barnesâ   Nightwood: Textual Analysis - IV
Lecture 21 - Djuna Barnesâ   Nightwood: Textual Analysis - V
Lecture 22 - Djuna Barnesâ   Nightwood: Textual Analysis - VI
Lecture 23 - Djuna Barnesâ   Nightwood: Textual Analysis - Conclusion and Introduction to Zora Neale Hurstonâ
Lecture 24 - Zora Neale Hurstonâ s Their Eyes Were Watching God: Biographical Overview and Social and Cultur
Lecture 25 - Zora Neale Hurstonâ s Their Eyes Were Watching God: Biographical Overview and Social and Cultur
Lecture 26 - Zora Neale Hurstonâ s Their Eyes Were Watching God: Biographical Overview and Social and Cultur
Lecture 27 - Zora Neale Hurstonâ s Their Eyes Were Watching God: Textual Analysis - I
Lecture 28 - Zora Neale Hurstonâ s Their Eyes Were Watching God: Textual Analysis - II
Lecture 29 - Zora Neale Hurstonâ s Their Eyes Were Watching God: Textual Analysis - III

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Lecture 30 - Zora Neale Hurstonâ s Their Eyes Were Watching God: Textual Analysis - Conclusion
Lecture 31 - Elizabeth Bowen's The Death of the Heart: Biographical Overview and Social Contexts - I
Lecture 32 - Elizabeth Bowen's The Death of the Heart: Biographical Overview and Social Contexts - II
Lecture 33 - Elizabeth Bowen's The Death of the Heart: The Anglo-Irish Ascendancy and Bowen's Fiction
Lecture 34 - Elizabeth Bowen's The Death of the Heart: Conclusion and Introduction to Iris Murdoch
Lecture 35 - Iris Murdochâ s A Severed Head: Biographical Overview and Social and Cultural Contexts - I
Lecture 36 - Iris Murdochâ s A Severed Head: Biographical Overview and Social and Cultural Contexts - II
Lecture 37 - Iris Murdoch's A Severed Head: Biographical Overview and Social and Cultural Contexts - III
Lecture 38 - Iris Murdochâ s A Severed Head: Fictionality
Lecture 39 - Fictionality: Conclusion and Introduction to Bessie Head
Lecture 40 - Bessie Headâ s A Question of Power: Biographical Overview and Social and Cultural Contexts - I
Lecture 41 - Bessie Headâ s A Question of Power: Biographical Overview and Social and Cultural Contexts - II
Lecture 42 - Bessie Headâ s A Question of Power: Biographical Overview and Social and Cultural Contexts - II
Lecture 43 - Bessie Headâ s A Question of Power: Textual Analysis
Lecture 44 - Bessie Headâ s A Question of Power: Textual Analysis-Conclusion and Introduction to Marilynne R
Lecture 45 - Marilynne Robinsonâ s Housekeeping: Biographical Overview and Social and Cultural Contexts - I
Lecture 46 - Marilynne Robinsonâ s Housekeeping: Biographical Overview and Social and Cultural Contexts - II
Lecture 47 - Marilynne Robinsonâ s Housekeeping: Textual Analysis - I
Lecture 48 - Marilynne Robinsonâ s Housekeeping: Textual Analysis - II
Lecture 49 - Marilynne Robinsonâ s Housekeeping: Textual Analysis - III
Lecture 50 - Marilynne Robinsonâ s Housekeeping: Textual Analysis - Conclusion and Introduction to Toni Morr
Lecture 51 - Toni Morrisonâ s Beloved: Biographical Overview and Social and Cultural Contexts
Lecture 52 - Toni Morrisonâ s Beloved: Textual Analysis
Lecture 53 - Toni Morrisonâ s Beloved: Textual Analysis - Conclusion
Lecture 54 - Tsitsi Dangarembgaâ s Nervous Conditions: Biographical Overview and Social and Cultural Context
Lecture 55 - Tsitsi Dangarembgaâ s Nervous Conditions: Textual Analysis
Lecture 56 - Tsitsi Dangarembgaâ s Nervous Conditions: Textual Analysis-Conclusion and Introduction to Miche
Lecture 57 - Michelle Cliffâ s No Telephone to Heaven: Biographical Overview and Social and Cultural Context
Lecture 58 - Michelle Cliffâ s No Telephone to Heaven: Textual Analysis - Conclusion and Introduction to A S
Lecture 59 - Sunetra Gupta's Memories of Rain: Biographical Overview and Social and Cultural Contexts
Lecture 60 - Sunetra Gupta's Memories of Rain: Textual Analysis - Conclusion
Lecture 61 - Conclusion

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NPTEL Video Course - Humanities and Social Sciences - NOC:Power and Politics in Contemporary India: A Sociolo

Subject Co-ordinator - Prof. Lalatendu Keshari Das

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Political Sociology ? Scope and Key Concerns
Lecture 2 - Classical Origins: Karl Marx
Lecture 3 - Classical Origins: Max Weber
Lecture 4 - Marx, Weber and Conservation Practice
Lecture 5 - Power Elites and Reproduction of Inequality
Lecture 6 - Bourdieu and Reproduction of Classes
Lecture 7 - Antonio Gramsci and Hegemony
Lecture 8 - Foucault and Governmentality
Lecture 9 - Steven Lukes and Three Dimensions of Power
Lecture 10 - Ranajit Guha: Dominance without Hegemony and General Configuration of Power
Lecture 11 - Nature of State: Louis Althusser and Ideological State Apparatus
Lecture 12 - Nature of State: Miliband-Poulantzas Debate
Lecture 13 - Sudipta Kaviraj: Critique of Passive Revolution in India
Lecture 14 - Pranab Bardhan: Indiaâ s Ruling Elites and Development Politics
Lecture 15 - Partha Chatterjee: Civil and Political Society
Lecture 16 - Nations and Nationalism: Anthony Smith
Lecture 17 - Nations and Nationalism: Benedict Anderson
Lecture 18 - Nations and Nationalism: Partha Chatterjee
Lecture 19 - Nations and Nationalism: G Aloysius
Lecture 20 - Citizenship and Social Class: TH Marshall
Lecture 21 - Kinship and Political Authority in South Asia
Lecture 22 - Political Articulations of Caste: From Hierarchy to Mobilisation
Lecture 23 - Intersections of Caste and Democracy
Lecture 24 - Community, Identity, and Moral Economies
Lecture 25 - Case Study: Dalit-Bahujan Politics and Assertion
Lecture 26 - Class, Hegemony, and Political Mobilisation
Lecture 27 - Political Sociology of Agrarian Change and Land
Lecture 28 - Urban Informality and Class Politics
Lecture 29 - Labor, Precarity, and Informal Worker's Movements

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Lecture 30 - Political Lives of Labour in India
Lecture 31 - Ethnicity, Community, and State Recognition
Lecture 32 - Sociology of Communalism and Secularism
Lecture 33 - Religion, Morality, and the Political Field
Lecture 34 - Political Rituals and Symbolism
Lecture 35 - Subnationalism: Separate Koshal Statehood Movement in India
Lecture 36 - Classical and New Social Movement Theories
Lecture 37 - Political Process Model and Resource Mobilisation
Lecture 38 - Subaltern Movements: Adivasi, Dalit, Women
Lecture 39 - Urban Protests and Anti-State Mobilisations
Lecture 40 - Case Study: Chipko Movement
Lecture 41 - Sociology of Development and Post-development Critique
Lecture 42 - From Government to Governance: Neoliberal Transitions
Lecture 43 - The Role of NGOs and Donor-Driven Agendas
Lecture 44 - The State, Welfare, and Targeted Governance
Lecture 45 - Case Study: The Rise of Self-help Groups and Micro-politics: Kudumbashree, Kerala
Lecture 46 - Legal Pluralism and the Sociology of Law
Lecture 47 - Rights-based Mobilisation and Judicial Politics
Lecture 48 - Courts as Sites of Negotiation and Performance
Lecture 49 - Customary Law, Gender, and the State
Lecture 50 - Case Study: PIL, Judicial Activism, and Chilika Bachao Andolan
Lecture 51 - Political Communication and Public Discourse
Lecture 52 - Visual Politics: Symbols, Posters, and Performances
Lecture 53 - Popular Culture and the Construction of the Political
Lecture 54 - Media, Surveillance, and the Manufacturing of Consent
Lecture 55 - Case Study: Human-Elephnat Conflict in Media
Lecture 56 - Politics of the Margins and Hidden Transcripts (James Scott)
Lecture 57 - Gender and Political Sociology: Beyond Representation
Lecture 58 - The Political in the Everyday: Affect, Emotion, and Intimacy
Lecture 59 - Decolonising Political Sociology: Southern and Indigenous Epistemologies
Lecture 60 - Final Synthesis: What is the Political Today ?

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NPTEL Video Course - Humanities and Social Sciences - NOC:Artistic Exploration in Scientific Research and Tec

Subject Co-ordinator - Prof. Bitasta Das

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Science and Humanities
Lecture 2 - Humanities and Art
Lecture 3 - Idea of Folk
Lecture 4 - Folk and Folk Art
Lecture 5 - Importance of Folklore
Lecture 6 - Folk Art Around the World
Lecture 7 - Indian Folk Art
Lecture 8 - Indian Schools of Painting
Lecture 9 - Indian Folk Paintings - 1
Lecture 10 - Indian Folk Paintings - 2
Lecture 11 - Madhubani
Lecture 12 - Gond
Lecture 13 - Warli
Lecture 14 - Chittara
Lecture 15 - Sohrai
Lecture 16 - Importance of Interdisciplinary Approach
Lecture 17 - Art vis-Ã -vis Science and Technology
Lecture 18 - When Art Meets Science and Technology
Lecture 19 - Folk Art A Potent Medium of Communication
Lecture 20 - Representation of Science and Technology with Indian Folk Art - 1
Lecture 21 - Representation of Science and Technology with Indian Folk Art - 2
Lecture 22 - Recapitulation
Lecture 23 - Conclusion

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NPTEL Video Course - Law - NOC:Introduction to Law on Electricity

Subject Co-ordinator - Prof. Uday Shankar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of the Electricity Law; Constitutional Design
Lecture 2 - Evolution of Laws on Electricity Salient Features of Electricity Act, 2003
Lecture 3 - Evolution of Laws on Electricity
Lecture 4 - Salient Features of the Electricity Act 2003
Lecture 5 - Energy Security
Lecture 6 - Energy Mix
Lecture 7 - National Electricity Plan and Policy
Lecture 8 - Rural Electrification
Lecture 9 - Generation and Captive Power Plant
Lecture 10 - Generation and Captive Power Plant (Continued...)
Lecture 11 - Captive Power Plant and Dedicated Transmission Line
Lecture 12 - License
Lecture 13 - License (Continued...)
Lecture 14 - Transmission
Lecture 15 - Load Despatch Centre
Lecture 16 - Distribution
Lecture 17 - Distribution (Continued...)
Lecture 18 - Distribution and Retail Competition
Lecture 19 - Open Access
Lecture 20 - Open Access (Continued...)
Lecture 21 - Open Access (Continued...)
Lecture 22 - Trading
Lecture 23 - Trading and Power Market
Lecture 24 - Consumer Welfare
Lecture 25 - Rights of Consumer
Lecture 26 - Offences under the Electricity Act
Lecture 27 - Tariff
Lecture 28 - Tariff - Determination
Lecture 29 - Tariff - Competitive Bidding

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Lecture 30 - Regulatory Commissions
Lecture 31 - Regulatory Commissions (Continued...)
Lecture 32 - Appellate Tribunal
Lecture 33 - Other Institutions under the Act
Lecture 34 - Electricity (Amendment) Bill 2020/2021 - A Critical Comment
Lecture 35 - Renewable Energy
Lecture 36 - Renewable Energy (Continued...)
Lecture 37 - Role of Civil Society; Comments on Draft Renewable Energy Act, 2015
Lecture 38 - Energy Efficiency
Lecture 39 - Energy Conservation Act, 2001
Lecture 40 - Energy Conservation Act, 2001 (Continued...)

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NPTEL Video Course - Law - NOC:Legal and Regulatory Issues in Biotechnology

Subject Co-ordinator - Prof. Niharika Sahoo Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Biotechnology product development cycle and critical issues
Lecture 2 - Biotechnology product development cycle and critical issues (Continued...)
Lecture 3 - Ethics in Animal and Human Research
Lecture 4 - Ethics in Animal and Human Research: Code of ethics and regulation (Continued...)
Lecture 5 - Ethics in Stem Cell Research
Lecture 6 - Stem Cell Research in India
Lecture 7 - Patenting issues in biotechnology
Lecture 8 - Patenting issues in biotechnology (Continued...)
Lecture 9 - Patenting issues in biotechnology (Continued...)
Lecture 10 - IPR issues in Plant biotechnology
Lecture 11 - Regulatory Framework for Genetically engineered Plant
Lecture 12 - Cartagena Protocol
Lecture 13 - Regulatory approval process for Biopharmaceuticals
Lecture 14 - Regulatory approval process for Biopharmaceuticals and Biosimialars in US
Lecture 15 - Data exclusivity and Patent term extension
Lecture 16 - Resource Sharing: material transfer agreement
Lecture 17 - Technology transfer agreements and patents

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NPTEL Video Course - Law - NOC:New Labour Codes of India

Subject Co-ordinator - Prof.Raju Kd

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Government Policies
Lecture 3 - History of Labour Law in the Country
Lecture 4 - History - Previous Social Security Legislations in India (Continued...)
Lecture 5 - National Labour Commission Reports
Lecture 6 - Evolution of Trade Unions in India
Lecture 7 - Constitutional Freedom to Form Associations and Unions
Lecture 8 - ILO on Trade Union
Lecture 9 - Trade Union - Definitions, Registration, Cancellation, Management of Funds
Lecture 10 - Trade Union - Recognition, Immunities
Lecture 11 - Industrial Disputes - Introduction - Definitions
Lecture 12 - Resolution of Industrial Disputes
Lecture 13 - Concept of Workman, Contract of Service, Contract for Service
Lecture 14 - Strike
Lecture 15 - Lock-out
Lecture 16 - Lay-off
Lecture 17 - Retrenchment
Lecture 18 - Closure of Undertakings
Lecture 19 - Industrial Employment (Standing Orders)
Lecture 20 - Disciplinary Action and Procedures
Lecture 21 - The Code on Wages, 2019 - An Introduction
Lecture 22 - Minimum Wages, Floor Wages, Central and State Advisory Board
Lecture 23 - Payment of Wages, Deductions and Recovery, Fines
Lecture 24 - Equal Remuneration
Lecture 25 - Bonus
Lecture 26 - C.311-Minimum Wage Fixing Convention, 1970
Lecture 27 - C:26-ILO Minimum Wage-Fixing Machinery Convention,1928 C-99 Minimum Wage-Fixing
Lecture 28 - C.95-Protection of Wages Convention, 1949
Lecture 29 - C-100:Equal Remuneration Convention,1951,International Instruments on Equality

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Lecture 30 - C-173:Protection of Workersâ Claims (Employerâ s Insolvency) Convention, 1992
Lecture 31 - Code on Social Security, 2020 - Introduction
Lecture 32 - Definitions Under The Code on Social Security, 2020
Lecture 33 - Social Security Organizations (SSOs)
Lecture 34 - Employees Compensation and Benefits
Lecture 35 - The Concept of Arising Out of and in the Course of Employment
Lecture 36 - Employee's State Insurance
Lecture 37 - Different Benefits Under the ESI Scheme
Lecture 38 - Employee's Provident Fund
Lecture 39 - Gratuity
Lecture 40 - Maternity Benefit
Lecture 41 - Social Security in case of Building and Other Construction Worker
Lecture 42 - Social Security for Unorganized Sector and Platform workers
Lecture 43 - Bonded Labour System Abolition and Regulation
Lecture 44 - Child Labour Prohibition
Lecture 45 - Plantation Labour
Lecture 46 - Occupational Safety Health and Working Conditions Code, 2020 -Introduction, Definitions
Lecture 47 - Occupational Health and Safety
Lecture 48 - Working conditions, Welfare Provisions and Liability of Occupier
Lecture 49 - Regulation of Working Hours and the Concept of Decent Work
Lecture 50 - Duties of Employer and Employees, Special Provisions relating to Employment of Women
Lecture 51 - The Meaning of Factory,Manufacturing Process,Approval and Licensing of Factories
Lecture 52 - Role of Inspector-cum-Facilitator and Other Authorities
Lecture 53 - Social Security Fund, Offences and Penalties
Lecture 54 - Contract Labourand Proposed ILO Convention
Lecture 55 - Inter-State Migrant Workers
Lecture 56 - Mine Workers and Working Conditions
Lecture 57 - Beedi and Cigar Workers (Kerala and West Bengal Legislations)
Lecture 58 - Audio-Visual Workers; Cine Workers and Dock Workers
Lecture 59 - The Effective Abolition of Child Labour (C029; C105; C138 and C182)
Lecture 60 - The Governance Conventions of ILO Labour Standards

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NPTEL Video Course - Law - NOC:IP Management and Technology Transfer

Subject Co-ordinator - Prof. Gouri Gargate

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Why IP and IPM ?- Context of the development of IP culture
Lecture 3 - IP and academia - I
Lecture 4 - IP and academia - II
Lecture 5 - IP and its role in education and research
Lecture 6 - Types of IP - Patent
Lecture 7 - Types of IP - Copyright and trademark
Lecture 8 - Types of IP - Industrial design, SICLD, PPVFR
Lecture 9 - Types of IP - GI and Trade secret
Lecture 10 - IPM and various jurisdictions
Lecture 11 - Emerging areas of IP and open innovation
Lecture 12 - What is IPMS?
Lecture 13 - IPM system in organisation
Lecture 14 - IPM system model - I
Lecture 15 - IPM system model - II
Lecture 16 - IP Audit framework to evaluate your IPM system
Lecture 17 - Application of IPM model to develop/improve your IPM system
Lecture 18 - Case Study - I
Lecture 19 - Case Study - II
Lecture 20 - Capsule version-I
Lecture 21 - Use of IP analytics for your IPM
Lecture 22 - IPM and competitive intelligence
Lecture 23 - Case study - III
Lecture 24 - Case study - IV
Lecture 25 - Case study - V
Lecture 26 - IP policy
Lecture 27 - Case study - VI : IP policy of IITB
Lecture 28 - Case study - VI : IP policy of IITB
Lecture 29 - IP life cycle management

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Lecture 30 - IP life cycle management and IP policy
Lecture 31 - IP commercialization
Lecture 32 - Technology transfer- Definition, concept
Lecture 33 - Technology transfer models
Lecture 34 - Different ways of technology transfer
Lecture 35 - Case study - VII
Lecture 36 - Introduction to TT contracts
Lecture 37 - Structure of TT contracts
Lecture 38 - Integrative approach- IPM and TT
Lecture 39 - Capsule version II
Lecture 40 - Am I ready for IPM and TT ? (Course applicability)

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NPTEL Video Course - Law - NOC:Biodiversity Protection, Farmers and Breeders Rights

Subject Co-ordinator - Prof. Padmavati, Dr. Narendran Thiruthy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept and Scope of Biodiversity Protection
Lecture 2 - Types of Biodiversity, Megabiodiverse Centers
Lecture 3 - Biodiversity Mapping
Lecture 4 - Types of Bio-resources, Conservation Mechanisms
Lecture 5 - International Resources / Centres of Conservation
Lecture 6 - Traditional Resources Rights, Ecosystem Measures
Lecture 7 - Overview of International Framework
Lecture 8 - Convention on Biodiversity - Objectives and Articles
Lecture 9 - International Regime on ABS
Lecture 10 - Biodiversity and Climate Change
Lecture 11 - Biobanks - Governance issues
Lecture 12 - The Biodiversity Act, 2002
Lecture 13 - Regulatory Authorities in India - NBA and SBB
Lecture 14 - Biodiversity Management Committees
Lecture 15 - Peoples Biodiversity Registers
Lecture 16 - ABS Regulation and Benefit Sharing in India
Lecture 17 - Trade Regime and Biodiversity
Lecture 18 - Comparison of Biodiversity Laws of countries
Lecture 19 - TRIPS and CBD Relation
Lecture 20 - CBD and relation to other international treaties related to environment and organization
Lecture 21 - Interrelationship and New Developments
Lecture 22 - Biodiversity and Interface with IPR
Lecture 23 - Challenges related to biopiracy - case studies
Lecture 24 - Patents based on bioresources - Recent Trends and Developments
Lecture 25 - Disclosure requirements in Patent - A comparative perspective
Lecture 26 - Regulatory Law - Comparative perspective
Lecture 27 - Concept,Definitions and Criteria for Plant Variety Protection
Lecture 28 - Protection of Plant Varieties and Farmers' Right 2001 - Major Provisions of the Act
Lecture 29 - Plant Variety Protection - Comparative Perspective

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Lecture 30 - International Union for Protection of New Plant Varieties (UPOV)
Lecture 31 - Farmers' Rights - Other Country Model
Lecture 32 - Principles of Biodiversity Governance
Lecture 33 - Compliance Procedure and Linkage with IPR
Lecture 34 - Compliance Procedures under International Framework
Lecture 35 - Compliance Procedures in India
Lecture 36 - Compliance Procedures in EU
Lecture 37 - Biodiversity and Interrelationship with Life
Lecture 38 - Sustainable Development Agenda
Lecture 39 - Biodiversity, ecosystem functioning, ecosystem services
Lecture 40 - Biodiversity and Human Happiness

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NPTEL Video Course - Law - NOC:International Trade Law

Subject Co-ordinator - Prof. Raju KD

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the World Trading system
Lecture 2 - The history of Indian Trade and the Formation of GATT
Lecture 3 - The GATT to WTO
Lecture 4 - The Uruguay Round and The World Trade Organization
Lecture 5 - Introduction to World Agriculture Trade
Lecture 6 - The GATT and Agriculture
Lecture 7 - The WTO Agriculture Agreement Objectives, Domestic Support and Different Boxes
Lecture 8 - Food Security Concerns at WTO
Lecture 9 - Rules of Dumping and Anti - Dumping
Lecture 10 - Determination of Injury, Definition of Industry, Domestic Industry and Casual Link
Lecture 11 - Procedural Aspects and Indian Laws on Anti-Dumping
Lecture 12 - Agreement on Sanitary and Phytosanitary measures (SPS)
Lecture 13 - Assessment of Risks, Codex and Standards
Lecture 14 - SPS v. TBT Agreement
Lecture 15 - Technical Barriers to Trade Agreement (TBT) and Indian Institutions
Lecture 16 - Basic TBT Commitments, Indian Laws, Rules and Regulations
Lecture 17 - General Agreements on Trade in Services (GATS)
Lecture 18 - Different Modes of Services
Lecture 19 - Opening of Legal Service Sector in India
Lecture 20 - Trade-Related Investment Measures Agreement (TRIMs)
Lecture 21 - Local Content and WTO disputes
Lecture 22 - Trade Related Aspects of Intellectual Property Rights (TRIPs) Agreement
Lecture 23 - Patents and Trademarks
Lecture 24 - Copyright, Industrial Design and Integrated Circuits
Lecture 25 - Geographical Indications and Trade Secrets
Lecture 26 - Doha Declaration and Post-TRIPs Scenario
Lecture 27 - Agreement on Customs Valuation (CV)
Lecture 28 - Different Methods of calculating Customs Valuation
Lecture 29 - Indian Laws on Customs Valuation

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Lecture 30 - The Agreement on Pre-Shipment Inspection
Lecture 31 - GATT Dispute Settlement
Lecture 32 - Dispute Settlement in WTO
Lecture 33 - Panel Proceedings
Lecture 34 - Appellate Body Proceedings

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NPTEL Video Course - Law - NOC:Centre-State Relations in India

Subject Co-ordinator - Prof. Uday Shankar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concepts of Federalism and Theories of Federalism
Lecture 2 - Nature of Centre-State Relations under the Indian Constitution
Lecture 3 - Constitutional Provisions Relating to Centre-State Relations
Lecture 4 - Administrative Relations between Centre and State
Lecture 5 - Administrative Relations between Centre and Union Territories
Lecture 6 - Administration and Control of Scheduled Areas and Scheduled Tribes
Lecture 7 - Administrative Control of Tribal Areas
Lecture 8 - Governor's role and control of Centre
Lecture 9 - Inter-State Disputes Relating to Water
Lecture 10 - Administrative Relations during Emergency
Lecture 11 - Administrative Relations during Emergency
Lecture 12 - Introduction to Services under Constitution, Public and Joint Public Service Commissions
Lecture 13 - Constitutional Provisions relating to Services between Union and Delhi
Lecture 14 - Distribution of Legislative Power
Lecture 15 - Residuary Power and Interpretation of Statutes
Lecture 16 - Power of Parliament to legislate for matters in State List
Lecture 17 - Doctrine of Repugnancy
Lecture 18 - Interpretation of Lists under Schedule VII of the Constitution
Lecture 19 - Doctrine of Doctrines of Pith and Substance, Incidental and Ancillary Power
Lecture 20 - Legislative Relations during Emergency
Lecture 21 - Legislative Relations of State with special status
Lecture 22 - Legislative Relations of Union and States in relation to role of Governor
Lecture 23 - Legislative Relations of Union and Panchayats
Lecture 24 - Legislative Power relating to tax laws
Lecture 25 - Goods and Services Tax and Goods and Services Tax Council
Lecture 26 - Distribution of Revenue between Centre and States
Lecture 27 - Finance Commission under Article 280
Lecture 28 - Inter State Commerce and Inter-Commerce Commission under Art 307
Lecture 29 - Consolidated Fund of India and States, Contingency Fund of India and States and Exemptions

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Lecture 30 - Financial Emergency
Lecture 31 - Grants-in-aid (Art 275)
Lecture 32 - Discretionary Grants (Art 282)
Lecture 33 - Borrowing by Union and State
Lecture 34 - Inter-State Council
Lecture 35 - Zonal Council and North Eastern Council
Lecture 36 - National Development Council, Planning Commission and NITI Aayog
Lecture 37 - Mechanism to Resolve Centre - State Disputes
Lecture 38 - Emerging Issues in Federalism I - One Nation One Election, Language Federalism
Lecture 39 - Emerging Issues in Federalism II - Demand for new States, Demand for Special Status
Lecture 40 - Role of Rajya Sabha in Federal Scheme

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NPTEL Video Course - Law - NOC:Intellectual Property Disputes: Court Practices and Enforcement

Subject Co-ordinator - Prof. Gouri Gargate

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Why IP and IP disputes? Context of the development of IP enforcement culture
Lecture 3 - IP litigation overview
Lecture 4 - IP litigation - Academic and research organisation
Lecture 5 - IP litigation - Industry and nation
Lecture 6 - Intellectual property rights
Lecture 7 - Patent System in India
Lecture 8 - Copyright and Trademark System in India
Lecture 9 - Industrial design, SICLD, PPVFR system in India
Lecture 10 - Geographical Indication, Traditional Knowledge and Trade secret system in India
Lecture 11 - Brief Overview of Court System in India
Lecture 12 - Brief Overview of Court Systems in UK, USA and EU
Lecture 13 - Substantive and Procedural Subject Matters
Lecture 14 - Role of Police
Lecture 15 - IP case laws- Academic system
Lecture 16 - IP and Competition Commission of India - Introduction
Lecture 17 - IP, AI and IP disputes
Lecture 18 - Disruptive Innovation, IP and IP disputes
Lecture 19 - Case laws - Emerging technologies
Lecture 20 - Capsule - I
Lecture 21 - Patent Infringement- Introduction
Lecture 22 - Enforcement of Patent rights - Rights of patentee and Co-patentee
Lecture 23 - Enforcement of Patent rights - Administrative
Lecture 24 - Enforcement of Patent rights - Judicial
Lecture 25 - Enforcement of Patent rights - Judicial (Continued...)
Lecture 26 - Patent Case laws
Lecture 27 - Trademark Infringement- Introduction
Lecture 28 - Enforcement of Trademark rights - Rights of Trademark owner
Lecture 29 - Enforcement of Trademark rights - I

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Lecture 30 - Enforcement of Trademark rights - II
Lecture 31 - Trademark Case laws
Lecture 32 - Copyright Infringement- Introduction
Lecture 33 - Enforcement of Copyright rights - Rights of Copyright owner
Lecture 34 - Enforcement of Copyright rights - I
Lecture 35 - Enforcement of Copyright rights - II
Lecture 36 - Copyright Case laws
Lecture 37 - Industrial design and IP disputes
Lecture 38 - Trade secret and IP disputes
Lecture 39 - GI, SICLD, PPVFR and IP disputes
Lecture 40 - Capsule version - II
Lecture 41 - Am I ready for IPM and TT? (Course applicability)

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NPTEL Video Course - Law - NOC:Directive Principles of State Policy and Fundamental Duties: Constitutional Im

Subject Co-ordinator - Prof. Uday Shankar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Theoretical Background of DPSP - I
Lecture 2 - Theoretical Background of DPSP - II
Lecture 3 - DPSPs: Definition and Approaches
Lecture 4 - Functions, Duties and Characteristics of DPSPs
Lecture 5 - Debate on the Justiciability or Non-Justiciability of DPSPs
Lecture 6 - Constituent Assembly Debates: DPSPs and its Structuring - I
Lecture 7 - Constituent Assembly Debates: DPSPs and its Structuring - II
Lecture 8 - DPSPs under Indian Constitution: Comparative Understanding
Lecture 9 - Thematic Understanding of DPSPs - I
Lecture 10 - Thematic Understanding of DPSPs - II
Lecture 11 - DPSPs within the Realm of Constitutionalism
Lecture 12 - Nature and Significance of DPSPs in the Indian Constitution
Lecture 13 - The Trinity: Preamble, Fundamental Rights and DPSP
Lecture 14 - Distinction between - Part III and Part IV
Lecture 15 - Exploring Article 37: Principles and Judicial Minimalism
Lecture 16 - DPSPs, Pluralism and Inclusivity
Lecture 17 - Interplay of DPSPs with Fundamental Rights - I
Lecture 18 - Interplay of DPSPs with Fundamental Rights - II
Lecture 19 - Article 31C and Inter-relationship with DPSP
Lecture 20 - Engaging DPSPs with Ancient Indian Texts
Lecture 21 - Impact of Indian Directive Principles on Other Constitutions
Lecture 22 - Welfare Goals, Rights, Enforcement: Interaction
Lecture 23 - DPSP and Uniform Civil Code
Lecture 24 - DPSPs and the Role of Central, State and Local Governments: Inter-governmental relations
Lecture 25 - DPSP and Labour Welfare
Lecture 26 - Directive Principles of State Policy: Amendments and Expanding Horizons
Lecture 27 - Directive Principles of State Policy and Expanding Horizons: Article 43B and Article 48A
Lecture 28 - Socio-Economic Rights, Model of Adoption and Enforcement: Interaction with Constitution
Lecture 29 - Fundamental Duties under Constitution: Debates, Reports of Various Committees

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Lecture 30 - Fundamental Duties under Constitution: Enforcement and Justiciability
Lecture 31 - Relationship between Fundamental Rights, DPSP and Fundamental Duties; Judicial Approach
Lecture 32 - Comparative Analysis: Fundamental Duties and Civic Responsibilities in Other Constitutions
Lecture 33 - Engaging Indian Knowledge System with Fundamental Duties
Lecture 34 - Duties in Other Religions and Constitutional Connect
Lecture 35 - Weaving Unity: Fraternity in Indian Culture and Constitution
Lecture 36 - Revering Nature: Indian Knowledge System and Relevance in Fundamental Duties
Lecture 37 - Feminine Divine: Indian Philosophy and Fundamental Duties
Lecture 38 - Fundamental Duties and their Reflection in the Legislative and Judicial Framework - I
Lecture 39 - Fundamental Duties and their Reflection in the Legislative and Judicial Framework - II
Lecture 40 - Oaths and Fundamental Duties: Constitutional Framework for Governance

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NPTEL Video Course - Law - NOC:Legal and Regulatory Compliance for Small and Medium Business Enterprises

Subject Co-ordinator - Prof. Raju KD

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to MSMEs
Lecture 2 - Legal Framework Governing MSMEs
Lecture 3 - MSME Social Data and Udyam Registration
Lecture 4 - Sole Proprietorship and Partnership
Lecture 5 - One Person Company and Pvt. Ltd.
Lecture 6 - LLP and Public Limited Company
Lecture 7 - Startups and Section 8 Company
Lecture 8 - License Requirement for MSMEs in India
Lecture 9 - Laws related to Industrial Relations
Lecture 10 - Laws related to wages
Lecture 11 - Laws related to Working Conditions
Lecture 12 - Laws related to Women and children
Lecture 13 - Handling Employment Disputes
Lecture 14 - Employees Insurance
Lecture 15 - Employees Provident Fund
Lecture 16 - Bonus and Gratuity
Lecture 17 - Compensation for Workmen
Lecture 18 - Central Government Schemes
Lecture 19 - Bonus and Gratuity
Lecture 20 - Compensation for Workmen
Lecture 21 - Central Government Schemes
Lecture 22 - IP for MSMEs: Strategy, Protection and Growth
Lecture 23 - Empowering MSMEs Through Patents and Innovation
Lecture 24 - Introduction to Goods and Service Tax
Lecture 25 - Compliance Requirements of GST
Lecture 26 - Positive and Negative Impacts of GST
Lecture 27 - Corporate Income Tax
Lecture 28 - Government support and Initiatives for Tax benefits
Lecture 29 - Introduction to Consumer Protection Act

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Lecture 30 - Product Liability
Lecture 31 - Remedies Under the 2019 Act
Lecture 32 - Online Shopping and Product Liability
Lecture 33 - Introduction to the Food Safety and Standards Act, 2006
Lecture 34 - Enforcement of the FSS Act
Lecture 35 - FSSAI Regulations and Packing Standards
Lecture 36 - Marketing and Advertising Regulations
Lecture 37 - Case-Studies involving MSMES
Lecture 38 - Standard Clauses in Business Contracts

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NPTEL Video Course - Law - NOC:Right to Information and Good Governance

Subject Co-ordinator - Prof. Sairam Bhat

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Transparency, Accountability and Good Governance - Part 1
Lecture 2 - Introduction to Transparency, Accountability and Good Governance - Part 2
Lecture 3 - India's Progress In Ensuring Transparency and Accountability
Lecture 4 - RTI and its contribution in strengthening Transparency and International Perspective on RTI Law
Lecture 5 - hronology of State RTI Laws in India and major Landmarks in RTI Journey
Lecture 6 - Chronology of State RTI Laws in India and major Landmarks in RTI Journey
Lecture 7 - Constituional and judicial perspective on RTI
Lecture 8 - Judical Activism and RTI
Lecture 9 - Judical Precedents, Reasonalbe Restricitions and Comparative perspective on RTI
Lecture 10 - Legislating the Right to Information
Lecture 11 - Legislating the Right to Information
Lecture 12 - Legislating the Right to Information
Lecture 13 - Legislating the Right to Information
Lecture 14 - Legislating the Right to Information
Lecture 15 - Legislating the Right to Information
Lecture 16 - Legislating the Right to Information
Lecture 17 - Legislating the Right to Information
Lecture 18 - Legislating the Right to Information
Lecture 19 - Salient Features of the RTI Act - I
Lecture 20 - Salient Features of the RTI Act - II
Lecture 21 - Salient Features of the RTI Act - III
Lecture 22 - Salient Features of the RTI Act - IV
Lecture 23 - Salient Features of the RTI Act - V
Lecture 24 - Salient Features of the RTI Act - VI
Lecture 25 - Salient Features of the RTI Act - VII
Lecture 26 - The Roles and Responsibilities of the Chief Information Commissioner - I
Lecture 27 - The Roles and Responsibilities of the Chief Information Commissioner - II
Lecture 28 - The Roles and Responsibilities of the Chief Information Commissioner - III
Lecture 29 - Public Information Officers, Appeal and Internal Office Management for effective RTI Management

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Lecture 30 - Public Information Officers, Appeal and Internal Office Management for effective RTI Management
Lecture 31 - Public Information Officers, Appeal and Internal Office Management for effective RTI Management
Lecture 32 - Public Information Officers, Appeal and Internal Office Management for effective RTI Management
Lecture 33 - Public Authority - I
Lecture 34 - Public Authority - II
Lecture 35 - Public Authority - III
Lecture 36 - Public Authority - IV
Lecture 37 - Public Authority - V
Lecture 38 - Public Authority - VI
Lecture 39 - Public Authority - VII
Lecture 40 - Public Authority - VIII
Lecture 41 - Public Authority - IX
Lecture 42 - Public Authority - X
Lecture 43 - Public Authority - XI
Lecture 44 - Public Authority - XII
Lecture 45 - Public Authority - XIII
Lecture 46 - Public Authority - XIV
Lecture 47 - Exempted Information - I
Lecture 48 - Exempted Information - II
Lecture 49 - Exempted Information - III
Lecture 50 - Exempted Information - IV
Lecture 51 - Exempted Information - V
Lecture 52 - Exempted Information - VI
Lecture 53 - Exempted Information - VII
Lecture 54 - Exempted Information - VIII
Lecture 55 - Exempted Information - IX
Lecture 56 - Exempted Information - X
Lecture 57 - Exempted Information - XI
Lecture 58 - Information Commissions under the RTI Act - I
Lecture 59 - Information Commissions under the RTI Act - II
Lecture 60 - Information Commissions under the RTI Act - III
Lecture 61 - Information Commissions under the RTI Act - IV
Lecture 62 - Information Commissions under the RTI Act - V
Lecture 63 - Role of NGOs and Right to Information Act
Lecture 64 - RTI Act and Political Parties - I
Lecture 65 - RTI Act and Political Parties - II
Lecture 66 - Official Secrets Act and RTI
Lecture 67 - Whistleblowers Protection Act and Right to Information - I
Lecture 68 - Whistleblowers Protection Act and Right to Information - II

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Lecture 69 - Whistleblowers Protection Act and Right to Information - III
Lecture 70 - Comparative Perspective on RTI Law - I
Lecture 71 - Comparative Perspective on RTI Law - II
Lecture 72 - Ecological Perspective of Right to Information
Lecture 73 - Victimization and Misuse of Right to Information
Lecture 74 - Landmark Judgements Under the RTI Act - I
Lecture 75 - Landmark Judgements Under the RTI Act - II

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NPTEL Video Course - Law - NOC:Constitution of India and Environmental Governance: Administrative and Adjudic

Subject Co-ordinator - Prof. M. K. Ramesh, Prof. Sairam Bhat

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Environmental Governance: Basis, Sources and Foundational Norms: Salient and Star
Lecture 2 - Theoretical Moorings, Sources and Evolution - Part 1
Lecture 3 - Theoretical Moorings, Sources and Evolution - Part 2
Lecture 4 - Theoretical Moorings, Sources and Evolution - Part 3
Lecture 5 - Theoretical Moorings, Sources and Evolution - Part 4
Lecture 6 - Theoretical Moorings, Sources and Evolution - Part 5
Lecture 7 - Theoretical Moorings, Sources and Evolution - Part 6
Lecture 8 - Theoretical Moorings, Sources and Evolution - Part 7
Lecture 9 - Common Law Roots and Constitutonal Basis: Common Law and Criminal Law Anchors
Lecture 10 - Constitutional Scheme of Environment and Natural Resources Management
Lecture 11 - Communitarian Management and Decentralised Governance
Lecture 12 - Constitutional Right to Environment
Lecture 13 - Overarching Law-Environment Protection Act - I
Lecture 14 - Overarching Law-Environment Protection Act - II
Lecture 15 - Pollution Control: Law, Enforcement and Compliance: The Setting; Scope and Application
Lecture 16 - Authorities regulating Pollution Control
Lecture 17 - Pollution Control Boards: Its consitution and role
Lecture 18 - Powers and Functions of Various Authorities - I
Lecture 19 - Powers and Functions of Various Authorities - II
Lecture 20 - Environment Impact Assessment Law: Why EIA? Evolution of EIA
Lecture 21 - EIA Notification, 2006 - I
Lecture 22 - EIA Notification, 2006 - II
Lecture 23 - United Nations Framework Convention on Climate Change
Lecture 24 - Kyoto Protocol: Developments Between 1992-2012
Lecture 25 - Paris Agreement and Climate Justice
Lecture 26 - India Case Study: National Rendezvous for Climate Justice
Lecture 27 - Biodiversity: Significance and Concerns
Lecture 28 - Development of the International Framework on Biodiversity: Convention on Biodiversity 1992
Lecture 29 - Protocols Under the Convention on Biodiversity 1992

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Lecture 30 - Indian Biodiversity Legal Framework
Lecture 31 - Legal Framework on Biosafety
Lecture 32 - Forest and Wildlife Law: Introduction to Indian Forest Act 1927
Lecture 33 - Forest and Wildlife Law: Introduction to Forest Conservation Act, 1980
Lecture 34 - Forest Rights and CAMPA: Introduction to Forest Rights Act, 2006
Lecture 35 - Forest and Wildlife Law: Introduction to Wildlife Protection Act, 1972
Lecture 36 - Specific Ecosystems and their Management: I. Regulation of Coastal Areas
Lecture 37 - Specific Ecosystems and their Management: II. Ecologically Sensitive Zones
Lecture 38 - Specific Ecosystems and their Management: III. Wetlands and Water Bodies
Lecture 39 - Water Policy and Law: An Overview
Lecture 40 - Water Policy and Law: Indian Legal Framework
Lecture 41 - Basic Legal Framework and Strategies for Waste Management - I
Lecture 42 - Basic Legal Framework and Strategies for Waste Management - II
Lecture 43 - Law Concerning Hazardous Wastes and Substances
Lecture 44 - Environmental Justice Dispensation: Role of Higher Judiciary
Lecture 45 - Catalytic Role and Complementary Role of the Judiciary
Lecture 46 - Positive Aspects of Judicial Activism
Lecture 47 - Critical Review of Judicial Activism
Lecture 48 - Overview of the law relating to Compensation for Environmental Wrong and History of the Growth o
Lecture 49 - History and Growth of Environmental Tribunals
Lecture 50 - Overview of the law relating to Compensation for Environmental Wrong and History of the Growth o
Lecture 51 - History and Growth of Environmental Tribunals
Lecture 52 - National Green Tribunal - I
Lecture 53 - National Green Tribunal - II
Lecture 54 - National Green Tribunal - III
Lecture 55 - Accessing and Securing Environmental Justice within the Statutory Framework
Lecture 56 - Environmental Legal Order: Law and Policy
Lecture 57 - Environmental Legal Order: Structures and Schemes of Governance
Lecture 58 - Environmental Adjudication
Lecture 59 - Suggestions and Wrap Up

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NPTEL Video Course - Law - NOC:Constitutional Studies

Subject Co-ordinator - Prof. Sudhir Krishnaswamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Constitutions
Lecture 2 - Why have a Constitution?
Lecture 3 - Constitutional Change
Lecture 4 - How Should a Society Make a Constitution?
Lecture 5 - Making India's Constitution
Lecture 6 - Purpose History Preamble
Lecture 7 - Preamble Values Meaning
Lecture 8 - Citizenship: Basic Concepts
Lecture 9 - Citizenship: Challenges and Future
Lecture 10 - Introduction to Fundamental Rights
Lecture 11 - Fundamental Rights
Lecture 12 - Right to Equality
Lecture 13 - Directive Principles of State Policy and Philosophical Principles
Lecture 14 - Case Studies
Lecture 15 - Right to Life
Lecture 16 - Positive Life
Lecture 17 - Free Speech and Religious Freedom
Lecture 18 - Directive Principles of State Policy

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NPTEL Video Course - Law - NOC:Advanced Contracts, Tendering and Public Procurement

Subject Co-ordinator - Prof. Sairam Bhat

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline and Overview - Part 1
Lecture 2 - Course Outline and Overview - Part 2
Lecture 3 - Introduction to Contract Law
Lecture 4 - Development of Contract Law
Lecture 5 - Evaluation of Contract Law
Lecture 6 - Formation of Contract - Offer
Lecture 7 - Formation of Contract - Revocation of Offer
Lecture 8 - Formation of Contract - Capacity to Contract
Lecture 9 - Formation of Contract - Capacity and Consideration
Lecture 10 - Formation of Contract - Free Consent - Part 1
Lecture 11 - Formation of Contract - Free Consent - Part 2
Lecture 12 - Formation of Contract - Free Consent III: Unconscionable and Standard Form of Contracts
Lecture 13 - Formation of Contract- Free Consent IV: Voidable Contracts
Lecture 14 - Formation of Contract: Legality of Object and Public Policy - Part 1
Lecture 15 - Formation of Contract: Legality of Object and Public Policy - Part 2
Lecture 16 - Formation of Contract: Legality of Object and Public Policy - Part 3
Lecture 17 - Formation of Contract: Legality of Object and Public Policy - Part 4
Lecture 18 - Void Agreements - Part 1
Lecture 19 - Void Agreements - Part 2
Lecture 20 - Void Agreements - Part 3
Lecture 21 - Void Agreements - Part 4
Lecture 22 - Discharge of Contracts - Part 1
Lecture 23 - Discharge of Contracts - Part 2
Lecture 24 - Breach of Contracts - Part 1
Lecture 25 - Breach of Contracts - Part 2
Lecture 26 - Breach of Contracts - Part 3
Lecture 27 - Liquidated Damages in Government Contracts - Part 1
Lecture 28 - Liquidated Damages in Government Contracts - Part 2
Lecture 29 - Special Contracts: Bailment - Part 1

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Lecture 30 - Special Contracts: Bailment - Part 2
Lecture 31 - Special Contracts: Pledge
Lecture 32 - Special Contracts: Indemnity - Part 1
Lecture 33 - Special Contracts: Indemnity - Part 2
Lecture 34 - Special Contracts: Guarantee - Part 1
Lecture 35 - Special Contracts: Guarantee - Part 2
Lecture 36 - Special Contracts: Agency - Part 1
Lecture 37 - Special Contracts: Agency - Part 2
Lecture 38 - Special Contracts: Sale of Goods - Part 1
Lecture 39 - Special Contracts: Sale of Goods - Part 2
Lecture 40 - Special Contracts: Sale of Goods - Part 3
Lecture 41 - Special Contracts: Sale of Goods - Part 4
Lecture 42 - Special Contracts: Sale of Goods - Part 5
Lecture 43 - Tendering, Contracts, Public Procurement
Lecture 44 - Public Private Partnerships: Law and Policy in India - Part 1
Lecture 45 - Public Private Partnerships: Law and Policy in India - Part 2
Lecture 46 - Public Private Partnerships: Law and Policy in India - Part 3
Lecture 47 - Public Private Partnerships: Law and Policy in India - Part 4
Lecture 48 - Government Contracts - Part 1
Lecture 49 - Government Contracts - Part 2
Lecture 50 - Government Contracts - Part 3
Lecture 51 - Government Contracts - Part 4
Lecture 52 - Government Contracts - Part 5
Lecture 53 - Bank Guarantee
Lecture 54 - Writ Reliefs in Government Contracts - Part 1
Lecture 55 - Writ Reliefs in Government Contracts - Part 2
Lecture 56 - Arbitration Clauses in Government Contracts

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NPTEL Video Course - Law - NOC:Conflict Management through Mediation

Subject Co-ordinator - Dr. Ashok R. Patil

Co-ordinating Institute - National Law School of India University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Course Outline and concepts
Lecture 2 - Need for ADR and Hierarchy of Courts
Lecture 3 - Conflict and Conflict Management - Part 1
Lecture 4 - Conflict and Conflict Management - Part 2
Lecture 5 - Legal Development of ADR in India
Lecture 6 - Introduction to Week 2
Lecture 7 - Judicial Process v Mediation
Lecture 8 - Arbitration v Mediation
Lecture 9 - Conciliation v Mediation
Lecture 10 - Lok Adalats v Mediation
Lecture 11 - Negotiation v Mediation
Lecture 12 - Introduction to Week 3
Lecture 13 - Concept of Mediation
Lecture 14 - Features of mediation
Lecture 15 - Advantages of mediation
Lecture 16 - Stages of Mediation
Lecture 17 - Types of Mediation
Lecture 18 - Pre-Litigation Mediation
Lecture 19 - Post-Litigation Mediation
Lecture 20 - Private Mediation
Lecture 21 - Challenges in mediation
Lecture 22 - Introduction to Week 5
Lecture 23 - Communication in mediation
Lecture 24 - Paraphrasing, Restating and Reflecting
Lecture 25 - Summarising
Lecture 26 - Reframing
Lecture 27 - Body Language and Perception
Lecture 28 - Do's and Don't for Mediator
Lecture 29 - Role of Mediator

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Lecture 30 - Mediator-Personality
Lecture 31 - Medition under Consumer Protection Act, 2019 - Introduction
Lecture 32 - Medition under Consumer Protection Act, 2019 - Chapter V
Lecture 33 - Consumer Protection (Mediation) Rules, 2020
Lecture 34 - Consumer Protection (Mediation) Regulations, 2020
Lecture 35 - Mediation under Commercial Courts Act, 2015 - Part 1
Lecture 36 - Mediation under Commercial Courts Act, 2015 - Part 2
Lecture 37 - United Nations Convention on International Settlement Agreements Resulting from Mediation, 2018
Lecture 38 - United Nations Convention on International Settlement Agreements Resulting from Mediation, 2018
Lecture 39 - Mediation Bill, 2021 - Part 1
Lecture 40 - Mediation Bill, 2021 - Part 2
Lecture 41 - Online Despute Resolution
Lecture 42 - Online Mediation
Lecture 43 - Mediation under Companies Act, 2013
Lecture 44 - Mediation Settlement
Lecture 45 - Mediaition Settlement Illustration/Sample 1
Lecture 46 - Mediaition Settlement Illustration/Sample 2 - Part 1
Lecture 47 - Mediaition Settlement Illustration/Sample 2 - Part 2
Lecture 48 - Mediaition Settlement Illustration/Sample 3

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NPTEL Video Course - Law - NOC:Constitution Law and Public Administration in India

Subject Co-ordinator - Prof. Sairam Bhat

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Constitutional Law and Public Administration in India
Lecture 2 - Background, History and Framing of the Constitution of India - I
Lecture 3 - Background, History and Framing of the Constitution of India - II
Lecture 4 - Sources of the Constitution and Constituent Assembly
Lecture 5 - Salient Features of the Constitution of India
Lecture 6 - Schedules of the Indian Constitution
Lecture 7 - Constitution and Public Policy
Lecture 8 - Supremacy of the Indian Constitution - I
Lecture 9 - Supremacy of the Indian Constitution - II
Lecture 10 - Preamble of the Indian Constitution
Lecture 11 - Union and Its Territory - I
Lecture 12 - Union and Its Territory - II
Lecture 13 - Union and Its Territory - III
Lecture 14 - Citizenship - I
Lecture 15 - Citizenship - II
Lecture 16 - Introduction to Fundamental Rights
Lecture 17 - Article 12 Definition of State - I
Lecture 18 - Article 12 Definition of State - II
Lecture 19 - Right to Equality - I
Lecture 20 - Right to Equality - II
Lecture 21 - Rights Against Discrimination - I
Lecture 22 - Rights Against Discrimination - II
Lecture 23 - Right to Freedom - I
Lecture 24 - Right to Freedom - II
Lecture 25 - Article 20
Lecture 26 - Article 21
Lecture 27 - Article 21A and Article 22
Lecture 28 - Right to Freedom of Religion
Lecture 29 - Right to Constitutional Remedies - I (Article 32)

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Lecture 30 - Right to Constitutional Remedies - II (Article 32 and Article 226)
Lecture 31 - Article 33 - Armed Forces and Fundamental Rights
Lecture 32 - Directive Principles of State Policy (DPSPs)
Lecture 33 - DPSPs and Fundamental Duties
Lecture 34 - Amendment to the Constitution
Lecture 35 - Different Forms of Governance: Federal, Unitary, Parliamentary, Presidential System
Lecture 36 - Introduction to Union and State Legislatures
Lecture 37 - Union and State Legislatures - II
Lecture 38 - Law Making and Legislative Interpretation
Lecture 39 - Election Commission and Election Process
Lecture 40 - Union Executive
Lecture 41 - State Executive
Lecture 42 - Introduction to the Indian Judiciary
Lecture 43 - Supreme Court of India
Lecture 44 - Judicial Review - I
Lecture 45 - Judicial Review - II
Lecture 46 - Constitutional Authorities - I (CAG and EC)
Lecture 47 - Constitutional Authorities - II (EC)
Lecture 48 - Constitutional Authorities - III (Public Service Commissions and Law Officers)
Lecture 49 - Local Self Governance
Lecture 50 - E-Governance
Lecture 51 - Administrative Tribunals - I
Lecture 52 - Administrative Tribunals - II
Lecture 53 - Administrative Tribunals - III
Lecture 54 - Role of Public Policy in Public Administration - I
Lecture 55 - Role of Public Policy in Public Administration - II
Lecture 56 - Role of Public Policy in Public Administration - III
Lecture 57 - Delegated Legislation - I
Lecture 58 - Delegated Legislation - II
Lecture 59 - Non-Constitutional Bodies - I (CVC)
Lecture 60 - Non-Constitutional Bodies - II (CBI)
Lecture 61 - Non-Constitutional Bodies - III (Lokpal and Lokayukta)
Lecture 62 - Non-Constitutional Bodies - IV (Information Commission)
Lecture 63 - Non-Constitutional Bodies - V (Disaster Management Authority)
Lecture 64 - Non-Constitutional Bodies - VI (Planning Commission and RBI)

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NPTEL Video Course - Law - NOC:Insolvency and Bankruptcy Law in India

Subject Co-ordinator - Prof. A Sridhar

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and History of Insolvency Laws in India
Lecture 2 - Introduction and History of Insolvency Laws in India
Lecture 3 - Insolvency Law in UK and USA
Lecture 4 - Insolvency Law in India before IBC
Lecture 5 - Liquidation Provisions under Companies Act, 1956
Lecture 6 - Sick Industrial Companies (Special Provisions) Act, 1985
Lecture 7 - Various Committee Reports on Insolvency - 1
Lecture 8 - Various Committee Reports on Insolvency - 2
Lecture 9 - Various Committee Reports on Insolvency - 3
Lecture 10 - Applicability of IBC
Lecture 11 - Introduction to IBC, Definitions - Part 1
Lecture 12 - Introduction to IBC, Definitions - Part 2
Lecture 13 - Introduction to IBC, Who may Initiate CIRP
Lecture 14 - Initiation of CIRP - Part 1
Lecture 15 - Initiation of CIRP - Part 2
Lecture 16 - Initiation of CIRP - Part 3
Lecture 17 - Initiation of CIRP - Part 4
Lecture 18 - Commencement of CIRP, Moratorium - Part 1
Lecture 19 - Commencement of CIRP, Moratorium - Part 2
Lecture 20 - Committee of Creditors - Part 1
Lecture 21 - Committee of Creditors - Part 2
Lecture 22 - Committee of Creditors - Part 3
Lecture 23 - Public Announcement, Filing of Claims and verification of Claims
Lecture 24 - Timelines and Persons Not Eligible to Make Application Under the Insolvency and Bankruptcy Code
Lecture 25 - Invitation for Expression of Interest and Shortlisting of Prospective Resolution Applicants
Lecture 26 - Person Ineligible to Act as a Resolution Applicant - Part 1
Lecture 27 - Person Ineligible to Act as a Resolution Applicant - Part 2
Lecture 28 - Information Memorandum, Request for Resolution Plan and Evaluation Matrix
Lecture 29 - Valuation of the Corporate Debtor and Other Aspects

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Lecture 30 - Nature, Scope and Contents of a Resolution Plan - Part 1
Lecture 31 - Nature, Scope and Contents of a Resolution Plan - Part 2
Lecture 32 - Resolution Plan - Considerations by Judiciary
Lecture 33 - Withdrawal and Settlement under Section 12A of the Code
Lecture 34 - Insolvency Professional Agencies
Lecture 35 - Insolvency Professionals
Lecture 36 - Information Utilities under IBC
Lecture 37 - Insolvency and Bankruptcy Board of India (IBBI)
Lecture 38 - Fast Track Resolution Process
Lecture 39 - Pre-Packaged Insolvency Resolution Process under IBC - Part 1
Lecture 40 - Pre-Packaged Insolvency Resolution Process under IBC - Part 2
Lecture 41 - Introduction and Need for Liquidation
Lecture 42 - Legal provisions for Liquidation - Part 1
Lecture 43 - Legal provisions for Liquidation - Part 2
Lecture 44 - Legal provisions for Liquidation - Part 3
Lecture 45 - Preferential Transactions
Lecture 46 - Under Valued Transactions
Lecture 47 - Transactions defrauding creditors
Lecture 48 - Overview of the Procedure for Liquidation
Lecture 49 - IBBI Regulations for Liquidation Process - Part 1
Lecture 50 - IBBI Regulations for Liquidation Process - Part 2
Lecture 51 - IBBI Regulations for Liquidation Process - Part 3
Lecture 52 - IBBI Regulations for Liquidation Process - Part 4
Lecture 53 - IBBI Regulations for Liquidation Process - Part 5
Lecture 54 - IBBI Regulations for Liquidation Process - Part 6
Lecture 55 - IBBI Regulations - Model Timeline for Liquidation Process
Lecture 56 - Case Studies on Liquidation Process - Part 1 of 1
Lecture 57 - Case Studies on Liquidation Process - Part 1 of 2
Lecture 58 - Case Studies on Liquidation Process - Part 1 of 3
Lecture 59 - Case Study on Successful Liquidation - Part 2 of 3
Lecture 60 - Case Study on Successful Liquidation - Part 3 of 3

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NPTEL Video Course - Law - NOC:International Investment Law and the Environment

Subject Co-ordinator - Prof. Eluckiaa A

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is International Investment Law ?
Lecture 2 - Foreign Investment and the Environment: Conflict or Coexistence? - Segment 1
Lecture 3 - Foreign Investment and the Environment: Conflict or Coexistence? - Segment 2
Lecture 4 - Foreign Investment and the Environment: Conflict or Coexistence? - Segment 3
Lecture 5 - Regulatory Chillâ and â Race to the Bottom - Segment 1
Lecture 6 - Regulatory Chillâ and â Race to the Bottom - Segment 2
Lecture 7 - Regulatory Chillâ and â Race to the Bottom - Segment 3
Lecture 8 - Foreign Investment: Historical context - Segment 1
Lecture 9 - Foreign Investment: Historical context - Segment 2
Lecture 10 - Protecting Foreign Investment: European Context
Lecture 11 - Protecting Foreign Investment: Beyond Europe - Segment 1
Lecture 12 - Protecting Foreign Investment: Beyond Europe - Segment 2
Lecture 13 - Protecting Foreign Investment: Some Instances - Segment 1
Lecture 14 - Protecting Foreign Investment: Some Instances - Segment 2
Lecture 15 - Protecting Foreign Investment: Some Instances - Segment 3
Lecture 16 - Protecting Foreign Investment: Some Instances - Segment 4
Lecture 17 - Protecting Foreign Investment through Diplomatic Protection and International Minimum Standard c
Lecture 18 - Challenges to Protection of Foreign Investment - Segment 1
Lecture 19 - Challenges to Protection of Foreign Investment - Segment 2
Lecture 20 - Challenges to Protection of Foreign Investment - Segment 3
Lecture 21 - Challenges to Protection of Foreign Investment - Segment 4
Lecture 22 - Challenges to Protection of Foreign Investment - Segment 5
Lecture 23 - Response of Capital-Importing Countries to Developing Investment Protection Standards - Segment
Lecture 24 - Response of Capital-Importing Countries to Developing Investment Protection Standards - Segment
Lecture 25 - Response of Capital-Importing Countries to Developing Investment Protection Standards - Segment
Lecture 26 - Response of Capital-Importing Countries to Developing Investment Protection Standards - Segment
Lecture 27 - Competing Interests: Capital-Importing vs. Capital-Exporting Countries in International Conferen
Lecture 28 - Competing Interests: Capital-Importing vs. Capital-Exporting Countries in International Conferen
Lecture 29 - Competing Interests: Capital-Importing vs. Capital-Exporting Countries in International Conferen

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Lecture 30 - Move Towards Regulating Foreign Investment - Segment 1
Lecture 31 - Move Towards Regulating Foreign Investment - Segment 2
Lecture 32 - Move Towards Regulating Foreign Investment - Segment 3
Lecture 33 - Move Towards Regulating Foreign Investment - Segment 4
Lecture 34 - Practice of Signing Bilateral Investment Treaties (BIT)
Lecture 35 - Investment Protection Standards - Part 1
Lecture 36 - Investment Protection Standards - Part 2
Lecture 37 - Investment Protection Standards - Part 3
Lecture 38 - Non-Discriminatory Provisions in BITs
Lecture 39 - Other Protection Standards in BITs
Lecture 40 - Investor-State Dispute Settlement (ISDS)
Lecture 41 - Should Host State Regulate Foreign Investment
Lecture 42 - Right to Regulate and International Investment Agreements - Part 1
Lecture 43 - Right to Regulate and International Investment Agreements - Part 2
Lecture 44 - Right to Regulate and International Investment Agreements - Part 3
Lecture 45 - Interpreting the Right to Regulate in IIAs
Lecture 46 - Sole Effects Doctrine - Part 1
Lecture 47 - Sole Effects Doctrine - Part 2
Lecture 48 - Sole Effects Doctrine - Part 3
Lecture 49 - Police Power Doctrine Approach of Arbitral Tribunals in Investment Arbitration while Reviewing R
Lecture 50 - Police Power Doctrine Approach of Arbitral Tribunals in Investment Arbitration while Reviewing R
Lecture 51 - Police Power Doctrine Approach of Arbitral Tribunals in Investment Arbitration while Reviewing R
Lecture 52 - Police Power Doctrine Approach of Arbitral Tribunals in Investment Arbitration while Reviewing R
Lecture 53 - Weighing and Balancing Approach for Reviewing Regulatory Measures - Part 1
Lecture 54 - Weighing and Balancing Approach for Reviewing Regulatory Measures - Part 2
Lecture 55 - Weighing and Balancing Approach for Reviewing Regulatory Measures - Part 3
Lecture 56 - Weighing and Balancing Approach for Reviewing Regulatory Measures - Part 4
Lecture 57 - Metalclad vs. Mexico - Segment 1
Lecture 58 - Metalclad vs. Mexico - Segment 2
Lecture 59 - SD Myers vs. Canada - Segment 1
Lecture 60 - SD Myers vs. Canada - Segment 2
Lecture 61 - SD Myers vs. Canada - Segment 3
Lecture 62 - SD Myers vs. Canada - Segment 4
Lecture 63 - SD Myers vs. Canada - Segment 5
Lecture 64 - Methanex vs. United States - Segment 1
Lecture 65 - Methanex vs. United States - Segment 2
Lecture 66 - Methanex vs. United States - Segment 3
Lecture 67 - Methanex vs. United States - Segment 4
Lecture 68 - Methanex vs. United States - Segment 5

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Lecture 69 - Methanex vs. United States - Segment 6
Lecture 70 - Standard of Review in ISDS involving Environmental Concerns
Lecture 71 - Margin of Appreciation
Lecture 72 - Doctrine of Proportionality
Lecture 73 - Principle of Good Faith
Lecture 74 - Fair and Equitable Treatment Clause and Standard of Review
Lecture 75 - Transparency in ISDS relating to Environmental Concerns
Lecture 76 - What is Mediation ?
Lecture 77 - Chemtura Corporation vs. Canada - Segment 1
Lecture 78 - Chemtura Corporation vs. Canada - Segment 2
Lecture 79 - Chemtura Corporation vs. Canada - Segment 3
Lecture 80 - Glamis Gold Ltd vs. United States of America - Segment 1
Lecture 81 - Glamis Gold Ltd vs. United States of America - Segment 2
Lecture 82 - Glamis Gold Ltd vs. United States of America - Segment 3
Lecture 83 - Glamis Gold Ltd vs. United States of America - Segment 4
Lecture 84 - Glamis Gold Ltd vs. United States of America - Segment 5
Lecture 85 - Glamis Gold Ltd vs. United States of America - Segment 6
Lecture 86 - Quiborax vs. Bolivia (2015) - Segment 1
Lecture 87 - Quiborax vs. Bolivia (2015) - Segment 2
Lecture 88 - Quiborax vs. Bolivia (2015) - Segment 3
Lecture 89 - Quiborax vs. Bolivia (2015) - Segment 4
Lecture 90 - Quiborax vs. Bolivia (2015) - Segment 5
Lecture 91 - Marion and Reinhard Unglaube vs. Costa Rica - Segment 1
Lecture 92 - Marion and Reinhard Unglaube vs. Costa Rica - Segment 2
Lecture 93 - Marion and Reinhard Unglaube vs. Costa Rica - Segment 3
Lecture 94 - Marion and Reinhard Unglaube vs. Costa Rica - Segment 4
Lecture 95 - Marion and Reinhard Unglaube vs. Costa Rica - Segment 5
Lecture 96 - Gold Reserve vs. Venezuela - Segment 1
Lecture 97 - Gold Reserve vs. Venezuela - Segment 2
Lecture 98 - Gold Reserve vs. Venezuela - Segment 3
Lecture 99 - Gold Reserve vs. Venezuela - Segment 4
Lecture 100 - Allard vs. Barbados - Segment 1
Lecture 101 - Allard vs. Barbados - Segment 2
Lecture 102 - Allard vs. Barbados - Segment 3
Lecture 103 - Crystallex vs. Venezuela - Segment 1
Lecture 104 - Crystallex vs. Venezuela - Segment 2
Lecture 105 - Crystallex vs. Venezuela - Segment 3
Lecture 106 - Copper Mesa vs. Ecuador (2012) - Segment 1
Lecture 107 - Copper Mesa vs. Ecuador (2012) - Segment 2

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Lecture 108 - Aven vs. Costa Rica (2015) - Segment 1
Lecture 109 - Aven vs. Costa Rica (2015) - Segment 2
Lecture 110 - Aven vs. Costa Rica (2015) - Segment 3
Lecture 111 - Provisions in IIA Relating to the Environment - Segment 1
Lecture 112 - Provisions in IIA Relating to the Environment - Segment 2
Lecture 113 - General Exceptions for Environment in IIA - Segment 1
Lecture 114 - General Exceptions for Environment in IIA - Segment 2
Lecture 115 - General Exceptions for Environment in IIA - Segment 3
Lecture 116 - General Exceptions for Environment in IIA - Segment 4
Lecture 117 - Particular Exceptions for the Environment and Other Provisions - Segment 1
Lecture 118 - Particular Exceptions for the Environment and Other Provisions - Segment 2
Lecture 119 - Particular Exceptions for the Environment and Other Provisions - Segment 3
Lecture 120 - Particular Exceptions for the Environment and Other Provisions - Segment 4
Lecture 121 - Particular Exceptions for the Environment and Other Provisions - Segment 5
Lecture 122 - Applicable Law in Environmental Issues - Segment 1
Lecture 123 - Applicable Law in Environmental Issues - Segment 2
Lecture 124 - Applicable Law in Environmental Issues - Segment 3
Lecture 125 - Systemic Interpretation - Segment 1
Lecture 126 - Systemic Interpretation - Segment 2
Lecture 127 - Systemic Interpretation - Segment 3
Lecture 128 - IIL Self-Contained Regime - Segment 1
Lecture 129 - IIL Self-Contained Regime - Segment 2
Lecture 130 - Plea of Necessity - Segment 1
Lecture 131 - Plea of Necessity - Segment 2
Lecture 132 - Plea of Necessity - Segment 3
Lecture 133 - Investment Disputes - Segment 1
Lecture 134 - Investment Disputes - Segment 2
Lecture 135 - Investment Disputes - Segment 3
Lecture 136 - Investment Disputes - Segment 4
Lecture 137 - Investment Disputes - Segment 5
Lecture 138 - Investment Disputes - Segment 6
Lecture 139 - Standard of Review in ISDS Involving Environmental Concerns
Lecture 140 - Margin of Appreciation
Lecture 141 - Doctrine of Proportionality - Segment 1
Lecture 142 - Doctrine of Proportionality - Segment 2
Lecture 143 - Doctrine of Proportionality - Segment 3
Lecture 144 - Doctrine of Proportionality - Segment 4
Lecture 145 - Principle of Good Faith - Segment 1
Lecture 146 - Principle of Good Faith - Segment 2

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Lecture 147 - FET Clause and Standard of Review - Segment 1
Lecture 148 - FET Clause and Standard of Review - Segment 2
Lecture 149 - FET Clause and Standard of Review - Segment 3
Lecture 150 - FET Clause and Standard of Review - Segment 4
Lecture 151 - FET Clause and Standard of Review - Segment 5
Lecture 152 - FET Clause and Standard of Review - Segment 6
Lecture 153 - Transparency in ISDS Relating to Environmental Concerns
Lecture 154 - Amicus Curiae Submission - Segment 1
Lecture 155 - Amicus Curiae Submission - Segment 2
Lecture 156 - Amicus Curiae Submission - Segment 3
Lecture 157 - Amicus Curiae Submission - Segment 4
Lecture 158 - Amicus Curiae Submission - Segment 5
Lecture 159 - Amicus Curiae Submission - Segment 6
Lecture 160 - What is Mediation
Lecture 161 - Mediation as a Dispute Resolution Method in ISDS - Segment 1
Lecture 162 - Mediation as a Dispute Resolution Method in ISDS - Segment 2
Lecture 163 - Mediation as a Dispute Resolution Method in ISDS - Segment 3
Lecture 164 - Mediation as a Dispute Resolution Method in ISDS - Segment 4
Lecture 165 - Mediation as a Dispute Resolution Method in ISDS - Segment 5
Lecture 166 - Mediation in Investment Disputes Involving Environmental Concerns
Lecture 167 - Appellate Mechanism in ISDS
Lecture 168 - Multilateral Investment Court
Lecture 169 - ISDS Reforms and the Environment

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NPTEL Video Course - Law - NOC:Artificial Intelligence, Law and Justice

Subject Co-ordinator - Prof. Krishna Ravi Srinivas

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - AI
Lecture 2 - Rule of Law
Lecture 3 - Data and AI
Lecture 4 - AI, Judicial System in India - Part I
Lecture 5 - AI, Judicial System in India - Part II
Lecture 6 - Use of AI in Law in India - Part I
Lecture 7 - Use of AI in Law in India - Part II
Lecture 8 - Algorithmic, AI, Decision Making
Lecture 9 - AI and The Rule of Law - Part I
Lecture 10 - AI and The Rule of Law - Part II
Lecture 11 - AI and The Rule of Law - Part III
Lecture 12 - Algorithmic Justice - Part I
Lecture 13 - Algorithmic Justice - Part II
Lecture 14 - AI and Copyright - Part I
Lecture 15 - AI and Copyright - Part II
Lecture 16 - AI and Copyright - Part III
Lecture 17 - AI and Copyright - Part IV
Lecture 18 - AI and Patents/Patenting - Part I
Lecture 19 - AI and Patents/Patenting - Part II
Lecture 20 - AI Ethics
Lecture 21 - AI Ethics and Law and Justice
Lecture 22 - Responsible AI
Lecture 23 - Responsible AI in Law and Justice
Lecture 24 - Responsible AI in Law and Justice in Indian Context
Lecture 25 - Explainable AI
Lecture 26 - Explainable AI in Law and Justice
Lecture 27 - AI and Different Branches of Law (Labour Law)
Lecture 28 - AI and Different Branches of Law (Health Law)
Lecture 29 - AI and Competition Law

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Lecture 30 - AI and Law and Justice in select jurisdictions
Lecture 31 - AI and Law and Justice in USA
Lecture 32 - AI and Judges
Lecture 33 - AI and Human Rights
Lecture 34 - AI in Legal Education
Lecture 35 - AI and Constitution - Part I
Lecture 36 - AI and Constitution - Part II
Lecture 37 - AI, Law, Justice and Innovation
Lecture 38 - AI, Law and Justice : Beyond Technosolutionism
Lecture 39 - Law, AI, Technology and Future
Lecture 40 - AI and Law and Justice Summing up and some thoughts

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NPTEL Video Course - Law - NOC:Copyright and Related Rights Law

Subject Co-ordinator - Prof. Rohan Cherian Thomas

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Subject Matter, Incorporeal Property and Literary Work Definitions
Lecture 2 - Idea-Expression and Meaning of â Literaryâ in Literary Work
Lecture 3 - Quantum of Literary Work
Lecture 4 - Computer Software
Lecture 5 - Database
Lecture 6 - Statutory Definitions of Artistic Work
Lecture 7 - Meaning of â Artisticâ in Artistic Work
Lecture 8 - Photography and Tattoos
Lecture 9 - Difference between Artistic Works and Industrial Designs
Lecture 10 - Architectural Works
Lecture 11 - Statutory Definitions of Musical Work
Lecture 12 - Meaning of â Musicâ - Part 1
Lecture 13 - Meaning of â Musicâ - Part 2
Lecture 14 - Is Music Finite ?
Lecture 15 - Music v Sound Recording
Lecture 16 - Statutory Definitions of Dramatic Work
Lecture 17 - Literary Work v Dramatic Work - Part 1
Lecture 18 - Literary Work v Dramatic Work - Part 2
Lecture 19 - Dramatic Work v Cinematograph Film
Lecture 20 - TV show format as Dramatic Works
Lecture 21 - Two Dimensions of Originality
Lecture 22 - Threshold of Creativity ?
Lecture 23 - Existence of Works
Lecture 24 - Construction of Originality by Courts - Part 1
Lecture 25 - Construction of Originality by Courts - Part 2
Lecture 26 - Unoriginal Works
Lecture 27 - Justification for Producer Authorship
Lecture 28 - Composite Works and Ownership Issues
Lecture 29 - Copyright Society - Part 1

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Lecture 30 - Copyright Society - Part 2
Lecture 31 - Statutory Definitions of Performance
Lecture 32 - Work v Performance
Lecture 33 - Performerâ s Economic Rights
Lecture 34 - Performerâ s Moral Rights
Lecture 35 - Performers Rights and Personality Rights
Lecture 36 - Statutory Definitions of Broadcasting
Lecture 37 - Broadcast Reproduction Right
Lecture 38 - Resale Royalty Right
Lecture 39 - Right to Receive Royalty - 1
Lecture 40 - Right to Receive Royalty - 2
Lecture 41 - Registration, Publication and Part I of Term
Lecture 42 - Term Part - II
Lecture 43 - Public Domain and Relinquishment
Lecture 44 - Reproduction, Issuance of Copies and Parallel Imports
Lecture 45 - Adaptation
Lecture 46 - Translation
Lecture 47 - Communication and Performance of Work to the Public
Lecture 48 - Rental Rights, TPM and RMI
Lecture 49 - Author's Special Rights - 1
Lecture 50 - Author's Special Rights - 2
Lecture 51 - Fair Use
Lecture 52 - Fair Dealing and Permitted Acts
Lecture 53 - Compulsory Licensing
Lecture 54 - Statutory Licensing
Lecture 55 - Infringement - Part I
Lecture 56 - Infringement - Part II
Lecture 57 - Infringement - Part III
Lecture 58 - Infringement - Part IV
Lecture 59 - Subconscious Copying and - Part I of Problem Solving
Lecture 60 - Problem Solving - Part II

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NPTEL Video Course - Law - NOC:Basic Course on Indian Constitution in Telugu

Subject Co-ordinator - Prof. Srikrishna Deva Rao, Prof. Vasanthi Nimushakavi

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why do we need a constitution? - à°-à°¾à°°à°¤à°¾à°¾ à±•à°¯à°¾ à° à° - à°¦à°¾à°¨à°¿ à°ªà±•à°°
Lecture 2 - When did the Constitution Originate? - à°-à°¾à°°à°¤ à°°à°¾ à±•à°¯à°¾ à° à°®à±• à°ªà±•à° à±•à°
Lecture 3 - Significance of the Preamble - à°-à°¾à°°à°¤ à°°à°¾ à±•à°¯à°¾ à° à°ªà±•à°°à°¸à±•à°¤à°¾à°µà°¨
Lecture 4 - Contemporary Debates - à°°à°¾ à±•à°¯à°¾ à° à°¨à°¿à°°à±•à£à°¯ à°¸à°- à°²à±• à° à°°à±•à° à°²à
Lecture 5 - Human Rights - à°®à°¾à°¨à°µ à°¹à° à±•à° à±•à°²à±•
Lecture 6 - Socio-Economic and Cultural Rights - à° à°°à±•à°¥à°¿à° à°¸à°¾à°®à°¾à° à°¿à° à°¸à°¾à° à°¸à±•à° à
Lecture 7 - Basic Structure - à°-à°¾à°°à°¤ à°°à°¾à° à±•à°¯à°¾ à° à° - à°®à±• à°²à°¿à° à°¸à±•à°µà°°à±• à°ªà°
Lecture 8 - Right to Equality - à°¸à°®à°¾à°¨à±•à°µà°ªà±• à°¹à° à±•à° à±•
Lecture 9 - Right to Life - à° à±• à°µà°¿à° à° à±• à°¹à° à±•à° à±•
Lecture 10 - Right to Safe Environment - à°ªà°°à±•à°¯à°¾à°µà°°à°£ à°¹à° à±•à° à±•à°²à±•
Lecture 11 - Right to Education - à°µà°¿à°¦à±•à°¯ à°¹à° à±•à° à±•
Lecture 12 - Right to Information - à°¸à°®à°¾à° à°¾à°° à°¹à° à±•à° à±•
Lecture 13 - Directive Principles - à° à°¦à±• à°¶ à°¸à± à°¤à±•à°°à°¾à°²à±•
Lecture 14 - Secularism - à°²à±• à° à°¿à° à°µà°¾à°¦à°®à±•
Lecture 15 - Federal Characteristics - à°¸à°®à°¾à° à±•à°¯ à°µà°¿à°§à°¾à°¨à°®à±•
Lecture 16 - Distribution of Legislative Powers - à°¶à°¾à°¸ à° à°§à°¿à° à°¾à°°à°¾à°² à°µà°¿à°-à° à°¨
Lecture 17 - Fiscal Federalism - à° à°°à±•à°¥à°¿à° à°¸à°®à°¾à±•à° à°®à°°à°¿à±•à° à°¸à± à°µà°² à°ªà°¨à±•à°¨à±•
Lecture 19 - Decentralization and Role of Panchayats - à°µà°¿à° à±• à° à°¦à±•à°°à±• à° à°°à°£ -à°ªà° à° à°¾à°¯à
Lecture 20 - Emergency Powers - à° à°¤à±•à°¯à°¸ à° à°§à°¿à° à°¾à°°à°¾à°²à±•
Lecture 21 - Vth and VI Schedule Areas - à°·à±• à°¡à±•à°¯à± à°²à±• -5 à°·à±• à°¡à±•à°¯à± à°²à±• -6 à°ªà±•à°°à°¾
Lecture 22 - Election Commission - à° à°¨à±•à°¨à°¿à° à°² à° à°®à±• à°·à°¨à±•
Lecture 23 - Constitutional Amendments - à°°à°¾à° à±•à°¯à°¾ à° à°¸à°µà°°à°£
Lecture 24 - Land Rights - à°-à±• à°®à°¿ à°¸à° à°¬à° à°§ à°¹à° à±•à° à±• à°²à±•
Lecture 25 - Disability Rights - à°µà°¿à° à°¾à°²à°¾à° à° à±•à°² à°¹à° à±•à° à±•à°²à±•
Lecture 26 - Judicial Appointments - à°¨à±•à°¯à°¾à°®à±• à°°à±•à°¤à±•à°² à°¨à°¿à°¯à°¾à°®à° à°¾à°²à±•
Lecture 27 - Combating Gender Stereotypes - à°²à°¿à° à° à°µà°¿à°µà° à±•à°·à°¨à±• à° à°¦à±•à°°à±•à° à±• à°¨à±•
Lecture 28 - Role of Governor - à° à°µà°°à±•à°¨à°°à±• à°ªà°¾à°¤à±•à°°
Lecture 29 - Telangana High Courtâ s Decision on the Eunuchâ s Act - à°¹à°¿à° à±•à°°à°¾ à° à° à±•à° à° à°ª

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Lecture 30 - Defection Law - à°ªà°¾à°°à±•à° à± à°«à°¿à°°à°¾à°¯à°¿ à°ªà±• à°¨à°¿à°°à±à à°§ à° à° à±•à° à°
Lecture 31 - Right to Bail - à°¬à± à°¯à°¿à°²à±• à°ªà± à° à°¦à± à°¹à° à±•à° à±•

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NPTEL Video Course - Law - NOC:Internet Crimes and Cyber Security

Subject Co-ordinator - Prof. K.V.K. Santhy, Prof. B Md Irfan

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Internet and Crimes
Lecture 2 - Introduction to Internet and (Cyber) Crimes - Part A
Lecture 3 - Introduction to Internet and (Cyber) Crimes - Part B
Lecture 4 - Cyber War and Use of Internet by Terrorists - Part - I
Lecture 5 - Cyber War and Use of Internet by Terrorists - Part - II
Lecture 6 - Crimes Against Women in Internet
Lecture 7 - Deep Web and Dark Web
Lecture 8 - Internet and Child Sexual Abuse in India: Policy and Laws
Lecture 9 - Information Technology Act-An Overview - Part A
Lecture 10 - Information Technology Act-An Overview - Part B
Lecture 11 - Law of Digital Evidence and its Admissibility in Courts
Lecture 12 - Liability of Internet Service Providers and Case studies
Lecture 13 - Cyber Fraud - Part A
Lecture 14 - Cyber Fraud - Part B
Lecture 15 - Emerging Issues and Crimes in Internet and Data Protection (Privacy)
Lecture 16 - Introduction to Cyberspace and Cyber Security
Lecture 17 - Basics of Cyber Control Systems
Lecture 18 - Understanding Digital Data and Digital Footprints
Lecture 19 - Introduction to Cyber Threats and Attacks
Lecture 20 - Cyber Threats and Attacks : Technical Understandings
Lecture 21 - Introduction to tools and techniques to Counter Cyber Attacks using VAPT Services
Lecture 22 - Tools and Techniques for Vulnerability Assessment
Lecture 23 - Tools and Techniques for Penetration Testing
Lecture 24 - Understanding Social Media Crimes
Lecture 25 - SOCMINT Investigation for Social Media Crimes
Lecture 26 - Fake News Analysis : Social media Crimes
Lecture 27 - Understanding Threats from Deep web - Part 1
Lecture 28 - Understanding Threats from Dark web - Part 2
Lecture 29 - Basics of Cyber Forensics

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Lecture 30 - Introduction to Cyber Threat Intelligence
Lecture 31 - Modus operandi of criminal, Investigation Process, Forensics - Part 1
Lecture 32 - Modus operandi of criminal, Investigation Process, Forensics - Part 2
Lecture 33 - Difficulties in Cyber Crimes Investigation
Lecture 34 - Probative value of Digital Evidence - Part 1
Lecture 35 - Probative value of Digital Evidence - Part 2
Lecture 36 - Live Forensics Using Encase FTK
Lecture 37 - Digital Artifact Sources and Investigation
Lecture 38 - Understanding Extracted Logs, Reports of Digital Artifacts
Lecture 39 - Introduction to Cyber Crimes
Lecture 40 - Digital Evidence Preservation and Chain of Custody
Lecture 41 - Challenges to Cybercrime Investigation

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NPTEL Video Course - Law - NOC:Energy Law

Subject Co-ordinator - Prof. Rosmy Joan

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy and the Law
Lecture 2 - Evolution of Energy Law
Lecture 3 - Theoretical Perspectives on Energy Law
Lecture 4 - Sources of Energy Law
Lecture 5 - Overview of Energy Laws and Regulations in India
Lecture 6 - The Notion of Permanent Sovereignty Over Natural Resources
Lecture 7 - Effects of PSNR
Lecture 8 - Self Determination Over Natural Resources: Peopleâ s Rights
Lecture 9 - PSNR in International Trade and International Water Jurisprudence
Lecture 10 - Other Principles of Energy Law
Lecture 11 - The Link Between Energy, Development and Economic Transformation
Lecture 12 - Role of Energy in Economic Development and Social Transformation - Economic Dimensions
Lecture 13 - Role of Energy in Economic Development and Social Transformation - Social Transformation Dimensi
Lecture 14 - Role of Energy in Economic Development and Social Transformation - Cross-Cutting and Global Dime
Lecture 15 - Role of Energy in Economic Development and Social Transformation - Case Studies
Lecture 16 - WTO and Energy
Lecture 17 - Regional Integration and the Energy Sector
Lecture 18 - Energy in WTO Dispute Settlement
Lecture 19 - New Frontiers in Trade and Energy Governance
Lecture 20 - Foreign Direct Investment in the Energy Sector
Lecture 21 - Development of Energy Charter Treaty
Lecture 22 - Admissibility and Jurisdiction
Lecture 23 - The ECTâ s Substantive Protections
Lecture 24 - Selected ECT Arbitral Awards
Lecture 25 - State Withdrawals from ECT: Statesâ Ability to Regulate in the Public Interest
Lecture 26 - Why Competition Matters in Energy Markets?
Lecture 27 - Energy Market Structure in India
Lecture 28 - Key Competition Issues
Lecture 29 - Role of CCI in the Energy Sector

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Lecture 30 - Selected Case Studies
Lecture 31 - Intellectual Property in the Global Energy Landscape
Lecture 32 - Patents, Innovation, and the Clean Energy Technology Landscape
Lecture 33 - Technology Transfer, Licensing, and Collaborative Innovation
Lecture 34 - Competition, IP Management, and Policy Tools
Lecture 35 - Emerging Issues and Future Directions in Energy-IP Governance
Lecture 36 - Global Frameworks for Sustainable Energy Governance
Lecture 37 - Human Rights Dimensions of the Energy Sector
Lecture 38 - The Impact of Energy Sources on Human Rights and the Environment
Lecture 39 - Corporate Responsibility: CSR, ESG, and Emerging Regulation
Lecture 40 - Integrative Approaches: Governance Tools, Just Transition, Accountability
Lecture 41 - Foundations of Energy Security
Lecture 42 - Geopolitics of Energy
Lecture 43 - Markets, Economics, and Regulation
Lecture 44 - Energy Transition, Technology, and Security
Lecture 45 - Energy Security in a Changing World
Lecture 46 - Foundations of Nuclear Energy
Lecture 47 - Regulatory Governance, Nuclear Safety and Security
Lecture 48 - Liability, Insurance and Nuclear Energy Mission 2025
Lecture 49 - International Law, Trade and Technology Transfer
Lecture 50 - Emerging Issues and Future Directions in Energy-IP Governance
Lecture 51 - Solar Energy
Lecture 52 - Wind Energy
Lecture 53 - Solar - Wind Hybrid Systems
Lecture 54 - Hydro Power
Lecture 55 - Case Studies
Lecture 56 - Biofuels in India
Lecture 57 - Waste to Energy Initiatives
Lecture 58 - Green Hydrogen
Lecture 59 - Green Buildings
Lecture 60 - Case Studies

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NPTEL Video Course - Law - NOC:Legal Essentials for Human Resource Management

Subject Co-ordinator - Prof. Ameesh Samalopanan

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Indian Constitution and Labour Laws
Lecture 3 - Historical Evolution of Labour Laws
Lecture 4 - Definition of Industry and Employer
Lecture 5 - Definition of Worker, Employee and Employer
Lecture 6 - What is Work, Employment and Wage ?
Lecture 7 - Drafting Employment Contracts
Lecture 8 - Understanding Employment Contracts in Detail
Lecture 9 - Laws Relating to Standing Orders - Part I
Lecture 10 - Laws Relating to Standing Orders - Part II
Lecture 11 - Definition of Wages
Lecture 12 - Payment of Wages Act, 1936
Lecture 13 - Payment of Bonus Act, 1965
Lecture 14 - Contract Labour
Lecture 15 - Duties and Obligations under Contract Labour Act
Lecture 16 - Social Security
Lecture 17 - Social Security Laws in the Country
Lecture 18 - Payment of Gratuity Act, 1972
Lecture 19 - Provident Fund Act, 1952 - Part I
Lecture 20 - Provident Fund Act, 1952 - Part II
Lecture 21 - The Employee Compensation Act
Lecture 22 - The Employee Compensation Act (Continued...)
Lecture 23 - Employeesâ State Insurance (ESI) Act - benefits and compliance
Lecture 24 - Maternity Benefit Act, 1961
Lecture 25 - Prevention of sexual harassment at workplace (prevention, prohibition and redressal) act, 2013 -
Lecture 26 - Prevention of sexual harassment at workplace (prevention, prohibition and redressal) act, 2013 -
Lecture 27 - Gig Workers and Platform Workers
Lecture 28 - Remote Working and Moonlighting
Lecture 29 - Definition of Industrial Disputes

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Lecture 30 - Industrial Dispute Resolution Mechanisms
Lecture 31 - Tribunals and Changes brought in IR Code
Lecture 32 - Notice Before Changing Service Conditions
Lecture 33 - Right to Strike and Lockouts
Lecture 34 - Introduction to Trade Unions
Lecture 35 - Obligation of Trade Unions
Lecture 36 - Employee Misconduct - types and consequences
Lecture 37 - Drafting a charge sheet
Lecture 38 - Domestic Enquiries in India - I
Lecture 39 - Domestic Enquiries in India - II
Lecture 40 - Termination of Employment and Full and Final Settlement

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NPTEL Video Course - Law - NOC:Trademark Law

Subject Co-ordinator - Prof. Sourabh Bharti

Co-ordinating Institute - NALSAR University of Law

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Law of Trade Marks : Theoretical Justifications of Trade Mark Law - Part 1
Lecture 2 - Law of Trade Marks : Theoretical Justifications of Trade Mark Law - Part 2
Lecture 3 - What is a Trade Mark ? - Part 1
Lecture 4 - What is a Trade Mark ? - Part 2
Lecture 5 - Registration - Absolute Grounds for the Refusal of Registration - Part 1
Lecture 6 - Registration - Absolute Grounds for the Refusal of Registration - Part 2
Lecture 7 - Registration - Absolute Grounds for the Refusal of Registration - Part 3
Lecture 8 - Registration - Relative Grounds - Part 1
Lecture 9 - Registration - Relative Grounds - Part 2
Lecture 10 - Registration - Honest and Concurrent Use
Lecture 11 - Registration Process
Lecture 12 - Registration (Effects of Registration and Infringement)
Lecture 13 - Dilution
Lecture 14 - Prohibited Use and Actionable Confusion - Part 1
Lecture 15 - Prohibited Use and Actionable Confusion - Part 2
Lecture 16 - Comparative Advertisement
Lecture 17 - Limitations on TM Rights
Lecture 18 - Power to Assingn and Obligation to Use
Lecture 19 - Law of Passing Off - Part 1
Lecture 20 - Law of Passing Off - Part 2
Lecture 21 - Law of Passing Off - Part 3
Lecture 22 - Trademarks and Domain Names

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NPTEL Video Course - Management - Managerial Accounting

Subject Co-ordinator - Dr. Varadraj Bapat

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Management Accounting
Lecture 2 - Double Entry System, Forms of Organisation
Lecture 3 - Financial Statements
Lecture 4 - Balance Sheet
Lecture 5 - Profit and Loss Account
Lecture 6 - Company Account
Lecture 7 - Accounting Concepts, Standards, IFRS
Lecture 8 - Depreciation, Inventory, Goodwill
Lecture 9 - Inventory Valuation, Cash Flow
Lecture 10 - Cash Flow Statement Cases
Lecture 11 - Cash Flow Statement Cases
Lecture 12 - Cash Flow Statement Cases-Part II
Lecture 13 - Fund Flow Statement Cases
Lecture 14 - Common-size, Comparative Statement Analysis
Lecture 15 - Ratio Analysis
Lecture 16 - Financial Statements Analysis
Lecture 17 - Comparative, Common-size and Ratio Analysis
Lecture 18 - Financial Statements Analysis - Colgate Palmolive Case
Lecture 19 - Financial Statements Analysis - Dabur India Case
Lecture 20 - Types of Costs
Lecture 21 - Accounting for Costs
Lecture 22 - Cost Allocation, Absorption
Lecture 23 - Job and Process Accounting
Lecture 24 - Job and Process Accounting including cost sheet and equivalent production
Lecture 25 - Equivalent production and Activity Based Costing
Lecture 26 - Activity Based Costing and Management
Lecture 27 - Cost Volume Profit Analysis
Lecture 28 - Relevant and Sunk Cost in Decision Making
Lecture 29 - New Product, Shut Down and Joint Products

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Lecture 30 - Budget and Budgetory control
Lecture 31 - Budgeting and Standard Costing
Lecture 32 - Standard Costing - Material, Labour and Overhead Variances
Lecture 33 - Standard Costing - Mix, Yeild, Sales and Fixed Overhead Variances
Lecture 34 - Standard Costing - Mix, Yeild and Fixed Overhead Variances
Lecture 35 - Cost Volume Profit and Break-Even Point Analysis
Lecture 36 - Cost Volume Profit Analysis - Cost Indifference Point and Levearge
Lecture 37 - Cash Flow Advanced Cases
Lecture 38 - Cash Flow Advanced Cases-Part II
Lecture 39 - Financial Statements Analysis Advanced
Lecture 40 - Financial Statement- Forcasting and Valuation - Dabur Case
Lecture 41 - Financial Statement- Forcasting and use of Adjusted data - Pfizer and Merck Case

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NPTEL Video Course - Management - Managerial Economics

Subject Co-ordinator - Dr. Trupti Mishra

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Managerial Economics
Lecture 2 - Introduction to Managerial Economics (Continued...)
Lecture 3 - Introduction to Managerial Economics (Continued...)
Lecture 4 - Basic Tools of Economic Analysis and Optimization Techniques
Lecture 5 - Basic Tools of Economic Analysis and Optimization Techniques (Continued...)
Lecture 6 - Basic Tools of Economic Analysis and Optimization Techniques (Continued...)
Lecture 7 - Basic Tools of Economic Analysis and Optimization Techniques (Continued...)
Lecture 8 - Theory of Demand
Lecture 9 - Theory of Demand (Continued...)
Lecture 10 - Theory of Demand (Continued...)
Lecture 11 - Theory of Demand (Continued...)
Lecture 12 - Consumer Behaviour
Lecture 13 - Consumer Behaviour (Continued...)
Lecture 14 - Elasticity of Supply
Lecture 15 - Demand Forecasting
Lecture 16 - Demand Forecasting (Continued...)
Lecture 17 - Theory of Production
Lecture 18 - Theory of Production (Continued...)
Lecture 19 - Theory of Production (Continued...)
Lecture 20 - Theory of Cost
Lecture 21 - Theory of Cost (Continued...)
Lecture 22 - Theory of Cost (Continued...)
Lecture 23 - Theory of Cost (Continued...)
Lecture 24 - Theory of Market
Lecture 25 - Perfect Competition
Lecture 26 - Perfect Competition (Continued...)
Lecture 27 - Monopoly
Lecture 28 - Monopoly (Continued...)
Lecture 29 - Monopoly (Continued...)

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Lecture 30 - Monopolistic
Lecture 31 - Oligopoly
Lecture 32 - Oligopoly (Continued...)
Lecture 33 - Oligopoly (Continued...)
Lecture 34 - Oligopoly (Continued...)
Lecture 35 - Oligopoly and Game Theory
Lecture 36 - Oligopoly and Game Theory (Continued...)
Lecture 37 - Game Theory / Product Pricing
Lecture 38 - Product Pricing
Lecture 39 - Product Pricing (Continued...)
Lecture 40 - Summary

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NPTEL Video Course - Management - NOC:Financial Accounting

Subject Co-ordinator - Dr. Varadraj Bapat

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Scope of Accounting
Lecture 2 - Financial Statements
Lecture 3 - Balance Sheet - 1
Lecture 4 - Balance Sheet - 2
Lecture 5 - Balance Sheet - 3
Lecture 6 - Balance Sheet - 4
Lecture 7 - Balance Sheet - 5
Lecture 8 - Profit and Loss Account - 1
Lecture 9 - Profit and Loss Account - 2
Lecture 10 - Profit and Loss Account - 3
Lecture 11 - Depreciation - 1
Lecture 12 - Depreciation - 2
Lecture 13 - Inventory Valuation
Lecture 14 - Cash Flow Statement - 1
Lecture 15 - Cash Flow Statement - 2
Lecture 16 - Cash Flow Statement - 3
Lecture 17 - Cash Flow Statement - 4
Lecture 18 - Cash Flow Statement - 5
Lecture 19 - Corporate Governance
Lecture 20 - Corporate Governance
Lecture 21 - Corporate Governance
Lecture 22 - Accounting Standards and Principles
Lecture 23 - Evolution of Accounting
Lecture 24 - Recording of Financial Transactions
Lecture 25 - Zee Case
Lecture 26 - Zee Case
Lecture 27 - Hindalco Case
Lecture 28 - Hindalco Case
Lecture 29 - Interpretation and Analysis of Financial Statements

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Lecture 30 - Ratio Analysis and Interpretation - 1
Lecture 31 - Ratio Analysis and Interpretation - 2
Lecture 32 - Interpretation and Analysis of Financial Statements
Lecture 33 - Interpretation and Analysis of Financial Statements
Lecture 34 - Interpretation and Analysis of Financial Statements
Lecture 35 - Interpretation and Analysis of Financial Statements
Lecture 36 - Financial Statement Analysis
Lecture 37 - Financial Statement Analysis
Lecture 38 - Financial Statement Analysis
Lecture 39 - Financial Statement Analysis
Lecture 40 - Revision of Course

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NPTEL Video Course - Management - NOC:Cost Accounting

Subject Co-ordinator - Dr. Varadraj Bapat

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cost Accounting
Lecture 2 - Classification of Costs
Lecture 3 - Marginal Costing
Lecture 4 - Cost Volume Profit Analysis
Lecture 5 - Margin of Safety
Lecture 6 - Application of Breakeven Point Analysis
Lecture 7 - Sensitivity Analysis
Lecture 8 - Case of Ayur Pharma
Lecture 9 - Different Decision Scenarios and Profit Planning
Lecture 10 - Relevant Costs in Decision Making
Lecture 11 - Case Study
Lecture 12 - Case Study
Lecture 13 - Case Study on Projection
Lecture 14 - Case Study
Lecture 15 - Budgeting and Budgetary Control
Lecture 16 - Functional Budget
Lecture 17 - Cash Budget
Lecture 18 - Standard Costing And Variance Analysis
Lecture 19 - Material Cost Variances
Lecture 20 - Overhead Variance

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NPTEL Video Course - Management - NOC:Game Theory

Subject Co-ordinator - Prof.K.S. Mallikarjuna Rao

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Combinatorial Games
Lecture 2 - Combinatorial Games
Lecture 3 - Combinatorial Games
Lecture 4 - Combinatorial Games
Lecture 5 - Combinatorial Games
Lecture 6 - Combinatorial Games
Lecture 7 - Combinatorial Games
Lecture 8 - Combinatorial Games
Lecture 9 - Combinatorial Games
Lecture 10 - Zero-Sum Games
Lecture 11 - Zero-Sum Games
Lecture 12 - Zero-Sum Games
Lecture 13 - Zero-Sum Games
Lecture 14 - Zero-Sum Games
Lecture 15 - Zero-Sum Games
Lecture 16 - Zero-Sum Games
Lecture 17 - Zero-Sum Games
Lecture 18 - Non-Zero-Sum Games
Lecture 19 - Non-Zero-Sum Games
Lecture 20 - Non-Zero-Sum Games
Lecture 21 - Iterated elimination of strictly dominated strategies
Lecture 22 - Lemke-Howson Algorithm - I
Lecture 23 - Lemke-Howson Algorithm - II
Lecture 24 - Lemke-Howson Algorithm - III
Lecture 25 - Evolutionarily Stable Strategies - I
Lecture 26 - Evolutionarily Stable Strategies - II
Lecture 27 - Evolutionarily Stable Strategies - III
Lecture 28 - Fictitious Play
Lecture 29 - Brown-Von Neumann-Nash Dynamics

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Lecture 30 - Potential Games
Lecture 31 - Cooperative Games
Lecture 32 - Cooperative Games
Lecture 33 - Cooperative Games
Lecture 34 - Cooperative Games
Lecture 35 - Cooperative Games
Lecture 36 - Cooperative Games
Lecture 37 - Cooperative Games
Lecture 38 - Cooperative Games
Lecture 39 - Cooperative Games
Lecture 40 - The Matching Problem

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NPTEL Video Course - Management - NOC:Introduction to Stochastic Processes

Subject Co-ordinator - Prof. Manjesh Hanawal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sample Space and events
Lecture 2 - Axioms of Probability
Lecture 3 - Independence of events and Conditional Probability
Lecture 4 - Bayeâ s Theorem and Introduction to Random Variables
Lecture 5 - CDF and itâ s properties
Lecture 6 - Continuity of Probability
Lecture 7 - Discrete and Continuous random variables
Lecture 8 - Expectation of random variables and its properties
Lecture 9 - Variance and some inequalities of random variables
Lecture 10 - Discrete Probability Distributions
Lecture 11 - Continuous Probability Distributions
Lecture 12 - Jointly distributed random variables and conditional distributions
Lecture 13 - Correlation and Covariance
Lecture 14 - Transformation of random vectors
Lecture 15 - Gaussian random vector and joint Gaussian distribution
Lecture 16 - Random Processes
Lecture 17 - Properties of random Process
Lecture 18 - Poisson Process
Lecture 19 - Properties of Poisson Process - Part 1
Lecture 20 - Properties of Poisson Process - Part 2
Lecture 21 - Convergence of sequence of random variables - Part 1
Lecture 22 - Convergence of sequence of random variables - Part 2
Lecture 23 - Relation between different notions of convergence
Lecture 24 - Cauchyâ s criteria of convergence
Lecture 25 - Convergence in expectation
Lecture 26 - Law of Large Numbers
Lecture 27 - Central limit theorem
Lecture 28 - Chernoff bound
Lecture 29 - Introduction to Markov property

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Lecture 30 - Transition Probability Matrix
Lecture 31 - Finite dimensional distribution of Markov chains
Lecture 32 - Strong Markov Property
Lecture 33 - Stopping Time
Lecture 34 - Hitting Times and Recurrence
Lecture 35 - Mean Number of returns to a state
Lecture 36 - Communicating classes and class properties
Lecture 37 - Class Properties (Continued...)
Lecture 38 - Positive Recurrence and The Invariant Probability Vector
Lecture 39 - Properties of Invariant Probability Vector
Lecture 40 - Condition For Transience
Lecture 41 - Example of Queue
Lecture 42 - Queue Continued and Example of Page Rank
Lecture 43 - Introduction to renewal Theory
Lecture 44 - The Elementary Renewal Theorem
Lecture 45 - Application to DTMC
Lecture 46 - Renewal Reward Theorem
Lecture 47 - Introduction to Continuous Time Markov Chains
Lecture 48 - Properties of states in CTMC
Lecture 49 - Embedded markov chain

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NPTEL Video Course - Management - NOC:Introduction to System Dynamics Modeling

Subject Co-ordinator - Prof. Jayendran Venkateswaran

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Systems Thinking
Lecture 2 - Systems Thinking and System Dynamics
Lecture 3 - Causal Loop Diagram (CLD)
Lecture 4 - Guidelines to build CLD - I
Lecture 5 - Guidelines to build CLD - II
Lecture 6 - Guidelines to build CLD - III
Lecture 7 - Examples of CLD
Lecture 8 - Study Traffic Congestion using CLD - I
Lecture 9 - Study Traffic Congestion using CLD - II
Lecture 10 - Stock and Flow Diagram Brief History
Lecture 11 - Stock and Flow Diagram
Lecture 12 - Stock and Flow Diagram
Lecture 13 - Stock and Flow Diagram
Lecture 14 - Graphical Integration
Lecture 15 - Patterns of Behaviour
Lecture 16 - Dynamics of Positive Feedback systems
Lecture 17 - Doubling Time in Positive Feedback systems
Lecture 18 - Introduction to Modeling using Vensim software
Lecture 19 - Dynamics of Negative Feedback system
Lecture 20 - Dynamics of Negative Feedback System
Lecture 21 - Negative Feedback Loop
Lecture 22 - Dynamics of Negative Feedback System
Lecture 23 - Zero-Value Goal system, Positive and Negative Loop Systems
Lecture 24 - Dynamic of Simple Structures
Lecture 25 - Dynamic of Simple Structures
Lecture 26 - Dynamic of Simple Structures
Lecture 27 - Dynamic of Simple Structures
Lecture 28 - Dynamic of Simple Structures
Lecture 29 - Dynamic of Simple Structures

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Lecture 30 - Dynamic of Simple Structures
Lecture 31 - Diffusion Model and parameter estimation - I
Lecture 32 - Diffusion Model and parameter estimation - II
Lecture 33 - Bass Diffusion Model
Lecture 34 - Bass Diffusion Model (Continued...)
Lecture 35 - Modeling Delays
Lecture 36 - Modeling Delays
Lecture 37 - Modeling Delays
Lecture 38 - Delays
Lecture 39 - Delays
Lecture 40 - Delays
Lecture 41 - Second Order Systems
Lecture 42 - Second Order Systems
Lecture 43 - Modeling Oscillations - Part I
Lecture 44 - Modeling Oscillations - Part II
Lecture 45 - Modeling Non-linear Relations
Lecture 46 - Modeling Non-linear Relations
Lecture 47 - Formulation Non Linear Relationship Table Functions - Part I
Lecture 48 - Formulation Non Linear Relationship Table Functions - Part II
Lecture 49 - Stock Management Structure - Part I
Lecture 50 - Stock Management Structure - Part II
Lecture 51 - Supply Chain Models - I
Lecture 52 - Supply Chain Models - II
Lecture 53 - Supply Chain Models - III
Lecture 54 - Supply Chain Models - IV
Lecture 55 - Modeling Example
Lecture 56 - Testing System Dynamics Models
Lecture 57 - Testing System Dynamics Models
Lecture 58 - Testing System Dynamics Models
Lecture 59 - Model Validation and Policy design
Lecture 60 - Sensitivity analysis and policy analysis
Lecture 61 - Modeling Example
Lecture 62 - System Archetypes
Lecture 63 - Course Wrap-up

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NPTEL Video Course - Computer Science and Engineering - NOC:Bandit Algorithm (Online Machine Learning)

Subject Co-ordinator - Prof. Manjesh Hanawal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Online Learning - I
Lecture 2 - Introduction to Online Learning - II
Lecture 3 - Basics of Statistical Learning
Lecture 4 - Empirical risk minimization
Lecture 5 - Consistency Halving algorithm
Lecture 6 - Online Learnability
Lecture 7 - Standard Optimal Algorithm
Lecture 8 - Classification in unrealizability case
Lecture 9 - Covers Impossibility Result
Lecture 10 - Weighted Majority
Lecture 11 - Proof Weighted Majority
Lecture 12 - Full Information vs Bandit Setting
Lecture 13 - Adversarial Bandit Setting
Lecture 14 - Exponential Weights for Exploration and Exploitation Algorithm
Lecture 15 - Regret Bound of Exp3
Lecture 16 - Regret Bound of Exp3 (Continued...)
Lecture 17 - Exp3.P and Exp3.IX
Lecture 18 - Online Convex Optimisation
Lecture 19 - Follow the Leader (FTL) Algorithm
Lecture 20 - Follow the Regularized Leader
Lecture 21 - Online Gradient Descent
Lecture 22 - Strongly Convex Function
Lecture 23 - FoReL with Strongly Convex Regulariser
Lecture 24 - FoReL with Strongly Convex Regulariser (Continued...)
Lecture 25 - Euclidean and Entropy Regularizer
Lecture 26 - Introduction to Stochastic Bandits
Lecture 27 - Concentration Inequalities
Lecture 28 - Subgaussian Random Variable
Lecture 29 - Regret Definition and Regret Decomposition

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Lecture 30 - Explore and Commit (ETC) Algorithm
Lecture 31 - Regret Analysis and ETC
Lecture 32 - Optimism in the Face of Uncertainty
Lecture 33 - Upper Confidence Bound Algorithm
Lecture 34 - Regret Analysis of UCB
Lecture 35 - Problem Dependent and Independent Bounds of UCB
Lecture 36 - KL-UCB Algorithm
Lecture 37 - Thompson Sampling - Brief Discussion
Lecture 38 - Proof Idea of Lower Bounds - 1
Lecture 39 - Proof Idea of Lower Bounds - 2
Lecture 40 - Proof of Lower Bound - 1
Lecture 41 - Proof of Lower Bound - 2
Lecture 42 - Stochastic Contextual Bandits
Lecture 43 - Introduction to Stochastic Linear Bandits
Lecture 44 - Stochastic Linear Bandits
Lecture 45 - Regret Analysis of SLB - I
Lecture 46 - Regret Analysis of SLB - II
Lecture 47 - Regret Analysis of SLB - III
Lecture 48 - Construction of Confidence Ellipsoids - I
Lecture 49 - Construction of Confidence Ellipsoids - II
Lecture 50 - Adversarial Contextual Bandits - I
Lecture 51 - Adversarial Contextual Bandits - II
Lecture 52 - Exp4 Algorithm
Lecture 53 - Regret of Exp4
Lecture 54 - Adversarial Linear Bandits
Lecture 55 - Exp3 for Adversarial Linear Bandits
Lecture 56 - Introduction to Pure Exploration and its lower bounds
Lecture 57 - Uniform Exploration
Lecture 58 - KL-LUCB
Lecture 59 - Lilâ UCB
Lecture 60 - Lower Bound for Pure Exploration Problem

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NPTEL Video Course - Management - NOC:Organization Development and Change in 21st Century

Subject Co-ordinator - Prof. Ashish Pandey

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Coping with Change and Transient Competitive Advantage
Lecture 3 - Sustainable Development, OD and Management of Change
Lecture 4 - Social Entrepreneurship
Lecture 5 - Comparison of Various Planned Change Models
Lecture 6 - Diagnostic for Organization Development and Change
Lecture 7 - Steps in Successful Organizational Change
Lecture 8 - Design of Effective Interventions and their prerequisites
Lecture 9 - Individual Level OD Interventions
Lecture 10 - Different kinds of Individual level OD Interventions
Lecture 11 - Group or Team Level OD Interventions
Lecture 12 - Design of Specific Interventions to Tackle Different Challenges of Different Teams
Lecture 13 - Organization Level OD Interventions
Lecture 14 - Discussion on various large group Interventions
Lecture 15 - Appreciative Inquiry - â Positiveâ Turn of OD
Lecture 16 - Managing OD and Change through Restructuring Organizations
Lecture 17 - Different Types of Organization Designs
Lecture 18 - New Forms of Organization Design
Lecture 19 - Change in the Organization Design
Lecture 20 - Change in Organization Culture
Lecture 21 - Can Organization Culture be Managed?
Lecture 22 - Organization Development in Digital Transformation
Lecture 23 - Mergers and Acquisitions - A Special Case of OD
Lecture 24 - Stages of Mergers and Acquisitions
Lecture 25 - Transorganizational OD Intervention
Lecture 26 - OD Interventions through Human Resource Functions
Lecture 27 - Talent Management as OD Intervention
Lecture 28 - Organization Learning - Relevance and Possibility
Lecture 29 - Learning Organization - Experimentation, Knowledge Management and Innovation

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Lecture 30 - Organizational Development - Cultural and Economic Contexts
Lecture 31 - Organization Development - Global and Trans-organizational Setting
Lecture 32 - Organizational Development in the Entrepreneurial Firms
Lecture 33 - OD Interventions in Family Owned Entrepreneurial Firms
Lecture 34 - Organizational Development in the Not for Profit Organizations (NPOs) and Social Enterprises (SE
Lecture 35 - Organizational Development in Non-Industrial Settings
Lecture 36 - Organizational Development in Educational Institutions

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NPTEL Video Course - Management - NOC:Managerial Economics

Subject Co-ordinator - Prof. Trupti Mishra

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Economics and Managerial Economics
Lecture 2 - Introduction to the Managerial Economics- Economics and Managerial economics, Review of Economic
Lecture 3 - Introduction to the Managerial Economics- Opportunity Cost, Measuring and Maximizing Profit
Lecture 4 - Introduction to the Managerial Economics- Understanding Incentive and Marginal Analysis
Lecture 5 - Introduction to the Managerial Economics- Marginal and Incremental Analysis, Model of an Economy
Lecture 6 - Basic Tools of Economic Analysis and Optimization Techniques- Functional relationship between ecc
Lecture 7 - Basic Tools of Economic Analysis and Optimization Techniques- Important Economic Function (Contir
Lecture 8 - Basic Tools of Economic Analysis and Optimization Techniques- Slope and its use in Economic Analy
Lecture 9 - Basic Tools of Economic Analysis and Optimization Techniques- Derivative of various functions
Lecture 10 - Basic Tools of Economic Analysis and Optimization Techniques- Optimization Technique
Lecture 11 - Basic Tools of Economic Analysis and Optimization Techniques- Constrained optimization
Lecture 12 - Basic Tools of Economic Analysis and Optimization Techniques- Regression Technique
Lecture 13 - Basic Tools of Economic Analysis and Optimization Techniques- Regression Technique (Continued...
Lecture 14 - Basic Tools of Economic Analysis and Optimization Techniques- Ordinary Least Square (OLS) metho
Lecture 15 - Theory of Demand- Defining Demand, Law of Demand
Lecture 16 - Theory of Demand- Demand Schedule/Demand Curve/ Demand Function, Factors affecting Demand, Marke
Lecture 17 - Theory of Demand- Change in Demand Curve, Supply/ Law of Supply, Factors affecting Supply
Lecture 18 - Theory of Demand- Change/Shift in the Supply, Market Equilibrium, Change in Equilibrium
Lecture 19 - Theory of Demand- A Shift in both Supply and Demand, Elasticity of Demand, Types of Elasticity c
Lecture 20 - Theory of Demand- Price elasticity of demand, Degree of price elasticity of demand, Elasticity a
Lecture 21 - Theory of Demand- Income Elasticity of Demand, Cross-Price Elasticity of Demand, Advertising Ela
Lecture 22 - Theory of Demand- Numerical for each Elasticity of Demand
Lecture 23 - Consumer Behaviour- Consumer Preferences, Utility Analysis (Total and Marginal Utility)
Lecture 24 - Consumer Behaviour- Numerical for Utility analysis, Law of Diminishing Marginal Utility, Indiffe
Lecture 25 - Consumer Behaviour- Budget line and Consumer equilibrium, Law of Equi-Marginal utility
Lecture 26 - Consumer Behaviour- Price, Income and Substitution Effects, Consumer Surplus
Lecture 27 - Elasticity of Supply- Numerical example to understand Consumer Surplus, Elasticity of Supply
Lecture 28 - Elasticity of Supply- Impact of Tax on Price and Quantity, Price fixed by Law
Lecture 29 - Demand Forecasting

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Lecture 30 - Methods of Demand Forecasting- Subjective methods of demand forecasting
Lecture 31 - Demand Forecasting-Quantitative method of Demand forecasting
Lecture 32 - Demand Forecasting- Quantitative method of Demand forecasting (Continued...)
Lecture 33 - Theory of Production- Introduction
Lecture 34 - Theory of Production- Law of Diminishing Return
Lecture 35 - Theory of Production- long Run Production Analysis, Return to Scale, Isoquants
Lecture 36 - Theory of Production- Isocost, Optimal Combination of Inputs, Expansion path, Economic Region of
Lecture 37 - Theory of Production- Different kind of Production Functions
Lecture 38 - Theory of Production- Effect of Changes in Input Prices, Law of Diminishing returns, Return to S
Lecture 39 - Theory of Cost- Cost of Production, Types of Cost
Lecture 40 - Theory of Cost- Cost-Output Relationship, Short run cost Analysis
Lecture 41 - Long Run Cost Analysis
Lecture 42 - Long-Run Marginal Cost Curve
Lecture 43 - Theory of Cost
Lecture 44 - Theory of Cost
Lecture 45 - Theory of Cost
Lecture 46 - Theory of Cost
Lecture 47 - Theory of Cost
Lecture 48 - Theory of Market
Lecture 49 - Theory of Market
Lecture 50 - Theory of Market
Lecture 51 - Theory of Market
Lecture 52 - Theory of Market
Lecture 53 - Theory of Market
Lecture 54 - Theory of Market
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Lecture 66 - Theory of Market
Lecture 67 - Theory of Market
Lecture 68 - Theory of Market

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Lecture 69 - Oligopoly and Game Theory
Lecture 70 - Oligopoly and Game Theory (Continued...)
Lecture 71 - Oligopoly and Game Theory- Nash Equilibrium
Lecture 72 - Oligopoly and Game Theory â The Prisonerâ s Dilemma and Types of Games
Lecture 73 - Applications of Game Theory in Economics
Lecture 74 - Product pricing- Price Discrimination
Lecture 75 - Product pricing- Price Discrimination (Continued...)
Lecture 76 - Types of Product pricing
Lecture 77 - Types of Product pricing (Continued...1)
Lecture 78 - Types of Product pricing (Continued...2)
Lecture 79 - Types of Product pricing (Continued...3)
Lecture 80 - Summary of Course

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NPTEL Video Course - Management - NOC:Quality Control and Improvement with MINITAB

Subject Co-ordinator - Prof. Indrajit Mukherjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Quality
Lecture 2 - Voice of the Customer and Kano Model
Lecture 3 - Quality Function Deployment
Lecture 4 - Critical to Quality Characteristics
Lecture 5 - Data Visualization for Quality Control and Improvement
Lecture 6 - Importance of Pareto Chart and Cause and Effect Diagram
Lecture 7 - Design Failure Mode and Effect Analysis
Lecture 8 - Introduction to Statistical Process Control
Lecture 9 - X-bar and R Chart
Lecture 10 - X-bar and S Chart
Lecture 11 - Individual Moving Range Chart and Attribute Chart
Lecture 12 - Attribute Control Charts and Process Capability
Lecture 13 - Process Capability Index
Lecture 14 - Process Performance and Sigma Level
Lecture 15 - Process Capability for Attribute data
Lecture 16 - Basic Statistics and Confidence Interval
Lecture 17 - Hypothesis Testing
Lecture 18 - One-sample t Test
Lecture 19 - Two-sample t Test
Lecture 20 - Paired t Test and ANOVA
Lecture 21 - One-way ANOVA
Lecture 22 - One-way ANOVA (Continued...)
Lecture 23 - ANCOVA and Nonparametric Test
Lecture 24 - Linear Regression
Lecture 25 - Linear Regression (Continued...) and Multiple Regression
Lecture 26 - Best Subset Regression, Multicollinearity
Lecture 27 - Multicollinearity, Best Subset Regression, Multiple Regression, Basics on Design of Experiment
Lecture 28 - Design of Experiment, One-factor-at-a-time experiment
Lecture 29 - Two-factor asymmetric Design, Symmetric Factorial Design, Two-way ANOVA

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Lecture 30 - Two-factor symmetric Design, Robust setting, Two-way ANOVA
Lecture 31 - Measurement System Analysis
Lecture 32 - Measurement System Analysis (Continued...)
Lecture 33 - Measurement System Analysis (Continued...), Introduction to Factorial Experiments
Lecture 34 - Factorial Experiments
Lecture 35 - Factorial Experiments (Continued...)
Lecture 36 - Factorial Experiments (Continued...)
Lecture 37 - Blocking in Factorial Design.
Lecture 38 - Multiple response Optimization and RSM
Lecture 39 - Fractional Factorial Design
Lecture 40 - Taguchi Method

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NPTEL Video Course - Management - NOC:Business and Sustainable Development

Subject Co-ordinator - Prof. Trupti Mishra

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Sustainable Development and Sustainability
Lecture 2 - Evolution of Sustainable Development
Lecture 3 - Importance of Sustainability
Lecture 4 - Sustainability - A mega trend
Lecture 5 - Environment, Human and Economy
Lecture 6 - Robert Solowâ s Conceptualization of Sustainability
Lecture 7 - Introduction to Firmâ s Response
Lecture 8 - Sustainable Products
Lecture 9 - Cleaner Production
Lecture 10 - Cleaner Production Illustrations
Lecture 11 - Life Cycle Assessment
Lecture 12 - Understanding LCA Through Examples
Lecture 13 - Design for Environment
Lecture 14 - Sustainability Reporting
Lecture 15 - Current Status of ESG in Indian Companies
Lecture 16 - Corporate Strategy
Lecture 17 - Competitive Environment Strategies
Lecture 18 - Eco-Branding
Lecture 19 - Competitive Environmental Strategy Matrix
Lecture 20 - CSR and Social Sustainability
Lecture 21 - Sustainable Development Goal (SDG)
Lecture 22 - Sustainability Standards
Lecture 23 - Sustainability Standards
Lecture 24 - Green Supply Chain
Lecture 25 - Examples of Green Supply Chain
Lecture 26 - Environmental Regulations and Policy Instruments
Lecture 27 - Market based instruments in India
Lecture 28 - Environmental Laws and Disclosure Regulations
Lecture 29 - Risks and Opportunities

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Lecture 30 - Sustainable financial product and services
Lecture 31 - Sustainable Value Framework
Lecture 32 - Course Summary

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NPTEL Video Course - Management - NOC:Advances in Strategic Human Resource Management

Subject Co-ordinator - Prof. Ashish Pandey

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Evolution and Role of HR Function
Lecture 2 - Evolution and Nature of Strategic Human Resource Management
Lecture 3 - Contributions of and Trends in HR Function
Lecture 4 - Measuring Effectiveness of HR Function
Lecture 5 - Competence Maturity Model and People Competence Maturity Model
Lecture 6 - Organizational Healing: An Introduction
Lecture 7 - Working with Remote Teams
Lecture 8 - Restoring Social and Psychological Well-being
Lecture 9 - Employee Assistance Program
Lecture 10 - Talent Management: An Introduction
Lecture 11 - Potential Matrix: A Tool for Talent Management
Lecture 12 - HR Digitization for Talent Management
Lecture 13 - Positive Employee Relation: The Introduction
Lecture 14 - Positive Work Practices in Organization
Lecture 15 - Humanistic Management Model
Lecture 16 - Link of Humanistic Model and HR Processes
Lecture 17 - Process to make organization great place to work
Lecture 18 - Diversity Management: The Introduction
Lecture 19 - Significance of a Diverse and Inclusive Workplace
Lecture 20 - Significance of a Diverse and Inclusive Workplace
Lecture 21 - Biases in Organization and Ways of their Resolution
Lecture 22 - Intergenerational Relationships in Organization: The Introduction
Lecture 23 - Classifications of Generations at Workforce
Lecture 24 - Types and Attributes of Generations at Workplace
Lecture 25 - Ways of Synergizing Across Generations
Lecture 26 - Ways of enhancing Intergeneration Synergy
Lecture 27 - Intergenerational Relationships in Organization: The Introduction
Lecture 28 - Classifications of Generations at Workforce
Lecture 29 - Types and Attributes of Generations at Workplace

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Lecture 30 - Ways of Synergizing Across Generations
Lecture 31 - Intergenerational Relationships in Organization: The Introduction
Lecture 32 - Classifications of Generations at Workforce
Lecture 33 - Types and Attributes of Generations at Workplace
Lecture 34 - Ways of Synergizing Across Generations
Lecture 35 - Role and Challenges of Sustainable HRM
Lecture 36 - Contribution of HRM in Corporate Sustainability and Corporate Social Responsibility
Lecture 37 - Ways to integrate Corporate Sustainability and Corporate Social Responsibility with HRM
Lecture 38 - Important HR Metrics and Ratios in HRM Function
Lecture 39 - HR Analytics explained through Case Examples
Lecture 40 - Tools for Effective Decision Making and Factors for Success in Future at Work

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NPTEL Video Course - Management - NOC:Yoga and Positive Psychology for Managing Career and Life

Subject Co-ordinator - Prof. Ashish Pandey

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why the Course on Managing Self and Career
Lecture 2 - Present Context of Professional Work
Lecture 3 - State of Wellbeing of Indian Youth
Lecture 4 - Link between Self-Management and Career Management
Lecture 5 - Journey of Positive Psychology
Lecture 6 - Can there be a Universal Positive Psychology ?
Lecture 7 - Difference in Good Life and Life Satisfaction
Lecture 8 - Why Yoga with Positive Psychology ?
Lecture 9 - Genesis of this Course
Lecture 10 - Using Stories to Understand Optimal Experiences
Lecture 11 - Fundamental Questions in Positive Psychology
Lecture 12 - What Positive Psychology is Not
Lecture 13 - Positive-Negative Dialects of Well-Being
Lecture 14 - Positive Psychology: The Second Wave
Lecture 15 - Positivity and Human Potential in Yogic Traditions
Lecture 16 - Holistic Life Goals
Lecture 17 - Embracing Emotions and Positive Behavior
Lecture 18 - Discovering Dharma
Lecture 19 - Distinction with Negative Human Potential
Lecture 20 - Positive Events: 16 Sanskaras
Lecture 21 - Four Ashrams or Stations in Life
Lecture 22 - Yagna - Positive Event
Lecture 23 - Positive Institutions
Lecture 24 - Family - A Positive Institution
Lecture 25 - Yoga and Governance
Lecture 26 - Positive Governance
Lecture 27 - Macro and Micro Integration in Yogic Perspective
Lecture 28 - Self and Society
Lecture 29 - Point for Action and Reflection

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Lecture 30 - Health and Wellbeing
Lecture 31 - How does wellbeing affect life ?
Lecture 32 - Yogic Perspectives of Health and Wellbeing
Lecture 33 - Doshas
Lecture 34 - Mind-body Complex
Lecture 35 - Diseases in Yogic Perspective
Lecture 36 - Panch Kosha or Five Layers of Self
Lecture 37 - Managing Mind
Lecture 38 - Factors to Enhance Well-being
Lecture 39 - Self-Realization - The Ultimate Joy
Lecture 40 - What is the Indian Worldview ?
Lecture 41 - Ways of Attaining Well-Being
Lecture 42 - TattvaBodh and Wisdom
Lecture 43 - Indriyajaya or Self-Control
Lecture 44 - Indriyajaya in Positive Psychology
Lecture 45 - Dharmic Drishti (Vision)
Lecture 46 - Dharmic Desires and Pursuits
Lecture 47 - Dharmahkriya in Positive Psychology
Lecture 48 - Sukhayu-Hitayu
Lecture 49 - DharmahKriya, Sukhayu-Hitayu and Career Success ?
Lecture 50 - What is our real nature ?
Lecture 51 - How the Mind Works: A Yogic Perspective
Lecture 52 - Obstacles in Attaining Wellbeing
Lecture 53 - Reflection on Functioning of the Mind
Lecture 54 - How to avoid Klisht Vrittis ?
Lecture 55 - Crossing Obstacles to Well-Being
Lecture 56 - Six Inner Treasures
Lecture 57 - How are the Six Inner Treasures Valuable
Lecture 58 - Mental, Vital and Physical Consciousness
Lecture 59 - Major Forms of Yoga in Indian Tradition
Lecture 60 - Ashtanga Yoga or Raj Yoga
Lecture 61 - Yoga for Panch Koshas
Lecture 62 - Three Pillars of Health
Lecture 63 - Spiritual Significance of Food
Lecture 64 - Eight Factors about Food
Lecture 65 - Seasons with Revolving Sun and Impact on Physiology
Lecture 66 - Contemporary Knowledge about Food and Mental Health
Lecture 67 - Food and Activities during the Cycle of the Day
Lecture 68 - Yogasanas to Integrate Body and Emotions

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Lecture 69 - Interoception, Asanas and Well-Being
Lecture 70 - Characteristics of Asanas
Lecture 71 - Process for Moving into Posture
Lecture 72 - Asanas for Different Body Constitution
Lecture 73 - Notes on Pranayama
Lecture 74 - Contemporary Evidences of Prana
Lecture 75 - Prana Vayu, Nadi System and Chakras
Lecture 76 - Pranayama Practices and Conscious Breathing
Lecture 77 - Process and Benefits of Diaphragmatic Breathing
Lecture 78 - Guidelines for Pranayama
Lecture 79 - Nadi Shodhana Pranayama (Alternate Nostril Breathing)
Lecture 80 - Tranquilizing Pranayamas
Lecture 81 - Organizational Suffering and Dysfunctional Behaviors
Lecture 82 - Introduction to Pratyahara
Lecture 83 - Indriya-Pratyahara: Control of the Senses
Lecture 84 - Methods of Pratyahara
Lecture 85 - Understanding Emotional Intelligence
Lecture 86 - Emotional Intelligence and its Relation to Everyday Behavior
Lecture 87 - How Yoga Helps in Emotional Balance
Lecture 88 - Positive and Negative Emotions
Lecture 89 - Dealing with Negative Emotions
Lecture 90 - How Yoga Helps in Equanimity of Mind
Lecture 91 - What are the 7 Stages of Wisdom
Lecture 92 - What Yoga does for Balancing Emotions and Cognitions
Lecture 93 - How Yoga Impacts Student's Performance: Empirical Studies

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NPTEL Video Course - Management - NOC:Business Fundamentals for Entrepreneurs (Part 1: Internal Operation)

Subject Co-ordinator - Prof. Devdip Purkayastha

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1 - Part 1
Lecture 2 - Module 1 - Part 2
Lecture 3 - Module 2 - Part 1
Lecture 4 - Module 2 - Part 2
Lecture 5 - Module 3 - Part 1
Lecture 6 - Module 3 - Part 2
Lecture 7 - Module 3 - Part 3
Lecture 8 - Module 4 - Part 1
Lecture 9 - Module 4 - Part 2
Lecture 10 - Module 5 - Part 1
Lecture 11 - Module 5 - Part 2
Lecture 12 - Module 6 - Part 1
Lecture 13 - Module 6 - Part 2
Lecture 14 - Module 7 - Part 1
Lecture 15 - Module 7 - Part 2
Lecture 16 - Module 8 - Part 1
Lecture 17 - Module 8 - Part 2
Lecture 18 - Module 9 - Part 1
Lecture 19 - Module 9 - Part 2
Lecture 20 - Module 10

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NPTEL Video Course - Management - NOC:Supply Chain Digitization

Subject Co-ordinator - Prof. Priyanka Verma, Prof. Sushmita Narayana, Prof. Debabrata Das

Co-ordinating Institute - National Institute of Industrial Engineering

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Supply Chain Management
Lecture 2 - Fundamentals of Supply Chain Management
Lecture 3 - Supply Chain Drivers
Lecture 4 - Supply Chain Processes - I
Lecture 5 - Supply Chain Processes - II
Lecture 6 - Supply Chain Challenges
Lecture 7 - Need/Strategies
Lecture 8 - Push Vs Pull
Lecture 9 - Case Study on Product Segmentation
Lecture 10 - Case Study on Inventory Segmentation
Lecture 11 - Link between Corporate and Supply Chain Strategy
Lecture 12 - Interface between Operations and Finance
Lecture 13 - Procurement Strategy (Make Vs Buy)
Lecture 14 - Procurement Strategy (Kraljic Matrix) - I and II
Lecture 15 - Procurement Strategy (Kraljic Matrix) - I and II
Lecture 16 - Introduction to Platform Economy
Lecture 17 - Introduction to Platform Economy - Example
Lecture 18 - Introduction to Channel Structures and Supply Chain Coordination
Lecture 19 - Newsvendor Case Example (Deterministic Setting) - I and II
Lecture 20 - Newsvendor Case Example (Deterministic Setting) - I and II
Lecture 21 - Newsvendor Case (Probabilistic Setting and Contracts) - I and II
Lecture 22 - Newsvendor Case (Probabilistic Setting and Contracts) - I and II
Lecture 23 - Channel Structure Designs in Supply Chains (Brick and Mortar)
Lecture 24 - Channel Structure Designs in Supply Chains (Dual Channels)
Lecture 25 - Channel Structure Designs in Supply Chains (Multi and Omni Channels)
Lecture 26 - Introduction to Analytics and Big Data
Lecture 27 - Different Types of Analytics and its Applications in Supply Chain Management
Lecture 28 - Predictive Analytics: Case Study on Predictive Maintenance
Lecture 29 - Predictive Analytics: Classification Tree Model

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Lecture 30 - Predictive Analytics: Building Classification Tree Model using Python
Lecture 31 - Role of AI/ML in Forecasting and Demand Analytics
Lecture 32 - Demand Forecasting using AI/ML: A Case Study
Lecture 33 - Demand Forecasting using AI/ML: Regression Tree Model
Lecture 34 - Demand Forecasting using AI/ML: Building Regression Tree Model using Python
Lecture 35 - Demand Forecasting using AI/ML: Random Forest Regression Model
Lecture 36 - Supply Chain Network Optimization: Break even analysis
Lecture 37 - Supply Chain Network Optimization: Facility location using Centre of Gravity
Lecture 38 - Supply Chain Network Optimization: Case on Capacitated Plant Location Model
Lecture 39 - Case on Supply Chain Network Design - I
Lecture 40 - Case on Supply Chain Network Design - II
Lecture 41 - Location of Distribution Centers using Clustering Technique: A Case Study
Lecture 42 - Steps of building K-Means Clustering Algorithm: A Case Study
Lecture 43 - Location of Distribution Centers: Building K-Means Clustering Model using Python
Lecture 44 - Measuring Efficiency of Manufacturing Facilities: A DEA Model - I
Lecture 45 - Measuring Efficiency of Manufacturing Facilities: A DEA Model - II
Lecture 46 - Role of Product Tracking and Traceability
Lecture 47 - Track and Trace Systems - I and II
Lecture 48 - Track and Trace Systems - I and II
Lecture 49 - ERP, WMS and TMS - I and II
Lecture 50 - ERP, WMS and TMS - I and II
Lecture 51 - Introduction to Supply Chain Digital Twin
Lecture 52 - Supply Chain Digital Twin: Greenfield Analysis - A Case Study - I
Lecture 53 - Supply Chain Digital Twin: Greenfield Analysis - A Case Study - II
Lecture 54 - Supply Chain Digital Twin: Network Optimization - A Case Study
Lecture 55 - Network Optimization with Capacity Constraints and Control Tower
Lecture 56 - Digital Infrastructure for Supply Chains: Industry 4.0
Lecture 57 - Industry 4.0 - IIoT, Cloud Computing, Horizontal and Vertical System Integration
Lecture 58 - Industry 4.0 - Cybersecurity, Big Data Analytics, Simulation, AR, Robots, AM
Lecture 59 - Blockchain
Lecture 60 - Supply Chain and Industry 4.0

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NPTEL Video Course - Management - NOC:Business Forecasting

Subject Co-ordinator - Prof. Pankaj Dutta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Business Forecasting
Lecture 2 - Data Driven Decision Making and Essentials of Predictive Analytics
Lecture 3 - Data Driven Decision Making and Essentials of Predictive Analytics
Lecture 4 - Types of Forecasting: Qualitative Approaches and Quantitative Approaches
Lecture 5 - Components of a Time Series and Measures of Forecast Accuracy
Lecture 6 - Components of a Time Series and Measures of Forecast Accuracy
Lecture 7 - Moving Average Methods: Simple, Weighted, and Exponential Moving Average
Lecture 8 - Moving Average Methods: Simple, Weighted, and Exponential Moving Average
Lecture 9 - Exponential Smoothing
Lecture 10 - Trend Projections and Holt Model
Lecture 11 - Simple Linear Regression and Measure of Goodness and Standard Error
Lecture 12 - Simple Linear Regression and Measure of Goodness and Standard Error
Lecture 13 - Simple Linear Regression and Measure of Goodness and Standard Error
Lecture 14 - Multiple Linear Regression and Multicollinearity
Lecture 15 - Multiple Linear Regression and Multicollinearity
Lecture 16 - Multiple Linear Regression and Multicollinearity
Lecture 17 - Seasonality, Seasonal Index, and Quarterly Average Method
Lecture 18 - Seasonality, Seasonal Index, and Quarterly Average Method
Lecture 19 - Seasonality and Trend: Winter's Holt Method
Lecture 20 - Seasonality and Trend: Winter's Holt Method
Lecture 21 - Multiplicative Decomposition Method
Lecture 22 - Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF)
Lecture 23 - ARIMA: Auto-Regressive (AR) Process
Lecture 24 - ARIMA: Moving Average (MA) Process
Lecture 25 - ARIMA: Auto-Regressive Moving Average (ARMA) Process
Lecture 26 - Auto-Regressive Integrated Moving Average (ARIMA) Model
Lecture 27 - Introduction to Machine Learning
Lecture 28 - Introduction to Machine Learning
Lecture 29 - Logistic Regression

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Lecture 30 - Logistic Regression
Lecture 31 - Human Judgment in Time Series Analysis
Lecture 32 - Monte Carlo Simulation: Discrete Case
Lecture 33 - Monte Carlo Simulation: Discrete Case
Lecture 34 - Monte Carlo Simulation: Continuous case
Lecture 35 - System Dynamics (Additional Learning)
Lecture 36 - Predictive Analytics using @Risk Software
Lecture 37 - Predictive Analytics using @Risk Software
Lecture 38 - Predictive Analytics using @Risk Software

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NPTEL Video Course - Management - NOC:Business Fundamentals for Entrepreneurs (Part 2: External Operation)

Subject Co-ordinator - Prof. Devdip Purkayastha

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Market Research - Part 1
Lecture 2 - Market Research - Part 2
Lecture 3 - Customers and Segments - Part 1
Lecture 4 - Customers and Segments - Part 2
Lecture 5 - Value Based Marketing - Part 1
Lecture 6 - Value Based Marketing - Part 2
Lecture 7 - Marketing Communication - Part 1
Lecture 8 - Marketing Communication - Part 2
Lecture 9 - Sales Channels and Distribution - Part 1
Lecture 10 - Sales Channels and Distribution - Part 2
Lecture 11 - B2B and B2C Selling - Part 1
Lecture 12 - B2B and B2C Selling - Part 2
Lecture 13 - Customer Service Management - Part 1
Lecture 14 - Customer Service Management - Part 2
Lecture 15 - Supply Chain Management - Part 1
Lecture 16 - Supply Chain Management - Part 2
Lecture 17 - Quadrangle of Success

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NPTEL Video Course - Management - NOC:Business Fundamentals for Entrepreneurs

Subject Co-ordinator - Prof. Devdip Purkayastha

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of a Business ? - Part 1
Lecture 2 - Overview of a Business ? - Part 2
Lecture 3 - Company and Structures - Part 1
Lecture 4 - Company and Structures - Part 2
Lecture 5 - Vision, Mission, Goals, Strategy and Culture - Part 1
Lecture 6 - Vision, Mission, Goals, Strategy and Culture - Part 2
Lecture 7 - Vision, Mission, Goals, Strategy and Culture - Part 3
Lecture 8 - Innovation and Product Development - Part 1
Lecture 9 - Innovation and Product Development - Part 2
Lecture 10 - Manufacturing and Quality - Part 1
Lecture 11 - Manufacturing and Quality - Part 2
Lecture 12 - Finance and Accounting - Part 1
Lecture 13 - Finance and Accounting - Part 2
Lecture 14 - Leadership and Human Resources - Part 1
Lecture 15 - Leadership and Human Resources - Part 2
Lecture 16 - Environment, Society and Governance - Part 1
Lecture 17 - Environment, Society and Governance - Part 2
Lecture 18 - Market Research - Part 1
Lecture 19 - Market Research - Part 2
Lecture 20 - Customers and Segments - Part 1
Lecture 21 - Customers and Segments - Part 2
Lecture 22 - Value Based Marketing - Part 1
Lecture 23 - Value Based Marketing - Part 2
Lecture 24 - Marketing Communication - Part 1
Lecture 25 - Marketing Communication - Part 2
Lecture 26 - Sales Channels and Distribution - Part 1
Lecture 27 - Sales Channels and Distribution - Part 2
Lecture 28 - B2B and B2C Sales - Part 1
Lecture 29 - B2B and B2C Sales - Part 2

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Lecture 30 - Customer Service Management - Part 1
Lecture 31 - Customer Service Management - Part 2
Lecture 32 - Supply Chain and Logistics - Part 1
Lecture 33 - Supply Chain and Logistics - Part 2
Lecture 34 - Business Risk and Management - Part 1
Lecture 35 - Business Risk and Management - Part 2
Lecture 36 - Business Information and Management - Part 1
Lecture 37 - Business Information and Management - Part 2
Lecture 38 - Business Types and Models - Part 1
Lecture 39 - Business Types and Models - Part 2
Lecture 40 - Social Business Development - Part 1
Lecture 41 - Social Business Development - Part 2
Lecture 42 - Starting up a New Technology Venture - Part 1
Lecture 43 - Starting up a New Technology Venture - Part 2
Lecture 44 - Starting up a New Technology Venture - Part 3
Lecture 45 - Starting up a New Social Venture - Part 1
Lecture 46 - Starting up a New Social Venture - Part 2
Lecture 47 - Business Case Discussion - Part 1
Lecture 48 - Business Case Discussion - Part 2
Lecture 49 - Course Recap and Wrap Up
Lecture 50 - Bonus Module: The Quadrangle of Success

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NPTEL Video Course - Management - NOC:Pre-Business School Statistics

Subject Co-ordinator - Prof. Sudeep Bapat

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Statistics
Lecture 2 - Sampling and Data Types
Lecture 3 - Descriptive Statistics
Lecture 4 - Descriptive Statistics (Continued...)
Lecture 5 - Case Study - 1
Lecture 6 - Probability Basics
Lecture 7 - Random Variables
Lecture 8 - A few Discrete Random Variables
Lecture 9 - The Normal Random Variable
Lecture 10 - Practical Examples using Case Studies - 2
Lecture 11 - Sampling Distribution and Estimation
Lecture 12 - Confidence Intervals
Lecture 13 - Hypothesis Testing
Lecture 14 - Hypothesis Testing (Continued...)
Lecture 15 - Practical Examples using Case Studies - 3
Lecture 16 - Regression and Beyond
Lecture 17 - Regression Models
Lecture 18 - Goodness of Fit
Lecture 19 - Analysis of Variance
Lecture 20 - Practical Examples using Case Studies - 4

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NPTEL Video Course - Management - NOC:Healthcare Quality Management - Infection Control and Patient Safety

Subject Co-ordinator - Prof. Dhananjay D Mankar

Co-ordinating Institute - Tata Institute of Social Sciences, Mumbai

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Foundations of Healthcare Quality
Lecture 2 - Evolution and Quality Improvement Framework
Lecture 3 - Quality and Patient Outcomes in Indian Hospitals - Part A
Lecture 4 - Quality and Patient Outcomes in Indian Hospitals - Part B
Lecture 5 - Quality and Patient Outcomes in Indian Hospitals - Part C
Lecture 6 - Quality and Patient Outcomes in Indian Hospitals - Part D
Lecture 7 - Quality Tools for Continuous Improvement - Part A
Lecture 8 - Quality Tools for Continuous Improvement - Part B
Lecture 9 - Quality Tools for Continuous Improvement - Part C
Lecture 10 - Quality Tools for Continuous Improvement - Part D
Lecture 11 - Evolution and Accreditation of Healthcare Organisation
Lecture 12 - Concept of ISO 9000 and NABH
Lecture 13 - Regulation and Accreditation for Quality and Patient Safety
Lecture 14 - Accreditation, Certification and Licensure in Healthcare Quality
Lecture 15 - Quality Management System in Healthcare
Lecture 16 - Patient Safety Measures
Lecture 17 - Promotion of Patient Safety
Lecture 18 - Leadership for Improving Patient Safety
Lecture 19 - Avedis Donabedianâ s Model of Structure Process and Outcome
Lecture 20 - Clinical Indicators in Healthcare Quality
Lecture 21 - Managerial Indicators in Healthcare Quality
Lecture 22 - Standard Treatment Guidelines in Clinical Settings - Part 1
Lecture 23 - Standard Treatment Guidelines in Clinical Settings - Part 2
Lecture 24 - Standard Treatment Guidelines in Clinical Settings - Part 3
Lecture 25 - Infection Control Practices - Part 1
Lecture 26 - Infection Control Practices - Part 2
Lecture 27 - Infection Control Practices - Part 3
Lecture 28 - Infection Control Practices - Part 4
Lecture 29 - Infection Control Practices - Part 5

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Lecture 30 - Infection Control Practices - Part 6
Lecture 31 - Medication Safety Management - Part 1
Lecture 32 - Medication Safety Management - Part 2
Lecture 33 - Medication Safety Management - Part 3
Lecture 34 - Medication Safety Management - Part 4
Lecture 35 - Medication Safety Management - Part 5
Lecture 36 - Medication Safety Management - Part 6
Lecture 37 - Clinical Governance in Healthcare
Lecture 38 - Healthcare Leadership: Engagement and Empowerment - Part 1
Lecture 39 - Healthcare Leadership: Engagement and Empowerment - Part 2
Lecture 40 - Health Information Management
Lecture 41 - Clinical Audit - Part 1
Lecture 42 - Clinical Audit - Part 2
Lecture 43 - Clinical Audit - Part 3
Lecture 44 - Clinical Audit - Part 4
Lecture 45 - Risk Management in Hospital and Healthcare - Part 1
Lecture 46 - Risk Management in Hospital and Healthcare - Part 2
Lecture 47 - Risk Management in Hospital and Healthcare - Part 3
Lecture 48 - Risk Management in Hospital and Healthcare - Part 4
Lecture 49 - Strategic Planning for Patient Safety - Part 1
Lecture 50 - Strategic Planning for Patient Safety - Part 2
Lecture 51 - Strategic Planning for Patient Safety - Part 3
Lecture 52 - Strategic Planning for Patient Safety - Part 4
Lecture 53 - Effective Preventive Maintenance for Hospitals - Part 1
Lecture 54 - Effective Preventive Maintenance for Hospitals - Part 2
Lecture 55 - Medico-Legal Aspects of Hospital Functioning
Lecture 56 - Importance of Communication in Healthcare Quality
Lecture 57 - Strategies for Effective Communication
Lecture 58 - Implementation of Healthcare Quality and Patient Safety
Lecture 59 - Healthcare Quality Management: Case Study - 1 NQAS
Lecture 60 - Healthcare Quality Management: Case Study - 2 NABH

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NPTEL Video Course - Management - NOC:Technology Commercialization and New Product Development

Subject Co-ordinator - Prof. Devdip Purkayastha, Prof. Rajkumar Hirwani

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Disciplined Innovation
Lecture 2 - 8C Problem Discovery Framework - Part 1
Lecture 3 - 8C Problem Discovery Framework - Part 2
Lecture 4 - 8P Product Development Framework - Part 1
Lecture 5 - 8P Product Development Framework - Part 2
Lecture 6 - WIMF - Winning in Market Framework - Part 1
Lecture 7 - WIMF - Winning in Market Framework - Part 2
Lecture 8 - Translational Research
Lecture 9 - Technology Readiness Assessment - TRL Framework
Lecture 10 - Technology Commercialisation
Lecture 11 - Disciplined Innovation - Customised AI Tool

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NPTEL Video Course - Management - Organisation Management

Subject Co-ordinator - Prof. Vinayshil Gautam

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organization Management,Nature, Scope and Complexity
Lecture 2 - Longitudinal thinking and legacy factor
Lecture 3 - Longitudinal thinking and legacy factor
Lecture 4 - Longitudinal thinking and legacy factor
Lecture 5 - Theory and majors schools of Thought and Framework of Organizational Analysis
Lecture 6 - Theory and majors schools of thought and framework of organizational analysis (Continued...)
Lecture 7 - Theory and majors schools of thought and framework of organizational analysis (Continued...)
Lecture 8 - Systems contingency approach to organization theory and practice; techniques of organizational di
Lecture 9 - Systems contingency approach to organization theory and practice; techniques of organizational di
Lecture 10 - Systems contingency approach to organization theory and practice; techniques of organizational c
Lecture 11 - Theory of organizational structures - nature and consequence of structure
Lecture 12 - Theory of organizational structures - nature and consequence of structure (Continued...)
Lecture 13 - Socio-culture dimension of work and behavior
Lecture 14 - Socio-culture dimension of work and behavior (Continued...)
Lecture 15 - Socio-culture dimension of work and behavior (Continued...)
Lecture 16 - Impact of environment and cultural variables on organization structure & style
Lecture 17 - Impact of environment and cultural variables on organization structure & style (Continued...)
Lecture 18 - Impact of environment and cultural variables on organization structure & style (Continued...)
Lecture 19 - Organization Change and Organisation Development
Lecture 20 - Organization Change and Organisation Development (Continued...)
Lecture 21 - Intervention strategies for organization development - individual, Group and Interpersonal Inter
Lecture 22 - Intervention strategies for organization development - individual, Group & interpersonal interve
Lecture 23 - Intervention strategies for organization development - individual, Group & interpersonal interve
Lecture 24 - Total System Intervention & Stabilizing Change Management by Objectives
Lecture 25 - Total System Intervention & Stabilizing Change Management by Objectives (Continued...)
Lecture 26 - Total System Intervention & Stabilizing Change Management by Objectives (Continued...)
Lecture 27 - Nature of Organisational Processes
Lecture 28 - Nature of Organisational Processes (Continued...)
Lecture 29 - Nature of Organisational Processes (Continued...)

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Lecture 30 - Environmental analysis Techniques and impact for organizational growth
Lecture 31 - Environmental analysis Techniques and impact for organizational growth (Continued...)
Lecture 32 - Environmental analysis Techniques and impact for organizational growth (Continued...)
Lecture 33 - Issues of Mechnisation, Automation and Computerisation
Lecture 34 - Issues of Mechnisation, Automation and Computerisation (Continued...)
Lecture 35 - Organisation Interdependence
Lecture 36 - Organisation Interdependence (Continued...)
Lecture 37 - Organisation Interdependence (Continued...)
Lecture 38 - Organisation Evaluation
Lecture 39 - Organisation Evaluation (Continued...)
Lecture 40 - Organisation Evaluation (Continued...)

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NPTEL Video Course - Management - Organisation of Engineering Systems and Human Resources Management

Subject Co-ordinator - Prof. Vinayshil Gautam

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the subject and the course
Lecture 2 - Understanding organizations
Lecture 3 - Understanding organizations
Lecture 4 - Concerns of organising engineering business and systems
Lecture 5 - Concerns of organising engineering business and systems (Continued...)
Lecture 6 - Concerns of organising engineering business and systems (Continued...)
Lecture 7 - Structure and process issues in running organisations
Lecture 8 - Structure and process issues in running organisations (Continued...)
Lecture 9 - Design issues in running organisations
Lecture 10 - Design issues in running organisations (Continued...)
Lecture 11 - Operating organizations
Lecture 12 - Operating organizations (Continued...)
Lecture 13 - Operating organizations (Continued...)
Lecture 14 - Cybernetics and systems framework
Lecture 15 - Cybernetics and systems framework (Continued...)
Lecture 16 - Socio-technical systems
Lecture 17 - Socio-technical systems (Continued...)
Lecture 18 - Socio-technical systems (Continued...)
Lecture 19 - Dealing with efficiency and excellence
Lecture 20 - Dealing with efficiency and excellence (Continued...)
Lecture 21 - Dealing with efficiency and excellence (Continued...)
Lecture 22 - Man-machine relationship
Lecture 23 - Man-machine relationship (Continued...)
Lecture 24 - Longitudinal Thinking
Lecture 25 - Longitudinal Thinking (Continued...)
Lecture 26 - Concerns of recruitment, selection, skill formation and redeployment
Lecture 27 - Concerns of recruitment, selection, skill formation and redeployment (Continued...)
Lecture 28 - Concerns of recruitment, selection, skill formation and redeployment (Continued...)
Lecture 29 - Developing teams and leadership

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Lecture 30 - Developing teams and leadership (Continued...)
Lecture 31 - Understanding motivation
Lecture 32 - Understanding motivation (Continued...)
Lecture 33 - Elements of human resources planning
Lecture 34 - Elements of human resources planning (Continued...)
Lecture 35 - Elements of human resources planning (Continued...)
Lecture 36 - Indian Industrial Law and managing industrial
Lecture 37 - Indian Industrial Law and managing industrial (Continued...)
Lecture 38 - Indian Industrial Law and managing industrial (Continued...)

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NPTEL Video Course - Management - NOC:Economic Growth and Development

Subject Co-ordinator - Prof. Rajshree Bedamatta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concepts of Economic Growth and Development
Lecture 2 - Structural features of developed and underdeveloped countries
Lecture 3 - The Global North and the Global South
Lecture 4 - Growth versus Development - some indices of economic development
Lecture 5 - Modern Economic Growth
Lecture 6 - Strategies of economic development and growth - I
Lecture 7 - Strategies of economic development and growth - II
Lecture 8 - Strategies of economic development and growth - III
Lecture 9 - Strategies of economic development and growth - IV
Lecture 10 - Strategies of economic development and growth - V
Lecture 11 - Strategies of economic development and growth - VI
Lecture 12 - Growth and Inequality
Lecture 13 - Economic Growth and Public Support
Lecture 14 - Measures of Inequality
Lecture 15 - Introduction to Human Development-Putting People First
Lecture 16 - The Human Development and Capability Approach
Lecture 17 - Utilitarianism, Basic Needs Approach and the Capability Approach
Lecture 18 - Measuring Human Development - I
Lecture 19 - Measuring Human Development - II
Lecture 20 - Other Human Development Indices
Lecture 21 - Multidimensional Poverty, MDGs and SDGs
Lecture 22 - Gender mainstreaming and Gender budgeting
Lecture 23 - In Conclusion

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NPTEL Video Course - Management - NOC:Organizational Behaviour: Individual Dynamics in Organization

Subject Co-ordinator - Prof. Abraham Cyril Issac

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding organizational behaviour:Tracing the evolution - 1
Lecture 2 - Understanding organizational behaviour:Tracing the evolution - 2
Lecture 3 - Individual in the organization: The building blocks
Lecture 4 - Understanding individual differences - 1
Lecture 5 - Understanding individual differences - 2
Lecture 6 - Diverse workforce, inclusive mindset - 1
Lecture 7 - Diverse workforce, inclusive mindset - 2
Lecture 8 - Perception of diversity and inclusion
Lecture 9 - Ableism and inclusion
Lecture 10 - Diversity management
Lecture 11 - The perceptual process
Lecture 12 - Factors that influence perception
Lecture 13 - Perception and decision making
Lecture 14 - What affects decisions?
Lecture 15 - Ethical decision making
Lecture 16 - Affect and emotions
Lecture 17 - Affective events theory
Lecture 18 - Emotional intelligence
Lecture 19 - Understanding stress
Lecture 20 - Emotions and moods: Application at workplace
Lecture 21 - Understanding self and personality
Lecture 22 - Types and theories of personality
Lecture 23 - Measuring personality
Lecture 24 - Personality traits relevant to organization
Lecture 25 - Assessing personality: caveats and concerns
Lecture 26 - Values and its importance
Lecture 27 - Sources and types of values
Lecture 28 - Values that cut across cultures
Lecture 29 - Person-job fit

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Lecture 30 - Person-organization fit
Lecture 31 - Motivation: Basic understanding and definition
Lecture 32 - Tracing the roots: Early theories - 1
Lecture 33 - Tracing the roots: Early theories - 2
Lecture 34 - Keeping up with times: Contemporary theories - 1
Lecture 35 - Keeping up with times: Contemporary theories - 2
Lecture 36 - Job Design and job characteristics model
Lecture 37 - Employee involvement
Lecture 38 - Motivating the employees: Strategies for organization - 1
Lecture 39 - Motivating the employees: Strategies for organization - 2
Lecture 40 - Organizational justice and employee motivation
Lecture 41 - Defining learning
Lecture 42 - How do individuals learn?
Lecture 43 - Theories of learning - 1
Lecture 44 - Theories of learning - 2
Lecture 45 - Learning in an organizational setting
Lecture 46 - Understanding creativity
Lecture 47 - Stages of individual creativity
Lecture 48 - Creativity and problem solving
Lecture 49 - Defining psychological capital
Lecture 50 - Using Psychological capital and mindfulness at work
Lecture 51 - Understanding knowledge sharing
Lecture 52 - Understanding knowledge hiding - what it is and what it is not
Lecture 53 - Individual factors affecting knowledge hiding
Lecture 54 - Integrating knowledge sharing and hiding behavior
Lecture 55
Lecture 56 - Understanding employee voice and silence
Lecture 57 - Individual factors affecting voice behavior
Lecture 58 - Individual factors affecting silence
Lecture 59 - Can silence be strategic?
Lecture 60 - Strategies for fostering safe environment at work

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NPTEL Video Course - Management - NOC:Labour Welfare and Industrial Relations

Subject Co-ordinator - Prof. Abraham Cyril Issac

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Background, IR in the post-independence period, functions of IR
Lecture 2 - Approaches towards IR, models of IR
Lecture 3 - Introduction to trade unions, labour legislations, worker's participation
Lecture 4 - Employers' Federation and their role in IR
Lecture 5 - Sailent features of IR in India
Lecture 6 - Birth and evolution of the trade union movement in India
Lecture 7 - Objectives, Theories, Bases of TUs
Lecture 8 - TU federations, Presence of local TUs, Reasons for growth, Compulsory Unionism
Lecture 9 - Trade Unions Act 1926: Aim, scope, registration, Rights and Responsibilities of TUs
Lecture 10 - Size and Finance of TUs, TU rivalry and recognition
Lecture 11 - Industrial Disputes: Meaning, Causes, Interests and Right Disputes
Lecture 12 - Strikes ,Forms, and Effects of Strike
Lecture 13 - Industrial Dispute Act 1947: Disputes Settlement Machineries
Lecture 14 - Statutory and Non-Statutory measures of Settlement
Lecture 15 - Collective Bargaining : Importance, Theories, Hurdles to CB in India
Lecture 16 - Introduction, objectives, classifications
Lecture 17 - Intra mural labour welfare services
Lecture 18 - Extra mural labour welfare services
Lecture 19 - Evolution of social security measures, Mention of welfare provisions of few labour laws
Lecture 20 - Social Security, Convention (No.102) ILO
Lecture 21 - Social security legislations: Evolution and Growth
Lecture 22 - Provision for old age and against unemployment and Gratuity, exisiting social security laws
Lecture 23 - Issues in Labour Welfare and Social Security, Review of welfare amenities
Lecture 24 - Role of Welfare officer, problems in enforcement of welfare amenities
Lecture 25 - Employees Compensation Act 1923: Occupational diseases, Compensation
Lecture 26 - Right to compensation in presence of Employees' State Insurance Act
Lecture 27 - Evolution of Provident Fund legislation in India, Central Government Health Scheme, 1954
Lecture 28 - Employees Provident Fund and Miscellaneous Provisions Act, 1952: scope, definitions
Lecture 29 - Employees' Provident Fund, Deposit Linked Insurance Schemes

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Lecture 30 - Employee Pension Scheme 1995, Miscellaneous Provisions
Lecture 31 - Payment of Gratuity Act 1972: Enactment, Scope and Coverage
Lecture 32 - Payment of Gratuity Act 1972: Main Provisions, Compulsory Insurance, Other Provisions
Lecture 33 - Maternity Benefit Act 1961: Growth, Definitions, Main Provisions, and Other Provisions
Lecture 34 - Child labour (Prohibition& Regulation)Act,1986: Objectives
Lecture 35 - Prohibition of Employment and Regulation of Conditions of children in certain occupations
Lecture 36 - Central Board of Workers' Education Scheme : Rational, Schemes, Composition of Board
Lecture 37 - Five Year Plans and Workers' Education
Lecture 38 - Factories Act 1948: definitions, authorities
Lecture 39 - Health, safety, provisions relating to hazardous processes
Lecture 40 - Welfare, working hours of adults
Lecture 41 - Employment of young persons, annual leave with wages and Penalties and procedure,other provisior
Lecture 42 - Payment of Wages Act, 1936: Objective, Scope
Lecture 43 - Wage legalities, Authorized deductions, miscellaneous provisions
Lecture 44 - Minimum Wages Act 1948: Scope, Fixation of minimum wages
Lecture 45 - Procedure for fixing minimum wages, mode of payment, miscellaneous provisions
Lecture 46 - Equal Remuneration Act 1976: Scope, definations, provisions
Lecture 47 - Workers' Participation in Management
Lecture 48 - Degree and Forms of Labour Participation
Lecture 49 - Workers Committee, Joint management Councils
Lecture 50 - Employee's Participation in PSUs Participation in Private sector
Lecture 51 - The participation of workers in Management Bill 1990
Lecture 52 - Labour Welfare and Industrial Relations: Case Laws
Lecture 53 - Introduction, Labour reforms undertaken
Lecture 54 - Code on Wages 2019
Lecture 55 - Occupational Safety, Health and Working Conditions Code, 2020
Lecture 56 - Industrial Relations Code, 2020
Lecture 57 - Code on Social Security, 2020
Lecture 58 - Labour Welfare and Industrial Relations: A Bird's Eye View

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NPTEL Video Course - Management - NOC:AI in Human Resource Management

Subject Co-ordinator - Prof. Abraham Cyril Issac

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Deploying AI in HR Practices
Lecture 2 - Introduction to AI Tools
Lecture 3 - Leveraging AI for Diversity Management
Lecture 4 - Decision Making
Lecture 5 - Adopting AI in Administrative task automation, Recruitment, and Talent acquisition
Lecture 6 - HR Metrics
Lecture 7 - Role of AI in Performance Management
Lecture 8 - Application of AI in Onboarding
Lecture 9 - Using AI in Person-Job Fit
Lecture 10 - HR Analytics
Lecture 11 - People Analytics using AI
Lecture 12 - HR Administration application
Lecture 13 - SMART HRM
Lecture 14 - Using AI For Employee Retention
Lecture 15 - Using AI for Performance Appraisal
Lecture 16 - Using AI In Employee Training
Lecture 17 - Using AI in Workforce Planning
Lecture 18 - Ethical Concerns in Using AI in Various Functions of HRM
Lecture 19 - AI-Augmented HRM
Lecture 20 - Learning and Development Programmes
Lecture 21 - Disruptive Innovation in HRM: Future of HRM
Lecture 22 - HRM in the Era of Generative AI
Lecture 23 - Building Organizational Capabilities through AI-Driven HRM
Lecture 24 - Metaverse in HRM
Lecture 25 - Challenges of AI Adoption in HRM
Lecture 26 - HRM Digitalization Success and Future Opportunities
Lecture 27 - AI in Career Succession Planning of Employees
Lecture 28 - AI in Sustaining Green HRM
Lecture 29 - Emerging Trends of AI Based HRM

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Lecture 30 - Benefits of Synergizing AI and HRM
Lecture 31 - AI in Compensation and Benefits
Lecture 32 - AI In Compliance
Lecture 33 - AI-Mediated Knowldege Management
Lecture 34 - AI in SHRM
Lecture 35 - HRP and HR Chatbots
Lecture 36 - Using AI in Enhancing Employee Experience
Lecture 37 - HR and Company Culture - Part 1
Lecture 38 - HR and Company Culture - Part 2
Lecture 39 - Adopting AI in Managing Company Culture - Part 1
Lecture 40 - Adopting AI in Managing Company Culture - Part 2
Lecture 41 - Boon or Curse: Co-existence of HR and AI - Part 1
Lecture 42 - Boon or Curse: Co-existence of HR and AI - Part 2
Lecture 43 - Birds Eye View of AI in HRM

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NPTEL Video Course - Management - NOC:Learning and Development in Organizations

Subject Co-ordinator - Prof. Abraham Cyril Issac

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Learning and Development: An Introduction - I
Lecture 2 - Learning and Development: An Introduction - II
Lecture 3 - Defining Learning and Development
Lecture 4 - Individual in the Organization: The need for Learning
Lecture 5 - Emerging Developments
Lecture 6 - Appreciating the Importance of Learning and Development
Lecture 7 - Personal Performance
Lecture 8 - Context of Learning and Development - 1
Lecture 9 - Context of Learning and Development - 2
Lecture 10 - Summarizing and Thinking Ahead
Lecture 11 - Business Environment
Lecture 12 - Human Resource Management Strategy Concept and Model - I
Lecture 13 - Human Resource Management Strategy Concept and Model - II
Lecture 14 - International Human Resource Development
Lecture 15 - The Stakeholders
Lecture 16 - Vision, Mission, and Values: Three Pillars of Organization
Lecture 17 - Organization Capabilities
Lecture 18 - Learning Organizations
Lecture 19 - High Performance Organizations
Lecture 20 - Challenges for the Learning and Development Function
Lecture 21 - How Learning and Development Works - I
Lecture 22 - How Learning and Development Works - II
Lecture 23 - Individual Differences in Learning
Lecture 24 - Diagnosing the Learning and Development Needs
Lecture 25 - Practitioner's Perspective
Lecture 26 - Learning and Development Interventions
Lecture 27 - Introducing Knowledge Management
Lecture 28 - Components of Knowledge Management
Lecture 29 - Individual Behavior and Knowledge Transfer

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Lecture 30 - Learning Knowledge Management Strategies
Lecture 31 - Psychological Contract
Lecture 32 - The Theory of Psychological Contract
Lecture 33 - Mapping the External Factors, Messages, Social Cues
Lecture 34 - Encoding, Decoding, and Individual Predispositions
Lecture 35 - Managing Group Development
Lecture 36 - Theory to Application - Introduction
Lecture 37 - Need Identification
Lecture 38 - Problem Identification and Solution Design
Lecture 39 - Sourcing Interventions
Lecture 40 - Evaluation and Diagnostic Questionnairs
Lecture 41 - Planning and Action
Lecture 42 - Roles and Responsibilities for Learning and Development
Lecture 43 - Sources of Expertise
Lecture 44 - Blended Learning
Lecture 45 - Sample Interventions
Lecture 46 - Technological Advances in Learning Interventions
Lecture 47 - New Skills and Behaviors
Lecture 48 - Diagnostic Questionnaires for Senior Managers - I
Lecture 49 - Diagnostic Questionnaires for Senior Managers - II
Lecture 50 - Diagnostic Questionnaires for Learning Interventions
Lecture 51 - Evaluating Learning and Development - I
Lecture 52 - Evaluating Learning and Development - II
Lecture 53 - Models of Evaluations
Lecture 54 - Evaluation of Coaching
Lecture 55 - Utility of Learning and Development Interventions
Lecture 56 - Learning and Development: Ongoing trends and approaches
Lecture 57 - Technology, Learning and Development - I
Lecture 58 - Technology, Learning and Development - II
Lecture 59 - Tools and Techniques for Learning and Development
Lecture 60 - Learning and Development's Impact on Organizational Results

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NPTEL Video Course - Management - NOC:Metrics and Analytics of Marketing

Subject Co-ordinator - Prof. Kuldeep Baishya

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Marketing Metrics - I
Lecture 2 - Introduction to Marketing Metrics - II
Lecture 3 - Key Categories of Marketing Metrics
Lecture 4 - Illustration of Marketing Funnel
Lecture 5 - Conceptual Framework for Marketing Metrics
Lecture 6 - Introduction to Strategic Goals and Margins
Lecture 7 - Metrics of Interest in Marketing
Lecture 8 - Understanding and Measuring Margins
Lecture 9 - Profit Metrics - Measuring Profitability
Lecture 10 - Integrating Metrics for Strategic Decision Making
Lecture 11 - Market Share, Relative Market Share and Market Concentration
Lecture 12 - BDI, CDI and Penetration Metrics
Lecture 13 - Share of Requirements and Usage Index
Lecture 14 - AAU, Customer Satisfaction and Willingness To Recommend
Lecture 15 - Net Promoter, Willingness To Search and Neuromarketing
Lecture 16 - Introduction to Customer Segmentation
Lecture 17 - RFM Customer Segmentation
Lecture 18 - ABC Customer Segmentation
Lecture 19 - Metrics for Customer Segmentation in Digital Marketing
Lecture 20 - Introduction to Channel Management Metrics
Lecture 21 - Foundations and Customer Metrics
Lecture 22 - Customer Profit
Lecture 23 - Customer Lifetime Value
Lecture 24 - Introduction to Prospect Lifetime Value
Lecture 25 - Economies Behind Acquisition
Lecture 26 - Introduction to Customer Churn
Lecture 27 - Predicting Churn, Signals, Models, and Validation
Lecture 28 - Churn Economics and Validation
Lecture 29 - Combating Churn

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Lecture 30 - Churn Dashboard and Operating Model
Lecture 31 - Trial, Repeat, Penetration, and Volume Projections
Lecture 32 - Growth: Percentage and CAGR
Lecture 33 - Cannibalization Rates and Fair Share Draw
Lecture 34 - Brand Equity Metrics
Lecture 35 - Conjoint Utilities: Consumer Preference, Segmentation and Volume Projection
Lecture 36 - Price Premium and Related Metrics
Lecture 37 - Reservation Price, Percent Good Value and Linear Demand
Lecture 38 - Price Elasticity of Demand
Lecture 39 - Optimal Prices and Linear and Constant Demand Functions
Lecture 40 - 'Own,' 'Cross,' and 'Residual' Price Elasticity
Lecture 41 - Promotion Management: An Overview
Lecture 42 - Baseline Sales, Incremental Sales, and Promotional Lift
Lecture 43 - Redemption Rates for Coupons/Rebates
Lecture 44 - Promotions and Pass-Through
Lecture 45 - Price Waterfall
Lecture 46 - Sales Force Coverage, Sales Force Goals and Sales Force Results
Lecture 47 - Sales Force Compensation and Pipeline Analysis
Lecture 48 - Numeric, ACV and PCV Distribution, Facings/Share of Shelf
Lecture 49 - Supply Chain Metrics
Lecture 50 - SKU Profitability: Markdowns, GMROII, and DPP
Lecture 51 - Introduction to Sales Forecasting
Lecture 52 - Modeling Trends and Seasonality
Lecture 53 - Online Metrics and Web Analytics
Lecture 54 - Online Metrics and Web Analytics - II
Lecture 55 - Social Media and Mobile Metrics
Lecture 56 - From Marketing Outcomes to Financial Results
Lecture 57 - Return on Investment and Economic Profit
Lecture 58 - Project Metrics and Marketing Return to Investment
Lecture 59 - DuPont Model and Sales Decomposition
Lecture 60 - Marketing Mix Models and Communication of Metrics

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NPTEL Video Course - Management - Strategic Marketing - Contemporary Issues

Subject Co-ordinator - Prof. Jayanta Chatterjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Strategic Marketing
Lecture 2 - Strategic Marketing
Lecture 3 - Strategic Marketing
Lecture 4 - Strategic Marketing
Lecture 5 - Strategic Marketing
Lecture 6 - Strategic Marketing
Lecture 7 - Strategic Marketing
Lecture 8 - Strategic Marketing
Lecture 9 - Strategic Marketing
Lecture 10 - Strategic Marketing
Lecture 11 - Strategic Marketing
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Lecture 13 - Strategic Marketing
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Lecture 26 - Strategic Marketing
Lecture 27 - Strategic Marketing
Lecture 28 - Strategic Marketing
Lecture 29 - Strategic Marketing

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Lecture 30 - Strategic Marketing
Lecture 31 - Strategic Marketing
Lecture 32 - Strategic Marketing
Lecture 33 - Strategic Marketing
Lecture 34 - Strategic Marketing
Lecture 35 - Strategic Marketing
Lecture 36 - Strategic Marketing
Lecture 37 - Strategic Marketing

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NPTEL Video Course - Management - NOC:Strategy: An Introduction to game Theory

Subject Co-ordinator - Prof. Aditya K. Jagannatham, Dr. Vimal Kumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Examples
Lecture 2 - Prisonersâ Dilemma
Lecture 3 - Best Response and Nash Equilibrium
Lecture 4 - Another Example
Lecture 5 - Dominant Strategies
Lecture 6 - Stag Hunt â Coordination and Bank Runs
Lecture 7 - Battle of Sexes and Multiple Nash Equilibria
Lecture 8 - Tragedy of Commons
Lecture 9 - Tragedy of Commons
Lecture 10 - Cournot Duopoly
Lecture 11 - Cournot Duopoly
Lecture 12 - Mixed Strategies
Lecture 13 - Battle of Sexes
Lecture 14 - Battle of Sexes
Lecture 15 - Paying Taxes
Lecture 16 - Portfolio Management Game
Lecture 17 - Rationality, Choice and Common Knowledge
Lecture 18 - Lterated Elimination of Domination Strategies
Lecture 19 - Auction
Lecture 20 - Auction
Lecture 21 - Traffic at Equilibrium and Braesss Paradox
Lecture 22 - Linear Markets
Lecture 23 - Extensive Form Games
Lecture 24 - Game Tree and Information Sets
Lecture 25 - Strategies in Extensive from Games
Lecture 26 - Extensive from Games with Simultaneous Moves and Their Normal From Representation
Lecture 27 - Sub Game Perfect Equilibrium Part-I
Lecture 28 - Sub Game Perfect Equilibrium Part-II
Lecture 29 - The Art of War

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Lecture 30 - Ultimatum Game
Lecture 31 - Stackelberg Model
Lecture 32 - Bayesian Games
Lecture 33 - Bayesian Game
Lecture 34 - Bayesian Nash Equilibrium
Lecture 35 - Yield vs Fight
Lecture 36 - Yield vs. Fight
Lecture 37 - Bayesian Cournot Game
Lecture 38 - Bayesian Games with mixed strategies
Lecture 39 - Auctions
Lecture 40 - Sealed Bid First Price Auction
Lecture 41 - Expected Revenue
Lecture 42 - Bayesian Second Price Auction
Lecture 43 - Expected Revenue
Lecture 44 - All Pay Auction
Lecture 45 - A Hawk-Dove Game
Lecture 46 - Evolutionary Biology
Lecture 47 - Evolutionary stable Strategy (ESS)
Lecture 48 - ESS and NE
Lecture 49 - Repeated Games
Lecture 50 - Finitely Repeated Game having Multiple Equilibriums
Lecture 51 - Chain-Store Paradox
Lecture 52 - Infinitely Repeated Game
Lecture 53 - Non Cooperative Bargaining
Lecture 54 - Axiomatic Bargaining
Lecture 55 - Extensive Form Game with Incomplete Information
Lecture 56 - Introduction to perfect Bayesian Equilibrium
Lecture 57 - Obtaining PBE
Lecture 58 - Gift Game

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NPTEL Video Course - Management - NOC:Managing Services

Subject Co-ordinator - Prof. Jayanta Chatterjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Service?
Lecture 2 - Evolving Service Markets
Lecture 3 - The Service Customers
Lecture 4 - Product Service Systems
Lecture 5 - The Service Act
Lecture 6 - Seamless Service
Lecture 7 - Service Management Elements
Lecture 8 - Core Vs. Supplementary Services
Lecture 9 - Intangibility of Services
Lecture 10 - Response to IHIP Challenges
Lecture 11 - Process & Promotion
Lecture 12 - Process Issues in Service
Lecture 13 - Challenges of Services-1
Lecture 14 - Service Uniqueness-2
Lecture 15 - Consumer in the Services Flow-1
Lecture 16 - Service Consumer Behavior-2
Lecture 17 - Customer Co Creation of Services-1
Lecture 18 - Customer Co Creation of Services-2
Lecture 19 - Current Service Map to New Service Design
Lecture 20 - Current Service Map to New Service Design.
Lecture 21 - Case Study on Service Excellence-1
Lecture 22 - Case Study on Service Excellence-2
Lecture 23 - Services Excellence - Culture
Lecture 24 - People in Services
Lecture 25 - Position - Value Proposition-1
Lecture 26 - Position - Value Proposition-2
Lecture 27 - Branding Services-1
Lecture 28 - Distributing Services
Lecture 29 - Distributing Services

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Lecture 30 - Network of Services
Lecture 31 - Strategy for Service Businesses
Lecture 32 - Strategy for Service Businesses.
Lecture 33 - Strategy for Service Businesses..
Lecture 34 - Pricing - Basic Concepts
Lecture 35 - Service Pricing
Lecture 36 - Service Pricing.
Lecture 37 - Service Quality-I
Lecture 38 - Service Quality-II
Lecture 39 - Service Quality-III
Lecture 40 - Service Complaints and Recovery Strategies
Lecture 41 - Loyalty - Relationship-I
Lecture 42 - Loyalty - Relationship-II
Lecture 43 - Strategy Canvas - Service Portfolio Analysis
Lecture 44 - Loyalty - Relationship
Lecture 45 - Managing Partner Relationships
Lecture 46 - Global Service Ecosystem - Contemporary Issues
Lecture 47 - Service Ecosystem - Service Innovation
Lecture 48 - Services as Systems

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NPTEL Video Course - Management - NOC:Quantitative Finance

Subject Co-ordinator - Dr. Raghu Nandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 2 (Continued) - Part 1
Lecture 2 (Continued) - Part 2
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Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
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Lecture 26
Lecture 27

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Lecture 28
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Lecture 44
Lecture 45
Lecture 46
Lecture 47
Lecture 48

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NPTEL Video Course - Management - NOC:Marketing Management-I

Subject Co-ordinator - Prof. Jayanta Chatterjee, Dr. Shashi Shekhar Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Defining Marketing
Lecture 2 - Core Concepts in Marketing
Lecture 3 - Case Studies
Lecture 4 - Marketing of Services
Lecture 5 - Evolution of Marketing
Lecture 6 - Contemporary Issues in Modern Marketing Practices
Lecture 7 - Introduction to Competitor Analysis
Lecture 8 - Marketing Objectives
Lecture 9 - Strategy and Core Competency
Lecture 10 - PESTEL Framework
Lecture 11 - Competitive Analysis
Lecture 12 - Case Study
Lecture 13 - Introduction To Marketing Information System
Lecture 14 - Components of a Marketing Information System
Lecture 15 - Marketing Research Process
Lecture 16 - MDP and MRP
Lecture 17 - Exploratory Research
Lecture 18 - Exploratory Research (Continued...)
Lecture 19 - Causal Research
Lecture 20 - Measurment and Scaling
Lecture 21 - Questionnaire and Sampling
Lecture 22 - Sampling Techniques
Lecture 23 - Data Collection, Preparation and Analysis
Lecture 24 - Multivariate Data Analysis
Lecture 25 - Introduction to Consumer Behviour and Need Recognition
Lecture 26 - Information Search
Lecture 27 - Socio-Cultural Influences on the Consumer Buying Process
Lecture 28 - Psychological Influences on Consumer Buying Process
Lecture 29 - Evaluation of Alternatives

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Lecture 30 - Purchase and Post Purchase Evaluation
Lecture 31 - Service Consumption
Lecture 32 - Structural Models of Attitude
Lecture 33 - Industrial Buyer Behaviour - I
Lecture 34 - Industrial Buyer Behaviour - II
Lecture 35 - Industrial Marketing Program and Buying Process
Lecture 36 - Three Dimension of Industrial Buyer Behaviour
Lecture 37 - Consumer Decision-Making Process Revisited
Lecture 38 - Identifying and Choosing Oppurtunities
Lecture 39 - Market Segmentation - I
Lecture 40 - Market Segmentation - II
Lecture 41 - Segmentation and Targeting
Lecture 42 - Segmentationa and Post Segmentation Strategies
Lecture 43 - Introduction to Marketing Strategy
Lecture 44 - Positioning
Lecture 45 - Segmentation and Targeting in B2B Market
Lecture 46 - Crafting the Positioning and Branding Effectively

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NPTEL Video Course - Management - NOC:Marketing Management-II

Subject Co-ordinator - Prof. Jayanta Chatterjee, Dr. Shashi Shekhar Mishra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Recap of Basic Concepts from Marketing Management 1 - I
Lecture 2 - Brief Recap of Basic Concepts from Marketing Management 1 - II
Lecture 3 - Product - An Important Component of the 4P
Lecture 4 - New Product Development - I
Lecture 5 - New Product Development - II
Lecture 6 - Entreprenuerial Marketing
Lecture 7 - Screening New Product Ideas
Lecture 8 - Diffusion of Innovation
Lecture 9 - Product Life Cycle and Introduction to Strategy
Lecture 10 - Strategy for New Product Introduction - I
Lecture 11 - Strategy for New Product Introduction - II
Lecture 12 - Marketing Strategies for Different Stages in PLC
Lecture 13 - Introduction to Brand, Branding and Brand Equity
Lecture 14 - Strategic Brand Management Process
Lecture 15 - Brand Building - I
Lecture 16 - Brand Building - II
Lecture 17 - Secondary Associations of a Brand and Advantages of Brand
Lecture 18 - Measuring Brand Equity and other Brand Related Constructs
Lecture 19 - Global Dimensions of Brands
Lecture 20 - Brand Message and Advantage of Brand
Lecture 21 - Branding Strategies - I
Lecture 22 - Branding Strategies - II
Lecture 23 - Strategic Brand Management
Lecture 24 - Creating a Powerful Brand
Lecture 25 - Introduction to Pricing
Lecture 26 - Considerations for Setting the Price
Lecture 27 - Determing the Demand and Cost Estimation
Lecture 28 - Cost Estimation and Break Even Analysis
Lecture 29 - Different Methods of Pricing - I

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Lecture 30 - Different Methods of Pricing - II
Lecture 31 - Introduction to Distribution
Lecture 32 - Types of Channel and their Dynamics
Lecture 33 - Different Channel Options
Lecture 34 - Integrated Marketing Channel
Lecture 35 - Retailing and Wholesaling - I
Lecture 36 - Retailing and Wholesaling - II
Lecture 37 - Retail Marketing Management
Lecture 38 - Choosing Retail Location and Layout
Lecture 39 - Introduction to Integrated Marketing Communications
Lecture 40 - Models of Communication
Lecture 41 - Designing and Implementing Marketing Communication
Lecture 42 - Digital Marketing Communication
Lecture 43 - Introduction to Services Marketing
Lecture 44 - Characteristics of Services
Lecture 45 - Failure of Service and Solutions
Lecture 46 - Service Quality
Lecture 47 - Recap of Important Concepts - I
Lecture 48 - Recap of Important Concepts - II

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NPTEL Video Course - Management - NOC:Project Management

Subject Co-ordinator - Prof. Raghunandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Project Management
Lecture 2 - Introduction to Agile Project Management
Lecture 3 - Project Management Process for a Project - I
Lecture 4 - Project Management Process for a Project - II
Lecture 5 - Project Management Process for a Project - III
Lecture 6 - Project Stakeholder and Risk Management
Lecture 7 - Project Risk Management
Lecture 8 - Solving Project Management Decision Problems
Lecture 9 - Project Risk Management Analysis - I
Lecture 10 - Project Risk Management Analysis - II
Lecture 11 - Analytic Hierarchy Process for Project Selection
Lecture 12 - Decision Tree Analysis
Lecture 13 - Decision Tree Analysis and Risk Management
Lecture 14 - Application of Utility Theory in Project Management - I
Lecture 15 - Application of Utility Theory in Project Management - II
Lecture 16 - Application of Utility Theory in Project Management - III
Lecture 17 - Application of Utility Theory in Project Management - IV
Lecture 18 - Other Criteria used for Project Selection
Lecture 19 - Work Breakdown Structure in Project Management
Lecture 20 - Activity Networks used in Project Management
Lecture 21 - Concept of Critical Path Method (CPM) and Introduction to PERT
Lecture 22 - Program Evaluation Review Technique (PERT) - I
Lecture 23 - Program Evaluation Review Technique (PERT) - II
Lecture 24 - Aspects and applications of CPM and PERT
Lecture 25 - Concepts of a Project Life Cycle
Lecture 26 - Discounting Rates and Project Pricing
Lecture 27 - Concept of Forward Rates and Payback Time
Lecture 28 - Important Example of PERT Network involving Probabilistic time and variance
Lecture 29 - Scheduling and Crashing of Jobs

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Lecture 30 - Resource levelling and resource constraint
Lecture 31 - Detailed Explanation on Crashing of Jobs
Lecture 32 - Project scheduling and Crashing Â An Example
Lecture 33 - Earned Value Management
Lecture 34 - Key components of Earned Value Management
Lecture 35 - Introduction to Graphical Evaluation and Review Technique (GERT) - I
Lecture 36 - Graphical Evaluation and Review Technique (GERT) - II
Lecture 37 - Graphical Evaluation and Review Technique (GERT) - III
Lecture 38 - Graphical Evaluation and Review Technique (GERT) - IV
Lecture 39 - Graphical Evaluation and Review Technique (GERT) - V
Lecture 40 - Q-GERT

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NPTEL Video Course - Management - NOC:Systems Engineering: Theory and Practice

Subject Co-ordinator - Dr. Deepu Philip

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Systems Engineering Â What is, origin and examples
Lecture 2 - Systems Engineering as a profession
Lecture 3 - Systems Engineering Management (SEM)
Lecture 4 - SEM - Lifecycle Integration
Lecture 5 - Systems Engineering - Modern Version
Lecture 6 - Overview of Systems Engineering Process
Lecture 7 - System Design Process
Lecture 8 - Systems View Point
Lecture 9 - Complex Systems and System Development Process
Lecture 10 - System Environments
Lecture 11 - System Interfaces and Interactions
Lecture 12 - System Development Process
Lecture 13 - System Engineering Life Cycle Stages
Lecture 14 - System Engineering Life Cycle Stages (Continued...)
Lecture 15 - Requirement Analysis
Lecture 16 - Requirement Analysis (Continued...)
Lecture 17 - Unmanned Aerial Systems - A Systems Engineering Case Study
Lecture 18 - Discussion about Systems Engineering and System Thinking with Professor Ian Angell
Lecture 19 - Demonstration of real life systems by the Indian Army
Lecture 20 - Need Analysis
Lecture 21 - Functional Analysis
Lecture 22 - Functional Flow Block Diagram
Lecture 23 - Quality Function Deployment
Lecture 24 - Timeline Analysis Sheet and Requirement Allocation Sheet
Lecture 25 - Design Synthesis
Lecture 26 - Design Synthesis (Continued...)
Lecture 27 - Design Synthesis Tools

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NPTEL Video Course - Management - NOC:Total Quality Management - I

Subject Co-ordinator - Prof. Raghunandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quality and its Dimensions
Lecture 2 - Quality and Variability
Lecture 3 - History of Quality Control
Lecture 4 - Management Aspects of Quality - I
Lecture 5 - Management aspects of Quality - II
Lecture 6 - Introduction to Concepts of Probability
Lecture 7 - Six Sigma Overview
Lecture 8 - DMAIC for Problem Solving
Lecture 9 - DMAIC exmaples and DMADV
Lecture 10 - Quality Improvement
Lecture 11 - 7 Old Tools for Quality Assurance
Lecture 12 - 7 New Tools for Quality Assurance
Lecture 13 - CPM, PDPC and Introduction To House of Quality
Lecture 14 - Building the House of Quality
Lecture 15 - Introduction to Acceptance Sampling
Lecture 16 - The Operating Characteristic Curve
Lecture 17 - The OC curve and Sampling Plans
Lecture 18 - Double Sampling
Lecture 19 - Sequential Sampling, Military Standard and Introduction to R
Lecture 20 - Basic Understanding of R and Introduction to Control Charts
Lecture 21 - Basics of X bar and R chart
Lecture 22 - Usage of X bar chart and R chart
Lecture 23 - Variable Sample Size in X bar and R chart
Lecture 24 - Patterns in Charts
Lecture 25 - S chart and OC curve
Lecture 26 - S square chart and MR chart
Lecture 27 - Attribute charts- The p chart
Lecture 28 - np control chart
Lecture 29 - Estimating control limits with varying sample size

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Lecture 30 - OC curve, c and u charts
Lecture 31 - u, g and h chart
Lecture 32 - Introduction to Process Capability Analysis
Lecture 33 - PCR calculation and Gauge Capability
Lecture 34 - Introduction to ISO 9000

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NPTEL Video Course - Management - NOC:Management of New Products and Services

Subject Co-ordinator - Prof. Jayanta Chatterjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Similarities and Differences
Lecture 2 - Theoretical Foundations I Competitive Strategy
Lecture 3 - Theoretical Foundations II Product Strategy
Lecture 4 - Theoretical Foundations III Understanding Customer Behaviour
Lecture 5 - Theoretical Foundations IV Product Life Cycle (PLC) and Chasm
Lecture 6 - Theoretical Foundations V Product Platforms and Portfolios
Lecture 7 - Theoretical Foundations VI Understanding Customers (STP)
Lecture 8 - STP continued
Lecture 9 - Understanding Product Platforms
Lecture 10 - The Idea Generation process
Lecture 11 - Creating Customer Value Proposition
Lecture 12 - Lean Product Process
Lecture 13 - Estimating Marketing and Sales Potential
Lecture 14 - Introduction to New Product Forecasting Techniques
Lecture 15 - Diffusion process and Product Life Cycle
Lecture 16 - Technology Adoption Life Cycle and Crossing the Chasm
Lecture 17 - Managing New Products in Large Organizations
Lecture 18 - Introduction to the Stage Gate model
Lecture 19 - What is a Lean Startup
Lecture 20 - The Business Model Canvas
Lecture 21 - Introduction to Intellectual Property Rights
Lecture 22 - Taking the Product to the Market - Deployment Strategies

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NPTEL Video Course - Management - NOC:Total Quality Management-II

Subject Co-ordinator - Prof. Raghunandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Statistics
Lecture 2 - Introduction to Probability Theory
Lecture 3 - Distribution of a Random Variable - I
Lecture 4 - Distribution of a Random Variable - II
Lecture 5 - Part-I
Lecture 6 - Part-II
Lecture 7 - Confidence Interval III and the introduction to Hypothesis Testing
Lecture 8 - Hypothesis Testing
Lecture 9 - The Analysis of Variance (ANOVA) - I
Lecture 10 - The Analysis of Variance (ANOVA) - II
Lecture 11 - The Analysis of Variance (ANOVA) - III
Lecture 12 - The Analysis of Variance (ANOVA) - IV
Lecture 13 - The Analysis of Variance (ANOVA) - V
Lecture 14 - The Analysis of Variance (ANOVA) - VI
Lecture 15 - The Analysis of Variance (ANOVA) - VII and Introduction to Factorial Design
Lecture 16 - Factorial Designs - I
Lecture 17 - Factorial Designs - II
Lecture 18 - Factorial Designs - III
Lecture 19 - Factorial Designs - IV
Lecture 20 - Factorial Designs - V
Lecture 21 - Factorial Designs - VI
Lecture 22 - Factorial Designs - VII
Lecture 23 - Factorial Designs - VIII
Lecture 24 - Two level Fractional Factorial Design - I
Lecture 25 - Two level Fractional Factorial Design - II
Lecture 26 - Two level Fractional Factorial Design - III
Lecture 27 - Two level Fractional Factorial Design - IV
Lecture 28 - Two level Fractional Factorial Design - V
Lecture 29 - Two level Fractional Factorial Design - VI

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Lecture 30 - Two level Fractional Factorial Design - VII
Lecture 31 - Additional Design and Analysis Topics for Factorial and Fractional Factorial Designs - I
Lecture 32 - Additional Design and Analysis Topics for Factorial and Fractional Factorial Designs - II
Lecture 33 - Confounding in the 3^k Factorial Design - I
Lecture 34 - Confounding in the 3^k Factorial Design - II
Lecture 35 - Fractional Replication of the 3^k Factorial Design
Lecture 36 - Fitting Regression Models - I
Lecture 37 - Fitting Regression Models - II
Lecture 38 - Fitting Regression Models - III

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NPTEL Video Course - Management - NOC:Practitioners Course In Descriptive, Predictive and Prescriptive Analyt

Subject Co-ordinator - Dr. Amandeep Singh, Dr. Deepu Philip

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Analytics for Decision Making Support
Lecture 3 - Decision Needs and Analytics
Lecture 4 - Systems, Models and Modeling Process
Lecture 5 - Types of Models
Lecture 6 - Data and its Types
Lecture 7 - Overview of Probability
Lecture 8 - Statistics and Analytics (Private)
Lecture 9 - Descriptive Statistics â Graphical Tools (Private)
Lecture 10 - Frequency Distribution and Histogram
Lecture 11 - Stem and Leaf Plot
Lecture 12 - Box Plots
Lecture 13 - Business Intelligence and Analytics
Lecture 14 - Normal Distribution
Lecture 15 - Sampling
Lecture 16 - Sampling Techniques
Lecture 17 - Hypothesis Testing
Lecture 18 - Hypothesis Testing continued
Lecture 19 - Machine Learning
Lecture 20 - Correlation
Lecture 21 - Correlation continued
Lecture 22 - Regression
Lecture 23 - Analysis of Varience (ANOVA) - Part 1
Lecture 24 - Analysis of Varience (ANOVA) - Part 2
Lecture 25 - Machine Learning - Part 2
Lecture 26 - Machine Learning - Part 3
Lecture 27 - Machine Learning - Part 4
Lecture 28 - Machine Learning - Part 5

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NPTEL Video Course - Management - NOC:Microeconomics: Theory and Applications

Subject Co-ordinator - Prof. Deep Mukerjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Major themes in Microeconomics - Part 1
Lecture 3 - Major themes in Microeconomics - Part 2
Lecture 4 - Basic differential calculus
Lecture 5 - Demand Function
Lecture 6 - Comparative Statics and Marshallian Consumer Theory
Lecture 7 - Marshallian Consumer Theory (Continued...)
Lecture 8 - Optimization Theory and Techniques - Part 1
Lecture 9 - Optimization Theory and Techniques - Part 2
Lecture 10 - Practice Session
Lecture 11 - Indifference Curves - Part 1
Lecture 12 - Indifference Curves - Part 2
Lecture 13 - Consumer Equilibrium - Part 1
Lecture 14 - Consumer Equilibrium - Part 2
Lecture 15 - Income consumption curve (ICC) and related issues
Lecture 16 - Price consumption curves and related issues
Lecture 17 - Slutsky Equation
Lecture 18 - Price Change and Consumer Welfare - Part 1
Lecture 19 - Price Change and Consumer Welfare - Part 2
Lecture 20 - Price Change and Consumer Welfare - Part 3
Lecture 21 - Intertemporal Choice - Part 1
Lecture 22 - Intertemporal Choice - Part 2
Lecture 23 - Introduction to Risk
Lecture 24 - Consumer Choice Involving Risk - Part 1
Lecture 25 - Consumer Choice Involving Risk - Part 2
Lecture 26 - Neoclassical Production Function
Lecture 27 - Isoquants - Part 1
Lecture 28 - Isoquants - Part 2
Lecture 29 - Cobb-Douglass production function

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Lecture 30 - Firm's Optimization Problems - Part 1
Lecture 31 - Firm's Optimization Problems - Part 2
Lecture 32 - Cost Function - Part 1
Lecture 33 - Cost function - Part 2
Lecture 34 - Short-run Cost Curves
Lecture 35 - Long-run Cost Curves
Lecture 36 - Short-run Equilibrium of firm
Lecture 37 - Short-run equilibrium of firm and supply function
Lecture 38 - Long-run equilibrium of a competitive firm - Part 1
Lecture 39 - Long-run equilibrium of a competitive firm - Part 2
Lecture 40 - Long-run Equilibrium of Competitive Industry
Lecture 41 - Welfare Analysis of Competitive Market
Lecture 42 - Welfare Analysis of Government Intervention on Competitive Market - Part 1
Lecture 43 - Welfare Analysis of Government Intervention in Competitive Market - Part 2
Lecture 44 - Monopoly - Part 1
Lecture 45 - Monopoly - Part 2
Lecture 46 - Discriminating Monopoly
Lecture 47 - Practice session (Monopoly)
Lecture 48 - Oligopoly - Part 1
Lecture 49 - Oligopoly - Part 2
Lecture 50 - Model for Cartel Behaviour
Lecture 51 - Practice session (Oligopoly)
Lecture 52 - Externality and Market Failure - Part 1
Lecture 53 - Externality and Market Failure - Part 2
Lecture 54 - Linear Programming - Part 1
Lecture 55 - Linear Programming - Part 2
Lecture 56 - Linear Programming - Part 3
Lecture 57 - Linear Programming - Part 4
Lecture 58 - Linear Regression - Part 1
Lecture 59 - Linear Regression - Part 2
Lecture 60 - Linear Regression - Part 3
Lecture 61 - Linear Regression - Part 4

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NPTEL Video Course - Management - NOC:Data Analysis and Decision Making-I

Subject Co-ordinator - Prof. Raghunandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Data Representation and Frequency
Lecture 3 - Frequency Table and Mean
Lecture 4 - Descriptive Statistics
Lecture 5 - Introduction To Probability
Lecture 6 - Conditional Probability
Lecture 7 - Baye'S Theorem And Distributions
Lecture 8 - Binomial Distribution
Lecture 9 - Hypergeometric, Poisson, Normal Distribution
Lecture 10 - Distribution Function
Lecture 11 - Normal Distribution
Lecture 12 - Sampling
Lecture 13 - Some Distributions
Lecture 14 - More on Distributions
Lecture 15 - Estimators
Lecture 16 - MLE
Lecture 17 - Statistical Inference
Lecture 18 - Hypothesis Testing
Lecture 19 - Hypothesis Testing
Lecture 20 - Hypothesis Testing
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26 - Forecasting
Lecture 27 - Forecasting
Lecture 28 - Data Properties
Lecture 29 - Multivariate Statistical Analysis

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Lecture 30 - Multivariate Statistical Analysis
Lecture 31 - Multivariate Statistical Analysis
Lecture 32 - Multivariate Statistical Analysis
Lecture 33 - Multivariate Distribution
Lecture 34 - Multivariate Extreme Value Distribution
Lecture 35 - Mle Estimates
Lecture 36 - Mle Estimates
Lecture 37 - Copula Theory
Lecture 38 - PCA
Lecture 39 - PCA
Lecture 40 - Factor Analysis
Lecture 41 - Factor Analysis
Lecture 42 - Introduction to Utility Theory
Lecture 43 - Utility Analysis
Lecture 44 - Decision Sciences
Lecture 45 - Utility Functions
Lecture 46 - Exponential Utility Function
Lecture 47 - Risk Concepts
Lecture 48 - Utility Theory Axioms
Lecture 49 - Utility Analysis
Lecture 50 - Chebyshev'S Inequality
Lecture 51 - Loss Function
Lecture 52 - Loss Function
Lecture 53 - Loss Function and MLR
Lecture 54 - MLR
Lecture 55 - Loss Function
Lecture 56 - Cannonical Correlation
Lecture 57 - cannonical Correlation (Continued...)
Lecture 58 - Structural Equation Modeling (SEM)
Lecture 59 - SEM
Lecture 60 - SEM

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NPTEL Video Course - Management - NOC:Economics of Health and Health Care

Subject Co-ordinator - Prof. Deep Mukerjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Health
Lecture 2 - Health Economics Map and Health Expenditure
Lecture 3 - Utility
Lecture 4 - Indifference Curve
Lecture 5 - Budget Line
Lecture 6 - Theory of Demand
Lecture 7 - Theory of Supply
Lecture 8 - Price Elasticity of Demand
Lecture 9 - Income Elasticity of Demand and Price Elasticity of Supply
Lecture 10 - Production Function
Lecture 11 - Relationship Between AP, MP and Law of Diminishing Marginal Returns
Lecture 12 - Long Run Production Function and Isoquant
Lecture 13 - Returns to Scale
Lecture 14 - Iso-Cost Curve and Co-production
Lecture 15 - Introduction to Cost Theory
Lecture 16 - Break-even Point and Long Run Cost Curve
Lecture 17 - Cost-Volume-Profit Analysis
Lecture 18 - Costing in a Hospital System
Lecture 19 - Choice in Healthcare
Lecture 20 - Measurements based on Choices
Lecture 21 - Grossman's Demand Model
Lecture 22 - Market Structures and Perfect Competition
Lecture 23 - Market Imperfection
Lecture 24 - Ideal Healthcare Market Conditions
Lecture 25 - Imperfect in Healthcare Markets
Lecture 26 - Building Blocks of Health Systems and Health Financing
Lecture 27 - Mechanisms of Health Financing
Lecture 28 - Introduction to health insurance
Lecture 29 - Important concepts of health insurance

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Lecture 30 - Strategies for Private Health Insurance companies
Lecture 31 - Types of health insurance and Death Spiral
Lecture 32 - Third Party Administrator.
Lecture 33 - Managed Care Organizations
Lecture 34 - Reinsurance
Lecture 35 - What is Economic Evaluation?
Lecture 36 - Cost Minimization Analysis and Cost Effectiveness Analysis
Lecture 37 - Cost-utility Analysis
Lecture 38 - Cost-Benefit Analysis
Lecture 39 - Types of Goods- Excludability and Rivalry in Consumption
Lecture 40 - Public Goods, Common Resources and decision making based on Cost-Benefit Analysis
Lecture 41 - Tragedy of Commons and Evaluation Framework
Lecture 42 - Fundamental concepts of economic externalities
Lecture 43 - External cost, external benefit and efficient output
Lecture 44 - External cost, external benefit and efficient output
Lecture 45 - Economics of Health and Healthcare
Lecture 46 - Development Indices
Lecture 47 - Social Determinants of Health
Lecture 48 - Fundamental Concepts and Theories Related to Population,Health and Development
Lecture 49 - Population Composition and demographic Dividend
Lecture 50 - Theories Related to Fertility, Population Growth and Socio-Economic Advancements
Lecture 51 - Underwriting

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NPTEL Video Course - Management - NOC:Simulation of Business Systems: An Applied Approach

Subject Co-ordinator - Dr. Deepu Philip

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Simulation
Lecture 2 - Terminologies in Simulation
Lecture 3 - How to Built Simulation Model
Lecture 4 - Components of Discrete Event Simulation
Lecture 5 - A Simple Example
Lecture 6 - Terminologies and Like Approaches
Lecture 7 - Monte-Carlo Simulation
Lecture 8 - How to build Simulation? - Major considerations
Lecture 9 - Basic Simulation terms and Illustrative examples
Lecture 10 - Steps in a Simulation Study
Lecture 11 - An introduction to ARENA
Lecture 12 - Simulation experiments using ARENA
Lecture 13 - Probability and Statistics for simulation
Lecture 14 - Pareto Analysis
Lecture 15 - Frequency Distribution
Lecture 16 - Simulation of Tandem Queues using ARENA
Lecture 17 - Simulation with ARENA
Lecture 18 - Simulation with ARENA
Lecture 19 - Simulation with ARENA
Lecture 20 - Stem and Leaf Display
Lecture 21 - Tecnomatix
Lecture 22 - Tecnomatix
Lecture 23 - Tecnomatix
Lecture 24 - Probability Distributions - I
Lecture 25 - Probability Distributions - II
Lecture 26 - Valid Model for Input Data

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NPTEL Video Course - Management - NOC:Management of Field Sales

Subject Co-ordinator - Prof. Jayanta Chatterjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Management of Field Sales
Lecture 2 - Sales Role and Activities
Lecture 3 - Value added selling and Non Verbal Messages
Lecture 4 - Communication Styles in Field Sales
Lecture 5 - Managing Product Life cycle
Lecture 6 - From Product To Benefit
Lecture 7 - The Sales Process
Lecture 8 - Prospecting
Lecture 9 - From Prospecting to Preparing the Sales Call
Lecture 10 - The Buying Process
Lecture 11 - Approaching the Customer with Adaptive Selling
Lecture 12 - Interactive Sales Presentation
Lecture 13 - Consultative Questioning Strategy
Lecture 14 - Account Evaluation - Long Term Approach
Lecture 15 - Negotiating Buyer Concerns
Lecture 16 - Sales Force Structure
Lecture 17 - Leading the Sales Force
Lecture 18 - Sales Force Motivation
Lecture 19 - Forecasting Sales and Developing Budgets
Lecture 20 - Understanding Sales Analytics

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NPTEL Video Course - Management - NOC:Data Analysis and Decision Making-II

Subject Co-ordinator - Prof. Raghunandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Utility Analysis
Lecture 2 - Utility Analysis
Lecture 3 - Utility Analysis
Lecture 4 - Utility Analysis
Lecture 5 - Utility Analysis
Lecture 6 - Utility Analysis
Lecture 7 - Utility Analysis
Lecture 8 - Utility Analysis
Lecture 9 - Decisions and Utility Analysis
Lecture 10 - Safety first principle
Lecture 11 - Loss Function
Lecture 12 - Loss Function
Lecture 13 - Balanced Loss Function
Lecture 14 - DEA
Lecture 15 - DEA
Lecture 16 - DEA
Lecture 17 - DEA
Lecture 18 - Decision Trees
Lecture 19 - Decision Trees
Lecture 20 - Decision Trees
Lecture 21 - AHP
Lecture 22 - AHP
Lecture 23 - AHP
Lecture 24 - AHP
Lecture 25 - AHP
Lecture 26 - ELECTRE
Lecture 27 - ELECTRE
Lecture 28 - ELECTRE
Lecture 29 - ELECTRE

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Lecture 30 - ELECTRE
Lecture 31 - TOPSIS
Lecture 32 - TOPSIS
Lecture 33 - TOPSIS
Lecture 34 - TOPSIS
Lecture 35 - TOPSIS
Lecture 36 - VIKOR
Lecture 37 - VIKOR
Lecture 38 - VIKOR
Lecture 39 - VIKOR
Lecture 40 - VIKOR
Lecture 41 - MAUT
Lecture 42 - MAUT
Lecture 43 - MAUT
Lecture 44 - multi-objective optimization
Lecture 45 - reliability based optimization
Lecture 46 - Optimization
Lecture 47 - Goal programming
Lecture 48 - GERT
Lecture 49 - Demand model
Lecture 50 - Bass model
Lecture 51 - GERT
Lecture 52 - GERT
Lecture 53 - GERT
Lecture 54 - AIS
Lecture 55 - AIS
Lecture 56 - AIS
Lecture 57 - AIS
Lecture 58 - ANN
Lecture 59 - Metaheuristics techniques
Lecture 60 - General Concepts

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NPTEL Video Course - Management - NOC:Advanced Green Manufacturing Systems

Subject Co-ordinator - Dr. Deepu Philip, Dr. Amandeep Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Significance of manufacturing
Lecture 2 - Productivity in manufacturing
Lecture 3 - Product lifecycle
Lecture 4 - Introduction to optimization
Lecture 5 - Mathematical modeling example
Lecture 6 - Rules of modeling
Lecture 7 - Modeling with continuous variable - Part 1
Lecture 8 - Modeling with continuous variable - Part 2
Lecture 9 - Value Engineering Green Plan
Lecture 10 - Value Engineering Green Plan
Lecture 11 - Value Engineering Green Plan
Lecture 12 - Value Engineering Green Plan - FAST diagramming
Lecture 13 - Value Engineering - Case Study
Lecture 14 - Value Engineering Green Plan - Paired comparison technique
Lecture 15 - Creativity Techniques
Lecture 16 - Frugal Innovation
Lecture 17 - Green Quality Function Deployment - Part 1
Lecture 18 - Green Quality Function Deployment - Part 2
Lecture 19 - Solving optimization problems
Lecture 20 - Solving optimization problems using MS Excel
Lecture 21 - MS Excel Solver demonstration
Lecture 22 - Solving optimization problems using MS Excel
Lecture 23 - Design of Experiments for Factor Selection
Lecture 24 - Fundamental Techniques of Experimentation
Lecture 25 - Simple Comparative Experiments
Lecture 26 - ANOVA - Part 1
Lecture 27 - ANOVA - Part 2
Lecture 28 - ANOVA - Part 3
Lecture 29 - Design for Environment - Part 1

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Lecture 30 - Design for Environment - Part 2
Lecture 31 - Design for Environment - Part 3
Lecture 32 - Design for Environment - Part 4
Lecture 33 - Life Cycle Assessment, EIO-LCA tool
Lecture 34 - Life Cycle Assessment, process based software
Lecture 35 - Introduction to Factorial Experiments
Lecture 36 - Statistical Analysis in Factorial Experiments
Lecture 37 - Numerical Analysis in Factorial Experiments - Part 1
Lecture 38 - Numerical Analysis in Factorial Experiments - Part 2
Lecture 39 - Overview of Optimization Methods - Part 1
Lecture 40 - Overview of Optimization Methods - Part 2
Lecture 41 - Green Factory through Green Unit Processes - Part 1
Lecture 42 - Green Factory through Green Unit Processes - Part 2
Lecture 43 - Green Factory Simulation - Part 1
Lecture 44 - Green Factory Simulation - Part 2
Lecture 45 - Green Factory Simulation - Part 3
Lecture 46 - Advanced Green Manufacturing Systems course summary

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NPTEL Video Course - Management - NOC:Data Analysis and Decision Making-III

Subject Co-ordinator - Prof. Raghunandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Linear Programming
Lecture 3 - Linear Programming
Lecture 4 - Utility Analysis
Lecture 5 - Utility Analysis
Lecture 6 - Utility Theory
Lecture 7 - Utility Theory
Lecture 8 - Utility Analysis
Lecture 9 - Safety First Principle
Lecture 10 - Safety First Principle (Continued...)
Lecture 11 - Optimization
Lecture 12 - Optimization
Lecture 13 - Optimization
Lecture 14 - Optimization
Lecture 15 - Simplex Method
Lecture 16 - Simplex Method
Lecture 17 - Simplex Method
Lecture 18 - Simplex Method
Lecture 19 - Optimization
Lecture 20 - Simplex Method
Lecture 21 - Simplex Method
Lecture 22 - Simplex Method
Lecture 23 - Simplex Method
Lecture 24 - Optimization
Lecture 25 - Optimization
Lecture 26 - Optimization
Lecture 27 - Simplex Method
Lecture 28 - Simplex Method
Lecture 29 - Simplex Method

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Lecture 30 - Transportation Problem
Lecture 31 - Transportation Problem
Lecture 32 - Transportation Problem
Lecture 33 - Transportation Problem
Lecture 34 - Transportation Problem
Lecture 35 - Loss Function
Lecture 36 - DEA
Lecture 37 - DEA
Lecture 38 - DEA
Lecture 39 - Gomory Cutting Plane Algorithm
Lecture 40 - Gomory Cutting Plane Algorithm
Lecture 41 - Integer Programming
Lecture 42 - Integer Programming
Lecture 43 - Integer Programming
Lecture 44 - Quadratic Programming
Lecture 45 - Portfolio Optimization
Lecture 46 - Chance Constraint Problem
Lecture 47 - Branch and Bound
Lecture 48 - Branch and Bound
Lecture 49 - Branch and Bound
Lecture 50 - Branch and Bound
Lecture 51 - Quadratic Programming
Lecture 52 - Steepest Descent
Lecture 53 - Reliability Based Optimization
Lecture 54 - Reliability Based Optimization
Lecture 55 - Reliability Based Optimization
Lecture 56 - Sequential Optimization and Reliability Assessment
Lecture 57 - Reliability/Stochastic Optimization
Lecture 58 - Reliability/Stochastic Optimization
Lecture 59 - Robustness
Lecture 60 - Robustness

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NPTEL Video Course - Management - NOC:Artificial Intelligence (AI) for Investments

Subject Co-ordinator - Prof. Abhinava Tripathi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 44

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NPTEL Video Course - Management - NOC:Brand Management

Subject Co-ordinator - Prof. Abhishek Kumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brands and Marketplace
Lecture 2 - Brands and Marketplace (Continued...)
Lecture 3 - Product Vs Brand
Lecture 4 - Product Vs Brand (Continued...)
Lecture 5 - Brand Management - The Activity
Lecture 6 - Brand Management - The Activity (Continued...)
Lecture 7 - Brand Associations as Raw Material
Lecture 8 - Brand Associations as Raw Material (Continued...)
Lecture 9 - Minning Brand Associations
Lecture 10 - Minning Brand Associations (Continued...)
Lecture 11 - Unearthing Brand Iceberg
Lecture 12 - Unearthing Brand Iceberg (Continued...)
Lecture 13 - Brand Personality
Lecture 14 - Brand Personality (Continued...)
Lecture 15 - Brand Identity
Lecture 16 - Brand Identity (Continued...)
Lecture 17 - Brand Positioning and Repositioning - Part A
Lecture 18 - Brand Positioning and Repositioning - Part A (Continued...)
Lecture 19 - Brand Positioning and Repositioning - Part B
Lecture 20 - Brand Positioning and Repositioning - Part B (Continued...)
Lecture 21 - Brand Positioning and Repositioning (Continued...)
Lecture 22 - Evolution of Brand Manager System
Lecture 23 - Evolution of Brand Manager System (Continued...)
Lecture 24 - Evolution of Brand Manager System - Part B (Continued...)
Lecture 25 - Brand Extensions
Lecture 26 - Brand Extensions (Continued...)
Lecture 27 - Brand Architecture - Part 1
Lecture 28 - Brand Architecture - Part 1 (Continued...)
Lecture 29 - Brand Architecture - Part 2

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Lecture 30 - Brand Architecture - Part 2 (Continued...)
Lecture 31 - Relationship Between Pricing and Brand Positioning
Lecture 32 - Relationship Between Pricing and Brand Positioning (Continued...)
Lecture 33 - Pricing - A Tool for Brand Management
Lecture 34 - Pricing - A Tool for Brand Management (Continued...)
Lecture 35 - Marketing Brand Equity
Lecture 36 - Marketing Brand Equity (Continued...)
Lecture 37 - Financial Brand Equity
Lecture 38 - Financial Brand Equity (Continued...)
Lecture 39 - Brands Serving Psycho-Socio Functions
Lecture 40 - Brand Management - Glossary

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NPTEL Video Course - Management - NOC:Advanced Business Decision Support Systems

Subject Co-ordinator - Prof. Deepu Philip, Dr. Amandeep Singh Oberoi, Dr. Prabal Pratap Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Management - NOC:Advanced Algorithmic Trading and Portfolio Management

Subject Co-ordinator - Prof. Abhinava Tripathi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Management - NOC:Advanced Financial Instruments for Sustainable Business and Decentraliz

Subject Co-ordinator - Prof. Abhinava Tripathi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Management - NOC:Multivariate Procedures with R

Subject Co-ordinator - Prof. Narendra K Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - R Software and its Installation
Lecture 2 - Help, Documentation, Examples, Packages and Libraries
Lecture 3 - Command Line and Data Editor
Lecture 4 - Introduction to R Studio
Lecture 5 - R as a Calculator
Lecture 6 - Calculation with Data Vectors and Built-in Function
Lecture 7 - Matrix Operations
Lecture 8 - Matrix Operations
Lecture 9 - Univariate Data-Central Tendency and Variability
Lecture 10 - Bivariate Data
Lecture 11 - Missing Data Handling
Lecture 12 - Measuring Central Tendency with Missing Data
Lecture 13 - Measuring Variation with Missing Data
Lecture 14 - Coefficient of Variation and Summary
Lecture 15 - Boxplots and Grouped Boxplots
Lecture 16 - Bar Diagram, Subdivided and Multiple Bar Diagrams
Lecture 17 - Pie Diagram, Histogram and Multiple Histogram
Lecture 18 - Scatter Plots, Smooth Scatter Plots and Matrix Plots
Lecture 19 - Three Dimensional Plots, Star Plots and Chernoff Faces
Lecture 20 - Continuous and Discrete
Lecture 21 - Probability Functions
Lecture 22 - Probability Functions for Continuous Bivariate and Multivariate Random Variables
Lecture 23 - Theoretical Properties
Lecture 24 - Application in R Software
Lecture 25 - Bivariate Normal and Multivariate Normal Distributions in R
Lecture 26 - Chi Square (X2), t and F Distribution
Lecture 27 - Point and Interval Estimation
Lecture 28 - Maximum Likelihood Estimation
Lecture 29 - Basics of Tests of Hypothesis

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Lecture 30 - Test and Confidence Interval for Mean in One Sample with Known Variance in Univariate Data
Lecture 31 - Test and Confidence Interval for Mean in One Sample with Unknown Variance in Univariate Data
Lecture 32 - Tests for Mean in Two Samples with Univariable Data
Lecture 33 - Analysis of Variance and Homogeneity of Variances with Univariate Data
Lecture 34 - Tests for Mean Vector with Multivariate Data in One Sample
Lecture 35 - Tests for Mean Vector with Multivariate Data in Two Sample
Lecture 36 - Centering, Scaling and Z-Scores
Lecture 37 - Introduction and Basic Concepts
Lecture 38 - Estimation of Parameters
Lecture 39 - Model Fitting with R Software
Lecture 40 - Test of Hypothesis and Confidence Interval Estimation on Individual Regression Coefficients
Lecture 41 - Analysis of Variance and Implementation in R Software
Lecture 42 - Goodness of Fit and Testing of Normality
Lecture 43 - Logistic Regression Model
Lecture 44 - Introduction to Classification
Lecture 45 - Bayes Procedure for Classification
Lecture 46 - Classification Procedure for Multivariate Normal Distributions
Lecture 47 - Classification Procedure and Analysis in R
Lecture 48 - Basic Concepts and Definitions
Lecture 49 - Hierarchical Classification
Lecture 50 - Hierarchical Classification and Analysis with R
Lecture 51 - Hierarchical Classification with Examples in R
Lecture 52 - Concepts and Theoretical Setup
Lecture 53 - Principle Component and Its Graphical Analysis in R
Lecture 54 - Canonical Variables and Concepts
Lecture 55 - Statistical Analysis of Canonical Variables
Lecture 56 - Canonical Variables Analysis in R

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NPTEL Video Course - Management - NOC:Business Marketing - Technology Focus

Subject Co-ordinator - Prof. Jayanta Chatterjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to B2B Marketing
Lecture 2 - Tech Marketing
Lecture 3 - Technology life cycle, networks and platforms
Lecture 4 - Organization Markets and Competition
Lecture 5 - Organization Buying decsions
Lecture 6 - Researching Business Markets
Lecture 7 - Design and Tech Market
Lecture 8 - Customer Driven Innovation, New Product Management
Lecture 9 - Market Segments - Technology Focus
Lecture 10 - PLC and TALC
Lecture 11 - Crossing the Chasm
Lecture 12 - B2B Brands - 1
Lecture 13 - B2B Brands - 2
Lecture 14 - B2B Pricing Basics
Lecture 15 - Critical Underpinning Concepts
Lecture 16 - Pricing (Continued...)
Lecture 17 - Pricing Summary
Lecture 18 - B2B Sales
Lecture 19 - Supply Chain
Lecture 20 - Marketing Communicaion
Lecture 21 - Digital Marketing
Lecture 22 - Digital Relationship Management
Lecture 23 - E-Marketing Tools
Lecture 24 - E-Market Place
Lecture 25 - B2B E-Commerce
Lecture 26 - Electronic Auction
Lecture 27 - E-Procurement
Lecture 28 - Marketing as Strategy - I
Lecture 29 - Marketing as Strategy - II

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Lecture 30 - LIVE Session (JCB, TATA Steel, THERMAX)
Lecture 31 - Marketing Orientation
Lecture 32 - Marketing - R&D interaction
Lecture 33 - Marketing Metrics
Lecture 34 - Sample Question and Answers

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NPTEL Video Course - Management - NOC:Advanced R Programming for Data Analytics in Business

Subject Co-ordinator - Prof. Abhinava Tripathi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of R
Lecture 2 - Data cleaning
Lecture 3 - Data Visualization - Part 1
Lecture 4 - Data Visualization - Part 2
Lecture 5 - Introduction to Probability Theory
Lecture 6 - Conditional Probabilities and Bayes Theorem
Lecture 7 - Random Variables and Probability Distributions
Lecture 8 - Binomial Distribution
Lecture 9 - Continuous Random Variables and Normal Distribution
Lecture 10 - Descriptive Analytics: Measures of Central Tendency
Lecture 11 - Descriptive Analytics: Measures of Variability and Shape
Lecture 12 - Statistical Inference: Sampling
Lecture 13 - Statistical Inference: Central Limit Theorem and Confidence Intervals
Lecture 14 - Statistical Inference: Hypothesis testing
Lecture 15 - Introduction to R
Lecture 16 - Inferential statistics: R Implementation
Lecture 17 - Statistical Inference: Sampling
Lecture 18 - Hypothesis Testing: R Implementation
Lecture 19 - Regression Modelling - Part 1
Lecture 20 - Regression Modelling - Part 2
Lecture 21 - Regression Algorithm: Application - Part 1
Lecture 22 - Regression Algorithm: Application - Part 2
Lecture 23 - Classification Algorithms: Logit/Probit Regression - Part 1
Lecture 24 - Classification Algorithms: Logit/Probit Regression - Part 2
Lecture 25 - Classification Algorithms: Application - Part 1
Lecture 26 - Classification Algorithms: Application - Part 2
Lecture 27 - Advanced Data Visualization - Part 1
Lecture 28 - Advanced Data Visualization - Part 2
Lecture 29 - Introduction to Panel Data Modelling

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Lecture 30 - Panel data application and implementation with R
Lecture 31 - Advanced Time-Series Models
Lecture 32 - Introduction to ARMA process
Lecture 33 - Forecasting with ARMA models
Lecture 34 - Non-stationarity, Cointegration, and Error correction Models
Lecture 35 - Return and Volatility Modelling and Forecasting
Lecture 36 - Maximum Likelihood Estimation (MLE)
Lecture 37 - Quantile Regression - Part A
Lecture 38 - Quantile Regression - Part B
Lecture 39 - Solar Panel Marketing Case Study
Lecture 40 - PCA and Clustering - Part 1
Lecture 41 - PCA and clustering - Part 2
Lecture 42 - Tutorial - HR Analytics - Part 1
Lecture 43 - Tutorial - HR Analytics - Part 2
Lecture 44 - Application of Logistic Regression - Part 1
Lecture 45 - Application of logistic regression - Part 2

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NPTEL Video Course - Management - NOC:Advanced Financial Analytics

Subject Co-ordinator - Prof. Abhinava Tripathi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Teaching Assistants (TA)
Lecture 2 - Introduction to R
Lecture 3 - Data Cleaning with R
Lecture 4 - Data Visualization
Lecture 5 - Data Visualization with GGPLOT
Lecture 6 - Regression Modelling - Part 1
Lecture 7 - Regression Modelling - Part 2
Lecture 8 - Regression Algorithm : Application - Part 1
Lecture 9 - Regression Algorithm : Application - Part 2
Lecture 10 - Introduction to Market Microstructure
Lecture 11 - Introduction to Risk and Return
Lecture 12 - Portfolio Theory and Asset Pricing Models
Lecture 13 - Introduction to Portfolio Construction
Lecture 14 - Advanced Portfolio Optimization - Part 1
Lecture 15 - Advanced Portfolio Optimization - Part 2
Lecture 16 - Portfolio Construction with R - Part 1
Lecture 17 - Portfolio Construction with R - Part 2
Lecture 18 - Portfolio Construction with R - Part 3
Lecture 19 - Tutorial on Data Visualization
Lecture 20 - Tutorial on Portfolio Construction with Advanced Financial Market Instruments - Part 1
Lecture 21 - Tutorial on Portfolio Construction with Advanced Financial Market Instruments - Part 2
Lecture 22 - Introduction to Univariate Models - Part 1
Lecture 23 - Introduction to Univariate Models - Part 2
Lecture 24 - Introduction to ARMA Process
Lecture 25 - Non-Stationarity, Cointegration, and Error Correction Models - Part 1
Lecture 26 - Non-Stationarity, Cointegration, and Error Correction Models - Part 2
Lecture 27 - Volatility Modelling
Lecture 28 - Tail Risk Measurement: VaR and CVaR (or ES) models
Lecture 29 - Advanced Financial Markets Instruments: Return and Volatility Modelling and Forecasting

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Lecture 30 - Classification Algorithms: Logit/Probit Regression - Part 1
Lecture 31 - Classification Algorithms: Logit/Probit Regression - Part 2
Lecture 32 - Classification Algorithms: Application - Part 1
Lecture 33 - Classification Algorithms: Application - Part 2
Lecture 34 - Introduction to Panel Data Modelling
Lecture 35 - Panel Data Application and Implementation with R
Lecture 36 - Maximum Likelihood Estimation (MLE)
Lecture 37 - Quantile Regression - Part 1
Lecture 38 - Quantile Regression - Part 2
Lecture 39 - Quantile Regression: Income Expenditure Case Study
Lecture 40 - Trend Determining Techniques
Lecture 41 - Moving Average Indicators
Lecture 42 - Momentum Indicators - Part 1
Lecture 43 - Momentum Indicators - Part 2
Lecture 44 - R Application for Technical Analysis and Algorithmic Trading - Part 1
Lecture 45 - R Application for Technical Analysis and Algorithmic Trading - Part 2
Lecture 46 - Valuation of Fixed Income Securities
Lecture 47 - Valuation of Common Stocks
Lecture 48 - Cost of Capital
Lecture 49 - Yield to Maturity and Theories of Term Structure of Interest Rates - Part 1
Lecture 50 - Yield to Maturity and Theories of Term Structure of Interest Rates - Part 2
Lecture 51 - Duration and Convexity

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NPTEL Video Course - Management - NOC:Application of Forecasting, Regression and Time Series Models

Subject Co-ordinator - Prof. Raghu Nandan Sengupta

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Examples in Forecasting for Illustration
Lecture 2 - Quantitative and Qualitative Forecasting and Steps for Forecasting
Lecture 3 - Types of Forecasting and measures for Forecasting
Lecture 4 - Numerical Measures and Metrics of Forecasting
Lecture 5 - Examples of Forecasting; Auto Correlation Function and Correlogram
Lecture 6 - AIC, Ideas of Overfitting and Underfitting, Metrics of Analyzing
Lecture 7 - Example of Forecasting, Estimation of Interval Tolerance and Prediction
Lecture 8 - Distribution of Errors, Example of errors and MSE
Lecture 9 - Averaging Techniques
Lecture 10 - Averaging Techniques
Lecture 11 - Exponential Smoothing Forecasting Single Non-Adaptive Method
Lecture 12 - Exponential Smoothing Forecasting Multiple Non-Adaptive Parameters
Lecture 13 - Exponential Smoothing Single Adaptive Method - Part 1
Lecture 14 - Exponential Smoothing Single Adaptive Method - Part 2
Lecture 15 - Exponential Smoothing Single Adaptive Method - Part 3
Lecture 16 - Forecasting Example
Lecture 17 - Forecasting Example and Metrics used for analysing forecasting models
Lecture 18 - Exponential smoothing forecasting multiple adaptive method
Lecture 19 - Holt's Linear Method - Part 1
Lecture 20 - Holt's Linear Method - Part 2
Lecture 21 - Holt winter method (Additive Seasonality) - Part 1
Lecture 22 - Holt winter method (Additive Seasonality) - Part 2
Lecture 23 - Holt winter method (Multiplicative Seasonality) - Part 1
Lecture 24 - Holt winter method (Multiplicative Seasonality) - Part 2
Lecture 25 - Introduction of Regression
Lecture 26 - Introduction of Regression - Explanation with diagrams
Lecture 27 - Examples of Regression - Part 1
Lecture 28 - Examples of Regression - Part 2
Lecture 29 - Examples of Regression - Multiple Linear Regression

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Lecture 30 - Multiple Linear Regression
Lecture 31 - Multiple Linear Regression, homoscedasticity, heteroscedasticity, non-autocorrelation, autocorre
Lecture 32 - Multiple Linear Regression, OLS estimate of Î², Projection, Mean of estimate of Î², Variance of
Lecture 33 - Multiple Linear Regression, Unbiased Estimate of Ï 2 , CAPM, Market Line
Lecture 34 - Discussion about SLR in Finance
Lecture 35 - Examples of SLR and MLR in Finance
Lecture 36 - Examples of MLR Finance
Lecture 37 - Examples of MLR Finance and Others Areas
Lecture 38 - Examples of MLR Finance and Others Areas
Lecture 39 - LINEX Loss Function, Estimation Under LINEX Loss Function
Lecture 40 - LINEX Loss Function, Expected Value of Loss, Risk of Estimation
Lecture 41 - LINEX loss function
Lecture 42 - Balanced loss function
Lecture 43 - Other loss function
Lecture 44 - Logistic Regression
Lecture 45 - Non linear regression
Lecture 46 - Multiple linear regression
Lecture 47 - Non linear Regression
Lecture 48 - Exponential Regression model
Lecture 49 - Logistic Response model
Lecture 50 - Probit Regression Models
Lecture 51 - Introduction to Time Series Models
Lecture 52 - Auto Covariance and correlation function
Lecture 53 - Stationarity and Non stationarity
Lecture 54 - Autoregressive Integrated Moving Average
Lecture 55 - Invertible and non invertible
Lecture 56 - Auto Regressive (AR) Process, Stationarity, Causality
Lecture 57 - ARMA(p,q), Autocovariance Function, Autocorrelation Function, Partial Autocorrelation Function
Lecture 58 - Stationary, Non stationary, Mean squared Error, Preliminy Estimation, Maximum Likelihood Estimat
Lecture 59 - GARCH Volatility Clustering, Box- Pierce LM, AGARCH Conditional Heteroscedasticity, Conditional
Lecture 60 - ARCH (p), GARCH (p,q) and why it is Related to ARCH, EGARCH, Ljung - Box - Pierce Q-Test

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NPTEL Video Course - Management - NOC:Economic Analysis for Management

Subject Co-ordinator - Prof. Vinay Ramani

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Demand and Supply - Introduction
Lecture 2 - Demand and Supply - Part I
Lecture 3 - Demand and Supply - Part II
Lecture 4 - Demand and Supply - Part III
Lecture 5 - Factors Affecting the Demand Curve
Lecture 6 - Factors affecting Demand and Supply - Part 1
Lecture 7 - Factors affecting Demand and Supply - Part 2
Lecture 8 - Factors affecting Demand and Supply - Part 3
Lecture 9 - Price Elasticity of Demand - Part 1
Lecture 10 - Price Elasticity of Demand - Part 2
Lecture 11 - Price Elasticity of Demand - Part 3
Lecture 12 - Price Elasticity of Demand - Part 4
Lecture 13 - Marginal Analysis - Part 1
Lecture 14 - Marginal Analysis - Part 2
Lecture 15 - Marginal Analysis - Part 3
Lecture 16 - Marginal Analysis - Part 4
Lecture 17 - Marginal Analysis - Part 5
Lecture 18 - Marginal Analysis - Part 6
Lecture 19 - Consumer Choice - Part 1
Lecture 20 - Consumer Choice - Part 2
Lecture 21 - Consumer Choice - Part 3
Lecture 22 - Consumer Choice - Part 4
Lecture 23 - Consumer Choice - Part 5
Lecture 24 - Consumer Choice - Part 6
Lecture 25 - Consumer Choice - Part 7
Lecture 26 - Consumer Choice Applications - Part 1
Lecture 27 - Consumer Choice Applications - Part 2
Lecture 28 - Consumer Choice Applications - Part 3
Lecture 29 - Consumer Choice Applications - Part 4

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Lecture 30 - Producer Theory - Part 1
Lecture 31 - Producer Theory - Part 2
Lecture 32 - Producer Theory - Part 3
Lecture 33 - Producer Theory - Part 4
Lecture 34 - Cost Minimization - Part 1
Lecture 35 - Cost Minimization - Part 2
Lecture 36 - Cost Minimization - Part 3
Lecture 37 - Cost Minimization - Part 4
Lecture 38 - Labor Demand Curve - Part 1
Lecture 39 - Labor Demand Curve - Part 2
Lecture 40 - Cost Curve - Part 1
Lecture 41 - Cost Curve - Part 2
Lecture 42 - Cost Curve - Part 3
Lecture 43 - Cost Curve - Part 4
Lecture 44 - Perfect Competition - Part 1
Lecture 45 - Perfect Competition - Part 2
Lecture 46 - Perfect Competition - Part 3
Lecture 47 - Perfect Competition - Part 4
Lecture 48 - Perfect Competition - Part 5
Lecture 49 - Perfect Competition - Part 6
Lecture 50 - Welfare Analysis - Part 1
Lecture 51 - Welfare Analysis - Part 2
Lecture 52 - Welfare Analysis - Part 3
Lecture 53 - Welfare Analysis - Part 4
Lecture 54 - Welfare Analysis - Part 5
Lecture 55 - Monopoly and Regulation - Part 1
Lecture 56 - Monopoly and Regulation - Part 2
Lecture 57 - Monopoly and Regulation - Part 3
Lecture 58 - Price Discrimination - Part 1
Lecture 59 - Price Discrimination - Part 2
Lecture 60 - Price Discrimination - Part 3

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NPTEL Video Course - Management - Econometric Modelling

Subject Co-ordinator - Dr. Rudra P. Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Econometric Modelling
Lecture 2 - Structure of Econometric Modelling
Lecture 3 - Univariate Econometric Modelling
Lecture 4 - Bivariate Econometric Modelling
Lecture 5 - Bivariate Econometric Modelling (Continued...)
Lecture 6 - Probability
Lecture 7 - Bivariate Econometric Modelling
Lecture 8 - Bivariate Econometric Modelling (Continued...)
Lecture 9 - Reliability BEM
Lecture 10 - Reliability BEM (Continued...1)
Lecture 11 - Reliability BEM (Continued...2)
Lecture 12 - ANOVA for Bivariate Econometric Modelling
Lecture 13 - Trivariate Econometric Modelling
Lecture 14 - Trivariate Econometric Modelling (Continued...)
Lecture 15 - Reliability of Trivariate Econometric Modelling
Lecture 16 - Multivariate Econometric Modelling
Lecture 17 - Multivariate Econometric Modelling (Continued...)
Lecture 18 - Matrix Approach to Econometric Modelling
Lecture 19 - Matrix Approach to Econometric Modelling (Continued...)
Lecture 20 - Multicolinearity Problem
Lecture 21 - Multicolinearity Problem (Continued...)
Lecture 22 - Autocorrelation Problem
Lecture 23 - Autocorrelation Problem (Continued...)
Lecture 24 - Heteroscedasticity Problem
Lecture 25 - Heteroscedasticity Problem (Continued...)
Lecture 26 - Dummy Modelling
Lecture 27 - Dummy Modelling (Continued...)
Lecture 28 - LOGIT and PROBIT Model
Lecture 29 - LOGIT and PROBIT Model (Continued...)

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Lecture 30 - Panel Data Modelling
Lecture 31 - Panel Data Modelling (Continued...)
Lecture 32 - Simultaneous Equation Modelling
Lecture 33 - Simultaneous Equation Modelling (Continued...)
Lecture 34 - Structural Equation Modelling
Lecture 35 - Structural Equation Modelling (Continued...)
Lecture 36 - Time Series Modelling
Lecture 37 - Time Series Modelling (Continued...)
Lecture 38 - Unit Root
Lecture 39 - Cointegration
Lecture 40 - Concluding Remarks

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NPTEL Video Course - Management - Organizational Behaviour

Subject Co-ordinator - Dr. Susmita Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Organizational Behaviour
Lecture 2 - Effectiveness in Organizations
Lecture 3 - Social System and Organizational Culture
Lecture 4 - Social System and Organizational Culture (Continued...)
Lecture 5 - Individual differences and work behaviour
Lecture 6 - Personality
Lecture 7 - Personality (Continued...)
Lecture 8 - Attitudes
Lecture 9 - Attitudes (Continued...)
Lecture 10 - Attitudes (Continued...)
Lecture 11 - Perceptions and Attributions
Lecture 12 - Perceptions and Attributions (Continued...)
Lecture 13 - Motivation
Lecture 14 - Motivation (Continued...)
Lecture 15 - Job Design, Work and Motivation
Lecture 16 - Job Design, Work and Motivation (Continued...)
Lecture 17 - Evaluation, Feedback and Rewards
Lecture 18 - Evaluation, Feedback and Rewards (Continued...)
Lecture 19 - Managing Misbehaviour
Lecture 20 - Stress
Lecture 21 - Counseling
Lecture 22 - Informal and Formal Groups
Lecture 23 - Teams and Teambuilding
Lecture 24 - Managing Conflict and Negotiation
Lecture 25 - Managing Conflict and Negotiation (Continued...)
Lecture 26 - Power and Politics
Lecture 27 - Empowerment and Participation
Lecture 28 - Assertive Behaviour and Transactional Analysis
Lecture 29 - Communication

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Lecture 30 - Communication (Continued...)
Lecture 31 - Decision Making
Lecture 32 - Decision Making (Continued...)
Lecture 33 - Leadership
Lecture 34 - Leadership (Continued...)
Lecture 35 - Leadership (Continued...)
Lecture 36 - Organizational structure and Design
Lecture 37 - Organizational structure and Design (Continued...)
Lecture 38 - Organizational structure and Design (Continued...)
Lecture 39 - Change and Innovation
Lecture 40 - Change and Innovation (Continued...)
Lecture 41 - Organizational behaviour across cultures

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NPTEL Video Course - Management - Security Analysis and Portfolio Management

Subject Co-ordinator - Dr. Jitendra Mahakud, Dr. Chandra Sekhar Mishra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Investment Management
Lecture 2 - Markets for Investment
Lecture 3 - Risk and Return
Lecture 4 - Risk and Return (Continued...)
Lecture 5 - Organization and Function of Equity and Debt Markets
Lecture 6 - Mutual Funds
Lecture 7 - Market Efficiency - Concepts and forms of efficiency
Lecture 8 - Testing Market Efficiency
Lecture 9 - Financial Statement Analysis
Lecture 10 - Financial Statement Analysis (Continued...)
Lecture 11 - Valuation of Equity Shares - I
Lecture 12 - Valuation of Equity Shares - II
Lecture 13 - Economic Analysis - I
Lecture 14 - Economic Analysis - II
Lecture 15 - Industry Analysis - I
Lecture 16 - Industry Analysis - II
Lecture 17 - Company Analysis - I
Lecture 18 - Company Analysis - II
Lecture 19 - Technical Analysis - I
Lecture 20 - Technical Analysis - II
Lecture 21 - Introduction to Portfolio Management
Lecture 22 - Introduction to Portfolio Management (Continued...)
Lecture 23 - Capital Market Theory - I
Lecture 24 - Capital Market Theory - II
Lecture 25 - Arbitrage Pricing Theory
Lecture 26 - Multifactor Pricing Model
Lecture 27 - Markowitz Optimal Portfolio Selection Model
Lecture 28 - Other Optimal Portfolio Selection Models
Lecture 29 - Equity Portfolio Management Strategies - I

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Lecture 30 - Equity Portfolio Management Strategies - II
Lecture 31 - Introduction to Bond Analysis
Lecture 32 - Bond Pricing and Yield
Lecture 33 - Interest Rate
Lecture 34 - Bond Price Volatility
Lecture 35 - Bond Portfolio Management Strategies - I
Lecture 36 - Bond Portfolio Management Strategies - II
Lecture 37 - Derivatives - I
Lecture 38 - Derivatives - II
Lecture 39 - Portfolio Performance Evaluation - I
Lecture 40 - Portfolio Performance Evaluation - II

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NPTEL Video Course - Management - Six Sigma

Subject Co-ordinator - Prof. Tapan P. Bagchi

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concepts in Quality Management - I
Lecture 2 - Concepts in Quality Management - II
Lecture 3 - Concepts in Quality Management - III
Lecture 4 - Initiating Six Sigma
Lecture 5 - Review of Probability and Statistics - I
Lecture 6 - Review of Probability and Statistics - II
Lecture 7 - Review of Probability and Statistics - III
Lecture 8 - Review of Probability and Statistics - IV
Lecture 9 - QM Systems Overview
Lecture 10 - Cost of Quality and TQM Tools
Lecture 11 - QFD and ISO 9000
Lecture 12 - QS 9000 and Awards
Lecture 13 - Competing Through Service Quality
Lecture 14 - Introduction to Project Management
Lecture 15 - Project Life Cycle
Lecture 16 - Critical Path Method
Lecture 17 - Measurement System Analysis
Lecture 18 - Acceptance Sampling
Lecture 19 - Design of Sampling Plans
Lecture 20 - MIL-STD-105E Sampling Plan
Lecture 21 - Introduction to SPC
Lecture 22 - Control Chart Examples
Lecture 23 - Control Charts by Excel
Lecture 24 - Process Capability
Lecture 25 - Quality Function Deployment
Lecture 26 - Design of Experiments - Overview
Lecture 27 - Planning for DOE
Lecture 28 - Factor Effect Calculations
Lecture 29 - ANOVA in DOE

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Lecture 30 - Benchmarking in Six Sigma
Lecture 31 - How to Benchmark
Lecture 32 - Six Sigma in Supply Chains
Lecture 33 - Taguchi Methods
Lecture 34 - Robust Design
Lecture 35 - The Journey to Six Sigma
Lecture 36 - A Case Study of Defect Reduction
Lecture 37 - DFM & Reliability
Lecture 38 - Failure Modes & Effects Analysis (FMEA)
Lecture 39 - Implementing Six Sigma
Lecture 40 - Getting Results From Six Sigma

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NPTEL Video Course - Management - International Business Communication

Subject Co-ordinator - Prof. A. Malic

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Definitions & Concepts
Lecture 3 - Communicative Competence - I
Lecture 4 - Communicative Competence - II
Lecture 5 - Communicative Competence - III
Lecture 6 - Intercultural Communication - I
Lecture 7 - Intercultural Communication - II
Lecture 8 - Intercultural Communication - III
Lecture 9 - Intercultural Communication - Thought and Speech
Lecture 10 - Intercultural Communication - Thought and Speech (Continued...)
Lecture 11 - Intercultural Communication
Lecture 12 - Nonverbal Communication
Lecture 13 - Barriers to Communication
Lecture 14 - Barriers to Communication (Continued...)
Lecture 15 - Barriers to Communication (Continued...) & Listening
Lecture 16 - Listening (Continued...)
Lecture 17 - Communication Rules
Lecture 18 - Communication Style
Lecture 19 - Interpersonal Communication
Lecture 20 - Interpersonal Communication (Continued...)
Lecture 21 - Relational Communication
Lecture 22 - Relational Communication (Continued...)
Lecture 23 - Organizational Communication
Lecture 24 - Organizational Communication (Continued...)
Lecture 25 - Collaboration
Lecture 26 - Communication in Groups and Teams
Lecture 27 - Communication in Groups and Teams (Continued...1)
Lecture 28 - Communication in Groups and Teams (Continued...2)
Lecture 29 - Persuasive Communication

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Lecture 30 - Persuasive Communication (Continued...)
Lecture 31 - Negotiation and Conflict Management
Lecture 32 - Negotiation and Conflict Management (Continued...)
Lecture 33 - Leadership
Lecture 34 - Written Communication in International Business
Lecture 35 - Role of Technology in international Business Communication
Lecture 36 - Moving to Another Culture
Lecture 37 - Re-entry
Lecture 38 - Crisis Communication
Lecture 39 - Ethics in Business Communication
Lecture 40 - Conclusion

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NPTEL Video Course - Management - Consumer Behaviour

Subject Co-ordinator - Dr. Sangeeta Sahney

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Study of Consumer Behaviour
Lecture 2 - Introduction to the Study of Consumer Behaviour (Continued...)
Lecture 3 - Market Research and Consumer Behaviour
Lecture 4 - Market Research and Consumer Behaviour (Continued...)
Lecture 5 - Market Segmentation and Positioning
Lecture 6 - Market Segmentation and Positioning (Continued...)
Lecture 7 - The Consumer Decision Making Process
Lecture 8 - The Consumer Decision Making Process (Continued...)
Lecture 9 - Models of Consumers and Models of Consumer Behaviour
Lecture 10 - Models of Consumers and Models of Consumer Behaviour (Continued...)
Lecture 11 - Models of Consumers and Models of Consumer Behaviour (Continued...)
Lecture 12 - Models of Consumers and Models of Consumer Behaviour (Continued...)
Lecture 13 - Consumer Needs and Motivation, Emotions and Mood, Consumer Involvement
Lecture 14 - Consumer Needs and Motivation, Emotions and Mood, Consumer Involvement (Continued...)
Lecture 15 - Consumer Needs and Motivation, Emotions and Mood, Consumer Involvement (Continued...)
Lecture 16 - Consumer Needs and Motivation, Emotions and Mood, Consumer Involvement (Continued...)
Lecture 17 - Consumer Needs and Motivation, Emotions and Mood, Consumer Involvement (Continued...)
Lecture 18 - Consumer Learning
Lecture 19 - Consumer Learning (Continued...)
Lecture 20 - Consumer Learning (Continued...)
Lecture 21 - Consumer Learning (Continued...)
Lecture 22 - Personality, Self Concept and Self Image
Lecture 23 - Personality, Self Concept and Self Image (Continued...)
Lecture 24 - Consumer Perception, Risk and Imagery
Lecture 25 - Consumer Perception, Risk and Imagery (Continued...)
Lecture 26 - Consumer Perception, Risk and Imagery (Continued...)
Lecture 27 - Consumer Attitudes
Lecture 28 - Consumer Attitudes (Continued...)
Lecture 29 - Consumer Attitudes (Continued...)

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Lecture 30 - Consumer Communication
Lecture 31 - Consumer Communication (Continued...)
Lecture 32 - Consumer Groups and Reference Groups
Lecture 33 - Family and Family Life Cycle
Lecture 34 - Social Class and Mobility, Lifestyle Analysis
Lecture 35 - Culture, Sub-Culture and Cross-Culture
Lecture 36 - Culture, Sub-Culture and Cross-Culture (Continued...)
Lecture 37 - Interpersonal Communication and Influence
Lecture 38 - Opinion Leadership
Lecture 39 - Diffusion of Innovation
Lecture 40 - Diffusion of Innovation (Continued...)

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NPTEL Video Course - Management - International Finance

Subject Co-ordinator - Dr. Arun K. Misra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - International Financial Environment
Lecture 2 - International Financial Transactions
Lecture 3 - Gold Standard
Lecture 4 - Purchasing Power Parity
Lecture 5 - Floating and Fixed Exchange Rate Regimes
Lecture 6 - Currency Boards and Currency Basket Systems
Lecture 7 - Features of Foreign Exchange Market
Lecture 8 - Exchange Rate Arithmetic
Lecture 9 - Understanding Merchant Rates
Lecture 10 - Foreign Exchange Forward Contracts
Lecture 11 - Value at Risk for Foreign Exchange Market
Lecture 12 - International Parity Conditions and Movement Exchange Rate
Lecture 13 - Exchange Rate Determination and Forecasting
Lecture 14 - Development of Foreign Exchange Market in India
Lecture 15 - Foreign Exchange Exposures
Lecture 16 - Transaction Exposure Management
Lecture 17 - Foreign Exchange Futures Market for Transaction Exposure Management
Lecture 18 - Foreign Currency Options
Lecture 19 - Interest Rate Swaps
Lecture 20 - Currency Swaps
Lecture 21 - Operating Exposure Assessment
Lecture 22 - Operating Exposure Management
Lecture 23 - International Capital Structure and Capital Assets Pricing Model
Lecture 24 - International Capital Budgeting
Lecture 25 - Evaluation of Foreign Direct Investment
Lecture 26 - Cross Listing of Shares
Lecture 27 - International Financial Integration
Lecture 28 - World Trade Organisation
Lecture 29 - India's Forex Reserves Composition and Determinants of Optimum Reserves

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Lecture 30 - Movement of Exchange Rates in India
Lecture 31 - International Trade Theory
Lecture 32 - International Bond Market
Lecture 33 - India's Foreign Trade - Direction and Composition
Lecture 34 - Financial Stability
Lecture 35 - Test-1
Lecture 36 - Money and Forex Market Interaction
Lecture 37 - Test-2
Lecture 38 - Characteristics of Indian Foreign Exchange Market
Lecture 39 - Test-3
Lecture 40 - Test-4

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NPTEL Video Course - Management - Applied Multivariate Statistical Modeling

Subject Co-ordinator - Dr. J. Maiti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to multivariate statistical modeling
Lecture 2 - Introduction to multivariate statistical modeling (Continued...)
Lecture 3 - Univariate descriptive statistics
Lecture 4 - Sampling distribution
Lecture 5 - Estimation
Lecture 6 - Estimation (Continued...)
Lecture 7 - Hypothesis testing
Lecture 8 - Multivariate descriptive statistics
Lecture 9 - Multivariate descriptive statistics (Continued...)
Lecture 10 - Multivariate normal distribution
Lecture 11 - Multivariate normal distribution (Continued...)
Lecture 12 - Multivariate Inferential Statistics
Lecture 13 - Multivariate Inferential Statistics (Continued...)
Lecture 14 - ANOVA (Analysis of Varianace)
Lecture 15 - Analysis of Variance (Continued...)
Lecture 16 - Multivariate Analysis of Variance (MANOVA)
Lecture 17 - MANOVA (Continued...)
Lecture 18 - Tutorial - ANOVA
Lecture 19 - Tutorial ANOVA (Continued...)
Lecture 20 - MANOVA - Case Study
Lecture 21 - Multiple Regression â Introduction
Lecture 22 - MLR - Sampling distribution of regression coefficients
Lecture 23 - MLR - Model adequacy tests
Lecture 24 - MLR - Test of assumptions
Lecture 25 - MLR - Model diagnostics
Lecture 26 - MLR - Case Study
Lecture 27 - Multivariate Linear Regression
Lecture 28 - Multivariate Linear Regression - Estimation
Lecture 29 - Multivariate Linear Regression - Model Adequacy tests

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Lecture 30 - Principal Component Analysis (PCA)
Lecture 31 - PCA - Model Adequacy & Interpretation
Lecture 32 - Regression Modeling using SPSS
Lecture 33 - Factor Analysis
Lecture 34 - Factor Analysis - Estimation & Model Adequacy testing
Lecture 35 - Factor Analysis - Model Adequacy, rotation, factor scores & case study
Lecture 36 - Cluster Analysis
Lecture 37 - Cluster Analysis (Continued...)
Lecture 38 - Introduction to Structural Equation Modeling (SEM)
Lecture 39 - SEM - Measurement Model
Lecture 40 - SEM - Structural Model
Lecture 41 - Correspondence Analysis
Lecture 42 - Correspondence Analysis (Continued...)

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NPTEL Video Course - Nanotechnology - Economics, Management, Entrepreneurship

Subject Co-ordinator - Prof. P.K.J. Mohapatra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Market Equilibrium
Lecture 3 - Elasticity of Demand
Lecture 4 - Demand Forecasting
Lecture 5 - Production
Lecture 6 - Exercises on Economics
Lecture 7 - Cost - Volume - Profit Relationships
Lecture 8 - Cost Management Systems and Activity Costing Systems
Lecture 9 - Relevant Information and Decision Making
Lecture 10 - Cost Allocation
Lecture 11 - Exercises on Economics (Continued...)
Lecture 12 - Double - Entry Bookkeeping
Lecture 13 - Job Costing
Lecture 14 - Process Costing
Lecture 15 - The Master Budget
Lecture 16 - Flexible Budegst and Variance Analysis
Lecture 17 - Financial Statements
Lecture 18 - Financial Statements (Continued...)
Lecture 19 - Analysis of Financial Statements
Lecture 20 - Exercises (Continued...)
Lecture 21 - Time Value of Money
Lecture 22 - Comparison of Alternatives
Lecture 23 - Comparison of Alternatives (Continued...)
Lecture 24 - Comparison of Alternatives (Continued...)
Lecture 25 - Depreciation Accounting
Lecture 26 - Depreciation Accounting (Continued...)
Lecture 27 - Exercises
Lecture 28 - Evolution of Management Thoughts
Lecture 29 - Functions of Management

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Lecture 30 - Functions of Management (Continued...)
Lecture 31 - Functions of Management (Continued...)
Lecture 32 - Directing
Lecture 33 - Product Development
Lecture 34 - Forecasting Revisited
Lecture 35 - Forecasting Revisited (Continued...)
Lecture 36 - Forecasting Revisited (Continued...)
Lecture 37 - Capacity Planning
Lecture 38 - Capacity Planning (Continued...) and Plant Location
Lecture 39 - Product Service Strategies and Plant Layout
Lecture 40 - Plant Lauout (Continued...) and Production Planning and Control
Lecture 41 - Production Planning and Control (Continued...)
Lecture 42 - Inventory Management
Lecture 43 - Inventory Management (Continued...)
Lecture 44 - Supply Chain Management
Lecture 45 - Supply Chain Management (Continued...) and Marketing Management
Lecture 46 - Marketing Management (Continued...)
Lecture 47 - Forms of Ownership
Lecture 48 - Starting a New Company and Small - scale Industrial Undertakings
Lecture 49 - Capital Financing
Lecture 50 - Entrepreneurship - Final Words

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NPTEL Video Course - Management - NOC:Principles of Human Resource Management

Subject Co-ordinator - Prof. A Malik

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to HRM
Lecture 2 - Job Analysis and Design
Lecture 3 - Employee testing and selection
Lecture 4 - Performance appraisal
Lecture 5 - Performance evaluation and feedback
Lecture 6 - The Training process
Lecture 7 - General and Specific Training and Evaluation of Training
Lecture 8 - Career Management and planning
Lecture 9 - Career Development
Lecture 10 - Compensation
Lecture 11 - Pay for performance systems
Lecture 12 - Pay and Reward systems
Lecture 13 - Benefits
Lecture 14 - Separation and Administration of Benefits
Lecture 15 - Business Ethics
Lecture 16 - Ethical Aspects of HRM Activities
Lecture 17 - Employee Health
Lecture 18 - Employee Wellbeing in the Workplace
Lecture 19 - Organized Labor
Lecture 20 - Managing the Labor Relations Process
Lecture 21 - International HRM
Lecture 22 - Global Employment Law, Industrial Relations and International Ethics
Lecture 23 - Challenges to International HRM
Lecture 24 - Strategic HRM
Lecture 25 - Multilevel Model of Strategic HRM
Lecture 26 - Strategic HRM in a Networked World
Lecture 27 - Sustainable HRM
Lecture 28 - HR Measurement and Accountability
Lecture 29 - Types of Score Cards

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Lecture 30 - Discipline in Organizations
Lecture 31 - Dealing with Difficult Employees
Lecture 32 - Using HRM to Prevent the Need for Discipline

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NPTEL Video Course - Management - NOC:Commodity Derivatives and Risk Management

Subject Co-ordinator - Dr. Prabina Rajib

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Commodity Derivatives and Risk Management
Lecture 2 - Introduction to Commodity Derivatives and Risk Management (Continued...)
Lecture 3 - Futures Contract Specifications
Lecture 4 - Futures Contract Specifications (Continued...)
Lecture 5 - Futures Contract - Mark-to-Market Margin
Lecture 6 - Commodity Options and Commodity Spreads
Lecture 7 - Pricing and Valuations of Futures Contract
Lecture 8 - Pricing and Valuations of Futures Contract (Continued...)
Lecture 9 - Convenience Field, Contango-Backwardation
Lecture 10 - Commodity Basic Risk - Part I
Lecture 11 - Commodity Basic Risk - Part II
Lecture 12 - Minimum Variance Hedge Ratio - Part I
Lecture 13 - Minimum Variance Hedge Ratio - Part II
Lecture 14 - Commodity Indexes - Part I
Lecture 15 - Commodity Indexes - Part II
Lecture 16 - Agri-Commodity Price Risk Management - Part I
Lecture 17 - Agri-Commodity Price Risk Management - Part II
Lecture 18 - Seasonality in Agri-Commodity, Contango and Backwardation - Part I
Lecture 19 - Seasonality in Agri-Commodity, Contango and Backwardation - Part II
Lecture 20 - Commodity Prices Determination - Part I
Lecture 21 - Commodity Prices Determination - Part II
Lecture 22 - Crude Oil Derivatives - Part I
Lecture 23 - Crude Oil Price Determination
Lecture 24 - Spot-Futures Relationship in Crude Oil - Part I
Lecture 25 - Spot-Futures Relationship in Crude Oil - Part II
Lecture 26 - Hedging of Crude Oil and Refined Product Price Risk - Part I
Lecture 27 - Hedging of Crude Oil and Refined Product Price Risk - Part II
Lecture 28 - Introduction to Gold and Gold Derivatives
Lecture 29 - LBMA, Gold Spot Price and Gold Derivatives

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Lecture 30 - OTC Contracts on Gold and Gold Dehedge
Lecture 31 - Spot Trading of Electricity in India - Part I
Lecture 32 - Spot Trading of Electricity in India - Part II
Lecture 33 - Weather Derivatives - Part I
Lecture 34 - Weather Derivatives - Part II
Lecture 35 - Introduction to Carbon Credit Market
Lecture 36 - Carbon Derivatives
Lecture 37 - Physical Market for Freight, Freight Exchanges, Freight Indexes
Lecture 38 - Hedging Freight rate Risk with Freight Rate Derivatives
Lecture 39 - Metal Derivatives and London Metal Exchange (LME)
Lecture 40 - Real Estate Derivatives

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NPTEL Video Course - Management - NOC:Strategic Communication for Sustainable Development

Subject Co-ordinator - Prof. A Malik

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Models for Public Participation in Sustainable Development
Lecture 3 - Role of Communication in Sustainable Development
Lecture 4 - Sustainability Communication
Lecture 5 - Approaches to Sustainability Communication
Lecture 6 - Approaches to Sustainability Communication
Lecture 7 - Sociological Perspectives on Sustainability Communication
Lecture 8 - Psychological Perspectives on Sustainability Communication
Lecture 9 - Psychological Perspectives on Sustainability Communication (Continued...)
Lecture 10 - Steyn and Puth's Model for Communication Strategy
Lecture 11 - Application of Steyn and Puth's Model to Development
Lecture 12 - Tools of Strategic Communication for Sustainable Development
Lecture 13 - Role of Strategic Communication for Sustainable Development
Lecture 14 - Role of Stakeholders in Strategic Communication for Sustainable Development
Lecture 15 - Systems Approach to Identifying Decisive Information
Lecture 16 - Adapting CSR Communication Strategies to Sustainable Development
Lecture 17 - Strategic Conversations
Lecture 18 - Creating a Strategic Communication Plan
Lecture 19 - Communication for Behavioral Impact (COMBI) for Sustainable Development
Lecture 20 - Media and Sustainability Communication
Lecture 21 - ICTs in Sustainable Development
Lecture 22 - Community Informatics
Lecture 23 - Challenges to the use of ICTs in Sustainable Development Efforts
Lecture 24 - Wrap up and Conclusion

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NPTEL Video Course - Management - NOC:Consumer Behaviour

Subject Co-ordinator - Prof. Srabanti Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Consumer Behaviour
Lecture 2 - The Changing Patterns of Consumer Behaviour
Lecture 3 - Dimensions of Consumerism
Lecture 4 - Use of Market Segmentation in Consumer Behaviour
Lecture 5 - Process of Motivation
Lecture 6 - Theories of Motivation
Lecture 7 - Consumer Involvement
Lecture 8 - Case Study on Motivation and Involvement
Lecture 9 - Concept and Levels of Perception
Lecture 10 - Process of Perception
Lecture 11 - Theories of Personality - I
Lecture 12 - Theories of Personality - II
Lecture 13 - Brand Personality and Self concept
Lecture 14 - Theories of Learning
Lecture 15 - Attitude Formation - I
Lecture 16 - Attitude Formation - II
Lecture 17 - Changing Attitude
Lecture 18 - Exercise on Attitude Formation and Change
Lecture 19 - Values
Lecture 20 - AIO Classification
Lecture 21 - VALS - I Typology
Lecture 22 - VALS - TM Typology
Lecture 23
Lecture 24
Lecture 25 - Group Influences on Consumption
Lecture 26 - Role of Celebrity Endorsement
Lecture 27 - Concept of Family and Family Life Cycle
Lecture 28 - Family Buying Decisions
Lecture 29 - Diffusion of Innovations - I

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Lecture 30 - Diffusion of Innovations - II
Lecture 31 - Influencing Factors for Adoption and Opinion Leadership
Lecture 32 - Consumer Decision Making
Lecture 33 - Consumer Black Box Model
Lecture 34 - Models of Consumer Behaviour - I
Lecture 35 - Models of Consumer Behaviour - II
Lecture 36 - Models of Consumer Behaviour - III
Lecture 37 - Models of Consumer Behaviour - IV
Lecture 38 - Organisational Buying Behaviour - I
Lecture 39 - Organisational Buying Behaviour - II
Lecture 40 - Dimensions of Consumer Research

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NPTEL Video Course - Management - NOC:Foundation Course in Managerial Economics

Subject Co-ordinator - Prof. Barnali Nag

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles of Economics
Lecture 2 - Demand - Supply Framework
Lecture 3 - Determinants of Demand
Lecture 4 - Supply Curve, Determinants of Supply Curve
Lecture 5 - Demand Supply Equilibrium
Lecture 6 - Elasticity of Demand and Supply
Lecture 7 - Determinants of Elasticity of Demand
Lecture 8 - Elasticity and Revenue
Lecture 9 - Elasticity of Supply
Lecture 10 - Demand Supply and Government Policies
Lecture 11 - Demand Supply and Government Policies (Continued...)
Lecture 12 - Taxes and Demand and Supply Framework
Lecture 13 - Elasticity and Taxes
Lecture 14 - Efficiency and Market Equilibrium
Lecture 15 - Production and Cost
Lecture 16 - Costs
Lecture 17 - Cost Curves
Lecture 18 - LR and SR Cost Curves
Lecture 19 - Market Structures
Lecture 20 - Perfect Competition
Lecture 21 - Perfect Competition and Profit Maximization
Lecture 22 - Suppy Curve of Firm in Perfect Competition
Lecture 23 - Supply Curve of Market in Perfect Competition
Lecture 24 - Market Supply (Continued...)
Lecture 25 - Monopoly
Lecture 26 - Monopoly - Determination of Price and Quality
Lecture 27 - Monopoly - Supply and Efficiency
Lecture 28 - Price Discrimination
Lecture 29 - Public Policy and Regulation

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Lecture 30 - Monopolistic Competition
Lecture 31 - Monopolistic Competition - Determining P and K
Lecture 32 - Monopolistic Competition - Efficiency and Welfare
Lecture 33 - Monopolistic Competition - Advertising
Lecture 34 - Oligopoly
Lecture 35 - Oligopoly - Determining P and Q
Lecture 36 - Oligopoly - P and Q Outcomes with Example
Lecture 37 - Difference between Market Outcomes
Lecture 38 - Oligopoly - Game Theory
Lecture 39 - Oligopoly - Game Theory (Continued...)
Lecture 40 - Oligopoly Pricing
Lecture 41 - Public Policy in Oligopoly

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NPTEL Video Course - Management - NOC:Knowledge Management

Subject Co-ordinator - Prof. K. B. L. Srivastava

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to KM
Lecture 2 - Introduction to KM (Continued...)
Lecture 3 - Why KM ?
Lecture 4 - KM System Life Cycle (KSLC)
Lecture 5 - Aligning KM and business strategy
Lecture 6 - Process and models of KM cycle
Lecture 7 - Process and models of KM cycle (Continued...)
Lecture 8 - Knowledge creation and architecture
Lecture 9 - Capturing tacit knowledge
Lecture 10 - Capturing tacit knowledge (Continued...)
Lecture 11 - Knowledge codification
Lecture 12 - Knowledge codification
Lecture 13 - System development
Lecture 14 - System development
Lecture 15 - Knowledge transfer and knowledge sharing
Lecture 16 - Knowledge infrastructure
Lecture 17 - Knowledge infrastructure (Continued...)
Lecture 18 - Knowledge audit
Lecture 19 - The knowledge team
Lecture 20 - The knowledge team (Continued...)
Lecture 21 - Analysis, design of KM system
Lecture 22 - Analysis, design of KM system
Lecture 23 - Developing the KM system
Lecture 24 - Prototyping and deployment
Lecture 25 - Prototyping and deployment
Lecture 26 - Inferences from data
Lecture 27 - Inferences from data
Lecture 28 - Data mining
Lecture 29 - Data Management

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Lecture 30 - Knowledge portals
Lecture 31 - Evaluation of KM effectiveness
Lecture 32 - Metrics
Lecture 33 - Legal issues
Lecture 34 - Ethical Issues
Lecture 35 - Managerial issues
Lecture 36 - KM. Experiences form Indian companies
Lecture 37 - KM practices of select industries
Lecture 38 - KM practices of select industries
Lecture 39 - Linking KM with innovation and learning organization
Lecture 40 - Future of KM

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NPTEL Video Course - Management - NOC:Services Marketing: A Practical Approach

Subject Co-ordinator - Dr. Biplab Datta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Why Study Services Marketing Management?
Lecture 3 - The Service System
Lecture 4 - Characteristics of Services
Lecture 5 - Understanding the Macro-Environment - I
Lecture 6 - Understanding the Macro-Environment - II
Lecture 7 - Understanding the Macro-Environment - III and Understanding the Micro-Environment - I
Lecture 8 - Understanding the Micro-Environment - II
Lecture 9 - Services Marketing Process
Lecture 10 - Exploring Marketing Oppurtunities - I
Lecture 11 - Exploring Marketing Oppurtunities - II
Lecture 12 - Segmenting the Market, Targeting and Positioning
Lecture 13 - Services Marketing Research
Lecture 14 - Understanding Consumer Behaviour
Lecture 15 - New Service Development
Lecture 16 - The Service Product
Lecture 17 - Service Quality - I
Lecture 18 - Service Quality - II
Lecture 19 - Designing the Service Process - I
Lecture 20 - Designing the Service Process - II
Lecture 21 - Developing Service Personnel
Lecture 22 - Educating Customers
Lecture 23 - Managing Service Delivery Channels
Lecture 24 - Managing Channel Conflict
Lecture 25 - Managing Demand and Capacity - I
Lecture 26 - Managing Demand and Capacity - II
Lecture 27 - Designing the Physical Evidence
Lecture 28 - Managing Integrated Marketing Communications - I
Lecture 29 - Managing Integrated Marketing Communications - II

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Lecture 30 - Pricing the Service
Lecture 31 - Managing Customers
Lecture 32 - Managing Service Recovery
Lecture 33 - Providing Service Guarantees
Lecture 34 - Consumer Protection
Lecture 35 - Case Study - I
Lecture 36 - Case Study - II
Lecture 37 - Case Study - III
Lecture 38 - Case Study - IV
Lecture 39 - Case Study - V

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NPTEL Video Course - Management - NOC:Business Ethics

Subject Co-ordinator - Dr. Susmita Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Business Ethics? Why Business Ethics is important?
Lecture 2 - Business Ethics in different organizational contexts
Lecture 3 - Globalization
Lecture 4 - Sustainability
Lecture 5 - What is Corporation?
Lecture 6 - Corporate Social Responsibility
Lecture 7 - Stakeholder theory of the firm
Lecture 8 - Corporate accountability
Lecture 9 - Corporate citizenship
Lecture 10 - Normative ethical theories and descriptive ethical theories, western modernist ethical theories
Lecture 11 - Western modernist ethical theories (Continued...)
Lecture 12 - Alternative perspectives on ethical theories
Lecture 13 - Indian perspective on Ethics
Lecture 14 - Models of ethical decision making and individual influences on ethical decision making
Lecture 15 - Situational influences on ethical decision making
Lecture 16 - Case Study 1
Lecture 17 - What is Business Ethics Management?
Lecture 18 - Setting standards of ethical behavior
Lecture 19 - Managing stakeholder relationship
Lecture 20 - Assessing ethical performance
Lecture 21 - Organizing for business ethics
Lecture 22 - Shareholders as stakeholders
Lecture 23 - Ethical issues in corporate governance
Lecture 24 - Shareholders as citizens of corporation
Lecture 25 - Shareholding for sustainability
Lecture 26 - Financial Management
Lecture 27 - Models of organizations
Lecture 28 - Firm-employee relationship
Lecture 29 - Firm-employee relationship (Continued...)

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Lecture 30 - Globalization and employment
Lecture 31 - Towards sustainable employment
Lecture 32 - Case Study 2
Lecture 33 - Consumers as stakeholders
Lecture 34 - Ethical issues, marketing and the consumer
Lecture 35 - Globalization and consumers
Lecture 36 - Consumers and corporate citizenship
Lecture 37 - Sustainable consumption
Lecture 38 - Suppliers and competitors as stakeholders
Lecture 39 - Ethical issues and competitors
Lecture 40 - Globalization, suppliers and competitors
Lecture 41 - The corporate citizen in the business community
Lecture 42 - Sustainability and business relationship
Lecture 43 - Civil society and business ethics
Lecture 44 - Ethical issues and CSOs
Lecture 45 - Globalization and CSOs
Lecture 46 - Corporate citizenship and civil society
Lecture 47 - Civil society, business and sustainability
Lecture 48 - Government, regulation and business ethics
Lecture 49 - Ethical issues in the relation between business and government
Lecture 50 - Globalization and business-government relations
Lecture 51 - Corporate citizenship and regulation
Lecture 52 - Governments, business and sustainability
Lecture 53 - Case Study 3
Lecture 54 - Environment and business ethics
Lecture 55 - Ethics of pollution control
Lecture 56 - Ethics of conserving depletable resources
Lecture 57 - Sustainability
Lecture 58 - Information technology and business ethics
Lecture 59 - Data identity and security
Lecture 60 - Computer crimes and IPR
Lecture 61 - TRIPS in India

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NPTEL Video Course - Management - NOC:Gender Justice and Workplace Security

Subject Co-ordinator - Prof. Dipa Dube

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Gender Justice
Lecture 2 - Introduction to Gender Justice (Continued...)
Lecture 3 - Introduction to Gender Justice (Continued...)
Lecture 4 - Introduction to Gender Justice (Continued...)
Lecture 5 - International and Constitutional Perspectives
Lecture 6 - International Perspectives
Lecture 7 - Constitutional Perspectives
Lecture 8 - Constitutional Perspectives (Continued...)
Lecture 9 - Constitutional Perspectives (Continued...)
Lecture 10 - Women at workplace
Lecture 11 - Women at workplace (Continued...)
Lecture 12 - Women at workplace (Continued...)
Lecture 13 - Women at workplace (Continued...)
Lecture 14 - Gender Violence- Within and Beyond
Lecture 15 - Gender Violence- Within and Beyond (Continued...)
Lecture 16 - Gender Violence- Within and Beyond (Continued...)
Lecture 17 - Gender Violence- Within and Beyond (Continued...)
Lecture 18 - Gender Violence- Within and Beyond (Continued...)
Lecture 19 - Role of different agencies
Lecture 20 - Role of different agencies (Continued...)

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NPTEL Video Course - Management - NOC:Corporate Social Responsibility

Subject Co-ordinator - Prof. Aradhna Malik

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - What is CSR?
Lecture 3 - Why CSR?
Lecture 4 - Theories of CSR
Lecture 5 - Theories of CSR (Continued...)
Lecture 6 - Theories of CSR (Continued...)
Lecture 7 - Evolution of CSR
Lecture 8 - Evolution of CSR (Continued...)
Lecture 9 - CSR-Global Timeline
Lecture 10 - CSR-Global Timeline (Continued...)
Lecture 11 - CSR in India
Lecture 12 - CSR in India (Continued...)
Lecture 13 - Who are Stakeholders?
Lecture 14 - The Stakeholder Approach
Lecture 15 - Stakeholders and CSR
Lecture 16 - Stakeholders Theory Perspectives
Lecture 17 - Stakeholder Theory in Action
Lecture 18 - Stakeholder Identification
Lecture 19 - Stakeholder Salience
Lecture 20 - Stakeholder Management
Lecture 21 - Stakeholder Dialogue
Lecture 22 - Management of Stakeholder Diaglogue
Lecture 23 - Planning of CSR Activities
Lecture 24 - CSR Design and Implementation
Lecture 25 - CSR Design and Implementation
Lecture 26 - CSR Activities
Lecture 27 - CSR Design and Implementation
Lecture 28 - CSR Activities
Lecture 29 - Bases for Evaluation of CSR Activities

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Lecture 30 - Measurement of CSR
Lecture 31 - An Example of CSR Evaluation
Lecture 32 - CSR in India
Lecture 33 - What is Corporate Governance?
Lecture 34 - Theories of Corporate Governance
Lecture 35 - Why Corporate Governance?
Lecture 36 - Models and Systems of Corporate Governance
Lecture 37 - Implementing Corporate Governance
Lecture 38 - Board of Directors
Lecture 39 - Board of Directors (Continued...)
Lecture 40 - Principles of Corporate Governance
Lecture 41 - Corporate Governance and Corporate Social Responsibility
Lecture 42 - Corporate Governance and Corporate Social Responsibility (Continued...)
Lecture 43 - What is Corporate Citizenship?
Lecture 44 - Stages of Corporate Citizenship
Lecture 45 - Why Corporate Citizenship?
Lecture 46 - Corporate Citizenship and CSR
Lecture 47 - What is Sustainable Development?
Lecture 48 - Corporate Sustainability and CSR
Lecture 49 - Integration of Corporate Sustainability with CSR
Lecture 50 - Integration of Corporate Sustainability with CSR (Continued...)
Lecture 51 - SDG Compass
Lecture 52 - SDG Compass (Continued...)
Lecture 53 - CSR Public Policies
Lecture 54 - CSR Public Policies
Lecture 55 - Consumer Social Responsibility (CnSR)
Lecture 56 - Corporate Social Irresponsibility (CSiR)
Lecture 57 - Future of CSR
Lecture 58 - Wrap-Up

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NPTEL Video Course - Management - NOC:Decision Modeling

Subject Co-ordinator - Prof. Biswajit Mahanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Decision Analysis
Lecture 2 - Payoff Matrix
Lecture 3 - Decision Making Under Risk
Lecture 4 - Value of Information
Lecture 5 - Probability Concepts
Lecture 6 - Bayes Theorem
Lecture 7 - Decision Tree
Lecture 8 - Decision Problem with Experimentation
Lecture 9 - Decision Problem with Experimentation (Continued...)
Lecture 10 - Decision Problem Example
Lecture 11 - Introduction to Waiting Lines
Lecture 12 - Poisson and Exponential Distribution
Lecture 13 - Birth and Death Process
Lecture 14 - M/M/1 Queing Model
Lecture 15 - Queuing Examples
Lecture 16 - Queuing Examples (Continued...)
Lecture 17 - M/D/1 and M/M/s Queuing Models
Lecture 18 - M/M/s and M/M/infinity Models
Lecture 19 - Finite Queue Space and Queuing Cost Models
Lecture 20 - Queuing Cost, Priority and Networking Models
Lecture 21 - Introduction to Simulation
Lecture 22 - Discrete-Event and Monte-Carlo Simulation
Lecture 23 - Pseudo random Numbers
Lecture 24 - Simulation Examples
Lecture 25 - Generation of Random Variates
Lecture 26 - Simulation Examples (Continued...)
Lecture 27 - Monte-Carlo Simulation and Output Analysis
Lecture 28 - Variance Reduction and Simulation Software
Lecture 29 - Continuous Simulation and System Dynamics

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Lecture 30 - System Dynamics Example
Lecture 31 - Introduction to Graph Theory
Lecture 32 - Introduction (Continued...)
Lecture 33 - Operations on a Graph, Tree and Spanning Tree
Lecture 34 - Minimal Spanning Tree
Lecture 35 - Cutsets
Lecture 36 - Fundamental Circuits and Network Simplex Method
Lecture 37 - Maximal Flow Problems
Lecture 38 - Maximal Flow Problems (Continued...)
Lecture 39 - Shortest Path Problems
Lecture 40 - Shortest Path Problems (Continued...)

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NPTEL Video Course - Management - NOC:E-Business

Subject Co-ordinator - Prof. Mamata Jenamani

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Types of e-business transactions
Lecture 3 - Business Models on the web
Lecture 4 - Business Models on the web (Continued...)
Lecture 5 - Innovative E-Business models for Bricks and Mortar firms
Lecture 6 - Inter and Intra Organizational Business Processes
Lecture 7 - Information system foundations
Lecture 8 - Types of business information system
Lecture 9 - Decision support for the management
Lecture 10 - Enterprise Resource planning
Lecture 11 - Connecting with stakeholders
Lecture 12 - E-procurement - Reengineering the traditional procurement process
Lecture 13 - E-procurement - New paradigms in the procurement process
Lecture 14 - E-procurement - e-procurement Implementation issues and risks
Lecture 15 - Customer relationship management
Lecture 16 - E-Marketing
Lecture 17 - E-Marketing (Continued...)
Lecture 18 - Supply Chain Management - I - The Information flow
Lecture 19 - Supply Chain Management - II - Tntegration
Lecture 20 - Supply Chain Management - III - Interoperability
Lecture 21 - Supply Chain Management - IV - Logistics and distribution
Lecture 22 - Supply Chain Management - V - E-Commerce supply chain
Lecture 23 - Components of E-Business Infrastructure
Lecture 24 - Internet and the Web
Lecture 25 - Networking resources
Lecture 26 - Hardware and software resources
Lecture 27 - Data resources
Lecture 28 - Security categories
Lecture 29 - Security terminologies

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Lecture 30 - Digital signature
Lecture 31 - Protocols for security
Lecture 32 - Impact of security protocol on server performance
Lecture 33 - Digital Payment systems
Lecture 34 - Interoperability of information system
Lecture 35 - Electronic data interchange (EDI)
Lecture 36 - Fundamentals of web services
Lecture 37 - Fundamentals of cloud based systems
Lecture 38 - Automatic data capture using RFID
Lecture 39 - Automatic data capture using RFID and its applications
Lecture 40 - Automatic data capture using RFID and its applications (Continued...)
Lecture 41 - GPS and GIS in supply chain
Lecture 42 - Sensors and IOT
Lecture 43 - Business Analytics and Big data
Lecture 44 - Decision support Concepts
Lecture 45 - Understanding the web log - I
Lecture 46 - Understanding the web log - II
Lecture 47 - Using the Web log
Lecture 48 - User behaviour modelling from web log
Lecture 49 - User behaviour modelling from web log (Continued...)
Lecture 50 - E-Business Capacity Planning
Lecture 51 - E-Business Capacity Planning (Continued...)
Lecture 52 - Introduction to Recommender System
Lecture 53 - Content Based Recommender System
Lecture 54 - Collaborative Filtering Based Recommender System
Lecture 55 - Association and Demographics Based Recommended System
Lecture 56 - Dynamic Pricing
Lecture 57 - Introduction to Auction
Lecture 58 - Economic Considerations in Auction
Lecture 59 - Winner Determination Problem
Lecture 60 - Online auction issues

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NPTEL Video Course - Management - NOC:Design and Analysis of Experiments

Subject Co-ordinator - Prof. Jhareswar Maiti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 30 - Introduction to Factorial Experiments
Lecture 31 - Statistical Analysis of Factorial Experiments
Lecture 32 - Estimation of parameters and model adequacy test for factorial experiement
Lecture 33 - Full_Factorial_Single_Replicate
Lecture 34 - General_Full_factorial_design
Lecture 35 - Blocking_Factorial_design
Lecture 36 - Two_level_Factorial_Experiment
Lecture 37 - Statistical analysis of 2^k factorial design
Lecture 38 - 2_k_Factorial_Design_Single_Replicate
Lecture 39 - 2_k_Factorial_Design_Centre_Points
Lecture 40 - 2_k_Factorial_Design_Optimality_Issues
Lecture 41 - 2_k_ Factorial Design - Issues with Coded Design Variables
Lecture 42 - Blocking and Confounding in 2_k_Factorial Design
Lecture 43 - Blocking and Confounding in 2_k_Factorial Design (Continued...)
Lecture 44 - Blocking and Confounding in 2_k_Factorial Design (Continued...)
Lecture 45 - Fractional factorial design
Lecture 46 - Fractional factorial design
Lecture 47 - Fractional factorial design
Lecture 48 - Alias Structure in Fractional factorial design
Lecture 49 - General 2^(k-p) Fractional Factorial Design
Lecture 50 - Fractional factorial design
Lecture 51 - Plackett-Burman Designs
Lecture 52 - Response Surface Methodology (RSM) - First Order Model
Lecture 53 - Response Surface Methodology (RSM) - First Order Model (Continued...)
Lecture 54 - Experimental Design for Fitting Response Surfaces
Lecture 55 - Response Surface Methodology (RSM)
Lecture 56 - Analysis of Second Order Response Surface
Lecture 57 - ANOVA using MINITAB
Lecture 58 - Factorial Design using MINITAB
Lecture 59 - Fractional Factorial Design using MINITAB
Lecture 60 - Response Surface Methodology using MINITAB

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NPTEL Video Course - Management - NOC:Quality Design and Control

Subject Co-ordinator - Prof. Pradip Kumar Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History and Evolution of Quality Control and Management
Lecture 2 - History and Evolution of Quality Control and Management
Lecture 3 - History and Evolution of Quality Control and Management
Lecture 4 - History and Evolution of Quality Control and Management
Lecture 5 - History and Evolution of Quality Control and Management
Lecture 6 - Management of Quality - I
Lecture 7 - Management of Quality - I
Lecture 8 - Management of Quality - I
Lecture 9 - Management of Quality - I
Lecture 10 - Management of Quality - I
Lecture 11 - Management of Quality - II
Lecture 12 - Management of Quality - II
Lecture 13 - Management of Quality - II
Lecture 14 - Management of Quality - II
Lecture 15 - Management of Quality - II
Lecture 16 - Statistical Process Control - I
Lecture 17 - Statistical Process Control - I
Lecture 18 - Statistical Process Control - I
Lecture 19 - Statistical Process Control - I
Lecture 20 - Statistical Process Control - I
Lecture 21 - Statistical Process Control - II
Lecture 22 - Statistical Process Control - II (Continued...)
Lecture 23 - Statistical Process Control - II (Continued...)
Lecture 24 - Statistical Process Control - II (Continued...)
Lecture 25 - Statistical Process Control - II (Continued...)
Lecture 26 - Process Capability Analysis
Lecture 27 - Process Capability Analysis (Continued...)
Lecture 28 - Process Capability Analysis (Continued...)
Lecture 29 - Process Capability Analysis (Continued...)

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Lecture 30 - Process Capability Analysis (Continued...)
Lecture 31 - Acceptance Sampling - I
Lecture 32 - Acceptance Sampling - I
Lecture 33 - Acceptance Sampling - I
Lecture 34 - Acceptance Sampling - I (Continued...)
Lecture 35 - Acceptance Sampling - I (Continued...)
Lecture 36 - Acceptance Sampling - II
Lecture 37 - Acceptance Sampling - II (Continued...)
Lecture 38 - Acceptance Sampling - II (Continued...)
Lecture 39 - Acceptance Sampling - II (Continued...)
Lecture 40 - Acceptance Sampling - II (Continued...)
Lecture 41 - Design for Reliability - I
Lecture 42 - Design for Reliability - I (Continued...)
Lecture 43 - Design for Reliability - I (Continued...)
Lecture 44 - Design for Reliability - I (Continued...)
Lecture 45 - Design for Reliability - I (Continued...)
Lecture 46 - Design for Reliability - II
Lecture 47 - Design for Reliability - II (Continued...)
Lecture 48 - Design for Reliability - II (Continued...)
Lecture 49 - Design for Reliability - II (Continued...)
Lecture 50 - Design for Reliability - II (Continued...)
Lecture 51 - Quality by Experimental Design
Lecture 52 - Quality by Experimental Design (Continued...)
Lecture 53 - Quality by Experimental Design (Continued...)
Lecture 54 - Quality by Experimental Design (Continued...)
Lecture 55 - Quality by Experimental Design (Continued...)
Lecture 56 - Robust Design and Taguchi Method
Lecture 57 - Robust Design and Taguchi Method (Continued...)
Lecture 58 - Robust Design and Taguchi Method (Continued...)
Lecture 59 - Robust Design and Taguchi Method (Continued...)
Lecture 60 - Robust Design and Taguchi Method (Continued...)

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NPTEL Video Course - Management - NOC:Business Analytics for Management Decision

Subject Co-ordinator - Dr. Rudra P. Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 16 - Statistical inference
Lecture 17 - Testing of Hypothesis
Lecture 18 - Testing of Hypothesis (Continued...)
Lecture 19 - Confidence Interval
Lecture 20 - Confidence Interval 2
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Lecture 30
Lecture 31 - Dummy Modelling
Lecture 32 - Dummy Modelling (Continued...)
Lecture 33 - Panel Data Model
Lecture 34 - Panel Data Model (Continued...)
Lecture 35 - Time Series Forecasting
Lecture 36 - Time Series Forecasting (Continued...)
Lecture 37 - Machine Learning
Lecture 38 - Machine Learning (Continued...)
Lecture 39 - Data Mining
Lecture 40 - Simulation
Lecture 41 - Basics
Lecture 42 - Linear Programming 1
Lecture 43 - Linear Programming 2
Lecture 44 - Special Issues of Linear Programming
Lecture 45 - Simplex Method of Linear Programming
Lecture 46
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Lecture 51
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Lecture 55
Lecture 56 - Introduction to decision theory
Lecture 57 - Decision making under uncertainty
Lecture 58 - Decision making under certainty
Lecture 59 - Decision tree
Lecture 60 - The value of information and utility theory

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NPTEL Video Course - Management - NOC:Soft Skills for Business Negotiations and Marketing Strategies

Subject Co-ordinator - Prof. Uttam Kumar Bannerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 47 - Basics of negotiation
Lecture 48 - Process sequence phase frequency
Lecture 49 - Managing the process,trickes of countering
Lecture 50 - Barriers to agreements,ending of negotiation
Lecture 51 - Common mistakes
Lecture 52
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NPTEL Video Course - Management - NOC:Research Writing

Subject Co-ordinator - Prof. Aradhna Malik

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - What is research writing
Lecture 3 - The Writing Process
Lecture 4 - The Writing Process - 2
Lecture 5 - Finding what to read
Lecture 6 - Reading research documents
Lecture 7 - Paying attention to what you read
Lecture 8 - Reviewing Literature
Lecture 9 - Reviewing Literature (Continued...)
Lecture 10 - Elements of writing
Lecture 11 - Reviewing literature
Lecture 12 - Literature review
Lecture 13 - Shaping your appeal
Lecture 14 - Outlining
Lecture 15 - Organizing an argument
Lecture 16 - Methodology
Lecture 17 - Tools for writing up literature reviews and methodology
Lecture 18 - Presenting quantitative data
Lecture 19 - Presenting qualitative data
Lecture 20 - Writing the results section
Lecture 21 - Discussion of Results
Lecture 22 - Writing the conclusion section
Lecture 23 - Academic Integrity
Lecture 24 - Using and acknowledging sources
Lecture 25 - Writers Block
Lecture 26 - Revising
Lecture 27 - Mistakes and Fallacies
Lecture 28 - Editing and Proofreading
Lecture 29 - Choosing a journal to publish in

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Lecture 30 - Responding to reviewer comments
Lecture 31 - Wrap up

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NPTEL Video Course - Management - NOC:Engineering Econometrics

Subject Co-ordinator - Dr. Rudra P. Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Econometrics
Lecture 2 - Introduction to Engineering Econometrics (Continued...)
Lecture 3 - Introduction to Engineering Econometrics (Continued...)
Lecture 4 - Introduction to Engineering Econometrics (Continued...)
Lecture 5 - Introduction to Engineering Econometrics (Continued...)
Lecture 6 - Exploring Data on Spreadsheets
Lecture 7 - Exploring Data on Spreadsheets (Continued...)
Lecture 8 - Exploring Data on Spreadsheets (Continued...)
Lecture 9 - Exploring Data on Spreadsheets (Continued...)
Lecture 10 - Exploring Data on Spreadsheets (Continued...)
Lecture 11 - Descriptive Econometrics
Lecture 12 - Descriptive Econometrics (Continued...)
Lecture 13 - Descriptive Econometrics (Continued...)
Lecture 14 - Descriptive Econometrics (Continued...)
Lecture 15 - Descriptive Econometrics (Continued...)
Lecture 16 - Linear Regression Modelling
Lecture 17 - Linear Regression Modelling (Continued...)
Lecture 18 - Linear Regression Modelling (Continued...)
Lecture 19 - Linear Regression Modelling (Continued...)
Lecture 20 - Linear Regression Modelling (Continued...)
Lecture 21 - Linear Regression Modelling (Continued...)
Lecture 22 - Linear Regression Modelling (Continued...)
Lecture 23 - Modelling Diagnostics
Lecture 24 - Modelling Diagnostics (Continued...)
Lecture 25 - Modelling Diagnostics (Continued...)
Lecture 26 - Multicolinearity problem - III
Lecture 27 - Autocorrelation problem - I
Lecture 28 - Autocorrelation problem - II
Lecture 29 - Heteroskedasticity problem - I

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Lecture 30 - Heteroskedasticity problem - II
Lecture 31 - Model Specification- Choosing the Independent Variables
Lecture 32 - Model Specification- Choosing the Independent Variables
Lecture 33 - Non-Linear Regression Modelling - Dummy-Variable Regression Modelling
Lecture 34 - Non-Linear Regression Modelling - Interactive Regression Modelling
Lecture 35 - Non-Linear Regression Modelling - Polynomial (Curvilinear) Regression Model
Lecture 36 - Non-Linear Regression Modelling - Model Transformation
Lecture 37 - Extension of Dummy Regression Modelling
Lecture 38 - Extension of Dummy Regression Modelling - Dummy Independent Variable Modelling
Lecture 39 - Extension of Dummy Regression Modelling - Dummy Dependent Variable Modelling
Lecture 40 - Extension of Dummy Regression Modelling - Dummy Independent Variable Modelling
Lecture 41 - Time Series Modelling - Basics
Lecture 42 - Time Series Modelling - Trend Analysis
Lecture 43 - Time Series Modelling - Trend Analysis (Least Squares Method)
Lecture 44 - Time Series Modelling - Forecasting
Lecture 45 - Time Series Modelling - Stationarity
Lecture 46 - Time Series Modelling - Volatility Modelling
Lecture 47 - Time Series Modelling - Volatility Modelling
Lecture 48 - Time Series Modelling - Volatility Modelling
Lecture 49 - Time Series Modelling - Volatility Modelling
Lecture 50 - Time Series Modelling - Volatility Modelling
Lecture 51 - Time Series Modelling - VAR modelling
Lecture 52 - Time Series Modelling - VAR modelling
Lecture 53 - Panel Data Modelling
Lecture 54 - Panel Data Modelling (Continued...)
Lecture 55 - Panel Data Modelling (Continued...)
Lecture 56 - Panel Data Modelling
Lecture 57 - Fitting Models to Data
Lecture 58 - Fitting Models to Data (Continued...)
Lecture 59 - Fitting Models to Data (Continued...)
Lecture 60 - Fitting Models to Data (Continued...)

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NPTEL Video Course - Management - NOC:Industrial Safety Engineering

Subject Co-ordinator - Prof. Jhareswar Maiti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Industrial Safety Engineering
Lecture 2 - Key concepts and terminologies
Lecture 3 - Key concepts and terminologies-Safety domain ontology
Lecture 4 - Key concepts and terminologies-Risk Assessment and Control
Lecture 5 - Safety Engineering and Accident causing mechanisms
Lecture 6 - Preliminary Hazard List
Lecture 7 - Preliminary Hazard Analysis
Lecture 8 - Hazard and operability study (HAZOP)
Lecture 9 - Failure Modes and Effects Analysis (FMEA)- Identification of Failure Modes
Lecture 10 - Failure Modes and Effects Analysis (FMEA) (Continued...)
Lecture 11 - Application of Hazard Identification Techniques
Lecture 12 - Fault Tree Analysis (FTA) - Construction
Lecture 13 - Fault Tree Analysis (FTA) - Gate by Gate method
Lecture 14 - Fault Tree Analysis (FTA) - Cut-set method
Lecture 15 - Fault Tree Analysis (FTA) - Importance measures
Lecture 16 - Event Tree Analysis (ETA)
Lecture 17 - Bowtie Tool
Lecture 18 - Bow-tie
Lecture 19 - Bow-tie
Lecture 20 - Bow-tie
Lecture 21 - Bow-tie
Lecture 22 - Risk Assessment
Lecture 23 - Consequence Assessment
Lecture 24 - Energy Control Model and Hazard Control Hierarchy
Lecture 25 - Safety Function Deployment
Lecture 26 - Ranking of Design Solutions
Lecture 27 - Quantification of Basic Events for Non-repairable Components
Lecture 28 - Quantification of Basic Events
Lecture 29 - Quantification of Basic Events

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Lecture 30 - Quantification of Basic Events
Lecture 31 - Quantification of Basic Events
Lecture 32 - Quantification of Basic Events
Lecture 33 - Quantification of Basic Events
Lecture 34 - Computation of combined process parameters
Lecture 35 - Computation of combined process parameters
Lecture 36 - Quantification of Systems Safety and Reliability Block Diagram
Lecture 37 - Systems Safety Quantification
Lecture 38 - Systems Safety Quantification
Lecture 39 - Systems Safety Quantification
Lecture 40 - Systems Safety Quantification
Lecture 41 - Human Error, Classification and Causes
Lecture 42 - Human Error, Classification and Causes (Continued...)
Lecture 43 - Human Error Identification
Lecture 44 - Human Reliability Assessment
Lecture 45 - Human Error Quantification from Expertsâ opinions â Fuzzy Set Approach
Lecture 46 - Accident Investigation
Lecture 47 - Accident Investigation and Analysis
Lecture 48 - Control Chart Analysis
Lecture 49 - Accident Data Analysis
Lecture 50 - Accident Data Analysis
Lecture 51 - Occupational Health and Safety Management Systems(OH&SMS) and OHSAS 18001 - Part I
Lecture 52 - Occupational Health and Safety Management Systems(OH&SMS) and OHSAS 18001 - Part II
Lecture 53 - Occupational Health and Safety Management Systems(OH&SMS) and OHSAS 18001 - Part III
Lecture 54 - Safety Performance Indicators - Part I
Lecture 55 - Safety Performance Indicators - Part II
Lecture 56 - Energy Isolations
Lecture 57 - Virtual Reality - Introduction
Lecture 58 - Geometry of virtual world
Lecture 59 - VR roadmap - A case study
Lecture 60 - Summary

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NPTEL Video Course - Management - NOC:Management of Inventory Systems

Subject Co-ordinator - Prof. PK Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Inventory and Materials Management
Lecture 2 - Introduction to Inventory and Materials Management (Continued...)
Lecture 3 - Introduction to Inventory and Materials Management (Continued...)
Lecture 4 - Introduction to Inventory and Materials Management (Continued...)
Lecture 5 - Introduction to Inventory and Materials Management (Continued...)
Lecture 6 - Inventory Problems and Selective Inventory Management
Lecture 7 - Inventory Problems and Selective Inventory Management (Continued...)
Lecture 8 - Inventory Problems and Selective Inventory Management (Continued...)
Lecture 9 - Inventory Problems and Selective Inventory Management (Continued...)
Lecture 10 - Inventory Problems and Selective Inventory Management (Continued...)
Lecture 11 - Static Inventory Problem under Risk
Lecture 12 - Static Inventory Problem under Risk (Continued...)
Lecture 13 - Static Inventory Problem under Risk (Continued...)
Lecture 14 - Static Inventory Problem under Risk (Continued...)
Lecture 15 - Static Inventory Problem under Risk (Continued...)
Lecture 16 - Static Inventory Problems under Uncertainty
Lecture 17 - Static Inventory Problems under Uncertainty (Continued...)
Lecture 18 - Static Inventory Problems under Uncertainty (Continued...)
Lecture 19 - Static Inventory Problems under Uncertainty (Continued...)
Lecture 20 - Static Inventory Problems under Uncertainty (Continued...)
Lecture 21 - Dynamic Inventory Problems under Certainty
Lecture 22 - Dynamic Inventory Problems under Certainty (Continued...)
Lecture 23 - Dynamic Inventory Problems under Certainty (Continued...)
Lecture 24 - Dynamic Inventory Problems under Certainty (Continued...)
Lecture 25 - Dynamic Inventory Problems under Certainty (Continued...)
Lecture 26 - Dynamic Inventory Problems under Risk
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Lecture 29 - Dynamic Inventory Problems under Risk (Continued...)

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Lecture 30 - Dynamic Inventory Problems under Risk (Continued...)
Lecture 31 - MRP, MRP-II and DRP
Lecture 32 - MRP, MRP-II and DRP (Continued...)
Lecture 33 - MRP, MRP-II and DRP (Continued...)
Lecture 34 - MRP, MRP-II and DRP (Continued...)
Lecture 35 - MRP, MRP-II and DRP (Continued...)
Lecture 36 - JIT-based Approaches for Materials Management
Lecture 37 - JIT-based Approaches for Materials Management (Continued...)
Lecture 38 - JIT-based Approaches for Materials Management (Continued...)
Lecture 39 - JIT-based Approaches for Materials Management (Continued...)
Lecture 40 - JIT-based Approaches for Materials Management (Continued...)
Lecture 41 - Basics of Purchasing Management
Lecture 42 - Basics of Purchasing Management (Continued...)
Lecture 43 - Basics of Purchasing Management (Continued...)
Lecture 44 - Basics of Purchasing Management (Continued...)
Lecture 45 - Basics of Purchasing Management (Continued...)
Lecture 46 - Theory of Constraints and Materials Management
Lecture 47 - Theory of Constraints and Materials Management (Continued...)
Lecture 48 - Theory of Constraints and Materials Management (Continued...)
Lecture 49 - Theory of Constraints and Materials Management (Continued...)
Lecture 50 - Theory of Constraints and Materials Management (Continued...)
Lecture 51 - Value Engineering/Analysis and Stores Management
Lecture 52 - Value Engineering/Analysis and Stores Management (Continued...)
Lecture 53 - Value Engineering/Analysis and Stores Management (Continued...)
Lecture 54 - Value Engineering/Analysis and Stores Management (Continued...)
Lecture 55 - Value Engineering/Analysis and Stores Management (Continued...)
Lecture 56 - Logistics and Supply Chain Management
Lecture 57 - Logistics and Supply Chain Management (Continued...)
Lecture 58 - Logistics and Supply Chain Management (Continued...)
Lecture 59 - Logistics and Supply Chain Management (Continued...)
Lecture 60 - Logistics and Supply Chain Management (Continued...)

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NPTEL Video Course - Management - NOC:Selected Topics in Decision Modeling

Subject Co-ordinator - Prof. Biswajit Mahanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Dynamic Programming
Lecture 2 - Stagecoach Problem
Lecture 3 - An Investment Problem
Lecture 4 - An Investment Problem (Continued...)
Lecture 5 - Further Examples
Lecture 6 - Machine Allocation and Cargo Loading Problem
Lecture 7 - Knapsack Problem
Lecture 8 - Probabilistic Dynamic Programming
Lecture 9 - Probabilistic Dynamic Programming (Continued...)
Lecture 10 - Dijkstra's Algorithm
Lecture 11 - Integer Programming
Lecture 12 - Integer Programming
Lecture 13 - Integer Programming
Lecture 14 - Integer Linear Programming
Lecture 15 - Cutting Plane Method
Lecture 16 - Exhaustive Enumeration and Branch and Bound Techniques
Lecture 17 - Branch and Bound Technique
Lecture 18 - Assignment and Travelling Salesman Problem
Lecture 19 - Travelling Salesman Problem (Continued...)
Lecture 20 - Heuristic Methods for Integer Programming
Lecture 21 - Non-Linear Programming
Lecture 22 - Single-Variable Unconstrained Optimization
Lecture 23 - Multi-variable Unconstrained NLP
Lecture 24 - Solving Unconstrained NLP
Lecture 25 - Numerical Methods for Unconstrained NLP
Lecture 26 - Constrained NLP
Lecture 27 - Constrained NLP
Lecture 28 - Constrained NLP
Lecture 29 - Quadratic Programming

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Lecture 30 - Example problems on Constrained NLP
Lecture 31 - Introduction to Metaheuristics
Lecture 32 - Genetic Algorithms
Lecture 33 - Genetic Algorithm Process
Lecture 34 - Genetic Algorithm Process (Continued...)
Lecture 35 - Genetic Algorithm Examples
Lecture 36 - Simulated Annealing
Lecture 37 - Tabu Search
Lecture 38 - Particle Swarm Optimization
Lecture 39 - Multi-Objective Optimization
Lecture 40 - NSGA-II Examples

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NPTEL Video Course - Management - NOC:Ethics in Engineering Practice

Subject Co-ordinator - Dr. Susmita Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ethical Reasoning and Engineering Ethics
Lecture 2 - Introduction to Ethical Reasoning and Engineering Ethics (Continued...)
Lecture 3 - Introduction to Ethical Reasoning and Engineering Ethics (Continued...)
Lecture 4 - Professional practice in enginnering
Lecture 5 - Professional practice in enginnering (Continued...)
Lecture 6 - Central Professional responsibilities of engineers
Lecture 7 - Central Professional responsibilities of engineers (Continued...)
Lecture 8 - Workplace Rights and Responsibilities
Lecture 9 - Workplace Rights and Responsibilities (Continued...)
Lecture 10 - Ethics as Design doing Justice to Moral Problems
Lecture 11 - Ethics as Design doing Justice to Moral Problems (Continued...)
Lecture 12 - Intellectual Property Rights and Ethics
Lecture 13 - Intellectual Property Rights and Ethics (Continued...)
Lecture 14 - Trade related Intellectual Property Rights
Lecture 15 - Trade related Intellectual Property Rights in India
Lecture 16 - A brief on Paris Convention, 1967 and The Berne Contract, 1971
Lecture 17 - Computer Software and Digital Information
Lecture 18 - Computer Software and Digital Information (Continued...)
Lecture 19 - Engineers, Nuclear Testing and Weapons
Lecture 20 - Engineers, Nuclear Testing and Weapons (Continued...)
Lecture 21 - Responsibility to Environment
Lecture 22 - Responsibility to Environment (Continued...)
Lecture 23 - Environmental Ethics and Spirituality
Lecture 24 - Engineering as Social Experimentation
Lecture 25 - Research Ethics
Lecture 26 - Research Ethics (Continued...)
Lecture 27 - Engineers as Managers Consultants and Leaders
Lecture 28 - Engineers as Managers Consultants and Leaders (Continued...)
Lecture 29 - Engineers as Managers Consultants and Leaders (Continued...)

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Lecture 30 - Key Questions - Ethical Conduct of Engineers
Lecture 31 - Key Questions - Ethical Conduct of Engineers (Continued...)
Lecture 32 - Key Questions - Central Professional Responsibilities of Engineers
Lecture 33 - Key Questions - Central Professional Responsibilities of Engineers (Continued...)
Lecture 34 - Key Questions - Relating to Rights and Responsibilities regarding IPR
Lecture 35 - Key Questions - Relating to Rights and Responsibilities regarding IPR (Continued...)
Lecture 36 - Key Questions - Relating to Rights and Responsibilities regarding IPR (Continued...)
Lecture 37 - Key Questions - Related to Engineers Rights and Duties and Ethics
Lecture 38 - Key Questions - Related to Engineers Rights and Duties and Ethics (Continued...)
Lecture 39 - Leadership Styles and Ethical Conduct
Lecture 40 - Leadership Styles and Ethical Conduct (Continued...)

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NPTEL Video Course - Management - NOC:Managing Change in Organizations

Subject Co-ordinator - Prof. Kbl Srivastava

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Nature of Change Management (1)
Lecture 2 - Nature of Change Management (2)
Lecture 3 - Types of Change
Lecture 4 - Types of Change (Continued...)
Lecture 5 - Types of Change (Continued...)
Lecture 6 - Need for Change
Lecture 7 - Need for Change (Continued...)
Lecture 8 - Scope of Change
Lecture 9 - Scope of Change (Continued...)
Lecture 10 - Scope of Change (Continued...)
Lecture 11 - Diagnosing Organisational Change
Lecture 12 - Diagnosing Organisational Change (Continued...)
Lecture 13 - Diagnosing Organisational Change (Continued...)
Lecture 14 - Resistance to Change
Lecture 15 - Managing Resistance
Lecture 16 - Approaches to Implementing Change
Lecture 17 - Approaches to Implementing Change (Continued...)
Lecture 18 - Approaches to Implementing Change (Continued...)
Lecture 19 - Approaches to Implementing Change (Continued...)
Lecture 20 - Approaches to Implementing Change (Continued...)
Lecture 21 - Implementing Change
Lecture 22 - Vision and Change
Lecture 23 - Vision and Change (Continued...)
Lecture 24 - Vision and Change (Continued...)
Lecture 25 - Vision and Change (Continued...)
Lecture 26 - Communication and Change
Lecture 27 - Communication and Change (Continued...)
Lecture 28 - Communication and Change (Continued...)
Lecture 29 - Sustaining Change

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Lecture 30 - Evaluating Change
Lecture 31 - Innovation and Change
Lecture 32 - Innovation and Change (Continued...)
Lecture 33 - Organizational Learning
Lecture 34 - Learning Organization and Change
Lecture 35 - Learning Organization and Change (Continued...)
Lecture 36 - Turnaround Strategy
Lecture 37 - Strategic Convergence and Learning from Change
Lecture 38 - Change Effectiveness
Lecture 39 - Change Management Cases and Examples
Lecture 40 - Change Management Example, Trends and Dynamics

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NPTEL Video Course - Management - NOC:Financial Institutions and Markets

Subject Co-ordinator - Dr. Jitendra Mahakud

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Financial System
Lecture 2 - Equilibrium in Financial Markets
Lecture 3 - Efficiency of Financial Markets
Lecture 4 - Measures of Financial Development
Lecture 5 - Financial Development and Economic Growth
Lecture 6 - Systematic risks in financial system
Lecture 7 - Unsystematic risks in financial system
Lecture 8 - Return concepts in financial system
Lecture 9 - Fundamental analysis of financial assets
Lecture 10 - Technical analysis of financial assets
Lecture 11 - Theories of interest rate determination - I
Lecture 12 - Theories of interest rate determination - II
Lecture 13 - Term structure theories of interest rate - I
Lecture 14 - Term structure theories of interest rate - II
Lecture 15 - Term structure theories of interest rate - III
Lecture 16 - Financial market regulation
Lecture 17 - RBI- structure and objective functions
Lecture 18 - Monetary policy instruments
Lecture 19 - Challenges and reforms in monetary policy and central bank autonomy
Lecture 20 - SEBI, IROA and PFRDA
Lecture 21 - Commercial banks
Lecture 22 - Commercial banks
Lecture 23 - Commercial bank performance
Lecture 24 - Basel Accords
Lecture 25 - Measure of risk in commercial banks
Lecture 26 - Provident fund and pension fund
Lecture 27 - Insurance companies
Lecture 28 - Mutual funds - I
Lecture 29 - Mutual funds - II

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Lecture 30 - NBFCs - I
Lecture 31 - NBFCs - II
Lecture 32 - Venture capital
Lecture 33 - Merchant banks
Lecture 34 - Credit Rating Agencies
Lecture 35 - Non-banking statutory financial organization
Lecture 36 - Call Money Market - I
Lecture 37 - Call Money Market - II
Lecture 38 - Treasury Bills Market
Lecture 39 - Miscellaneous short-term money market - I
Lecture 40 - Miscellaneous short-term money market - II
Lecture 41 - Bond Analysis - I
Lecture 42 - Bond Analysis - II
Lecture 43 - Bond Analysis - III
Lecture 44 - Bond Analysis - IV
Lecture 45 - Bond market in India
Lecture 46 - Stock market - I
Lecture 47 - Stock market - II
Lecture 48 - Stock market - III
Lecture 49 - Stock market - IV
Lecture 50 - Stock market - V
Lecture 51 - Derivatives Market - I
Lecture 52 - Derivatives Market - II
Lecture 53 - Derivatives Market - III
Lecture 54 - Derivatives Market - IV
Lecture 55 - Derivatives Market - V
Lecture 56 - Foreign Exchange Market - I
Lecture 57 - Foreign Exchange Market - II
Lecture 58 - Foreign Exchange Market - III
Lecture 59 - Foreign Exchange Market - IV
Lecture 60 - Foreign Exchange Market - V

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NPTEL Video Course - Management - NOC:Sales and Distribution Management

Subject Co-ordinator - Dr. Sangeeta Sahney

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Sales Management
Lecture 2 - Sales Management, Personal Selling, and Salesmanship
Lecture 3 - Functions of Sales Executive and Roles played by Sales Managers
Lecture 4 - Duties and Responsibilities of Sales Managers and the Effective Sales Executive
Lecture 5 - Skills required in Sales Managers and Qualities in a Sales Managers
Lecture 6 - Determining Sales related Marketing Policies
Lecture 7 - Determining Sales related Marketing Policies
Lecture 8 - Strategic Planning, Sales Objectives, Strategies and Tactics
Lecture 9 - The Sales Organization
Lecture 10 - The Sales Organization
Lecture 11 - The Sales Department Relations
Lecture 12 - The Sales Department Relations
Lecture 13 - Planning, Sales forecasting and Budgeting
Lecture 14 - Planning, Sales forecasting and Budgeting
Lecture 15 - Planning, Sales forecasting and Budgeting
Lecture 16 - Buyer-Seller Dyads
Lecture 17 - Diversity of Personal-Selling Situations
Lecture 18 - Theories of Selling
Lecture 19 - Theories of Selling
Lecture 20 - The Selling Process
Lecture 21 - The Selling Process
Lecture 22 - Sales Force Management
Lecture 23 - Sales Force Management
Lecture 24 - Sales Force Management
Lecture 25 - Sales Force Management
Lecture 26 - Sales Force Management
Lecture 27 - Sales Force Management
Lecture 28 - Sales Force Management
Lecture 29 - Sales Force Management

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Lecture 30 - Sales Force Management
Lecture 31 - Sales Force Management
Lecture 32 - Sales Quotas
Lecture 33 - Sales Quotas
Lecture 34 - Sales Territory
Lecture 35 - Sales Territory
Lecture 36 - Distribution Channel Management
Lecture 37 - Distribution Channel Management
Lecture 38 - Channel Systems, Channel Management, Logistics and Marketing Channels - Part I
Lecture 39 - Channel Systems, Channel Management, Logistics and Marketing Channels - Part II
Lecture 40 - International Sales and Channel Management

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NPTEL Video Course - Management - NOC:Six Sigma

Subject Co-ordinator - Prof. Jitesh J Thakkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief overview of the course
Lecture 2 - Quality concepts and definition
Lecture 3 - History of continuous improvement
Lecture 4 - Six Sigma Principles and Focus Areas - Part 1
Lecture 5 - Six Sigma Principles and Focus Areas - Part 2
Lecture 6 - Six Sigma Applications
Lecture 7 - Quality Management
Lecture 8 - Fundamentals of Total Quality Management
Lecture 9 - Cost of quality
Lecture 10 - Voice of customer
Lecture 11 - Quality Function Deployment (QFD)
Lecture 12 - Management and Planning Tools - Part 1
Lecture 13 - Management and Planning Tools - Part 2
Lecture 14 - Six Sigma Project Identification, Selection and Definition
Lecture 15 - Process characteristics and Monitoring
Lecture 16 - Process characteristics and analysis
Lecture 17 - Process Mapping
Lecture 18 - Data Collection and Summarization - Part 1
Lecture 19 - Data Collection and Summarization - Part 2
Lecture 20 - Measurement systems
Lecture 21 - Measurement systems analysis
Lecture 22 - Fundamentals of statistics
Lecture 23 - Probability theory
Lecture 24 - Process capability analysis
Lecture 25 - Process capability analysis
Lecture 26 - Process capability analysis
Lecture 27 - Non-normal process capability analysis
Lecture 28 - Hypothesis testing
Lecture 29 - Hypothesis Testing

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Lecture 30 - Hypothesis Testing
Lecture 31 - Hypothesis Testing
Lecture 32 - Correlation and Regression Analysis
Lecture 33 - Regression Analysis
Lecture 34 - One-Way ANOVA
Lecture 35 - Two-Way ANOVA
Lecture 36 - Multi-vari Analysis
Lecture 37 - Failure Mode Effect Analysis (FMEA)
Lecture 38 - Introduction to Design of Experiment
Lecture 39 - Randomized Block Design
Lecture 40 - Randomized Block Design
Lecture 41 - Factorial Design
Lecture 42 - Factorial Design
Lecture 43 - Fractional Factorial Design
Lecture 44 - Fractional Factorial Design
Lecture 45 - Taguchi Method
Lecture 46 - Taguchi Method
Lecture 47 - Seven QC Tools
Lecture 48 - Statistical Process Control
Lecture 49 - Statistical Process Control
Lecture 50 - Operating Characteristic (OC) Curve for Variable Control charts
Lecture 51 - Statistical Process Control
Lecture 52 - Operating Characteristic (OC) Curve for Attribute Control charts
Lecture 53 - Statistical Process Control
Lecture 54 - Acceptance Sampling
Lecture 55 - Acceptance Sampling Plans for Attributes
Lecture 56 - Design of Acceptance Sampling Plans for Attributes
Lecture 57 - Acceptance Sampling Plans for Variables
Lecture 58 - Acceptance Sampling
Lecture 59 - Design for Six Sigma (DFSS)
Lecture 60 - Design for Six Sigma (DFSS)
Lecture 61 - Team Management
Lecture 62 - Six Sigma
Lecture 63 - Six Sigma

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NPTEL Video Course - Management - NOC:Performance and Reward Management

Subject Co-ordinator - Dr. Susmita Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding meaning of performance management and reward systems management with performance ma
Lecture 2 - Understanding meaning of performance management and reward systems management with performance ma
Lecture 3 - Understanding meaning of performance management and reward systems management with performance ma
Lecture 4 - Understanding meaning of performance management and reward systems management with performance ma
Lecture 5 - Understanding meaning of performance management and reward systems management with performance ma
Lecture 6 - Developing an understanding as to why performance management and reward management are of strateg
Lecture 7 - Developing an understanding as to why performance management and reward management are of strateg
Lecture 8 - Developing an understanding as to why performance management and reward management are of strateg
Lecture 9 - Developing an understanding as to why performance management and reward management are of strateg
Lecture 10 - Developing an understanding as to why performance management and reward management are of strate
Lecture 11 - Implementation of a performance management system, defininig performance and choosing a measure
Lecture 12 - Implementation of a performance management system, defininig performance and choosing a measure
Lecture 13 - Implementation of a performance management system, defininig performance and choosing a measure
Lecture 14 - Implementation of a performance management system, defininig performance and choosing a measure
Lecture 15 - Implementation of a performance management system, defininig performance and choosing a measure
Lecture 16 - Implementing a performance management system in your organization
Lecture 17 - Implementing a performance management system in your organization (Continued...)
Lecture 18 - Implementing a performance management system in your organization (Continued...)
Lecture 19 - Implementing a performance management system in your organization (Continued...)
Lecture 20 - Implementing a performance management system in your organization (Continued...)
Lecture 21 - Role of performance management in employee development, addressing performance management skills
Lecture 22 - Role of performance management in employee development, addressing performance management skills
Lecture 23 - Role of performance management in employee development, addressing performance management skills
Lecture 24 - Role of performance management in employee development, addressing performance management skills
Lecture 25 - Role of performance management in employee development, addressing performance management skills
Lecture 26 - Overview,reward system, understanding total, strategic and international reward
Lecture 27 - Overview,reward system, understanding total, strategic and international reward (Continued...)
Lecture 28 - Overview,reward system, understanding total, strategic and international reward (Continued...)
Lecture 29 - Overview,reward system, understanding total, strategic and international reward (Continued...)

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Lecture 30 - Overview,reward system, understanding total, strategic and international reward (Continued...)
Lecture 31 - Understanding linkage between performance management and reward, an overview of various types of
Lecture 32 - Understanding linkage between performance management and reward, an overview of various types of
Lecture 33 - Understanding linkage between performance management and reward, an overview of various types of
Lecture 34 - Understanding linkage between performance management and reward, an overview of various types of
Lecture 35 - Understanding linkage between performance management and reward, an overview of various types of
Lecture 36 - Understanding linkage between performance management and reward, an overview of various types of
Lecture 37 - Valuing and grading jobs, understanding pay levels, job evaluation schemes, equal pay, market ra
Lecture 38 - Valuing and grading jobs, understanding pay levels, job evaluation schemes, equal pay, market ra
Lecture 39 - Valuing and grading jobs, understanding pay levels, job evaluation schemes, equal pay, market ra
Lecture 40 - Valuing and grading jobs, understanding pay levels, job evaluation schemes, equal pay, market ra
Lecture 41 - Valuing and grading jobs, understanding pay levels, job evaluation schemes, equal pay, market ra
Lecture 42 - Rewarding Special Groups, rewarding directors and senior executives, sales and customer service
Lecture 43 - Rewarding Special Groups, rewarding directors and senior executives, sales and customer service
Lecture 44 - Rewarding Special Groups, rewarding directors and senior executives, sales and customer service
Lecture 45 - Rewarding Special Groups, rewarding directors and senior executives, sales and customer service
Lecture 46 - Rewarding Special Groups, rewarding directors and senior executives, sales and customer service
Lecture 47 - Rewarding Special Groups, rewarding directors and senior executives, sales and customer service
Lecture 48 - Understanding relevance of employee benefits and pension schemes, employee benefits, flexible be
Lecture 49 - Understanding relevance of employee benefits and pension schemes, employee benefits, flexible be
Lecture 50 - Understanding relevance of employee benefits and pension schemes, employee benefits, flexible be
Lecture 51 - Understanding relevance of employee benefits and pension schemes, employee benefits, flexible be
Lecture 52 - Understanding relevance of employee benefits and pension schemes, employee benefits, flexible be
Lecture 53 - Developing and Implementing Reward Systems
Lecture 54 - Developing and Implementing Reward Systems (Continued...)
Lecture 55 - Developing and Implementing Reward Systems (Continued...)
Lecture 56 - Developing and Implementing Reward Systems (Continued...)
Lecture 57 - Developing and Implementing Reward Systems (Continued...)
Lecture 58 - Understanding the implications of performance and reward management in present organizational dy
Lecture 59 - Understanding the implications of performance and reward management in present organizational dy
Lecture 60 - Understanding the implications of performance and reward management in present organizational dy
Lecture 61 - Understanding the implications of performance and reward management in present organizational dy
Lecture 62 - Understanding the implications of performance and reward management in present organizational dy
Lecture 63 - Understanding the implications of performance and reward management in present organizational dy

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NPTEL Video Course - Management - NOC:The Ethical Corporation

Subject Co-ordinator - Prof. Chhanda Chakraborti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is a Corporation
Lecture 2 - Ethical Corporation
Lecture 3 - What is Ethics
Lecture 4 - Law and Ethics, and Responsibilities
Lecture 5 - Why should a Corporation be Ethical
Lecture 6 - Normative Ethical Theories
Lecture 7 - Normative Ethical Theories
Lecture 8 - Normative Ethical Theories
Lecture 9 - Normative Ethical Theories
Lecture 10 - Normative Ethical Theories
Lecture 11 - Managing Ethics within the Corporation
Lecture 12 - Managing Ethics within the Organization
Lecture 13 - Managing Ethics within a Corporation
Lecture 14 - How to Manage Inter - Personal Ethical Misconduct at Workplace
Lecture 15 - How to Apply Ethics
Lecture 16 - Understanding Corporate Governance
Lecture 17 - Conflicts and Key Elements in Corporate Governance
Lecture 18 - Specific Areas of Concern in Corporate Governance and Countermeasures - I
Lecture 19 - Specific Areas of Concern in Corporate Governance and Countermeasures - II
Lecture 20 - Concluding Session on Corporate Governance
Lecture 21 - Investing in Human relations
Lecture 22 - Employer-employee
Lecture 23 - Organization model and employer-employee relation
Lecture 24 - Some specific issues in employer-employee relationship
Lecture 25 - Employees All Over the World
Lecture 26 - The Ethical Corporation
Lecture 27 - Corporate Obligations to Natural Environment through the Laws
Lecture 28 - Corporate Obligations to Natural Environment through Appeal to Business Sense and Strategy
Lecture 29 - Corporate Obligations to Natural Environment on Ethical Grounds

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Lecture 30 - Environmental Obligations
Lecture 31 - Consumers as Stakeholders and Consumer Protection
Lecture 32 - Ethics of Consumer Protection
Lecture 33 - Consumer ethics
Lecture 34 - Consumer ethics
Lecture 35 - Consumer Ethics
Lecture 36 - Competitors as Stakeholders and Fiar Competition
Lecture 37 - What is NOT Fair Competition
Lecture 38 - Competitors as Stakeholders; Global Competition
Lecture 39 - Suppliers as Stakeholders
Lecture 40 - Competitors and Suppliers

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NPTEL Video Course - Management - NOC:Intellectual Property Rights and Competition Law

Subject Co-ordinator - Prof. Niharika Sahoo Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Intellectual Property Law Patents
Lecture 2 - Trademark
Lecture 3 - Geographical Indications
Lecture 4 - Copyright
Lecture 5 - Industrial Designs
Lecture 6 - Integrated Circuits Layout Designs
Lecture 7 - Trade Secrets or Undisclosd Information
Lecture 8 - Information Competition Law
Lecture 9 - Introduction to Competition Law (Continued...)
Lecture 10 - Introduction Competieion Low Anti-Competitive Practices
Lecture 11 - Bid-Rigging
Lecture 12 - Introduction Competition Law - Vertical Agreements
Lecture 13 - Abuse of Dominance, Combinations
Lecture 14 - Regulation of Combinations
Lecture 15 - Economic Theory of Ip And Competition
Lecture 16 - Interface Between Ip And Competition
Lecture 17 - The United States Anti-Trust Law
Lecture 18 - Tying Arrangements And Intellectual Property Under Sharman Act
Lecture 19 - Unites States Jurisprudence
Lecture 20 - Price Fixing And Antitrust Law
Lecture 21 - Market Allocation And Ipr
Lecture 22 - Vertical Restraints
Lecture 23 - Vertical Restraints (Contd)
Lecture 24 - Enforcement of Anti-Trust Law in United States
Lecture 25 - Introduction To EU Competition Policy And IPR
Lecture 26 - IP Based Conduct under Article 101
Lecture 27 - IP Based Conduct under Article 102
Lecture 28 - IP Based Conduct under Article 102
Lecture 29 - Technology Transfer Agreements

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Lecture 30 - TTBER and safe harbor provisions
Lecture 31 - Standard Essential Patents and FRAND Terms
Lecture 32 - Introduction to Competition Law in India (Continued...)
Lecture 33 - Introduction to Competition Law in India (Continued...)
Lecture 34 - Introduction to Competition Law in India (Continued...)
Lecture 35 - IP Licensing and Indian Competition Law
Lecture 36 - IP Licensing and Indian Competition Law (Continued...)
Lecture 37 - IP Licensing and Indian Competition Law (Continued...)
Lecture 38 - IP Licensing and Indian Competition Law (Continued...)
Lecture 39 - Patent and Competition Law
Lecture 40 - Trademark, Copyright and Competition Law
Lecture 41 - TRIPS and Competition Law
Lecture 42 - TRIPS and Competition Law (Continued...)
Lecture 43 - Comparative analysis of IP and competition law across US, EU and India

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NPTEL Video Course - Management - NOC:Patent Search for Engineers and Lawyers

Subject Co-ordinator - Prof. Shreya Matilal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to IPR
Lecture 2 - IP-Economic Rationale
Lecture 3 - Patentability-Novelty - I
Lecture 4 - Patentability-Novelty - II
Lecture 5 - Non-Obviousness
Lecture 6 - How to read a patent document
Lecture 7 - How to read a patent document
Lecture 8 - Introduction to patent search
Lecture 9 - Introduction to patent search
Lecture 10 - Fundamentals of patent search
Lecture 11 - Fundamentals of patent search
Lecture 12 - Hands on Patent Search
Lecture 13 - Hands on Patent Search
Lecture 14 - Hands on Patent Search - Sequence Search
Lecture 15 - Hands on Patent Search - Emerging areas of Technology
Lecture 16 - Types of patent Search
Lecture 17 - Types of patent Search (Continued...)
Lecture 18 - Types of patent Search (Continued...)
Lecture 19 - Types of patent Search, Validity Search
Lecture 20 - Invalidity Search
Lecture 21 - Types of Patent Search FTO
Lecture 22 - Types of Patent Search
Lecture 23 - Introduction to patent landscape
Lecture 24 - Introduction to patent landscape (Continued...)
Lecture 25 - Introduction to patent landscape (Continued...)
Lecture 26 - Hands on Patent Landscape
Lecture 27 - Hands on Patent Landscape (Continued...)
Lecture 28 - Hands on Patent Landscape (Continued...)
Lecture 29 - Hands on Patent Landscape (Continued...)

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Lecture 30 - Hands on Patent Landscape (Continued...)
Lecture 31 - Analytical tools for Patent search and analysis
Lecture 32 - Analytical tools for Patent search and analysis (Continued...)
Lecture 33 - Analytical tools for Patent search and analysis (Continued...)
Lecture 34 - Analytical tools for Patent search and analysis (Continued...)
Lecture 35 - Analytical tools for Patent search and analysis (Continued...)
Lecture 36 - Analytical tools for Patent search and analysis (Continued...)
Lecture 37 - Administrative Enforcement
Lecture 38 - Judicial Enforcement
Lecture 39 - DOE
Lecture 40 - Patent Infringement

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NPTEL Video Course - Management - NOC:Modelling and Analytics for Supply Chain Management

Subject Co-ordinator - Prof. Kunal Kanti Ghosh, Prof. Anupam Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Modelling and Analytics for Supply Chain Management
Lecture 2 - Introduction to Modelling and Analytics In Supply Network
Lecture 3 - Decisions and Performance Measures In Supply Chain
Lecture 4 - Introduction to Analytics in Supply Chain
Lecture 5 - Analytics Framework Based on SCOR Model
Lecture 6 - Design Options for Distribution Network
Lecture 7 - Supplier selection Analytics
Lecture 8 - Supplier selection Analytics (Continued...)
Lecture 9 - Supplier selection Analytics (Continued...)
Lecture 10 - Supplier selection Analytics (Continued...)
Lecture 11 - Supplier selection Analytics (Continued...)
Lecture 12 - Transportation cost - I
Lecture 13 - Transportation cost - II
Lecture 14 - Transportation cost - III
Lecture 15 - Transportation cost - IV
Lecture 16 - Warehouse location models - I
Lecture 17 - Warehouse location models - II
Lecture 18 - Warehouse location models - III
Lecture 19 - Warehouse location models - IV
Lecture 20 - Warehouse layout
Lecture 21 - Space calculation - I
Lecture 22 - Space calculation - II
Lecture 23 - Performance of the entire supply chain
Lecture 24 - Data envelopment analysis
Lecture 25 - Concepts in inventory management - I
Lecture 26 - Concepts in inventory management - II
Lecture 27 - Concepts in inventory management - III
Lecture 28 - Concepts in inventory management - IV
Lecture 29 - Concepts in inventory management - V

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Lecture 30 - Safety Stock and Reorder Level
Lecture 31 - Continuous Review System
Lecture 32 - Continuous Review System (Continued...)
Lecture 33 - Periodic Review System
Lecture 34 - Periodic Review System (Continued...)
Lecture 35 - Transportation system - India and World
Lecture 36 - Transport Costing
Lecture 37 - Public transport costing
Lecture 38 - Fixing Fare for public transportation system
Lecture 39 - Foreign trade logistics
Lecture 40 - Analytical Hierarchy Processing (AHP) Method
Lecture 41 - Technique of Order Preference by Similarity to Ideal Solution (TOPSIS) Method
Lecture 42 - TOPSIS and VIKOR Method
Lecture 43 - VIKOR and ISM Method
Lecture 44 - VIKOR and ISM Method
Lecture 45 - Forecasting Simple and Weighted Average Mean Square Error
Lecture 46 - Forecasting Exponential Smoothing Method
Lecture 47 - Forecasting Seasonality in Forecasting
Lecture 48 - Forecasting Trend Regression and Holt's Method
Lecture 49 - Forecasting Trend Holt's and Winters Method
Lecture 50 - Forecasting Multi Period Forecasting
Lecture 51 - Information Distortions; Coordination and Collaboration Modelling
Lecture 52 - Information Distortions; Coordination and Collaboration Modelling
Lecture 53 - Six Sigma and queuing in Coordination
Lecture 54 - Queuing in Coordination; Measuring the Degree of Coordination
Lecture 55 - Risk Analytics in Supply Network Design
Lecture 56 - Risk Analytics in Supply Network Design (Continued...)
Lecture 57 - Designing the global supply chain
Lecture 58 - Designing the global supply chain
Lecture 59 - Designing the global supply chain
Lecture 60 - Designing the global supply chain
Lecture 61 - Designing the global supply chain
Lecture 62 - Designing the global supply chain

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NPTEL Video Course - Management - NOC:Marketing Analytics

Subject Co-ordinator - Prof. Swagato Chatterjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to R programming
Lecture 2 - Introduction to R programming (Continued...)
Lecture 3 - Introduction to R programming (Continued...)
Lecture 4 - Introduction to R programming (Continued...)
Lecture 5 - Introduction to R programming (Continued...)
Lecture 6 - Introduction to R programming (Continued...)
Lecture 7 - What Consumers Want
Lecture 8 - What Consumers Want (Continued...)
Lecture 9 - What Consumers Want (Continued...)
Lecture 10 - What Consumers Want (Continued...)
Lecture 11 - What Consumers Want (Continued...)
Lecture 12 - What Consumers Want (Continued...)
Lecture 13 - Segmentation Targeting and Positioning
Lecture 14 - Segmentation Targeting and Positioning (Continued...)
Lecture 15 - Segmentation Targeting and Positioning (Continued...)
Lecture 16 - Segmentation Targeting and Positioning (Continued...)
Lecture 17 - Segmentation Targeting and Positioning (Continued...)
Lecture 18 - Demand Forecasting and Pricing
Lecture 19 - Demand Forecasting and Pricing (Continued...)
Lecture 20 - Demand Forecasting and Pricing (Continued...)
Lecture 21 - Demand Forecasting and Pricing (Continued...)
Lecture 22 - Pricing
Lecture 23 - Pricing (Continued...)
Lecture 24 - Pricing (Continued...)
Lecture 25 - Pricing (Continued...)
Lecture 26 - Pricing (Continued...)
Lecture 27 - Pricing (Continued...)
Lecture 28 - Pricing (Continued...)
Lecture 29 - Marketing Mix Models and Advertising Models

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Lecture 30 - Marketing Mix Models and Advertising Models (Continued...)
Lecture 31 - Marketing Mix Models and Advertising Models (Continued...)
Lecture 32 - Marketing Mix Models and Advertising Models (Continued...)
Lecture 33 - Marketing Mix Models and Advertising Models (Continued...)
Lecture 34 - Recommendation Engine and Retail Analytics
Lecture 35 - Recommendation Engine and Retail Analytics (Continued...)
Lecture 36 - Recommendation Engine and Retail Analytics (Continued...)
Lecture 37 - Recommendation Engine and Retail Analytics (Continued...)
Lecture 38 - Recommendation Engine and Retail Analytics (Continued...)
Lecture 39 - Recommendation Engine and Retail Analytics (Continued...)
Lecture 40 - RFM and Market Basket Analysis
Lecture 41 - RFM and Market Basket Analysis (Continued...)
Lecture 42 - RFM and Market Basket Analysis (Continued...)
Lecture 43 - RFM and Market Basket Analysis (Continued...)
Lecture 44 - RFM and Market Basket Analysis (Continued...)
Lecture 45 - Customer Churn and Customer Lifetime Value
Lecture 46 - Customer Churn and Customer Lifetime Value (Continued...)
Lecture 47 - Customer Churn and Customer Lifetime Value (Continued...)
Lecture 48 - Customer Churn and Customer Lifetime Value (Continued...)
Lecture 49 - Customer Churn and Customer Lifetime Value (Continued...)
Lecture 50 - Customer Churn and Customer Lifetime Value (Continued...)
Lecture 51 - Text Mining and Sentiment Analytics
Lecture 52 - Text Mining and Sentiment Analytics (Continued...)
Lecture 53 - Text Mining and Sentiment Analytics (Continued...)
Lecture 54 - Text Mining and Sentiment Analytics (Continued...)
Lecture 55 - Text Mining and Sentiment Analytics (Continued...)
Lecture 56 - Text Mining and Sentiment Analytics (Continued...)
Lecture 57 - Text Mining and Sentiment Analytics (Continued...)
Lecture 58 - Text Mining and Sentiment Analytics (Continued...)
Lecture 59 - Text Mining and Sentiment Analytics (Continued...)
Lecture 60 - Text Mining and Sentiment Analytics (Continued...)
Lecture 61 - Social Network Analysis and Excel Dashboards
Lecture 62 - Social Network Analysis and Excel Dashboards (Continued...)
Lecture 63 - Social Network Analysis and Excel Dashboards (Continued...)
Lecture 64 - Social Network Analysis and Excel Dashboards (Continued...)
Lecture 65 - Social Network Analysis and Excel Dashboards (Continued...)
Lecture 66 - Social Network Analysis and Excel Dashboards (Continued...)

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NPTEL Video Course - Management - NOC:Management of Commercial Banking

Subject Co-ordinator - Prof. Jitendra Mahakud

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance and Forms of Commercial Banks
Lecture 2 - Functions, Goals and Constraints of Commercial Banks
Lecture 3 - Regulation of Commercial Banks
Lecture 4 - Financial Statements of Commercial Banks - I
Lecture 5 - Financial Statements of Commercial Banks - II
Lecture 6 - Bank Performance Measures - I
Lecture 7 - Bank Performance Measures - II
Lecture 8 - Bank Performance Measures - III
Lecture 9 - Bank Performance Measures - IV
Lecture 10 - Bank Performance Measures - V
Lecture 11 - Valuation of Bank Stocks - I
Lecture 12 - Valuation of Bank Stocks - II
Lecture 13 - Valuation of Fixed Assets - I
Lecture 14 - Valuation of Fixed Assets - II
Lecture 15 - Valuation of Fixed Assets - III
Lecture 16 - Commercial Bank Risk - I
Lecture 17 - Commercial Bank Risk - II
Lecture 18 - Commercial Bank Risk - III
Lecture 19 - Commercial Bank Risk - IV
Lecture 20 - Commercial Bank Risk - V
Lecture 21 - Overview of Asset Liability Management
Lecture 22 - Dollar Gap Analysis
Lecture 23 - Earnings Sensitivity Analysis
Lecture 24 - Duration Gap Analysis - I
Lecture 25 - Duration Gap Analysis - II
Lecture 26 - Use of Derivatives in ALM - I
Lecture 27 - Use of Derivatives in ALM - II
Lecture 28 - Use of Derivatives in ALM - III
Lecture 29 - Use of Derivatives in ALM - IV

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Lecture 30 - Use of Derivatives in ALM - V
Lecture 31 - Management of Lending Activities - I
Lecture 32 - Management of Lending Activities - II
Lecture 33 - Management of Lending Activities - III
Lecture 34 - Management of Lending Activities - IV
Lecture 35 - Management of Lending Activities - V
Lecture 36 - Management of Lending Activities - VI
Lecture 37 - Management of Lending Activities - VII
Lecture 38 - Management of Lending Activities - VIII
Lecture 39 - Management of Lending Activities - IX
Lecture 40 - Management of Lending Activities - X
Lecture 41 - Management Investment Portfolios - I
Lecture 42 - Management Investment Portfolios - II
Lecture 43 - Management Investment Portfolios - III
Lecture 44 - Management Investment Portfolios - IV
Lecture 45 - Management Investment Portfolios - V
Lecture 46 - Managing Liquidity of Commercial Banks - I
Lecture 47 - Managing Liquidity of Commercial Banks - II
Lecture 48 - Managing Liquidity of Commercial Banks - III
Lecture 49 - Managing Liquidity of Commercial Banks - IV
Lecture 50 - Managing Liquidity of Commercial Banks - V
Lecture 51 - Management of Deposits - I
Lecture 52 - Management of Deposits - II
Lecture 53 - Management of Non-Deposit Liabilities
Lecture 54 - Management of Off-Balance Sheet Activities - I
Lecture 55 - Management of Off-Balance Sheet Activities - II
Lecture 56 - Management of Off-Balance Sheet Activities - III
Lecture 57 - Management of Bank Capital - I
Lecture 58 - Management of Bank Capital - II
Lecture 59 - Management of Bank Capital - III
Lecture 60 - Management of Bank Capital - IV

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NPTEL Video Course - Management - NOC:Behavioral and Personal Finance

Subject Co-ordinator - Prof. Abhijeet Chandra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Behavioral Economics and Finance
Lecture 2 - Introduction to Behavioral Economics and Finance (Continued...)
Lecture 3 - Economics of Decision Making
Lecture 4 - Economics of Decision Making (Continued...)
Lecture 5 - Decision Making Under Risk and Uncertainty
Lecture 6 - Decision Making Under Risk and Uncertainty (Continued...)
Lecture 7 - Non-expected Utility Preferences
Lecture 8 - Non-expected Utility Preferences (Continued...)
Lecture 9 - Prospect Theory and Behavioral Biases
Lecture 10 - Prospect Theory and Behavioral Finance
Lecture 11 - Prospect Theory and Behavioral Finance (Continued...)
Lecture 12 - Beliefs, Biases and Heuristics
Lecture 13 - Beliefs, Biases and Heuristics (Continued...)
Lecture 14 - Beliefs, Biases and Heuristics (Continued...)
Lecture 15 - Biases and Financial Decision-Making
Lecture 16 - Biases and Financial Decision-Making (Continued...)
Lecture 17 - Overconfidence and Investor Behavior
Lecture 18 - Valuation of Financial Assets
Lecture 19 - Valuation of Financial Assets (Continued...)
Lecture 20 - Valuation of Financial Assets (Continued...)
Lecture 21 - Portfolio Return and Risk
Lecture 22 - Portfolio Return and Risk (Continued...)
Lecture 23 - Personal Financial Goals
Lecture 24 - Planning Personal Finances
Lecture 25 - Personal Financial Statements
Lecture 26 - Taxes and Financial Planning
Lecture 27 - Taxes and Financial Planning (Continued...)
Lecture 28 - Portfolios for Individual Investors
Lecture 29 - Investment Alternatives for Individual Investors

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Lecture 30 - Investing in Mutual Funds
Lecture 31 - Fixed Income Investments
Lecture 32 - Fixed Income Investments (Continued...)
Lecture 33 - Purchasing Decisons
Lecture 34 - Consumer Credit Decisions
Lecture 35 - Loans and Amortization
Lecture 36 - Loans and Amortization (Continued...)
Lecture 37 - Credit Card as Source of Consumer Credit
Lecture 38 - Alternative Investments
Lecture 39 - Alternative Investments (Continued...)
Lecture 40 - Structured Finance
Lecture 41 - Wealth Managment

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NPTEL Video Course - Management - NOC:Customer Relationship Management

Subject Co-ordinator - Prof. Swagato Chatterjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - CMR
Lecture 2 - CMR
Lecture 3 - CMR
Lecture 4 - CMR
Lecture 5 - Co-Creation
Lecture 6 - Co-creation (Continued...)
Lecture 7 - Co-creation (Continued...)
Lecture 8 - Building Customer Relationships
Lecture 9 - Building Customer Relationships (Continued...)
Lecture 10 - Building Customer Relationships (Continued...)
Lecture 11 - Building Customer Relationships (Continued...)
Lecture 12 - Building Customer Relationships (Continued...)
Lecture 13 - Building Customer Relationships (Continued...)
Lecture 14 - Economics of CRM
Lecture 15 - Economics of CRM (Continued...)
Lecture 16 - Economics of CRM (Continued...)
Lecture 17 - Economics of CRM (Continued...)
Lecture 18 - Economics of CRM (Continued...)
Lecture 19 - Economics of CRM (Continued...)
Lecture 20 - Economics of CRM (Continued...)
Lecture 21 - Social CRM
Lecture 22 - Social CRM (Continued...)
Lecture 23 - Social CRM (Continued...)
Lecture 24 - Tchibo Case Study
Lecture 25 - Tchibo Case Study (Continued...)
Lecture 26 - Customer Equity in CRM
Lecture 27 - Customer Equity in CRM (Continued...)
Lecture 28 - CRM in B2C Markets
Lecture 29 - CRM in B2C Markets (Continued...)

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Lecture 30 - CRM in B2C Markets (Continued...)
Lecture 31 - CRM in B2C Markets (Continued...)
Lecture 32 - CRM in B2B Markets
Lecture 33 - CRM in B2B Markets (Continued...)
Lecture 34 - CRM in B2B Markets (Continued...)
Lecture 35 - CRM in B2B Markets (Continued...)
Lecture 36 - eCRM
Lecture 37 - eCRM
Lecture 38 - eCRM
Lecture 39 - Contact Centres for CRM
Lecture 40 - Contact Centres for CRM (Continued...)
Lecture 41 - Global CRM
Lecture 42 - Global CRM (Continued...)

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NPTEL Video Course - Management - NOC:Principles of Management

Subject Co-ordinator - Prof. S. Srinivasan, Dr. Susmita Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition, Nature, Purpose and Scope of Management
Lecture 2 - Skills, Roles and Functions of Management
Lecture 3 - Principles of Management
Lecture 4 - Scientific Management
Lecture 5 - Evolution of Management Thought
Lecture 6 - Concept, Types, Importance and Process of Planning
Lecture 7 - Characteristics, Nature and Scope and Principles of Planning
Lecture 8 - Traditional objective setting and methods of Planning
Lecture 9 - Strategic Management and Planning
Lecture 10 - Premising and Forecasting of Planning
Lecture 11 - Concept, Types, Importance and Process of Decision Making
Lecture 12 - Different Models of Decision Making
Lecture 13 - Decision Making Styles and Cognitive biases in decision making
Lecture 14 - Barriers of Effective Decision Making
Lecture 15 - Group Decision Making
Lecture 16 - Concept,Importance and Steps of Management by Objectives
Lecture 17 - Concept,Importance and Steps of Management by exception
Lecture 18 - Style of Management (American, Japanese and Indian)
Lecture 19 - Approaches of management including McKinseyâ s 7â s approach
Lecture 20 - Introduction, strategies, techniques, benefits and rules of Self Management
Lecture 21 - Concept, Importance, Process, Nature, and Principle of Organisation
Lecture 22 - Organisational Design and Structure
Lecture 23 - Coordination in Management
Lecture 24 - Differentiation in management
Lecture 25 - Concept, Types, Importance, Steps, Factors and Advantages of Integration
Lecture 26 - Concept, Types, Importance and Process of Span of Management
Lecture 27 - Concept, types, factors, advantages and disadvantages of Centralisation and Decentralisation
Lecture 28 - Delegation
Lecture 29 - Different issues relating to authority and power

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Lecture 30 - Different aspects of line and staff organisation
Lecture 31 - Concept, importance, process and methods of Staffing and HRM
Lecture 32 - Recruitment and Selection
Lecture 33 - Recruitment and Selection (Continued...)
Lecture 34 - Performance Appraisal
Lecture 35 - Performance Appraisal (Continued...)
Lecture 36 - Concept, Types, Importance, Techniques of Career strategy
Lecture 37 - Concept, Types, Importance, Techniques of Career strategy (Continued...)
Lecture 38 - Concept, Types, Importance, Techniques of Career strategy (Continued...)
Lecture 39 - Coordination-Concept, Issues and Techniques
Lecture 40 - Coordination-Concept, Issues and Techniques (Continued...)
Lecture 41 - Concept, importance, elements of organisational change
Lecture 42 - Concept, importance, elements of organisational change (Continued...)
Lecture 43 - Forces and factors of organisational change
Lecture 44 - Resistance to change
Lecture 45 - Theories of change and resistance to change
Lecture 46 - Methods of dealing with change
Lecture 47 - Methods of dealing with change (Continued...)
Lecture 48 - Behavioural reaction to organisational Change
Lecture 49 - Approaches to manage organisational Change
Lecture 50 - Approaches to manage organisational Change
Lecture 51 - Action Research model to manage organisational change
Lecture 52 - Organisational development
Lecture 53 - Leadership, and Its Theories
Lecture 54 - Team and Team Work in Management
Lecture 55 - Human factors and Motivation
Lecture 56 - Communication and Its Barriers
Lecture 57 - Controlling
Lecture 58 - Budgeting, concept, importance, process and benefits
Lecture 59 - Reporting- concepts, types, importance and advantages

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NPTEL Video Course - Management - NOC:Decision Support System for Managers

Subject Co-ordinator - Prof Sujoy Bhattacharya, Prof. Anupam Ghosh, Prof. Kunal Kanti Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to decision support systems
Lecture 2 - Components of a decision support systems
Lecture 3 - Components of a decision support systems (Continued...)
Lecture 4 - Models in decision support systems
Lecture 5 - Models in decision support systems (Continued...)
Lecture 6 - Structured, Semi-Structured and Unstructured problems; Models
Lecture 7 - Purpose of models; classification of models
Lecture 8 - Solution Techniques - Optimization
Lecture 9 - Solution Techniques - Optimization
Lecture 10 - Solution Techniques - Optimization
Lecture 11 - Decision Support Systems for Forecasting
Lecture 12 - Decision Support Systems for Forecasting (Continued...)
Lecture 13 - Decision Support Systems for Forecasting (Continued...)
Lecture 14 - Decision Support Systems for Forecasting (Continued...)
Lecture 15 - Decision Support Systems for Forecasting (Continued...)
Lecture 16 - Decision Making for Warehouse Location
Lecture 17 - Decision Making for Warehouse Location (Continued..)
Lecture 18 - Estimation of space requirement in a warehouse and concept of economic order quantity (EOQ)
Lecture 19 - Economic order quantity (EOQ) (Continued...)
Lecture 20 - ABC-FSN-VED Analysis; space calculation in a warehouse - for Staging area
Lecture 21 - Space calculation in a warehouse
Lecture 22 - Order Picking; Material handling equipment's
Lecture 23 - Material Safety and Safety Equipment's
Lecture 24 - Automated storage and replenishment systems (AS/RS)
Lecture 25 - Managerial Decision making in the context of warehousing and materials management
Lecture 26 - Issues in HR; Employee Selection
Lecture 27 - Employee Selection, Promotion and Deployment Method - Lp Method
Lecture 28 - Employee Selection, Promotion and Deployment Method - Rating and ranking Method ; Clustering
Lecture 29 - Employee Selection, Promotion and Deployment Method - BCG

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Lecture 30 - Strategizing for Business, the SWOT and Porter's Framwork Revisited
Lecture 31 - Fortune at the Bottom of the Pyramid, GE, Rule of Three
Lecture 32 - Self Actualisation Needs, Rural Marketing Challenges
Lecture 33 - Rural Marketing; Balanced ScoreCard
Lecture 34 - Evaluating Investment Proposls
Lecture 35 - Costing and Pricing for Public Transport
Lecture 36 - Costing and Pricing for Hospitals
Lecture 37 - Decision Support Systems for Marketing
Lecture 38 - Decision Support Systems for Marketing
Lecture 39 - Decision Support Systems for Marketing
Lecture 40 - Pricing
Lecture 41 - Taxation and the Distribution Network
Lecture 42 - Transhipment; Flexibility and Six Sigma
Lecture 43 - Flexibility and Total Cost of the Network
Lecture 44 - Risk Analysis for the Distribution Network
Lecture 45 - Echelons in the Network
Lecture 46 - Concept of Variability and Six Sigma
Lecture 47 - Concept of Variability and Six Sigma (Continued...)
Lecture 48 - Roadmap to Six Sigma; Ishikawa Diagram and SIPOC
Lecture 49 - Service Systems
Lecture 50 - Decision Support Systems for Inventory
Lecture 51 - Decision Support Systems for Inventory (Continued...)
Lecture 52 - Decision Support Systems for Inventory (Continued...)
Lecture 53 - Decision Support Systems for Inventory (Continued...)
Lecture 54 - Decision Support Systems for Inventory (Continued...)
Lecture 55 - Decision Support Systems for Operations Management
Lecture 56 - Decision Support Systems for Operations Management (Continued...)
Lecture 57 - Decision Support Systems for Operations Management (Continued...)
Lecture 58 - Decision Support Systems for Operations Management (Continued...)
Lecture 59 - Decision Support Systems for Operations Management (Continued...)
Lecture 60 - DSS for Multi - Item Production - Distribution Planning

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NPTEL Video Course - Management - NOC:Management Information System

Subject Co-ordinator - Prof. Kunal Kanti Ghosh, Prof. Surojit Mukherjee, Prof. Saini Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Dimensions of Information System
Lecture 4 - Information Management in the digital world
Lecture 5 - Class discussions and conclusion
Lecture 6 - Data bases and information management
Lecture 7 - Data warehouse and business intelligence
Lecture 8 - Introduction to data mining
Lecture 9 - Data analytics tools and techniques
Lecture 10 - What is ERP ?
Lecture 11 - ERP - Evolution and Benefits
Lecture 12 - Business Benrfits of ERP
Lecture 13 - ERP project management
Lecture 14 - Change management and conclusion
Lecture 15 - Customer relationship management
Lecture 16 - Supply Chain Management - Part 1
Lecture 17 - Supply Chain Management - Part 2
Lecture 18 - Supplier relationship management
Lecture 19 - Product lifecycle maintenance
Lecture 20 - Information Systems for manufacturing management
Lecture 21 - Information Systems for manufacturing management (Continued...)
Lecture 22 - Information Systems for materials management
Lecture 23 - Information Systems for quality management
Lecture 24 - Information Systems for marketing
Lecture 25 - Information Systems for marketing (Continued...)
Lecture 26 - Information Systems for sales and distribution
Lecture 27 - Information Systems for finance and accounting
Lecture 28 - Information Systems for human resource management
Lecture 29 - Information Systems for human resource management (Continued...)

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Lecture 30 - Information Systems (IS) strategy
Lecture 31 - Aligning IT with business objectives
Lecture 32 - Balanced Score Card
Lecture 33 - Data Centers, Virtualization and cloud computing
Lecture 34 - Cloud computing and selection of cloud vendor
Lecture 35 - Introduction to E-Commerce
Lecture 36 - B2C Business Models
Lecture 37 - B2C Business Models (Continued...)
Lecture 38 - Unique E-Commerce Business Models
Lecture 39 - Social Commerce and M-Commerce
Lecture 40 - Cloud Computing - Part I
Lecture 41 - Cloud Computing - Part II
Lecture 42 - Internet of Things - Part I
Lecture 43 - Internet of Things - Part II
Lecture 44 - Internet of Things - Part III
Lecture 45 - Big Data and other Emerging Technologies
Lecture 46 - Knowledge Management Systems (KMS)
Lecture 47 - Decision Support Systems
Lecture 48 - Executive Support Systems
Lecture 49 - Expert Systems
Lecture 50 - Learning Management Systems (LMS)
Lecture 51 - Ethical and Social Issues in MIS - I
Lecture 52 - Ethical and Social Issues in MIS - II
Lecture 53 - Security Issues in MIS - I
Lecture 54 - Security Issues in MIS - II
Lecture 55 - Security Issues in MIS - III
Lecture 56 - Managing Global Organization - Globalization - Part 1
Lecture 57 - Global Strategies and Business Organization
Lecture 58 - Shared Services
Lecture 59 - Offshoring/Transitioning Global IT Systems
Lecture 60 - Globalization of Corporates in a Flat World

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NPTEL Video Course - Management - NOC:Applied Econometrics

Subject Co-ordinator - Prof. Tutan Ahmed

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Module 1 and Introduction of Causality
Lecture 2 - Correlation and Causality
Lecture 3 - Correlation and Causality (Continued...)
Lecture 4 - Correlation and Causality (Continued...)
Lecture 5 - Probability Theory
Lecture 6 - Probability Theory (Continued...)
Lecture 7 - Probability Theory (Continued...)
Lecture 8 - Probability Theory (Continued...)
Lecture 9 - Posterior Probability
Lecture 10 - Bayesian Theorem
Lecture 11 - Bayesian Theorem (Continued...): Repeated Trial
Lecture 12 - Bayesian Theorem (Continued...): Example of Diamond Identification
Lecture 13 - Probability Distribution
Lecture 14 - Double Structure of Variable
Lecture 15 - Probability Distribution (Discrete/Continuous Variable) Random Variable
Lecture 16 - Probability Mass Function (PMF) Probability Density Function (PDF)
Lecture 17 - Expectation, Variance, Covariance
Lecture 18 - Expectation, Variance, Covariance (Continued...)
Lecture 19 - Covariance Rule
Lecture 20 - Bernoulli Distribution
Lecture 21 - Bernoulli Distribution (Continued...)
Lecture 22 - Normal Approximation of Bernoulli Distribution
Lecture 23 - Sampling
Lecture 24 - Sampling (Continued...)
Lecture 25 - Central Limit Theorem
Lecture 26 - Law of Large Numbers LLN
Lecture 27 - Properties of Estimator
Lecture 28 - Conflict Between Unbiasedness and Min Variance
Lecture 29 - T-Distribution

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Lecture 30 - Normal Distribution
Lecture 31 - Normal Distribution (Continued...)
Lecture 32 - Hypothesis Testing
Lecture 33 - Decision Rules
Lecture 34 - Level of Significance
Lecture 35 - P Value
Lecture 36 - Power of a Test
Lecture 37 - Confidence Interval
Lecture 38 - Confidence Interval Example
Lecture 39 - Properties of Power of a Test
Lecture 40 - Introduction to Module II
Lecture 41 - Error Term, Coefficient of Determination, Regression Coefficient
Lecture 42 - Error Term, Coefficient of Determination, Regression Coefficient (Continued...)
Lecture 43 - Error Term, Coefficient of Determination, Regression Coefficient (Continued...)
Lecture 44 - Definition : Variable, Parameter and Coefficient
Lecture 45 - Introduction to Regression: Recapitulating Correlation and Causal Thinking
Lecture 46 - Adjusted R-Squared
Lecture 47 - Degrees of Freedom
Lecture 48 - Multiple Regression
Lecture 49 - Multiple Regression (Continued...)
Lecture 50 - Regression Table
Lecture 51 - Regression Table (Continued...)
Lecture 52 - Multicollinearity
Lecture 53 - Multicollinearity (Continued...)
Lecture 54 - Multicollinearity (Continued...)
Lecture 55 - Multicollinearity (Continued...)
Lecture 56 - Multicollinearity (Continued...)
Lecture 57 - Dummy Variable
Lecture 58 - Dummy variable (Continued...)
Lecture 59 - Dummy variable (Continued...)
Lecture 60 - Dummy variable (Continued...)
Lecture 61 - Dummy variable (Continued...)
Lecture 62 - Dummy variable (Continued...)
Lecture 63 - Dummy variable (Continued...)
Lecture 64 - Heteroscedasticity
Lecture 65 - Heteroscedasticity (Continued...)
Lecture 66 - Heteroscedasticity (Continued...)
Lecture 67 - Heteroscedasticity (Continued...)
Lecture 68 - Heteroscedasticity (Continued...)

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Lecture 69 - Heteroscedasticity (Continued...)
Lecture 70 - Autocorrelation
Lecture 71 - Autocorrelation (Continued...)
Lecture 72 - Autocorrelation (Continued...)
Lecture 73 - Autocorrelation (Continued...)
Lecture 74 - Autocorrelation (Continued...)
Lecture 75 - Autocorrelation (Continued...)
Lecture 76 - Autocorrelation (Continued...)
Lecture 77 - Autocorrelation (Continued...)
Lecture 78 - Autocorrelation (Continued...)
Lecture 79 - Autocorrelation (Continued...)
Lecture 80 - Autocorrelation (Continued...)
Lecture 81 - Autocorrelation (Continued...)
Lecture 82 - Remedy for Autocorrelation
Lecture 83 - Model Specification
Lecture 84 - Model Specification (Continued...)
Lecture 85 - Model Specification (Continued...)
Lecture 86 - Model Specification (Continued...)
Lecture 87 - Model Specification (Continued...)
Lecture 88 - Model Specification (Continued...)
Lecture 89 - Model Specification (Continued...)
Lecture 90 - Model Specification (Continued...)
Lecture 91 - Continuation with Proxy Variable
Lecture 92 - Ramsey Reset Test
Lecture 93 - Introduction to Module III
Lecture 94 - Non Stochastic Regressor
Lecture 95 - Stochastic Regressor
Lecture 96 - Assumptions for Regression Models with Non-Stochastic Regressor
Lecture 97 - Assumptions for Regression Model with Stochastic Regressor
Lecture 98 - Instrumental Variable
Lecture 99 - Instrumental Variable (Continued...)
Lecture 100 - Asymptotic Property
Lecture 101 - Problem of Endogeneity
Lecture 102 - Simultaneous Equation Model
Lecture 103 - Instrumental Variable for Endogeneity Bias Problem
Lecture 104 - Good Bad and Weak Instrumental Variable
Lecture 105 - Overidentification Underidentification Exact Identification - Instrumental Variable
Lecture 106 - Two Stage Least Square and Instrumental Variable
Lecture 107 - 2SLS and IV with Stata

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NPTEL Video Course - Management - NOC:Organizational Behaviour - II

Subject Co-ordinator - Prof. Susmita Mukhopadyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Group and Types, Characteristics
Lecture 2 - Group Properties and Determinants of Group Behaviour
Lecture 3 - Stages, Theories and Models of Group Development
Lecture 4 - Effectiveness of Work Group Behaviour
Lecture 5 - Group Decision Making and Limitations of Group Behaviour
Lecture 6 - Concept and Types of Team
Lecture 7 - How to improve team performance, difference between Team and Group
Lecture 8 - Effectiveness of Teamwork
Lecture 9 - Teamwork Process
Lecture 10 - Teamwork and Leadership
Lecture 11 - Concept and Types of Cooperation and Competition
Lecture 12 - Factors leading to Competition and Cooperation
Lecture 13 - Functions of Cooperation and Competition
Lecture 14 - Models on Competition and Cooperation
Lecture 15 - Benefits and drawbacks of competition and cooperation
Lecture 16 - Communication
Lecture 17 - Communication (Continued...)
Lecture 18 - Communication (Continued...)
Lecture 19 - Communication (Continued...)
Lecture 20 - Communication (Continued...)
Lecture 21 - Conflict
Lecture 22 - Conflict (Continued...)
Lecture 23 - Conflict (Continued...)
Lecture 24 - Conflict (Continued...)
Lecture 25 - Conflict (Continued...)
Lecture 26 - Power and Political Behaviour
Lecture 27 - Power and Political Behaviour (Continued...)
Lecture 28 - Power and Political Behaviour (Continued...)
Lecture 29 - Power and Political Behaviour (Continued...)

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Lecture 30 - Power and Political Behaviour (Continued...)
Lecture 31 - Decision making
Lecture 32 - Decision making (Continued...)
Lecture 33 - Decision making (Continued...)
Lecture 34 - Decision making (Continued...)
Lecture 35 - Decision making (Continued...)
Lecture 36 - Leadership Concept Types and Importance
Lecture 37 - Team Leadership Context, Actions
Lecture 38 - Theories of Leadership: Trait, Behavioural, Contingency, LMX, Three Dimensional
Lecture 39 - Leadership Qualities, Techniques and Skills
Lecture 40 - Leadership and Management
Lecture 41 - Problem Solving-Concept, Types and Importance
Lecture 42 - Problem Solving Process, Decision Making and Comparison between
Lecture 43 - Creativity
Lecture 44 - Problem Solving and Creativity in Team
Lecture 45 - Creativity Across Different Paradigms
Lecture 46 - Team and Organization
Lecture 47 - Organizational Culture
Lecture 48 - International Organizational Behaviour
Lecture 49 - Interpersonal Behaviour Across Cultures
Lecture 50 - Organizational Characteristics in Global Context
Lecture 51 - Virtual Team-Concept and importance
Lecture 52 - Virtual Team Models
Lecture 53 - Skills and Competencies of Virtual Team Members
Lecture 54 - Process of Virtual Team Development
Lecture 55 - Factors of Success, Advantages and Disadvantages of Virtual Teams
Lecture 56 - Evaluating Teams
Lecture 57 - Steps of Evaluation
Lecture 58 - Tools, Techniques and Methods of Evaluation
Lecture 59 - Rewarding Teams
Lecture 60 - Rewarding Teams (Continued...)

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NPTEL Video Course - Management - NOC:Automation in Production Systems and Management

Subject Co-ordinator - Prof. Pradip Kumar Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts of Manufacturing Systems, Evolution of Manufacturing Systems
Lecture 2 - Types of Manufacturing Systems and Role of Automation
Lecture 3 - Product-Process-Flexibility Matrices, Four-Plane Concept of Manufacturing
Lecture 4 - Product Design and Manufacturing Systems
Lecture 5 - Definitions and Design Criteria for Production Systems
Lecture 6 - Manufacturing System Components - I
Lecture 7 - Manufacturing System Components - II
Lecture 8 - Industry 4.0
Lecture 9 - Automation Principles and Strategies for Process Improvement
Lecture 10 - Automated Production System Framework
Lecture 11 - Product Development Process: Approaches and stages
Lecture 12 - Mathematical Models for Interaction between Design and Manufacturing
Lecture 13 - Sequential and Concurrent Engineering Approaches for Product Development
Lecture 14 - Characterization of Concurrent Engineering Framework
Lecture 15 - Concurrent Engineering Techniques
Lecture 16 - Introduction to Concept and Application of Numerical Control (NC) Technology
Lecture 17 - Basic Concepts of an NC System
Lecture 18 - NC Coordinate System, NC Motion Control System
Lecture 19 - Features of CNC, Configuration of CNC Machine Control System
Lecture 20 - Numerical Examples
Lecture 21 - Distributed Numerical Control (DNC) and its Configuration
Lecture 22 - NC Part Programming-I (Manual, Computer-assisted)
Lecture 23 - NC Part Programming-II (CAD/CAM, MDI)
Lecture 24 - Interpolation and Part Programming
Lecture 25 - Numerical Examples
Lecture 26 - Group Technology (GT): Concept and Definition
Lecture 27 - Methods and Implementation of GT for Automation
Lecture 28 - Part Family Formation: Tools and Techniques
Lecture 29 - Numerical Examples on Part Family Formation

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Lecture 30 - Application of GT for Designing Flexible and Programmable Automation
Lecture 31 - Concept and Definition of Cellular Manufacturing System (CMS)
Lecture 32 - Cell Formation Approaches - I
Lecture 33 - Cell Formation Approaches - II
Lecture 34 - Evaluation of Cell Design, Numerical Examples
Lecture 35 - Production Planning and Control in CMS, Assessment of Solution by Heuristics
Lecture 36 - Types and Definitions of of Flexibility in Manufacturing Systems
Lecture 37 - Volume-Variety Relationships in Production Systems, What is FMS?
Lecture 38 - Basic Features of FMS: PhysicalSsubsystems
Lecture 39 - Basic Features of FMS: Control Subsystems and Manufacturing Control Activities.
Lecture 40 - Types of Problems in FMS
Lecture 41 - Operational Problems in FMS: Tools and Techniques - 1, Problem Formulation
Lecture 42 - Operational Problems in FMS: Tools and Techniques - 2, Numerical Examples
Lecture 43 - Tool Allocation Policies in FMS, Numerical Examples
Lecture 44 - Fixture and Pallet Selection Problems: Numerical Examples
Lecture 45 - Types of FMS Layout, Relative Advantages
Lecture 46 - Fundamentals of Robotics and its Applications
Lecture 47 - Robot Movement and Precision
Lecture 48 - Robot Motion Analysis, Robotic Joints and Links
Lecture 49 - Robot Classification System, Industrial Robot Applications
Lecture 50 - Numerical Examples
Lecture 51 - Definition of Process Planning: Function of Process Plan
Lecture 52 - Basic Steps in Process Plan Development
Lecture 53 - Process Planning Approaches: Manual Experience-based Process Planning
Lecture 54 - Process Planning Approaches: Computer-aided Process Planning
Lecture 55 - CIN and CAPP, Process Optimization and CAPP
Lecture 56 - Process Optimization and CAPP
Lecture 57 - FMS and CAPP
Lecture 58 - Process Optimization and CAPP: Numerical Examples
Lecture 59 - Process Planning and Concurrent Engineering
Lecture 60 - Autonomation (and other TPS Areas and Approaches)

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NPTEL Video Course - Management - NOC:Corporate Finance

Subject Co-ordinator - Prof. Abhijeet Chandra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Corporate Finance
Lecture 2 - Corporate Finance and Corporate Governance
Lecture 3 - Sources of Finance for a Firm
Lecture 4 - Return and Risk
Lecture 5 - Return, Risk and Portfolio Theory
Lecture 6 - Time Value of Money
Lecture 7 - Valuation of Future Cash Flows
Lecture 8 - Valuation of Future Cash Flows (Continued...)
Lecture 9 - Valuation of Bonds
Lecture 10 - Valuation of Stocks
Lecture 11 - Capital Budgeting Decisions
Lecture 12 - Capital Budgeting Decisions (Continued...)
Lecture 13 - Capital Budgeting Techniques - I
Lecture 14 - Capital Budgeting Techniques - II
Lecture 15 - Capital Budgeting Techniques - III
Lecture 16 - Introduction to Cost of Capital
Lecture 17 - Cost of Capital - I
Lecture 18 - Cost of Capital - II
Lecture 19 - Cost of Capital and Firm Value - I
Lecture 20 - Cost of Capital and Firm Value - II
Lecture 21 - Measures of Leverage
Lecture 22 - Measures of Leverage (Continued...)
Lecture 23 - Theories of Capital Structure - I
Lecture 24 - Theories of Capital Structure - II
Lecture 25 - Practical Issues in Capital Structure
Lecture 26 - Working Capital Management - I
Lecture 27 - Working Capital Management - II
Lecture 28 - Measuring Liquidity - I
Lecture 29 - Measuring Liquidity - II

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Lecture 30 - Inventory Management - I
Lecture 31 - Inventory Management - II
Lecture 32 - Inventory Management - III
Lecture 33 - Credit Management - I
Lecture 34 - Credit Management - II
Lecture 35 - Credit Management - III
Lecture 36 - Dividend Decisions - I
Lecture 37 - Dividend Decisions - II
Lecture 38 - Applications of Dividend Theories - I
Lecture 39 - Applications of Dividend Theories - II
Lecture 40 - Some Issues in Corporate Finance

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NPTEL Video Course - Management - NOC:International Marketing

Subject Co-ordinator - Prof. Biswarup Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to International Marketing
Lecture 2 - Introduction to International Marketing
Lecture 3 - Introduction to International Marketing
Lecture 4 - Introduction to International Marketing
Lecture 5 - International Business, Entry Modes and Theories
Lecture 6 - International Business, Entry Modes and Theories
Lecture 7 - International Business, Entry Modes and Theories
Lecture 8 - International Business, Entry Modes and Theories
Lecture 9 - International Business, Entry Modes and Theories
Lecture 10 - Hofstede's Cultural Dimensions, Cross-cultural Sales Negotiations
Lecture 11 - Hofstede's Cultural Dimensions, Cross-cultural Sales Negotiations (Continued...)
Lecture 12 - Hofstede's Cultural Dimensions, Cross-cultural Sales Negotiations (Continued...)
Lecture 13 - Hofstede's Cultural Dimensions, Cross-cultural Sales Negotiations (Continued...)
Lecture 14 - Hofstede's Cultural Dimensions, Cross-cultural Sales Negotiations (Continued...)
Lecture 15 - Import Export Procedures
Lecture 16 - Import Export Procedures (Continued...)
Lecture 17 - Import Export Procedures (Continued...)
Lecture 18 - Import Export Procedures (Continued...)
Lecture 19 - Import Export Procedures (Continued...)
Lecture 20 - Designing a Global Marketing Program
Lecture 21 - Designing a Global Marketing Program (Continued...)
Lecture 22 - Designing a Global Marketing Program (Continued...)
Lecture 23 - Designing a Global Marketing Program (Continued...)
Lecture 24 - Designing a Global Marketing Program (Continued...)
Lecture 25 - International Business Case Analysis
Lecture 26 - International Business Case Analysis
Lecture 27 - International Business Case Analysis (Continued...)
Lecture 28 - International Business Case Analysis (Continued...)
Lecture 29 - International Business Case Analysis (Continued...)

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Lecture 30 - Learning Session by Practicing Manager
Lecture 31 - Learning session by Practicing Manager (Continued ...)
Lecture 32 - Interaction with Practicing Manager - Question and Answer Session
Lecture 33 - Learning Session by Practicing Manager
Lecture 34 - Learning Session by Practicing Manager followed by Conclusion session
Lecture 35 - Interaction with Practicing Manager
Lecture 36 - Interaction with Practicing Manager (Continued...)
Lecture 37 - Interaction with Practicing Manager (Continued...)
Lecture 38 - Interaction with Practicing Manager (Continued...)
Lecture 39 - Concluding Session

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NPTEL Video Course - Management - NOC:Retail Management

Subject Co-ordinator - Prof. Swagato Chatterjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Retailing - Part 1
Lecture 2 - Introduction to Retailing - Part 2
Lecture 3 - Introduction to Retailing - Part 3
Lecture 4 - Relationship Management in Retailing
Lecture 5 - Value-based Retailing
Lecture 6 - Retailing Services
Lecture 7 - Loyalty and Reward Programs
Lecture 8 - Strategic Planning in Retailing
Lecture 9 - Global Retailing
Lecture 10 - Retail Business Models by Ownership
Lecture 11 - Franchising in Retail
Lecture 12 - Retail Institutions by Store - Based Strategy Mix
Lecture 13 - Retail Institutions by Store - Based Strategy Mix (Continued...)
Lecture 14 - Retail Institutions by Store - Based Strategy Mix (Continued...)
Lecture 15 - Retail Institutions by Store - Based Strategy Mix (Continued...)
Lecture 16 - Web, Non store-based and Other Forms of Nontraditional Retailing
Lecture 17 - Web, Non store-based and Other Forms of Nontraditional Retailing (Continued...)
Lecture 18 - Identifying and Understanding the Customers
Lecture 19 - Trading Area Analysis
Lecture 20 - Trading Area Analysis (Continued...)
Lecture 21 - Trading Area Analysis (Continued...)
Lecture 22 - Site Selection
Lecture 23 - Site ownership vs Site Leasing
Lecture 24 - Retail Supply Chain Management
Lecture 25 - Retail Supply Chain Management (Continued...)
Lecture 26 - Retail Operations Management - 1
Lecture 27 - Retail Operations Management - 2
Lecture 28 - Retail Operations Management - 3
Lecture 29 - Image in Retail

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Lecture 30 - Pricing in Retail
Lecture 31 - Pricing in Retail (Continued...)
Lecture 32 - Pricing in Retail (Continued...)
Lecture 33 - Merchandising in Retail
Lecture 34 - Merchandising in Retail (Continued...)
Lecture 35 - Category Management and Merchandise Planning
Lecture 36 - Retail Promotions
Lecture 37 - Retail Promotions: non-Ad Promotions
Lecture 38 - OBHR Issues in Retail - 1
Lecture 39 - HR Issues in Retail
Lecture 40 - Vendor Negotiations
Lecture 41 - Special Merchandising Contexts - 1
Lecture 42 - Special Merchandising Contexts - 2
Lecture 43 - Store Layout in Retail
Lecture 44 - Retail Operations: Financial Aspects
Lecture 45 - Budgeting and Costing
Lecture 46 - Financial Merchandise Management
Lecture 47 - Merchandise Forecasting, Dollar Control

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NPTEL Video Course - Management - NOC:Business Law for Managers

Subject Co-ordinator - Prof. S. Srinivasan, Prof. Kaushik Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept, Definition and Features of Company
Lecture 2 - Various Types of Companies and Their Memberships
Lecture 3 - Meetings of a Company and Memorandum of Associations
Lecture 4 - Corporate Social Responsibility (CSR)
Lecture 5 - Reporting and Various Activities under CSR
Lecture 6 - Concept, Definition and Features of Corporate Governance
Lecture 7 - Effect of Corporate Governance
Lecture 8 - Major Structural Issues
Lecture 9 - Duties and Responsibilities of Directors
Lecture 10 - Corporate Governance a Way Forward
Lecture 11 - Concept, Scope and Features of PIT
Lecture 12 - Investigation and Prohibition on Dealing, Counselling
Lecture 13 - Key Changes in PIT Amendment, 2020
Lecture 14 - Model Code of Conduct for PIT, Trading Initiatives
Lecture 15 - Insider trading examples, PIT Recent Cases and Insider Trading Initiatives
Lecture 16 - Concept, Elements, Importance and Forms of Contracts
Lecture 17 - Concept of Offer, Valid Offer and Essentials of Valid Offer
Lecture 18 - Concept of Fraud, Misrepresentation and Consideration
Lecture 19 - Major Issues related to Contract
Lecture 20 - Law of Insurance
Lecture 21 - Background, Concept and Salient Features of Factories Act
Lecture 22 - Health and Safety
Lecture 23 - Labour Welfare
Lecture 24 - Working Hours
Lecture 25 - Duties of Inspecting Officials
Lecture 26 - Background, Concept and Importance of Legislation for Wages
Lecture 27 - Payment of Wages
Lecture 28 - Minimum Wages
Lecture 29 - Payment of Bonus Act

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Lecture 30 - Equal Remuneration Act
Lecture 31 - Social Securities
Lecture 32 - Social securities in unorganised sector
Lecture 33 - The Employeesâ Provident Fund Act
Lecture 34 - Payment of Gratuity Act 1972
Lecture 35 - Employee State Insurance (ESI)
Lecture 36 - Concept and Salient Features of Industries
Lecture 37 - Industrial Relation
Lecture 38 - Industrial Dispute Act
Lecture 39 - Various Authorities under Industrial Dispute Act, 1947
Lecture 40 - Procedure, Power and Duties of Authorities

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NPTEL Video Course - Management - NOC:Safety and Risk Analytics

Subject Co-ordinator - Prof. Jhareswar Maiti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Safety and Risk Management
Lecture 2 - Hazard Triangle
Lecture 3 - Safety Ontology
Lecture 4 - Qualitative Risk Assessment
Lecture 5 - Quantitative Risk Assessment
Lecture 6 - Hazard and Risk Data - I
Lecture 7 - Hazard and Risk Data - II
Lecture 8 - Incident Investigation Data
Lecture 9 - Inspection and Audit Data
Lecture 10 - Behavioral and Organizational Safety Data
Lecture 11 - Data Dimensions and Information Quality
Lecture 12 - Missing Data Handling
Lecture 13 - Data Transformation - I
Lecture 14 - Data Transformation - II
Lecture 15 - Data Reduction - I
Lecture 16 - Data Reduction - II
Lecture 17 - Probability Distribution
Lecture 18 - Sample and Statistics
Lecture 19 - Safety Data Visualization Tools - I
Lecture 20 - Safety Data Visualization Tools - II
Lecture 21 - Safety Data Exploration
Lecture 22 - Leading and Lagging Indicators for Measuring Safety Performance
Lecture 23 - Control Charts for Safety Performance Evaluation and Monitoring
Lecture 24 - Safety Capability Analysis - I
Lecture 25 - Safety Capability Analysis - II
Lecture 26 - Safety Reports and Use of Text Analytics
Lecture 27 - Preprocessing of Text Data - I
Lecture 28 - Preprocessing of Text Data - II
Lecture 29 - Document Classification using KNN

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Lecture 30 - Topic Modeling - Latent Dirichlet Allocation
Lecture 31 - Bow-Tie Construction
Lecture 32 - Bow-Tie Quantification - I
Lecture 33 - Bow-Tie Quantification - II: Accident Scenarios/Paths
Lecture 34 - Bow-Tie Quantification - III: Accident Path Quantification
Lecture 35 - Bow-Tie Quantification - IV: Probabilistic Approach using Monte Carlo Simulation
Lecture 36 - Consequence Modeling and Risk Distribution
Lecture 37 - Introduction to Predictive Safety and Risk Analytics
Lecture 38 - Logistic Regression
Lecture 39 - Application of Logistic Regression
Lecture 40 - Classification and Regression Tree (CART)
Lecture 41 - Classification and Regression Tree (CART): Case Study
Lecture 42 - Support Vector Machine
Lecture 43 - Support Vector Machine (Continued...)
Lecture 44 - Application of Support Vector Machine
Lecture 45 - Association Rule Mining
Lecture 46 - Application of Association Rule Mining
Lecture 47 - Statistical Measures of Safety Program Effectiveness - I
Lecture 48 - Statistical Measures of Safety Program Effectiveness - II
Lecture 49 - Statistical Measures of Safety Program Effectiveness - III
Lecture 50 - Intervention Design
Lecture 51 - Risk Based Decision Making - I
Lecture 52 - Risk Based Decision Making - II
Lecture 53 - Risk Based Maintenance - I
Lecture 54 - Risk Based Maintenance - II
Lecture 55 - Introduction to Behavioral Safety
Lecture 56 - Behavioral Safety Data Collection and Preliminary Analysis
Lecture 57 - Causal Modelling - I
Lecture 58 - Causal Modelling - II: Application of Path Model
Lecture 59 - Injury Epidemiology
Lecture 60 - Occupational Safety, Health and Working Conditions Code, 2020 Analytics

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NPTEL Video Course - Management - NOC:Strategic Management for Competitive Advantage

Subject Co-ordinator - Prof. Sanjib Chowdhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Concept - I
Lecture 2 - Introduction and Concept - II
Lecture 3 - Analysis of micro and macro environment - I
Lecture 4 - Analysis of micro and macro environment - II
Lecture 5 - Competition and Competitive Advantage - I
Lecture 6 - Competition and Competitive Advantage - II
Lecture 7 - Competition and Competitive Advantage - III
Lecture 8 - Framework for Internal Analysis of Firm - I
Lecture 9 - Framework for Internal Analysis of Firm - II
Lecture 10 - Value Chain Analysis
Lecture 11 - Resource-based view of firm and sustainability
Lecture 12 - Strategy Formulation - I
Lecture 13 - Strategy Formulation - II
Lecture 14 - Strategy Formulation - III
Lecture 15 - Diversification - I
Lecture 16 - Diversification - II
Lecture 17 - Mergers and Acquisitions - I
Lecture 18 - Mergers and Acquisitions - II
Lecture 19 - Portfolio Analysis and Display Matrices - I
Lecture 20 - Portfolio Analysis and Display Matrices - II
Lecture 21 - Operating and Financial Analysis
Lecture 22 - Complexities and Challenges of Competing in Global Markets - I
Lecture 23 - Complexities and Challenges of Competing in Global Markets - II
Lecture 24 - Entry Mode Strategies and Main Approaches for International Business
Lecture 25 - Building Competitive Advantage in International Markets
Lecture 26 - Strategies for competing in developing markets, and defending against global giants
Lecture 27 - Resource Allocation
Lecture 28 - 7-S Framework for Organizational Change
Lecture 29 - Strategy Implementation Issues

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Lecture 30 - Matching organization structure to strategy
Lecture 31 - Forms of Organization
Lecture 32 - Boundaryless Organization
Lecture 33 - Strategic Leadership - I
Lecture 34 - Strategic Leadership - II
Lecture 35 - Universal Inner Structure of Effective Leaders
Lecture 36 - Strategic Leadership - IV
Lecture 37 - Business and Operational Excellence
Lecture 38 - Strategic and Operational Control
Lecture 39 - Balanced Scorecard Approach
Lecture 40 - Roles and Responsibilities of Board of Directors
Lecture 41 - Strategic Management Role and Style of the Board
Lecture 42 - Composition, structure and other requirements of Board
Lecture 43 - Improve Board Effectiveness, Board and Directorsâ Performance Evaluation
Lecture 44 - Corporate Governance Code
Lecture 45 - Corporate Social Responsibility and Sustainability
Lecture 46 - Social Auditing
Lecture 47 - Innovation for Survival and Growth - I
Lecture 48 - Innovation for Survival and Growth - II
Lecture 49 - Entrepreneurship and Intrapreneurship
Lecture 50 - Technology Management - I
Lecture 51 - Technology Management - II
Lecture 52 - In-house Development of Technology
Lecture 53 - Strategic Importance of Knowledge and Organizational Learning
Lecture 54 - Strategies for Knowledge Management
Lecture 55 - Developing Strategic Plan of a Major Oil Company - I
Lecture 56 - Developing Strategic Plan of a Major Oil Company - II
Lecture 57 - Developing Strategic Plan of a Major Oil Company - III
Lecture 58 - Summary of Modules 1-6
Lecture 59 - Summary of Modules 7-11
Lecture 60 - Summary of Modules 12-18

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NPTEL Video Course - Management - NOC:Human Factors Engineering

Subject Co-ordinator - Prof. Virendra Kumar Tewari, Prof. Pradip Kumar Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition, purpose, and development of Human Factors and Ergonomics
Lecture 2 - Types and components of worksystems, their interactions and evaluations
Lecture 3 - Human components, machine components and environment components of worksystems
Lecture 4 - Modern worksystems, FMJ vs FJM
Lecture 5 - Contribution of human factors in systems design, engineering and management
Lecture 6 - Anthropometry in product/process design, MHD, anthropometric design motto
Lecture 7 - Types of anthropometric data, principles of applied anthropometry
Lecture 8 - Examples of anthropometric design, numerical exercises
Lecture 9 - Working Posture Analysis, Postural Triangle, Design for Seated and Standing Workers - Part 1
Lecture 10 - Working Posture Analysis, Postural Triangle, Design for Seated and Standing Workers - Part 2
Lecture 11 - Metabolism during work, Aerobic and anaerobic work, oxygen uptake
Lecture 12 - Physical work capacity and energy expenditure, Individual differences, RWL, MOW
Lecture 13 - MOE expenditure, Subjective measures of physical effort, Borg RPE scale, Factors
Lecture 14 - EE of various operations in agriculture, construction and manufacturing industry - I
Lecture 15 - EE of various operations in agriculture, construction and manufacturing industry - II
Lecture 16 - Types of Injury Problems in Manual Handling Tasks, Types of Activities and Body Movements
Lecture 17 - Biomechanical Modelling and Analysis of Manual Lifting
Lecture 18 - Definitions and Standards of Lifting: NIOSH Lifting Equation
Lecture 19 - EC Guidelines, UK Health and Safety Commission Guidelines
Lecture 20 - Use of Material Handling Aids, Types of Material Handling Devices, Numerical Problems
Lecture 21 - Ergonomic Problems in Computer Workstations, Design Elements of Computer Workstation
Lecture 22 - Specifications of Computer Workstation Design Elements
Lecture 23 - Methods to Reduce Glare/Reflection on Screen
Lecture 24 - Design of Human-Computer Interaction
Lecture 25 - Evolution of Technology in Computer Screen, Numerical Problems
Lecture 26 - Work Postures and Related Complaints, Work Postures for Different Tasks, Task Analysis
Lecture 27 - Power Law of Practice, Learning Curve, Numerical Pro
Lecture 28 - Work Posture Assessment, Rapid Entire Body Assessment (REBA), MSDs/RMIs
Lecture 29 - Hand tool design: Fitting the task, user and hand, Usage of hand tools and types of

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Lecture 30 - Design guidelines for hand tools
Lecture 31 - Environment Component in Worksystems, Ergonomic Design of Physical Environment
Lecture 32 - Ergonomic Design Framework for Environment, Importance of Illumination
Lecture 33 - Measurement of Illuminance, Luminance, and Contrast
Lecture 34 - Measures of Contrast, Contrast Ratio under Different Work Situations
Lecture 35 - Direct and Indirect Glare or Reflection, Illumination for Inspection and Quality
Lecture 36 - Problem of Heat Stress at Workplaces, Thermoregulation Process, Acclimation and
Lecture 37 - Thermal Balance Equation and Heat Stress
Lecture 38 - Quality of Thermal Environment, Evaluation of Thermal Environment
Lecture 39 - Whole Body Vibration and Sources of Vibration Discomfort
Lecture 40 - Design guidelines for hand tools
Lecture 41 - Auditory Environment and Human Performance, Measurement of Sound and Noise Exposure
Lecture 42 - Noise Exposure and Hearing Loss, Noise Analysis and Noise Reduction using Engineering
Lecture 43 - Effects of Noise on Performance, Broadbent and Poulton Theories, Interference of Noise
Lecture 44 - Octave bands and examples
Lecture 45 - Ergonomic design ofauditory environmentin different workplaces
Lecture 46 - Concepts of Design for Manufacturing (DFM), Design for Assembly (DHA), and Design
Lecture 47 - Product Design Assessment and Important Measures, Manual Assembly Design Efficiency
Lecture 48 - Assembly Time Determination with PMTS Methods, Human Factors Principles in DHA
Lecture 49 - Maintenance in Manufacturing/Production System - Important Ergonomic Design Issues - Part I
Lecture 50 - Maintenance in Manufacturing/Production System - Important Ergonomic Design Issues - Part II
Lecture 51 - Definition of Shift Work, Problems with Shift Work, Effect on Circadian Rhythms
Lecture 52 - Problems of shift workers, Shift Work and Human Performance
Lecture 53 - Recommended Shift Work Schedules
Lecture 54 - Major Ergonomic Issues and Problems in Shift Work Design - Part 1
Lecture 55 - Major Ergonomic Issues and Problems in Shift Work Design - Part 2
Lecture 56 - Concepts of Ergonomic Performance and its Indicators
Lecture 57 - EPI Assessment Tool Development
Lecture 58 - Factors and their level of assessment
Lecture 59 - Application of EPI Model in Different Worksystems
Lecture 60 - Epilogue

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NPTEL Video Course - Management - NOC:Organizational Design Change and Transformation

Subject Co-ordinator - Prof. S. Srinivasan, Prof. Susmita Mukhopadhyay, Prof. Sangeeta Sahney

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organizational Design
Lecture 2 - Introduction to Organizational Design
Lecture 3 - Introduction to Organizational Design
Lecture 4 - Introduction to Organizational Design
Lecture 5 - Introduction to Organizational Design
Lecture 6 - Organizational Environment
Lecture 7 - Organizational Environment
Lecture 8 - Organizational Environment
Lecture 9 - Organizational Environment
Lecture 10 - Organizational Environment
Lecture 11 - Organizational Structure
Lecture 12 - Organizational Structure
Lecture 13 - Organizational Structure
Lecture 14 - Organizational Structure
Lecture 15 - Organizational Structure
Lecture 16 - Organizational Design and Strategy in a changing Global environment
Lecture 17 - Organizational Design and Strategy in a changing Global environment
Lecture 18 - Organizational Design and Strategy in a changing Global environment
Lecture 19 - Organizational Design and Strategy in a changing Global environment
Lecture 20 - Organizational Design and Strategy in a changing Global environment
Lecture 21 - Organizational Change
Lecture 22 - Organizational Change
Lecture 23 - Organizational Change
Lecture 24 - Organizational Change
Lecture 25 - Organizational Change
Lecture 26 - Managing Conflict, Power, and Politics
Lecture 27 - Managing Conflict, Power, and Politics
Lecture 28 - Managing Conflict, Power, and Politics
Lecture 29 - Managing Conflict, Power, and Politics

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Lecture 30 - Managing Conflict, Power, and Politics
Lecture 31 - Organizational culture
Lecture 32 - Organizational culture and socialization
Lecture 33 - Organizational culture and climate
Lecture 34 - Managing organizational culture
Lecture 35 - International aspects of organizational culture
Lecture 36 - Organizational design and technology
Lecture 37 - Technologies and organizational structure
Lecture 38 - Technological theories and organizational design
Lecture 39 - Organizational design and technology: Challenges
Lecture 40 - Organizational competencies
Lecture 41 - Decision making
Lecture 42 - Learning
Lecture 43 - Knowledge management
Lecture 44 - IT and IS
Lecture 45 - IT in Management and Organization
Lecture 46 - Organizational Birth and Growth
Lecture 47 - Organizational Decline and Death
Lecture 48 - Organizational Inertia and Resilience
Lecture 49 - Organizational Transformation
Lecture 50 - Organizational Development and Intervention
Lecture 51 - Innovation: Concept, Types
Lecture 52 - Innovation Framework Model
Lecture 53 - Intrapreneurship
Lecture 54 - Creativity
Lecture 55 - Creativity and Related Issues
Lecture 56 - Creativity and Design Thinking
Lecture 57 - Turnaround Situation: Strategic, Operational and Cultural
Lecture 58 - IT and ICT Intervention
Lecture 59 - Human Resource Intervention
Lecture 60 - Organizational Culture, Transformation and Ethical Values
Lecture 61 - Future Trends for Organizational Transformation

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NPTEL Video Course - Management - NOC:Mergers, Acquisitions and Corporate Restructuring

Subject Co-ordinator - Prof. Chandra Sekhar Mishra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mergers and Acquisitions - I
Lecture 2 - Introduction to Mergers and Acquisitions - II
Lecture 3 - Theories of Mergers and Acquisitions
Lecture 4 - Legal Environment of M and A in India
Lecture 5 - Case Studies - DO M and A PAY ?
Lecture 6 - Takeover Tactics and Anti-takeover Defenses - 1
Lecture 7 - Takeover Tactics and Anti-takeover Defenses - 1
Lecture 8 - Takeover Tactics and Anti-takeover Defenses - 2
Lecture 9 - Takeover Tactics and Anti-takeover Defenses - 3
Lecture 10 - Acquisition Search and Due Diligence - 1
Lecture 11 - Acquisition Search and Due Diligence - 2
Lecture 12 - Valuation in M and A: Cash Flow Based Approach - 1
Lecture 13 - Valuation in M and A: Cash Flow Based Approach - 3 (Cost of Capital)
Lecture 14 - Valuation in M and A: Cash Flow Based Approach - 4 (Dividend Discount Model)
Lecture 15 - Valuation in M and A: Cash Flow Based Approach - 4 (Dividend Discount Model)
Lecture 16 - Valuation in M and A: Cash Flow Based Approach - 5 (Free Cash Flow Models)
Lecture 17 - Valuation in M and A: Cash Flow Based Approach - 6 (Free Cash Flow Models) (Continued...)
Lecture 18 - Valuation in M and A: Valuation of Synergies - 1
Lecture 19 - Valuation in M and A: Valuation of Synergies - 2
Lecture 20 - Valuation in M and A: Asset Based Valuation
Lecture 21 - Valuation in M and A: Relative Valuation - 1
Lecture 22 - Valuation in M and A: Relative Valuation - 2
Lecture 23 - Alternative Exit and Restructuring Strategies - 1
Lecture 24 - Alternative Exit and Restructuring Strategies - 2
Lecture 25 - Alternative Exit and Restructuring Strategies - 3
Lecture 26 - M and A Deal Structuring - 1
Lecture 27 - M and A Deal Structuring - 2
Lecture 28 - M and A Deal Structuring - 3
Lecture 29 - M and A Deal Structuring - 4

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Lecture 30 - M and A Deal Structuring - 5
Lecture 31 - Legal Aspects of M and A - 1
Lecture 32 - Legal Aspects of M and A - 2
Lecture 33 - Legal Aspects of M and A - 3
Lecture 34 - Accounting Aspects of M and A - I
Lecture 35 - Accounting Aspects of M and A - II
Lecture 36 - Alternative Exit and Restructuring Strategies - 1
Lecture 37 - Alternative Exit and Restructuring Strategies - 2
Lecture 38 - Alternative Exit and Restructuring Strategies - 3
Lecture 39 - Leveraged Buyouts
Lecture 40 - Alternative Exit and Restructuring Strategies - Insolvency and Bankruptcy

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NPTEL Video Course - Management - NOC:Invest Management

Subject Co-ordinator - Prof. Abhijeet Chandra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Investment Management as a Process
Lecture 2 - Role of Financial Markets and Institutions
Lecture 3 - Types of Investments
Lecture 4 - Ecology of Financial Markets
Lecture 5 - Investment Philosophies
Lecture 6 - Present and Future Values of Investments
Lecture 7 - Bonds as an Investment
Lecture 8 - Pricing and Valuation of Bonds
Lecture 9 - Pricing and Valuation of Bonds (Continued...)
Lecture 10 - Prices, Yields, and Duration of Bonds
Lecture 11 - Equity as an Asset Class
Lecture 12 - Equity Valuation Models
Lecture 13 - Equity Valuation Models (Continued...)
Lecture 14 - Equity Valuation Ratios
Lecture 15 - Equity Investment Strategies
Lecture 16 - Portfolio Theory - Primer
Lecture 17 - Capital Asset Pricing Model
Lecture 18 - The CAPM and Index Models
Lecture 19 - The CAPM and Index Models (Continued...)
Lecture 20 - Consumption-Based Asset Pricing
Lecture 21 - Two-fund Theorem
Lecture 22 - Mutual Fund Basics
Lecture 23 - Mutual Fund Basics (Continued...)
Lecture 24 - Risk Indicator of a Mutual Fund
Lecture 25 - Risk Indicator of a Mutual Fund (Continued...)
Lecture 26 - Market Efficiency
Lecture 27 - Market Efficiency (Continued...)
Lecture 28 - Fundamental Analysis of Securities
Lecture 29 - Value Investing using PV Models

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Lecture 30 - Asset Allocation and Portfolio Strategies
Lecture 31 - Exchange Traded Funds (ETFs)
Lecture 32 - Forming Portfolio with ETFs
Lecture 33 - Forming Portfolio with ETFs (Continued...)
Lecture 34 - Cryptocurrencies
Lecture 35 - Cryptocurrencies (Continued...)
Lecture 36 - Behavioral Anomalies in Investments
Lecture 37 - Behavioral Anomalies in Investments (Continued...)
Lecture 38 - Portfolio Evaluation
Lecture 39 - Portfolio Evaluation (Continued...)
Lecture 40 - Wrapping up

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NPTEL Video Course - Management - NOC:Project Management: Planning, Execution, Evaluation and Control

Subject Co-ordinator - Prof. Sanjib Chowdhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts and Introduction
Lecture 2 - Drivers of Project Management
Lecture 3 - Linkages between Organization Strategy and Projects
Lecture 4 - Project Governance and Design of Project Portfolio System
Lecture 5 - Non-Financial and Multi-Criteria Project Selection Models
Lecture 6 - Organization Structure
Lecture 7 - Organization Culture
Lecture 8 - Project Scope of Work and Deliverables
Lecture 9 - Responsibility Matrices and Project Communication Plan
Lecture 10 - Estimating Guidilines and Methods, Top-down Estimation
Lecture 11 - Level of Details, Type of Costs and Refining Estimates
Lecture 12 - Concept of Project Network and Development Rules
Lecture 13 - Construction of Netwrok and Computation Process
Lecture 14 - Extended Network Techniques to Represent Reality
Lecture 15 - Probabilty of Completion of Project on Time
Lecture 16 - Managing Risk and Risk Identification
Lecture 17 - Risk Assessment
Lecture 18 - Risk Response Development and Contingency Planning
Lecture 19 - Risk Response Control and Change Control Management
Lecture 20 - Risk Assessment of Capital projects
Lecture 21 - Classification of Scheduling Problems: Time-constrained Project
Lecture 22 - Resource-constrained Project
Lecture 23 - Time-phased Budget, Critical Chain Project Management
Lecture 24 - Rationale and Options for Project Crashing
Lecture 25 - Crashing - Reducing Project Duration
Lecture 26 - Reducing Project Duration - Solving Numerical
Lecture 27 - Project Monitoring and Control Process
Lecture 28 - Development of Performance Indexes for Monitoring
Lecture 29 - Forecasting Project Completion Time and Cost

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Lecture 30 - Strategic Dimensions and Decision Logic of Outsourcing
Lecture 31 - Best Practices in Outsourcing Project Work
Lecture 32 - Partnering and Traditional Approaches for Managing Relations
Lecture 33 - The Art of Negotiating
Lecture 34 - Customer's Satisfaction and Managing Customer Relations
Lecture 35 - Types of Contract and their Salient Features
Lecture 36 - Preparation and Evaluation of RFP: Best Practices
Lecture 37 - Project Closure Activities and Post-Implementation Evaluation
Lecture 38 - Retrospectives
Lecture 39 - Oversight Activities and Levels
Lecture 40 - Phase Gate System, Project Management Maturity Model

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NPTEL Video Course - Management - NOC:Commodity Derivatives and Risk Management (2023)

Subject Co-ordinator - Prof. Prabina Rajib

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Commodity Market
Lecture 2 - Commodity Spot Market and Different Types of Auction
Lecture 3 - Commodity Spot Market and Different Types of Auction
Lecture 4 - Introduction to forward contract
Lecture 5 - Introduction to Futures Contract
Lecture 6 - Futures Contract Specification
Lecture 7 - Futures Contract Specification (Continued...)
Lecture 8 - Futures Contract Specification (Continued...)
Lecture 9 - Futures Contract (Different Types of Margins)
Lecture 10 - Futures Contract (Mark-to-Market/MTM Margin)
Lecture 11 - Hedgers Vs. Speculators
Lecture 12 - Measures of Speculation
Lecture 13 - Spot Price, Futures Price and Basis Risk
Lecture 14 - Spot Price, Futures Price and Basis Risk (Continued...)
Lecture 15 - Pricing of Futures
Lecture 16 - Pricing of Futures (Continued...)
Lecture 17 - Convenience Yield, Minimum Variance Hedge Ratio
Lecture 18 - Hedge Effectiveness, Cross Hedge, Stack and Roll Vs. Strip Hedge
Lecture 19 - Calendar Spread, Valuation of Futures vs. Forwards, Commodity Swaps
Lecture 20 - Commodity Swaps
Lecture 21 - Commodity Index
Lecture 22 - Commodity Index (Continued...)
Lecture 23 - Commodity options
Lecture 24 - Introduction to Commodity Options (Continued...), Hedgers vs. Speculators
Lecture 25 - Pricing of Commodity Options
Lecture 26 - Commodity Options (Continued...), Put-Call Parity and Put-Call Ratio
Lecture 27 - Put-Call Parity, Implied Volatility, Swaptions
Lecture 28 - Commodity Swaption (Continued...) and Asian Options on Commodities
Lecture 29 - Commodity Derivatives Market : Value Proposition

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Lecture 30 - Commodity Derivatives Market : Value Proposition
Lecture 31 - Agricultural Commodity Price Risk Management
Lecture 32 - Agricultural Commodity Price Risk Management (Continued...)
Lecture 33 - Agricommodities Price Risk, Seasonality, Crush Spread Futures
Lecture 34 - Agri-commodity Seasonality, Crush Spread Futures, Salmon Futures
Lecture 35 - Crush Spread Futures, Salmon Futures, Agri-commodity risk Management Practices
Lecture 36 - Gold and other Precious Metal Derivatives
Lecture 37 - Gold as Asset, LBMA Spot Price Fix
Lecture 38 - Gold as Asset, ETF, Gold-Silver Ratio
Lecture 39 - Gold Price Risk Management, Dehedge, Zero Cost Derivatives
Lecture 40 - Gold Quanto Futures, Delta Hedge Trap
Lecture 41 - Crude oil and Crude oil Derivatives Price Risk Management
Lecture 42 - Crude oil and Crude oil Derivatives Price Risk Management (Continued...)
Lecture 43 - Crack Spread Futures, Spread Options and Crude Oil Price Risk
Lecture 44 - Crude Oil Price Risk Management: 3-Way Collar, Spread Options and Swaps
Lecture 45 - Swaps, Calendar Spreads: Crude Oil and Natural Gas Risk Management
Lecture 46 - Weather Derivatives
Lecture 47 - Weather Derivatives (Continued...)
Lecture 48 - Weather Derivatives (Snowfall, Rainfall and Hurricane)
Lecture 49 - Weather Derivatives (Rainfall and Hurricane)
Lecture 50 - Spot and Derivatives Contracts on Electricity
Lecture 51 - Electricity Trading in Day Ahead Market (DAM)
Lecture 52 - Spot and Derivatives in Electricity (System Price and Area Clearing Price)
Lecture 53 - Spot and Derivatives in Electricity (Green DAM, Duck Curve, Dark/Spark Spread)
Lecture 54 - Carbon Credits and Carbon Credit Derivatives Market
Lecture 55 - Carbon Credits (CDM, JI, RGGI, REC, ESCerts)
Lecture 56 - Carbon Credits (REC, ESCerts,CORSIA) and Carbon Derivatives
Lecture 57 - Freight Rates Derivatives
Lecture 58 - Freight Rates Derivatives (Continued...)
Lecture 59 - Water Derivatives
Lecture 60 - Real Estate Derivatives and Derivatives Losses

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NPTEL Video Course - Management - NOC:Service Management: Integrating Strategy, Operations, and Technology

Subject Co-ordinator - Prof. Sanjib Chowdhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Role of Services in an Economy - 1
Lecture 2 - The Role of Services in an Economy - 2
Lecture 3 - The Nature of Services - 1
Lecture 4 - The Nature of Services - 2
Lecture 5 - The Nature of Services - 3
Lecture 6 - Strategic Service Vision, and Competitive Advantage
Lecture 7 - Generic Strategies for Competitive Advantage (Continued...)
Lecture 8 - Five-forces Model, and SWOT Analysis
Lecture 9 - Winning Customers, Sustainability, and Role of Information in Services
Lecture 10 - Virtual Value Chain, Limits in the Use of Information, and Service Firm Competitiveness
Lecture 11 - Sources of Growth and Innovations in Service Sector
Lecture 12 - Design and Development of New Service
Lecture 13 - Taxonomy and Generic Approaches to Service System Design
Lecture 14 - Role of Technology in Services and Service Encounter Triad
Lecture 15 - Service Encounter (Continued...)
Lecture 16 - Service Profit Chain
Lecture 17 - Servicescapes and Facility Design
Lecture 18 - Process Flows
Lecture 19 - Product Layout: Work Allocation Problem
Lecture 20 - Process Layout: Relative Location Problem
Lecture 21 - Process Layout: Relative Location Problem (Continued...)
Lecture 22 - Defining and Measuring Service Quality
Lecture 23 - Quality Service by Design
Lecture 24 - Unconditional Service Guarantee and Service Recovery
Lecture 25 - Statistical Process Control - I
Lecture 26 - Statistical Process Control - II
Lecture 27 - Statistical Process Control - III
Lecture 28 - Statistical Process Control - IV
Lecture 29 - Foundation of Continuous Improvement

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Lecture 30 - Quality Improvement Programs - I
Lecture 31 - Quality Improvement Programs - II
Lecture 32 - Domestic Growth and Expansion Strategies
Lecture 33 - Generic International Strategies
Lecture 34 - Transnational Operations and Global Service Strategies
Lecture 35 - Strategic Location Considerations
Lecture 36 - Facility Location Modelling
Lecture 37 - Facility Location Techniques: Locational Cost-Profit-Volume analysis
Lecture 38 - Facility Location Techniques: Cross-Median Approach
Lecture 39 - Facility Location Techniques: Huff Retail Location Model - I
Lecture 40 - Facility Location Techniques: Huff Retail Location Model - II
Lecture 41 - Strategies for Managing Demand - I
Lecture 42 - Strategies for Managing Demand - II
Lecture 43 - Strategies for Managing Demand - III
Lecture 44 - Strategies for Managing Capacity - I
Lecture 45 - Strategies for Managing Capacity - II
Lecture 46 - Yield Management - I
Lecture 47 - Yield Management - II
Lecture 48 - Strategies for Managing Customer Waiting
Lecture 49 - Essential Features of Queuing Systems
Lecture 50 - Relationship between negative Exponential and Poisson distribution
Lecture 51 - Strategic Roles of Capacity Planning, and Queuing - Terminology
Lecture 52 - Queuing Models - Operating System Characteristics
Lecture 53 - Queuing System Cost Trade-off
Lecture 54 - Basic Concepts and Approach to Managing Project
Lecture 55 - Developing Project Plan using PERT/CPM
Lecture 56 - Construction of Network and Network Computation Process
Lecture 57 - Uncertain Activities, and Probability of Completion of Project on Time
Lecture 58 - The Role of Inventory in Services, and Inventory Models
Lecture 59 - Economic Order Quantity and Special Inventory Models
Lecture 60 - Inventory Management under Uncertainity
Lecture 61 - Inventory Control Systems and ABC Analysis

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NPTEL Video Course - Management - NOC:Financial Management (in Hindi)

Subject Co-ordinator - Prof. Abhijeet Chandra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
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Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Management - NOC:Advertising and Promotions Management

Subject Co-ordinator - Prof. Mrinalini Pandey

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Advertising - I
Lecture 2 - Introduction to Advertising - II
Lecture 3 - Introduction to Advertising - III
Lecture 4 - Introduction to Advertising - IV
Lecture 5 - Introduction to Advertising - V
Lecture 6 - Understanding Communication
Lecture 7 - Integrated Marketing Communications
Lecture 8 - Introduction to Positioning
Lecture 9 - Positioning - II
Lecture 10 - Positioning - III
Lecture 11 - Classification of advertising
Lecture 12 - Types of advertising
Lecture 13 - Theories of advertising
Lecture 14 - Segmentation, Targeting and Advertising Strategy Approaches
Lecture 15 - Perception
Lecture 16 - AIDA Model
Lecture 17 - DAGMAR Model
Lecture 18 - Hierarchy Of Effects Model
Lecture 19 - DRIP Model
Lecture 20 - Information Processing Model
Lecture 21 - Elaboration Likelihood Model (ELM)
Lecture 22 - Innovation Adoption Model
Lecture 23 - Foote, Cone and Belding Model and Kim Lord Model
Lecture 24 - Lasswellâ s Model
Lecture 25 - Multi-Attribute Attitude Models (MAAMS)
Lecture 26 - Objectives of Advertising
Lecture 27 - Communication and Sales as an Advertising Objective
Lecture 28 - Setting Communication Objectives and Rossiter and Percy Grid
Lecture 29 - Marketing Objectives

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Lecture 30 - Problems in Implementing Advertising and Promotions Objective
Lecture 31 - Introduction to Advertising Budgets
Lecture 32 - Budgeting Approaches - I
Lecture 33 - Budgeting Approaches - II
Lecture 34 - Advertising Budgets - III
Lecture 35 - Creative Strategy
Lecture 36 - Creative Execution
Lecture 37 - Introduction to Media Planning
Lecture 38 - Media Planning Process
Lecture 39 - Media Planning Decision and Media Types
Lecture 40 - Art of Copywriting
Lecture 41 - Copy Testing and Diagnosis
Lecture 42 - Advertising Campaign - I
Lecture 43 - Advertising Campaign - II
Lecture 44 - Advertising Research Technique - I
Lecture 45 - Advertising Research Technique - II
Lecture 46 - Introduction to the Advertising Agency - I
Lecture 47 - Advertising Agency - II
Lecture 48 - Advertising Agency - III
Lecture 49 - Advertising Agency - IV
Lecture 50 - Advertising Agencies - V
Lecture 51 - Introduction to Public Relations - I
Lecture 52 - Introduction to Public Relations - II
Lecture 53 - Introduction to Public Relations - III
Lecture 54 - The Process of Public Relations
Lecture 55 - Publicity and Corporate Advertising
Lecture 56 - Advertising Laws and Ethics
Lecture 57 - Intellectual Property Rights and Advertising
Lecture 58 - Social Aspects of Advertising
Lecture 59 - Economic Aspects of Advertising
Lecture 60 - Advertising the Way Forward: Insights for Tomorrowâ s Journey

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NPTEL Video Course - Management - NOC:Production and Operations Management: Theory and Application

Subject Co-ordinator - Prof. Sanjib Chowdhury

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Production and Operations Management: An Overview
Lecture 2 - Levels of Strategy and Operational Performance
Lecture 3 - Productivity Measures
Lecture 4 - Forecast Accuracy Metrics
Lecture 5 - Forecasting Approaches / Time-series Forecast - 1
Lecture 6 - Time-series Forecast - 2
Lecture 7 - Time-series Forecast - 3 / Trend Forecast
Lecture 8 - Time-series Forecast - 4 / Trend-Adjusted Exponential Smoothing, Seasonal Relatives
Lecture 9 - Monitoring Forecast Error, and Choosing Forecast Techniques
Lecture 10 - Legal, Ethical, and Sustainability consideration
Lecture 11 - Other Design Considerations in Product or Service
Lecture 12 - Service Design and Key Issues
Lecture 13 - Strategic Capacity Planning for Products and Services: Challenges of Capacity Planning
Lecture 14 - Evaluating Alternatives for Capacity Planning
Lecture 15 - Flexibility of Capacity Provision and Bottleneck Operations
Lecture 16 - Process Selection Choices
Lecture 17 - Facility Layout
Lecture 18 - Designing Product Layout - 1
Lecture 19 - Designing Product Layout - 2
Lecture 20 - Designing Process Layout
Lecture 21 - Location Decisions - Importance, Challenges, and Options
Lecture 22 - Techniques to Evaluate Location Alternatives - 1
Lecture 23 - Techniques to Evaluate Location Alternatives - 2
Lecture 24 - Foundations, Philosophies, and Essentials of Quality Management - 1
Lecture 25 - Foundations, Philosophies, and Essentials of Quality Management - 2
Lecture 26 - Quality Tools and Quality Improvement Process
Lecture 27 - Quality Improvement Programs: Quality Awards, Quality Certification
Lecture 28 - Quality Improvement Programs: Total Quality Management
Lecture 29 - Quality Improvement Programs: Six Sigma

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Lecture 30 - Overview of Quality Control and Inspection
Lecture 31 - Statistical Process Control - 1 (Process Variability)
Lecture 32 - Statistical Process Control - 2 (Variable Control Chart)
Lecture 33 - Statistical Process Control - 3 (Attribute Control Chart)
Lecture 34 - Statistical Process Control - 4 (Run Test)
Lecture 35 - Statistical Process Control - 5 (Process Capability)
Lecture 36 - Aggregate Planning: An Overview
Lecture 37 - Strategies for Meeting Uneven Demand and Aggregate Planning in Services
Lecture 38 - Techniques for Aggregate Planning and Disaggregating
Lecture 39 - Master Scheduling Process
Lecture 40 - Material Requirements Planning
Lecture 41 - MRP Processing
Lecture 42 - MRP II and ERP
Lecture 43 - The Importance of Inventory and Classification of Inventory Items
Lecture 44 - Economic Order Quantity and Economic Production Quantity
Lecture 45 - Economic Production Quantity and Quantity Discount Model
Lecture 46 - Quantity Discount Model
Lecture 47 - Inventory Management under Uncertainty
Lecture 48 - Continuous Review and Periodic Review Inventory Control Systems, Case Study
Lecture 49 - The Single-period Inventory Model
Lecture 50 - Lean Operations, Approach, and Principles
Lecture 51 - Building Blocks, Benefits, and Risks of Lean Production System
Lecture 52 - Tools and Balanced System of Lean Production System
Lecture 53 - The Need, Importance, and Approaches of Scheduling
Lecture 54 - Assignment Model: Hungarian Method
Lecture 55 - Sequencing, Priority Rules, and Performance Metrics - 1
Lecture 56 - Sequencing, Priority Rules, and Performance Metrics - 2
Lecture 57 - Sequencing Jobs through Two Work Centers or Machines
Lecture 58 - Basic Concepts and Approach to Managing Projects
Lecture 59 - Developing Project Plan using PERT/CPM
Lecture 60 - Construction of Network and Network Computation Process
Lecture 61 - Uncertain Activities and Probability of Project Completion on Time
Lecture 62 - Essential Features of Queuing Systems
Lecture 63 - Queuing Models: Operating Characteristics and System Performance Measures
Lecture 64 - Queuing System Cost Trade-of; Problem Solving

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NPTEL Video Course - Management - NOC:Foundation of Digital Business

Subject Co-ordinator - Prof. Surojit Mookherjee

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Digital Transformation
Lecture 2 - Drivers for Digital Transformation
Lecture 3 - Overview of Emerging Digital Technologies - Part 1
Lecture 4 - Overview of Emerging Digital Technologies - Part 2
Lecture 5 - Overview of Emerging Digital Technologies - Part 3
Lecture 6 - What is a Business Model and how to build a Business Model
Lecture 7 - Types of Business to Consumer B2C Digital Business Models
Lecture 8 - Digital Business Models of the Future
Lecture 9 - Overview of Digital Transformation
Lecture 10 - Building Digital Mastery
Lecture 11 - Building Digital Capabilities
Lecture 12 - Disruptive Business Models
Lecture 13 - Digital Transformation Play Book
Lecture 14 - Strategic Planning Tools for Digital Transformation
Lecture 15 - Digital Transformation Road Map - Microsoft Story
Lecture 16 - Platform Strategies - Sharing Economy
Lecture 17 - Platform as a Business Model
Lecture 18 - Developing a Platform Business Model Map
Lecture 19 - Artificial Intelligence - Introduction
Lecture 20 - Linear Regression and Deep Learning Model
Lecture 21 - Putting AI in practice
Lecture 22 - Prepare for AI
Lecture 23 - Get AI ideas Flowing
Lecture 24 - Becoming AI ready
Lecture 25 - Find AI opportunities - Part 1
Lecture 26 - Find AI opportunities - Part 2
Lecture 27 - Introduction to Gen AI and LLMs
Lecture 28 - Gen AI Impacting various business Operations
Lecture 29 - Gen AI - Rethinking the Enterprise Agenda

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Lecture 30 - Scaling Gen AI in Governments
Lecture 31 - Data to Regression Model - Lifecycle
Lecture 32 - NLP and Computer Vision Applications
Lecture 33 - Prompt Engineering
Lecture 34 - Orchestrating Agentic AI for Intelligent Business Operations
Lecture 35 - Common AI Ethical Issues
Lecture 36 - Managing Ethics and Bias
Lecture 37 - Future Ready Organization - Pathways to Transformation
Lecture 38 - Gen AI - New Frontier for the Future of Work
Lecture 39 - Workforce of the Future
Lecture 40 - Sustainable Digital Technologies

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NPTEL Video Course - Management - NOC:International Human Resource Management

Subject Co-ordinator - Prof. Mrinalini Pandey

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to International Human Resource Management - I
Lecture 2 - Introduction to International Human Resource Management - II
Lecture 3 - Introduction to International Human Resource Management - III
Lecture 4 - Introduction to International Human Resource Management - IV
Lecture 5 - Introduction to International Human Resource Management - V
Lecture 6 - Difference between Domestic Human Resource Management and International Human Resource Management
Lecture 7 - Difference between Domestic Human Resource Management and International Human Resource Management
Lecture 8 - Variables that moderate the differences between Domestic and International HRM
Lecture 9 - Approaches of IHRM Introduction
Lecture 10 - Approaches of IHRM II Introduction
Lecture 11 - Issues in Cultural Diversity at Work, Global Business Environment - Human and Cultural Variables
Lecture 12 - Issues in Cultural Diversity at Work, Global Business Environment - Human and Cultural Variables
Lecture 13 - Issues in Cultural Diversity at Work, Global Business Environment - Human and Cultural Variables
Lecture 14 - Issues in Cultural Diversity at Work, Global Business Environment - Human and Cultural Variables
Lecture 15 - Issues in Cultural Diversity at Work, Global Business Environment - Human and Cultural Variables
Lecture 16 - Cultural Differences and Similarities - I
Lecture 17 - Cultural Differences and Similarities - II
Lecture 18 - Cultural Differences and Similarities - III
Lecture 19 - Cultural Differences and Managerial Implications, Models of Culture - IV
Lecture 20 - Cultural Differences and Managerial Implications, Models of Culture - V
Lecture 21 - Motivation for IHRM - I
Lecture 22 - Motivation for IHRM - II
Lecture 23 - Motivation for IHRM - III
Lecture 24 - Motivation for IHRM - IV
Lecture 25 - Motivation for IHRM - V
Lecture 26 - Cross-Cultural Leadership - I
Lecture 27 - Cross-Cultural Leadership - II
Lecture 28 - Cross-Cultural Leadership - III
Lecture 29 - Cross-Cultural Leadership - IV

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Lecture 30 - Cross-Cultural Leadership - V
Lecture 31 - Cross-Cultural Communication - I
Lecture 32 - Cross-Cultural Communication - II
Lecture 33 - Cross-Cultural Communication - III
Lecture 34 - Cross-Cultural Communication - IV
Lecture 35 - Cross-Cultural Communication - V
Lecture 36 - Recruiting and Selecting Workforce for International Operations - I
Lecture 37 - Recruiting and Selecting Workforce for International Operations - II
Lecture 38 - Recruiting and Selecting Workforce for International Operations - III
Lecture 39 - Recruiting and Selecting Workforce for International Operations - IV
Lecture 40 - Recruiting and Selecting Workforce for International Operations - V
Lecture 41 - Performance Appraisal and Compensation - I
Lecture 42 - Performance Appraisal and Compensation - II
Lecture 43 - Performance Appraisal and Compensation - III
Lecture 44 - Performance Appraisal and Compensation - IV
Lecture 45 - Performance Appraisal and Compensation - V
Lecture 46 - Development and Retention in the Global Context - I
Lecture 47 - Development and Retention in the Global Context - II
Lecture 48 - Development and Retention in the Global Context - III
Lecture 49 - Development and Retention in the Global Context - IV
Lecture 50 - Development and Retention in the Global Context - V
Lecture 51 - International Industrial Relations - I
Lecture 52 - International Industrial Relations - II
Lecture 53 - International Industrial Relations - III
Lecture 54 - International Industrial Relations - IV
Lecture 55 - International Industrial Relations - V
Lecture 56 - AI in global HR practices - I
Lecture 57 - AI in global HR practices - II
Lecture 58 - AI in global HR practices - III
Lecture 59 - AI in global HR practices - IV
Lecture 60 - AI in global HR practices - V

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NPTEL Video Course - Management - NOC:Fundamentals of Digital Marketing

Subject Co-ordinator - Prof. Saini Das, Prof. Atanu Ghosh

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Defining Digital Marketing
Lecture 2 - Digital Marketing Strategy
Lecture 3 - Digital Marketing Strategy (Continued...)
Lecture 4 - Digital Display Advertising
Lecture 5 - Digital Display Advertising (Continued...)
Lecture 6 - Introductions to Search Ads
Lecture 7 - Organic Search (Search Engine Optimization)
Lecture 8 - Organic Search (Search Engine Optimization) (Continued...)
Lecture 9 - Paid Search
Lecture 10 - Ad Creation with Google Ads
Lecture 11 - Ad Creation with Google Ads (Continued...)
Lecture 12 - Ad Creation with Google Ads (Continued...)
Lecture 13 - Email Marketing - Part A
Lecture 14 - Email Marketing - Part B
Lecture 15 - Email Marketing - Part C
Lecture 16 - Introduction to Social Media
Lecture 17 - Social Media Communication Framework
Lecture 18 - Social Media Maturity and Content Management Framework
Lecture 19 - Managing Facebook Likes and Follows
Lecture 20 - Balancing Quantity and Quality of Facebook Likes and Follows
Lecture 21 - Principles of Targeting in Paid Social Media Campaigns
Lecture 22 - Target, Bid and Budget in Paid Social Media Campaigns
Lecture 23 - Principles of Paid Social Media Campaigns
Lecture 24 - Target, Bid and Budget in Paid Social Media Campaigns
Lecture 25 - Managing a Facebook Page
Lecture 26 - Facebook Page Analytics
Lecture 27 - Set Up Paid Meta Campaign
Lecture 28 - Mobile Marketing with Whatsapp
Lecture 29 - Content Marketing

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Lecture 30 - Influencer Marketing
Lecture 31 - B2B Digital Marketing
Lecture 32 - LinkedIn Marketing
Lecture 33 - Generative Engine Optimisation - 1
Lecture 34 - Generative Engine Optimisation - 2
Lecture 35 - Agentic Commerce
Lecture 36 - Website Development
Lecture 37 - Introduction to GA4
Lecture 38 - Introduction to GA4 (Continued...)
Lecture 39 - Introduction to GA4 (Continued...)
Lecture 40 - Introduction to GA4 (Continued...)

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NPTEL Video Course - Management - Infrastructure Finance

Subject Co-ordinator - Dr. A. Thillai Rajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Overview on Infrastructure Financing Sources
Lecture 3 - Basics of Financial Management - Part-1
Lecture 4 - Basics of Financial Management - Part-2
Lecture 5 - Basics of Financial Management - Part-3
Lecture 6 - Basics of Financial Management - Part-4
Lecture 7 - Analysis of company Performance - Part-1
Lecture 8 - Analysis of company Performance - Part-2
Lecture 9 - Analysis of Project Viability Time value of money
Lecture 10 - Analysis of Project Viability Cost of Capital
Lecture 11 - Analysis of Project Viability Capital Budgeting Techniques - I
Lecture 12 - Analysis of Project Viability Capital Budgeting Guidelines - II
Lecture 13 - Analysis of Project Viability Capital Budgeting Guidelines - III
Lecture 14 - Analysis of Project Viability Capital Budgeting Guidelines - IV
Lecture 15 - Overview and introduction to project finance
Lecture 16 - Project Financing Attributes and Motivations - I
Lecture 17 - Project Financing Attributes and Motivations - II
Lecture 18 - Project Finance Markets - I
Lecture 19 - Project Finance Markets - II
Lecture 20 - Project Finance Markets - III
Lecture 21 - Project Finance Markets Mezzanine / Sub-ordinated Debt
Lecture 22 - Project Finance Markets - Type of Dept and Leasing
Lecture 23 - Project Finance Markets - Financial Intermediation
Lecture 24 - Project Finance Markets - Loan Refinancing
Lecture 25 - Project Finance Markets - Project Bonds - I
Lecture 26 - Project Finance Markets - Project Bonds - II
Lecture 27 - Public Private Partnerships
Lecture 28 - Risk Management - I
Lecture 29 - Risk Management - II

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Lecture 30 - Risk Management - III
Lecture 31 - Risk Management - Market Risks
Lecture 32 - Risk Management - Country / Political risks - I
Lecture 33 - Risk Management - Country / Political risks - II
Lecture 34 - Risk Management - Country / Political risks - III
Lecture 35 - Risk Management - Country / Political risks - IV
Lecture 36 - Context of infrastructure development - I
Lecture 37 - Context of infrastructure development - II
Lecture 38 - Context of infrastructure development - III
Lecture 39 - Context of infrastructure development - IV
Lecture 40 - Context of infrastructure development - V

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NPTEL Video Course - Management - Manufacturing Systems Management

Subject Co-ordinator - Prof. G. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Manufacturing Systems Management
Lecture 2 - Different types of Manufacturing Systems
Lecture 3 - Introduction to Cellular Manufacturing
Lecture 4 - Cellular Manufacturing Applications, Production Flow Analysis
Lecture 5 - Production Flow Analysis
Lecture 6 - Cellular Manufacturing - Unidirectional flow, Capacity Planning, Layout
Lecture 7 - Exercise on Production Flow Analysis
Lecture 8 - Rank Order Clustering, Similarity Coefficient based algorithm
Lecture 9 - Similarity Coefficient based clustering algorithm
Lecture 10 - Hierarchical and Non hierarchical clustering algorithms
Lecture 11 - Optimization based algorithms
Lecture 12 - Optimization based algorithms, Assignment based algorithm
Lecture 13 - Assignment model, Algorithm considering sequence of visit of machines
Lecture 14 - Algorithm considering sequence of visit of machines
Lecture 15 - Algorithm considering cell load data, alternate process plans
Lecture 16 - Reducing Intercell moves
Lecture 17 - Part subcontracting, Incremental cell formation
Lecture 18 - Product based cells
Lecture 19 - Branching algorithm for product based cells, Operator and task assignment
Lecture 20 - Operator and task assignment
Lecture 21 - Operator and task assignment continued
Lecture 22 - Static and dynamic Operator allocation, Multiple products and incremental cells
Lecture 23 - Cell scheduling and sequencing
Lecture 24 - Cell scheduling and sequencing continued
Lecture 25 - Single piece transportation
Lecture 26 - Cell Layout, Introduction to Just-in-time manufacturing
Lecture 27 - Cell control and JIT
Lecture 28 - Basic elements of JIT, Kanban systems
Lecture 29 - Role of basic elements, Critical success factors

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Lecture 30 - Models in JIT
Lecture 31 - Models in JIT continued
Lecture 32 - CONWIP, Introduction to synchronous manufacturing
Lecture 33 - Theory of constraints, Product mix problem
Lecture 34 - Statistical Fluctuations, Random events, principles of SM
Lecture 35 - Scheduling in SM
Lecture 36 - Drum Buffer Rope system
Lecture 37 - Flexible Manufacturing System, Part selection problem
Lecture 38 - FMS Loading problem
Lecture 39 - FMS Loading, multiple batches and changeover times
Lecture 40 - FMS Loading and scheduling, Summary of the course contents

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NPTEL Video Course - Management - Operations and Supply Chain Management

Subject Co-ordinator - Prof. G. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - (Challenges, Methodologies)
Lecture 2 - Forecasting - Time series models - Simple Exponential smoothing
Lecture 3 - Forecasting - Linear Models, Regression, Holtâ s , seasonality
Lecture 4 - Forecasting - Winterâ s model, causal models, Goodness of forecast, Aggregate Planning, Tabular
Lecture 5 - Aggregate Planning, Tabular method, Linear Programming
Lecture 6 - Aggregate Planning, Transportation model
Lecture 7 - Aggregate Planning, Dynamic Programming, backordering
Lecture 8 - Aggregate Planning, Quadratic model, Demand and capacity planning
Lecture 9 - Inventory Models - Costs, EOQ model
Lecture 10 - Inventory - EOQ model graphs, with backordering
Lecture 11 - Inventory - Models for all quantity and marginal quantity Discount
Lecture 12 - Multiple Quantity Discount, Multiple item inventory - Constraint on numbers of orders
Lecture 13 - Multiple item inventory - Constraint on money value, space, equal number of orders
Lecture 14 - Multiple item inventory - combining orders, production consumption model
Lecture 15 - Inventory - Production consumption model with backordering, Economic lot scheduling problem
Lecture 16 - Economic lot scheduling problem, Supply Chain inventory
Lecture 17 - Lot sizing
Lecture 18 - Lot sizing - heuristics
Lecture 19 - Disaggregation
Lecture 20 - Disaggregation - time varying demand, Safety stock - ROL for discrete demand distribution
Lecture 21 - Safety stock - ROL for normal distribution of lead time demand
Lecture 22 - Integrated model, ROL for normal distribution of LTD and given mean
Lecture 23 - Safety stock reduction â delayed Product differentiation, substitution. MOM
Lecture 24 - Sequencing and scheduling â Assumptions, objectives and shop settings
Lecture 25 - Single machine sequencing. Two machine flow shop â Johnsonâ s algorithm
Lecture 26 - Flow shop scheduling - Three machines, Johnsonâ s algorithm and Branch and bound algorithm
Lecture 27 - Flow shop scheduling - heuristics â Palmer, Campbell Dudek Smith algorithm
Lecture 28 - Job shop scheduling - Gantt chart, Different dispatching rules
Lecture 29 - Job shop scheduling - Shifting bottleneck heuristic

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Lecture 30 - Job shop scheduling - Shifting bottleneck heuristic. Line Balancing
Lecture 31 - Line Balancing
Lecture 32 - Location problems - p median problem, Fixed charge problem
Lecture 33 - Location allocation problems in supply chain. Layout
Lecture 34 - Quantitative models for layout, Summary
Lecture 35 - Introduction to Supply Chain Management
Lecture 36 - Location Problems
Lecture 37 - Transportation and Distribution Models
Lecture 38 - Transportation and Distribution Models(continued)
Lecture 39 - Bin Packing and Travelling Salesman Problems
Lecture 40 - Vehicle Routeing Problems
Lecture 41 - Value of Information

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NPTEL Video Course - Management - Business Analysis for Engineers

Subject Co-ordinator - Dr. S. Vaidhyasubramaniam

Co-ordinating Institute - SASTRA University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Business Analysis for Engineers
Lecture 2 - Introduction to Accounting
Lecture 3 - Accounting Principles - 1
Lecture 4 - Balance Sheet Fundamentals
Lecture 5 - Balance Sheet Fundamentals
Lecture 6 - Accounting Principles - 2
Lecture 7 - Introduction to Income Statement & Double Entry
Lecture 8 - Double Entry Examples - 1
Lecture 9 - Double Entry Examples - 2
Lecture 10 - Preparation of Financial Statement
Lecture 11 - Cash Flow Statement - 1
Lecture 12 - Cash Flow Statement - 2
Lecture 13 - Special Accounts Illustrations
Lecture 14 - Final Illustrative Example
Lecture 15 - Summary of Financial Accounting
Lecture 16 - Introduction to Management Accounting & Behaviour of Cost
Lecture 17 - Cost-Volume Relationship
Lecture 18 - Cost-Objects & Variance
Lecture 19 - Labour & Over Heads Variance Analysis
Lecture 20 - Cash Conversion Cycle
Lecture 21 - Inventory Management
Lecture 22 - What is Strategy?
Lecture 23 - Poter's Diamond Model
Lecture 24 - Industry Analysis
Lecture 25 - Industry Analysis & Sources of Strategy
Lecture 26 - The Need for Value
Lecture 27 - Value Chain Analysis
Lecture 28 - Corporate Portfolio Analysis
Lecture 29 - External & Internal Environ Analysis

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Lecture 30 - Models for Strategy,Ansoff matrix
Lecture 31 - Porter's Generic Strategy
Lecture 32 - Prahlad's Core Competency
Lecture 33 - Case study to understand strategy
Lecture 34 - Case study to understand strategy
Lecture 35 - Blue ocean and conclusion
Lecture 36 - Introduction to Economics
Lecture 37 - Introduction to GDP
Lecture 38 - Supply vs Demand
Lecture 39 - Price & Income Elasticity and Utility
Lecture 40 - Macroeconomic Variables
Lecture 41 - Fiscal & Monetary Policy
Lecture 42 - Union Budget & Conclusion

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NPTEL Video Course - Management - NOC:Introduction to Operations Research

Subject Co-ordinator - Prof. G. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Linear Programming Introduction and formulations - Product Mix problem and Notations
Lecture 2 - Linear Programming Introduction and formulations - Manpower and Production planning formulations
Lecture 3 - Linear Programming Introduction and formulations - Media selection problem and Bicycle problem
Lecture 4 - Linear Programming Introduction and formulations - Caterer problem
Lecture 5 - Linear Programming Introduction and formulations - Maximum flow and bin packing problems
Lecture 6 - Graphical and Algebraic methods - Graphical method (maximization)
Lecture 7 - Graphical and Algebraic methods - Graphical method (minimization)
Lecture 8 - Graphical and Algebraic methods - Algebraic method (maximization)
Lecture 9 - Graphical and Algebraic methods - Algebraic method (minimization)
Lecture 10 - Graphical and Algebraic methods - Comparing graphical and algebraic methods
Lecture 11 - Simplex Algorithm - Algebraic form of simplex algorithm
Lecture 12 - Simplex Algorithm - Tabular form of simplex (maximization)
Lecture 13 - Simplex Algorithm - Tabular form (minimization)
Lecture 14 - Simplex Algorithm - Unboundedness
Lecture 15 - Simplex Algorithm - Infeasibility
Lecture 16 - Dual - Motivation to the dual
Lecture 17 - Dual - Writing the dual for a general LP
Lecture 18 - Dual - Writing the dual for a general LP (Continued...)
Lecture 19 - Dual - Duality theorems
Lecture 20 - Dual - Complimentary slackness theorem
Lecture 21 - Primal dual relationships - Dual solution using complimentary slackness
Lecture 22 - Primal dual relationships - Dual solution from simplex table; economic interpretation of dual
Lecture 23 - Primal dual relationships - Economic Interpretation of the dual; Dual Simplex algorithm
Lecture 24 - Primal dual relationships - Solving LPs with mixed type of constraints
Lecture 25 - Primal dual relationships - Matrix method for LP problems
Lecture 26 - Introducing the transportation problem
Lecture 27 - North West corner Rule and minimum cost method
Lecture 28 - Penalty cost method
Lecture 29 - Stepping stone method and Modified Distribution method

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Lecture 30 - MODI method; Dual of the transportation problem and the optimality of the MODI method
Lecture 31 - Introducing the Assignment problem
Lecture 32 - Solving the Assignment problem
Lecture 33 - Hungarian algorithm; Alternate optimum
Lecture 34 - Unequal number of rows and columns; Dual of the assignment problem
Lecture 35 - Optimality of the Hungarian algorithm
Lecture 36 - Setting up the problem and solving simple LP problems
Lecture 37 - Unboundedness and infeasibility
Lecture 38 - Solving other formulations
Lecture 39 - Solving a transportation problem
Lecture 40 - Solving an assignment problem

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NPTEL Video Course - Management - NOC:Introduction to Data Analytics

Subject Co-ordinator - Dr. Nandan Sudarsanam, Dr. Balaraman Ravindran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Course Overview (Continued...)
Lecture 3 - Descriptive Statistics - Graphical Approaches
Lecture 4 - Descriptive Statistics - Measures of Central Tendency
Lecture 5 - Descriptive Statistics - Measures of Dispersion
Lecture 6 - Random Variables and Probability Distributions
Lecture 7 - Probability Distributions (Continued...)
Lecture 8 - Probability Distributions (Continued...)
Lecture 9 - Inferential Statistics - Motivation
Lecture 10 - Inferential Statistics - Single sample tests
Lecture 11 - Two Sample tests
Lecture 12 - Type 1 and Type 2 Errors
Lecture 13 - Confidence Intervals
Lecture 14 - ANOVA and Test of Independence
Lecture 15 - Short Introduction to Regression
Lecture 16 - Introduction to Machine Learning
Lecture 17 - Supervised Learning
Lecture 18 - Unsupervised Learning
Lecture 19 - Ordinary Least Squares Regression
Lecture 20 - Simple and Multiple Regression in Excel and Matlab
Lecture 21 - Regularization/ Coefficients Shrinkage
Lecture 22 - Data Modelling and Algorithmic Modelling Approaches
Lecture 23 - Logistic Regression
Lecture 24 - Training a Logistic Regression Classifier
Lecture 25 - Classification and Regression Trees
Lecture 26 - Classification and Regression Trees (Continued...)
Lecture 27 - Bias Variance Dichotomy
Lecture 28 - Model Assessment and Selection
Lecture 29 - Support Vector Machines

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Lecture 30 - Support Vector Machines (Continued...)
Lecture 31 - Support Vector Machines for Non Linearly Separable Data
Lecture 32 - Support Vector Machines and Kernel Transformations
Lecture 33 - Ensemble Methods and Random Forests
Lecture 34 - Artificial Neural Networks
Lecture 35 - Artificial Neural Networks (Continued...)
Lecture 36 - Deep Learning
Lecture 37 - Associative Rule Mining
Lecture 38 - Association Rule Mining (Continued...)
Lecture 39 - Big Data - A small introduction
Lecture 40 - Big Data - A small introduction (Continued...)
Lecture 41 - Clustering Analysis
Lecture 42 - Clustering Analysis (Continued...)
Lecture 43 - Introduction to Experimentation and Active Learning
Lecture 44 - Introduction to Experimentation and Active Learning (Continued...)
Lecture 45 - An Introduction to Online Learning - Reinforcement Learning
Lecture 46 - An Introduction to Online Learning - Reinforcement Learning (Continued...)
Lecture 47 - Summary + Insights into the Final Exam
Lecture 48 - Tutorial on weka
Lecture 49 - Tutorial on Decision Trees
Lecture 50 - Big Data - A Small Introduction (Continued...)

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NPTEL Video Course - Management - NOC:Introduction to Data analytics

Subject Co-ordinator - Dr. Nandan Sudarsanam, Dr. Balaraman Ravindran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Course Overview (Continued...)
Lecture 3 - Descriptive Statistics - Graphical Approaches
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Lecture 7 - Probability Distributions (Continued...)
Lecture 8 - Probability Distributions (Continued...)
Lecture 9 - Inferential Statistics - Motivation
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Lecture 26 - Classification and Regression Trees (Continued...)
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Lecture 30 - Support Vector Machines (Continued...)
Lecture 31 - Support Vector Machines for Non Linearly Separable Data
Lecture 32 - Support Vector Machines and Kernel Transformations
Lecture 33 - Ensemble Methods and Random Forests
Lecture 34 - Artificial Neural Networks
Lecture 35 - Artificial Neural Networks (Continued...)
Lecture 36 - Deep Learning
Lecture 37 - Associative Rule Mining
Lecture 38 - Association Rule Mining (Continued...)
Lecture 39 - Big Data, A small introduction
Lecture 40 - Big Data, A small introduction (Continued...)
Lecture 41 - Clustering Analysis
Lecture 42 - Clustering Analysis (Continued...)
Lecture 43 - Introduction to Experimentation and Active Learning
Lecture 44 - Introduction to Experimentation and Active Learning (Continued...)
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Lecture 48 - Tutorial on weka
Lecture 49 - Tutorial on Decision Trees
Lecture 50 - Big Data - A Small Introduction (Continued...)

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NPTEL Video Course - Management - NOC:Patent Law for Engineers and Scientists

Subject Co-ordinator - Prof. Feroze Ali

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Patent Law as Concepts
Lecture 2 - Understanding the Patents Act and the Rules
Lecture 3 - Preliminary Sections
Lecture 4 - Preliminary Rules
Lecture 5 - Patents (Amendment) Rules, 2016
Lecture 6 - Easy way to read the Patents Act and Rules
Lecture 7 - What can be Patented?
Lecture 8 - Inventions not Patentable
Lecture 9 - Novelty
Lecture 10 - Anticipation
Lecture 11 - Inventive Step
Lecture 12 - Capable of Industrial Application
Lecture 13 - Person Skilled in the Art
Lecture 14 - Complete and Provisional Specifications
Lecture 15 - Contents of Specifications
Lecture 16 - Structure of a Patent Specification
Lecture 17 - Reading a Patent Specification
Lecture 18 - Introduction to Patent Drafting
Lecture 19 - Introduction to Patent Drafting
Lecture 20 - Who Can Apply for a Patent?
Lecture 21 - Form of Application
Lecture 22 - Patent Application
Lecture 23 - Powers of Controller
Lecture 24 - Patents of Addition
Lecture 25 - Priority Dates
Lecture 26 - Professor's Interaction 01
Lecture 27 - Publication of Application
Lecture 28 - Request for Examination
Lecture 29 - Examination of Application

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Lecture 30 - Expedited Examination of Application
Lecture 31 - Search for Anticipation
Lecture 32 - Procedure in case of Anticipation
Lecture 33 - Consideration of Report of Examiner
Lecture 34 - Refuse, Require Amendment, and Division of Applications
Lecture 35 - Dating of Application and Anticipation
Lecture 36 - Potential Infringement
Lecture 37 - Orders Regarding Substitution of Applicants
Lecture 38 - Putting Applications in Order for Grant
Lecture 39 - Amendments during Prosecution
Lecture 40 - Introduction to Opposition to Grant of Patents
Lecture 41 - Pre-Grant Opposition
Lecture 42 - Post-Grant Opposition
Lecture 43 - Obtained Invention
Lecture 44 - Mention of Inventor
Lecture 45 - Opposition in General
Lecture 46 - Secrecy Provisions
Lecture 47 - Grant of Patents
Lecture 48 - Rights conferred by Grant
Lecture 49 - Rights of Co-Owners of Patents and Power of Controller to give directions
Lecture 50 - Patent obtained by Fraud of True and First Inventor
Lecture 51 - Term of Patent
Lecture 52 - Restoration of Lapsed Patents
Lecture 53 - Surrender of Patents
Lecture 54 - Revocation of Patents
Lecture 55 - Register of Patents
Lecture 56 - Patent Office and its Establishment
Lecture 57 - Patent Agents
Lecture 58 - Use and Acquisition by Government
Lecture 59 - Penalties
Lecture 60 - Introduction to Compulsory Licensing
Lecture 61 - Working of Patents
Lecture 62 - Compulsory Licenses
Lecture 63 - Revocation of Patents 1
Lecture 64 - Powers of Controller
Lecture 65 - Licensing of Related Patents
Lecture 66 - Compulsory License on Notification by Central Government
Lecture 67 - Compulsory License for Export of Pharma Products
Lecture 68 - Termination of Compulsory License, Related Rules

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Lecture 69 - Intellectual Property Appellate Board
Lecture 70 - Infringement Suits and Defences
Lecture 71 - Reliefs in Suit for Infringement
Lecture 72 - Declaration as to Non-Infringement
Lecture 73 - Groundless threat of Infringement Proceedings
Lecture 74 - Certificate of Validity
Lecture 75 - Scientific Advisors
Lecture 76 - International Arrangements
Lecture 77 - Miscellaneous
Lecture 78 - Fees

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NPTEL Video Course - Management - NOC:Design Thinking - A Primer

Subject Co-ordinator - Dr. Ashwin Mahalingam, Prof. Bala Ramadurai

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Design Thinking - A Primer Start - Part 1
Lecture 2 - Design Thinking - A Primer Start - Part 2
Lecture 3 - Design Thinking - A Primer Start - Part 3
Lecture 4 - Intro to Design Thinking
Lecture 5 - Case Study - Arcturus IV by John E. Arnold
Lecture 6 - Course Preview and History of Design Thinking
Lecture 7 - Discussion - Intro to Demo Problem
Lecture 8 - Empathize - Lecture 1
Lecture 9 - Empathize - Workshop 1
Lecture 10 - Empathize - Workshop 2
Lecture 11 - Empathize - Skit
Lecture 12 - Interviews
Lecture 13 - Analyze - Lecture-1 5 Whys
Lecture 14 - Analyze - 5ys - IIT Stadium levels
Lecture 15 - Analyze - Lecture 2 Conflict of Interest
Lecture 16 - Analyze - Workshop - Part 1
Lecture 17 - Analyze - Workshop - Part 2
Lecture 18 - Solve - Tea cup story
Lecture 19 - Solve - Lecture 1
Lecture 20 - Solve - Workshop 1
Lecture 21 - Elephant and blind men
Lecture 22 - Test - Lecture 1
Lecture 23 - Test - Workshop 1
Lecture 24 - Test - Customer reactions to prototype
Lecture 25 - The END - Part 1
Lecture 26 - The END - Part 2
Lecture 27 - Finale and Appeal for proposals

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NPTEL Video Course - Management - NOC:Decision-Making Under Uncertainty

Subject Co-ordinator - Prof. N. Gautam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Tutorial - How to Install Octave and using Octave
Lecture 2 - Background and relevance
Lecture 3 - Examples of managing uncertainty and making decisions
Lecture 4 - Risk, uncertainty and variability
Lecture 5 - Probability
Lecture 6 - Discrete random variables
Lecture 7 - Continuous random variables
Lecture 8 - Expected Value
Lecture 9 - Multiple Random Variables
Lecture 10 - Criteria, Objectives and Settings for Decisions
Lecture 11 - Introduction to one-time decisions
Lecture 12 - Solving the secretary problem
Lecture 13 - Which option to gamble just once?
Lecture 14 - Utility Function
Lecture 15 - Nested one-time decisions
Lecture 16 - Decision Trees
Lecture 17 - Decisions in Game Shows
Lecture 18 - Decisions in Game Shows
Lecture 19 - Project Network and Analysis
Lecture 20 - Newsvendor Problem
Lecture 21 - Newsvendor Problem
Lecture 22 - Buffers to Cushion for Fluctuations
Lecture 23 - Safety Stock for Inventories
Lecture 24 - Safety Stock
Lecture 25 - Route Planning
Lecture 26 - Exploration and Exploitation
Lecture 27 - Introduction to sequential decision making
Lecture 28 - Costs, Ratings, Options and Choices for both Restaurants
Lecture 29 - Two Stage Stochastic Optimization

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Lecture 30 - Concluding Remarks and Simpson's Paradox
Lecture 31 - Markov Chains for Decisions
Lecture 32 - DTMC Modeling and Analysis
Lecture 33 - Markov Decision Process Set Up
Lecture 34 - Analyzing the four policies

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NPTEL Video Course - Management - NOC:Decision making using Financial Accounting

Subject Co-ordinator - Prof. G Arun Kumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Two Finacial Statements
Lecture 4 - Two Finacial Statements (Continued...)
Lecture 5 - Two Finacial Statements (Continued...)
Lecture 6 - Three Finacial Statements
Lecture 7 - Three Finacial Statements (Continued...)
Lecture 8 - Three Finacial Statements (Continued...)
Lecture 9 - Transaction and Finacial Statements
Lecture 10 - Transaction and Finacial Statements (Continued...)
Lecture 11 - Transaction and Finacial Statements (Continued...)
Lecture 12 - Lone Pine Cafe (Case)
Lecture 13 - Lone Pine Cafe (Case)
Lecture 14 - Journal - 1
Lecture 15 - Journal - 2
Lecture 16 - Journal - 3
Lecture 17 - Ledger Posting Part - 1
Lecture 18 - Ledger Posting Part - 2
Lecture 19 - Final Accounts
Lecture 20 - Cash Flow Statements - 1
Lecture 21 - Cash Flow Statements - 2
Lecture 22 - Cash Flow Statements - 3
Lecture 23 - Cash Flow Statements - 4
Lecture 24 - Cash Flow Statements - 5
Lecture 25 - Reading the Financial Statements of a Annual Report - 1
Lecture 26 - Reading the Financial Statements of a Annual Report - 2
Lecture 27 - Reading the Financial Statements of a Annual Report - 3
Lecture 28 - Financial Statement Analysis - 1
Lecture 29 - Financial Statement Analysis - 2

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Lecture 30 - Financial Statement Analysis - 3
Lecture 31 - Financial Statement Analysis - 4
Lecture 32 - Recap
Lecture 33 - Ratios Analysis
Lecture 34 - Ratios Analysis

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NPTEL Video Course - Management - NOC:Entrepreneurship

Subject Co-ordinator - Prof. C Bhaktavatsala Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Entrepreneurial Journey - Part 1
Lecture 2 - Entrepreneurial Journey - Part 2
Lecture 3 - Entrepreneurial Journey - Part 3
Lecture 4 - Entrepreneurial Discovery - Part 1
Lecture 5 - Entrepreneurial Discovery - Part 2
Lecture 6 - Entrepreneurial Discovery - Part 3
Lecture 7 - Entrepreneurial Discovery - Part 4
Lecture 8 - Ideation and Prototyping - Part 1
Lecture 9 - Ideation and Prototyping - Part 2
Lecture 10 - Ideation and Prototyping - Part 3
Lecture 11 - Ideation and Prototyping - Part 4
Lecture 12 - Ideation and Prototyping - Part 5
Lecture 13 - Ideation and Prototyping - Part 6
Lecture 14 - Testing and Validation - Part 1
Lecture 15 - Testing and Validation - Part 2
Lecture 16 - Commercialisation and Disruption as Success Drivers - Part 1
Lecture 17 - Commercialisation and Disruption as Success Drivers - Part 2
Lecture 18 - Commercialisation and Disruption as Success Drivers - Part 3
Lecture 19 - Commercialisation and Disruption as Success Drivers - Part 4
Lecture 20 - Commercialisation and Disruption as Success Drivers - Part 5
Lecture 21 - Technological Innovation and Entrepreneurship - Part 1
Lecture 22 - Technological Innovation and Entrepreneurship - Part 2
Lecture 23 - Technological Innovation and Entrepreneurship - Part 3
Lecture 24 - Technological Innovation and Entrepreneurship - Part 4
Lecture 25 - Technological Innovation and Entrepreneurship - Part 5
Lecture 26 - Technology, Business, and Operations Strategies - Part 1
Lecture 27 - Technology, Business, and Operations Strategies - Part 2
Lecture 28 - Technology, Business, and Operations Strategies - Part 3
Lecture 29 - Technology, Business, and Operations Strategies - Part 4

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Lecture 30 - Technology, Business, and Operations Strategies - Part 5
Lecture 31 - Raising Finances and Developing Financial Strategy - Part 1
Lecture 32 - Raising Finances and Developing Financial Strategy - Part 2
Lecture 33 - Raising Finances and Developing Financial Strategy - Part 3
Lecture 34 - Raising Finances and Developing Financial Strategy - Part 4
Lecture 35 - Raising Finances and Developing Financial Strategy - Part 5
Lecture 36 - Education and Entrepreneurship - Part 1
Lecture 37 - Education and Entrepreneurship - Part 2
Lecture 38 - Education and Entrepreneurship - Part 3
Lecture 39 - Beyond Founders and Founder-Families - Part 1
Lecture 40 - Beyond Founders and Founder-Families - Part 2
Lecture 41 - Beyond Founders and Founder-Families - Part 3
Lecture 42 - Beyond Founders and Founder-Families - Part 4
Lecture 43 - India as A Start-up Nation - Part 1
Lecture 44 - India as A Start-up Nation - Part 2
Lecture 45 - India as A Start-up Nation - Part 3
Lecture 46 - National Entrepreneurial Culture - Part 1
Lecture 47 - National Entrepreneurial Culture - Part 2
Lecture 48 - Entrepreneurial Thermodynamics - Part 1
Lecture 49 - Entrepreneurial Thermodynamics - Part 2
Lecture 50 - Human Resources Strategy
Lecture 51 - Entrepreneurship and Employment - Part 1
Lecture 52 - Entrepreneurship and Employment - Part 2
Lecture 53 - Entrepreneurship and Employment - Part 3
Lecture 54 - Entrepreneurship and Employment - Part 4
Lecture 55 - Corporate Governance
Lecture 56 - Marketing Strategy
Lecture 57 - Start-up Case Studies - Part 1
Lecture 58 - Start-up Case Studies - Part 2
Lecture 59 - Start-up Case Studies - Part 3
Lecture 60 - Start-up Case Studies - Part 4
Lecture 61 - In Closing

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NPTEL Video Course - Management - NOC:Organizational Behaviour

Subject Co-ordinator - Prof. M. P. Ganesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organizational Behaviour - Part 1
Lecture 2 - Introduction to Organizational Behaviour - Part 2
Lecture 3 - Introduction to Organizational Behaviour - Part 3
Lecture 4 - Introduction to Organizational Behaviour - Part 4
Lecture 5 - Introduction to Organizational Behaviour - Part 5
Lecture 6 - Perception - Part 1
Lecture 7 - Perception - Part 2
Lecture 8 - Perception - Part 3
Lecture 9 - Perception - Part 4
Lecture 10 - Personality - Part 1
Lecture 11 - Personality - Part 2
Lecture 12 - Personality - Part 3
Lecture 13 - Personality - Part 4
Lecture 14 - Personality - Part 5
Lecture 15 - Personality - Part 6
Lecture 16 - Personality - Part 7
Lecture 17 - Learning - Part 1
Lecture 18 - Learning - Part 2
Lecture 19 - Attitudes - Part 1
Lecture 20 - Attitudes - Part 2
Lecture 21 - Attitudes - Part 3
Lecture 22 - Attitudes - Part 4
Lecture 23 - Emotions - Part 1
Lecture 24 - Emotions - Part 2
Lecture 25 - Emotions - Part 3
Lecture 26 - Motivation - Part 1
Lecture 27 - Motivation - Part 2
Lecture 28 - Motivation - Part 3
Lecture 29 - Motivation - Part 4

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Lecture 30 - Motivation - Part 5
Lecture 31 - Motivation - Part 6
Lecture 32 - Interpersonal Relationships - Part 1
Lecture 33 - Interpersonal Relationships - Part 2
Lecture 34 - Interpersonal Relationships - Part 3
Lecture 35 - Interpersonal Relationships - Part 4
Lecture 36 - Communication - Part 1
Lecture 37 - Communication - Part 2
Lecture 38 - Communication - Part 3
Lecture 39 - Decision Making - Part 1
Lecture 40 - Decision Making - Part 2
Lecture 41 - Decision Making - Part 3
Lecture 42 - Decision Making - Part 4
Lecture 43 - Power and Leadership - Part 1
Lecture 44 - Power and Leadership - Part 2
Lecture 45 - Power and Leadership - Part 3
Lecture 46 - Power and Leadership - Part 4
Lecture 47 - Power and Leadership - Part 5
Lecture 48 - Group Dynamics - Part 1
Lecture 49 - Group Dynamics - Part 2
Lecture 50 - Group Dynamics - Part 3
Lecture 51 - Organizational Culture - Part 1
Lecture 52 - Organizational Culture - Part 2
Lecture 53 - Organizational Change
Lecture 54 - Organizational Structure - Part 1
Lecture 55 - Organizational Structure - Part 2
Lecture 56 - Organizational Structure - Part 3

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NPTEL Video Course - Management - NOC:The Future of Manufacturing Business: Role of Additive Manufacturing

Subject Co-ordinator - Prof. R. K. Amit, Prof. U. Chandrasekhar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Manufacturing ?
Lecture 2 - Manufacturing and Industrial Revolution
Lecture 3 - Manufacturing Processes and Era of Mass Production
Lecture 4 - Mass Production to Mass Customization
Lecture 5 - Laws of Manufacturing - I
Lecture 6 - Laws of Manufacturing - II
Lecture 7 - Business Models
Lecture 8 - Manufacturing Radar - I
Lecture 9 - Manufacturing Radar - II
Lecture 10 - Agile Manufacturing - I
Lecture 11 - Agile Manufacturing - II
Lecture 12 - Technology and Manufacturing
Lecture 13 - AM Implementation and SC Configuration - I
Lecture 14 - AM Implementation and SC Configuration - II
Lecture 15 - Manufacturing and IIoT - I
Lecture 16 - Manufacturing and IIoT - II
Lecture 17 - Digital Supply Network - I
Lecture 18 - Digital Supply Network - II
Lecture 19 - Machine Intelligence
Lecture 20 - Blockchains and Use Cases
Lecture 21 - Additive Manufacturing Technologies and Categorization
Lecture 22 - Process Chain for AM of Plastics and Metals
Lecture 23 - Design for Additive manufacturing (DFAM) for Metal printing
Lecture 24 - Supply chain for Additive Manufacturing
Lecture 25 - Design for Laser Powder Bed fusion (LPBF)
Lecture 26 - Additive Manufacturing Application for Prototype, Tooling and Part Repair
Lecture 27 - AM Materials and Metallurgy in LPBF
Lecture 28 - Additive Parameter Development
Lecture 29 - Quality in Additive Manufacturing

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Lecture 30 - Extrusion AM for Industrial Application
Lecture 31 - Design for LPBF - Case Studies
Lecture 32 - Metal Powder Manufacturing and Characterisation

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NPTEL Video Course - Management - NOC:Financial Accounting (IIT Mandi)

Subject Co-ordinator - Prof. Puran Singh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Financial Accounting
Lecture 2 - Company form of business
Lecture 3 - Accounting as an information system
Lecture 4 - Key accounting terms - I
Lecture 5 - Key accounting terms - II
Lecture 6 - Tutorial - Key accounting terms
Lecture 7 - Accounting Equation
Lecture 8 - Walkthrough of Balance Sheet - I
Lecture 9 - Walkthrough of Balance Sheet - II
Lecture 10 - Walkthrough of Balance Sheet - III
Lecture 11 - Walkthrough of Income Statement - I
Lecture 12 - Generally Accepted Accounting Principles - I
Lecture 13 - Generally Accepted Accounting Principles - II
Lecture 14 - Recap and way forward
Lecture 15 - Types of Accounts
Lecture 16 - Tutorial - Types of Accounts - Part I
Lecture 17 - Tutorial - Types of Accounts - Part II
Lecture 18 - Debit and Credit
Lecture 19 - Tutorial - Debit and Credit
Lecture 20 - Rules of debit and credit
Lecture 21 - Entering transactions in Journal - Part I
Lecture 22 - Entering transactions in Journal - Part II
Lecture 23 - Entering transactions in Journal - Part III
Lecture 24 - Tutorial - Entering transactions in Journal I - Part I
Lecture 25 - Tutorial - Entering transactions in Journal I - Part II
Lecture 26 - Tutorial - Entering transactions in Journal I - Part III
Lecture 27 - Key Trends in Journalizing
Lecture 28 - Journalizing complex transactions
Lecture 29 - Practice Problem - I

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Lecture 30 - Recap and way forward
Lecture 31 - Introduction to Ledger
Lecture 32 - Process of Ledger Posting - Part 1
Lecture 33 - Process of Ledger Posting - Part 2
Lecture 34 - Process of Ledger Posting - Part 3
Lecture 35 - Balancing the Accounts
Lecture 36 - Debit and Credit Balances
Lecture 37 - Tutorial - Identifying balances - Part 1
Lecture 38 - Tutorial - Identifying balances - Part 2
Lecture 39 - Tutorial - Identifying balances - Part 3
Lecture 40 - Tutorial - Identifying balances - Part 4
Lecture 41 - Practice Problem - I
Lecture 42 - Practice Problem - II
Lecture 43 - Practice Problem - III
Lecture 44 - Recap and way forward
Lecture 45 - Introduction to Trial Balance
Lecture 46 - Preparation of Trial Balance
Lecture 47 - Practice Problem - 1
Lecture 48 - Practice Problem - 2
Lecture 49 - Errors in Trial Balance
Lecture 50 - Recap and way forward
Lecture 51 - Introduction to Final Accounts
Lecture 52 - Tutorial - Identifying direct and indirect expenses
Lecture 53 - Tutorial - Mapping operating and non operating items to direct and indirect items
Lecture 54 - Preparation of Final Accounts
Lecture 55 - Tutorial - Preparation of Final Accounts
Lecture 56 - Tutorial - Preparation of Trading Account
Lecture 57 - Tutorial - Preparation of P&L Account
Lecture 58 - Tutorial - Preparation of Balance Sheet
Lecture 59 - Practice Problem
Lecture 60 - Adjustments in Final Accounts
Lecture 61 - Transactions to be adjusted in Final Accounts - Part 1
Lecture 62 - Transactions to be adjusted in Final Accounts - Part 2
Lecture 63 - Tutorial - Adjustments in Final Accounts
Lecture 64 - Tutorial - Calculating Cost of Goods Sold
Lecture 65 - Tutorial - Outstanding Expenses
Lecture 66 - Tutorial - Prepaid Expenses
Lecture 67 - Validating the learning - Balance Sheet
Lecture 68 - Validating the learning - Income Statement

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Lecture 69 - Recap and way forward
Lecture 70 - Introduction to Financial Statement Analysis
Lecture 71 - Liquidity Ratios
Lecture 72 - Tutorial - Liquidity Ratios
Lecture 73 - Solvency Ratios
Lecture 74 - Tutorial - Solvency Ratios
Lecture 75 - Profitability Ratios
Lecture 76 - Tutorial - Profitability Ratios - Part 1
Lecture 77 - Tutorial - Profitability Ratios - Part 2
Lecture 78 - Efficiency Ratios
Lecture 79 - Tutorial - Efficiency Ratios
Lecture 80 - Validating the learning - Walkthrough of RIL's Annual Report
Lecture 81 - Online Resources for Financial Analysis
Lecture 82 - Practice Problem - Liquidity Position
Lecture 83 - Practice Problem - Solvency Position
Lecture 84 - Practice Problem - Profitability Position
Lecture 85 - Practice Problem - Profitability Position
Lecture 86 - Practice Problem - Interpretation of Ratios
Lecture 87 - Practice Problem - Arithmetic problems
Lecture 88 - Recap and way forward
Lecture 89 - Types of Cash Flows
Lecture 90 - Tutorial - Types of Cash Flows
Lecture 91 - Walkthough of Cash Flow Statement of RIL
Lecture 92 - Profit and Loss Appropriation Account
Lecture 93 - Cash Flows from Operating Activities - Part 1
Lecture 94 - Cash Flows from Operating Activities - Part 2
Lecture 95 - Tutorial - Changes in working capital
Lecture 96 - Tutorial - Cash Flows from Operating Activities - Part 1
Lecture 97 - Cash Flows from Investing Activities
Lecture 98 - Tutorial - Cash Flows from Investing Activities
Lecture 99 - Cash Flows from Financing Activities
Lecture 100 - Tutorial - Cash Flows from Financing Activities
Lecture 101 - Preparing Cash Flow Statement
Lecture 102 - Identifying hidden information - Part 1
Lecture 103 - Identifying hidden information - Part 2
Lecture 104 - Identifying hidden information - Part 3
Lecture 105 - Practice Problem - Part 1
Lecture 106 - Practice Problem - Part 2
Lecture 107 - Need of Break Even Analysis

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Lecture 108 - Understanding the nature of costs
Lecture 109 - Contribution Margin
Lecture 110 - Tutorial - Contribution
Lecture 111 - Break Even Point
Lecture 112 - Tutorial - Break Even Point
Lecture 113 - Tutorial - Break Even Point
Lecture 114 - Visualizing the Break Even Point
Lecture 115 - Tutorial - Break Even Analysis
Lecture 116 - Case - Break Even Analysis
Lecture 117 - Introduction to Inventory Management
Lecture 118 - Economic Order Quantity
Lecture 119 - ABC Analysis
Lecture 120 - Methods of stock valuation

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NPTEL Video Course - Management - NOC:Technology Forecasting for Strategic Decision Making - An Introduction

Subject Co-ordinator - Prof. Dmitry Kucharavy, Prof. Bala Ramadurai

Co-ordinating Institute - EM Strasbourg Business School

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Tech Forecasting for Strategic Decision Making
Lecture 2 - Famous forecasts which missed the mark Lecture 4 - Why do we need technology forecasts? - Questic
Lecture 3 - Why do we need technology forecasts? - Innovation vs Invention Efficiency vs Effectiveness"
Lecture 4 - Why do we need technology forecasts? - Questions in Lecture 2, part 1
Lecture 5 - Why do we need technology forecasts? - Limiting Resources
Lecture 6 - Why do we need technology forecasts? - Why is it difficult to forecast?
Lecture 7 - Why do we need technology forecasts? - General stages of forecasting?
Lecture 8 - Why do we need technology forecasts? - Questions in Lecture 2, part 2
Lecture 9 - Failure and Success Startup Stories
Lecture 10 - Strategic, Tactical and Operational Decision Making
Lecture 11 - Quiz about Strategic, Tactical and Operational decision making
Lecture 12 - Answer to the quiz on Strategic, Tactical and operational decision making
Lecture 13 - Introduction to Vacuum forming case study and FORMAT handbook
Lecture 14 - Quiz on systems and set
Lecture 15 - Quiz on functions
Lecture 16 - Technology Lifecycle - Example case study - Transportation
Lecture 17 - Technology Lifecycle - Seasons, Clockspeed - Part 1
Lecture 18 - Technology Lifecycle - Seasons, Clockspeed - Part 2
Lecture 19 - Technology Lifecycle - Seasons, Clockspeed - Part 3
Lecture 20 - Technology Lifecycle - Seasons, Clockspeed - Part 4
Lecture 21 - Technology Lifecycle - Seasons, Clockspeed - Part 5
Lecture 22 - Aryabhata's experience in modeling and Live Solar Eclipse
Lecture 23 - Alternatives to forecasting in scope of technology management
Lecture 24 - Alternatives to forecasting in scope of technology management - Q&A
Lecture 25 - Element-Name-Value Model
Lecture 26 - System Operator
Lecture 27 - How to collect problems for mapping
Lecture 28 - How to formalize our knowledge about problems?
Lecture 29

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Lecture 30
Lecture 31
Lecture 32 - Technological roadmaps
Lecture 33 - Maps of contradiction for forecasting
Lecture 34 - Quantitative forecasting
Lecture 35 - Demo of S-curve fitting software
Lecture 36 - Forecasting and Forecast

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NPTEL Video Course - Management - NOC:Leadership for India Inc: Practical Concepts and Constructs

Subject Co-ordinator - Prof. C Bhaktavatsala Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Leadership: Business Context
Lecture 2 - Leadership and Management
Lecture 3 - Management Thought - 1
Lecture 4 - Management Thought - 2
Lecture 5 - Management Thought - 3
Lecture 6 - Trait Theory
Lecture 7 - Behavioural Theory
Lecture 8 - Situational Theory
Lecture 9 - Path-Goal Theory
Lecture 10 - Leader-Member Exchange Theory
Lecture 11 - Technology Leadership
Lecture 12 - Climate Leadership
Lecture 13 - Resource Leadership
Lecture 14 - Global Leadership
Lecture 15 - Crisis Leadership
Lecture 16 - Leadership Attributes
Lecture 17 - Apex Leadership Attributes
Lecture 18 - Leadership Essentials
Lecture 19 - Learning to Lead
Lecture 20 - Indian Leader Competencies
Lecture 21 - Self-actualization
Lecture 22 - Leadership Balance
Lecture 23 - Paradox Management
Lecture 24 - Agile and Precise
Lecture 25 - Adaptive Processes
Lecture 26 - Stature versus Title
Lecture 27 - Vision, Strategy, Structure and Execution
Lecture 28 - Organization Structures
Lecture 29 - Effective Execution

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Lecture 30 - Building Perpetual Corporations
Lecture 31 - Enablement as Development
Lecture 32 - Instilling Development Passion
Lecture 33 - CEO Succession
Lecture 34 - Success Factors for Succession
Lecture 35 - Stage and Stature
Lecture 36 - R&D Leadership
Lecture 37 - Operations Leadership
Lecture 38 - Marketing Leadership
Lecture 39 - Finance Leadership
Lecture 40 - Human Resources Leadership
Lecture 41 - Pioneering Leadership Model
Lecture 42 - Performance Leadership Model
Lecture 43 - Corporate Longevity Model
Lecture 44 - Intellectual Leadership Model
Lecture 45 - Leadership Accountability Model
Lecture 46 - Charismatic Leadership Model
Lecture 47 - People Leadership Model
Lecture 48 - Follower Leadership Model
Lecture 49 - Dependence-Independence Model
Lecture 50 - Connected Leadership Model
Lecture 51 - Leadership Sensibilities
Lecture 52 - Leadership Mistakes
Lecture 53 - Lonely at the Top
Lecture 54 - Leadership Emotions
Lecture 55 - Organizational Totalitarianism
Lecture 56 - Dr A P J Abdul Kalam President without Precedent
Lecture 57 - Dr C K Prahalad Timeless in Strategy, Tireless in Creativity
Lecture 58 - Steve Jobs Technology Visionary Par Excellence
Lecture 59 - Dr KallamAnjiReddy Game Changing Pharma Entrepreneur
Lecture 60 - J R D Tata Conglomerate Leadership Beyond Compare
Lecture 61 - Mahatma Gandhi Leadership Beyond Compare
Lecture 62 - In Closing

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NPTEL Video Course - Management - NOC:Strategy and Technology: A Practical Primer

Subject Co-ordinator - Prof. C Bhaktavatsala Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - External analysis
Lecture 2 - Industry evolution
Lecture 3 - Five forces model
Lecture 4 - Generic competitive strategies
Lecture 5 - Position analyses
Lecture 6 - Competitive Dynamics
Lecture 7 - Business Portfolio Analysis
Lecture 8 - Global Strategy
Lecture 9 - Creative Strategy
Lecture 10 - Balanced Scorecard
Lecture 11 - Execution overview
Lecture 12 - Structure as enabler
Lecture 13 - Execution
Lecture 14 - Execution case study
Lecture 15 - Strategic management
Lecture 16 - Competitive strategy overview
Lecture 17 - Economic forces
Lecture 18 - Liquidity as the sixth force
Lecture 19 - The six forces model
Lecture 20 - Strategic groups
Lecture 21 - Buyer power
Lecture 22 - Supplier power
Lecture 23 - Competitive moves
Lecture 24 - Market signaling
Lecture 25 - Competitor clusters and analysis
Lecture 26 - Generic strategies
Lecture 27 - Structural analysis and competitive strategy
Lecture 28 - Quality, Cost and value
Lecture 29 - Differentiation and De-commoditization

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Lecture 30 - Niche as a core competence
Lecture 31 - Generic industry environments
Lecture 32 - Integration, Expansion, and Diversification
Lecture 33 - Comparators and responders
Lecture 34 - Strategic balance
Lecture 35 - Technology and collaboration
Lecture 36 - Technology strategy
Lecture 37 - Competition in technology prism
Lecture 38 - Technological competence
Lecture 39 - Generic technology strategies
Lecture 40 - Innovation and generic strategies
Lecture 41 - Technology and Differentiation
Lecture 42 - Technology and Followership
Lecture 43 - Technology in five forces prism
Lecture 44 - Technology and Patenting
Lecture 45 - Technology and Change
Lecture 46 - Customised product design
Lecture 47 - Technology and functionality
Lecture 48 - Technological behaviour
Lecture 49 - Technology and public policy
Lecture 50 - Technology and transformation
Lecture 51 - Strategic shifts
Lecture 52 - Business models
Lecture 53 - Retro - Futurism
Lecture 54 - Innovation strategy and process
Lecture 55 - High technology business companies
Lecture 56 - Renewables and electric vehicles
Lecture 57 - Dyson and 3M
Lecture 58 - GE and DuPont
Lecture 59 - NVIDIA and Bose
Lecture 60 - Fitbit and apple
Lecture 61 - In closing

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NPTEL Video Course - Management - NOC:Business Development: From Start to Scale

Subject Co-ordinator - Prof. C Bhaktavatsala Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Business Development
Lecture 2 - Marketing and Business Development
Lecture 3 - Markets and Marketing
Lecture 4 - Strategy Formulation
Lecture 5 - Business Development Cases
Lecture 6 - Successful Business
Lecture 7 - Industry and Market
Lecture 8 - Vision, Mission and Strategy
Lecture 9 - Goals
Lecture 10 - Case Study of Business Development Excellence
Lecture 11 - Industry and Business
Lecture 12 - Porter's Five Forces Theory
Lecture 13 - Industrial Transformations
Lecture 14 - Competitive Strategies
Lecture 15 - Company Analysis
Lecture 16 - Industry, Market and Business
Lecture 17 - Industry and Market Analysis
Lecture 18 - Market Structures
Lecture 19 - Demand Forecasting
Lecture 20 - Competitor Analysis
Lecture 21 - Customer Characteristics
Lecture 22 - Customer Typologies
Lecture 23 - Market Research and Design Thinking
Lecture 24 - Customer Bonding
Lecture 25 - Customer Relationship Management
Lecture 26 - Market and Market Descriptors
Lecture 27 - Market and Product Segmentation
Lecture 28 - Product-Market Segmentation
Lecture 29 - Segmentation Deep Dive

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Lecture 30 - Market Attractivenesss and competitive positioning
Lecture 31 - Branding
Lecture 32 - Brand Organization
Lecture 33 - Advertising and Communication
Lecture 34 - Servitization
Lecture 35 - Pricing
Lecture 36 - A New IT Start-up
Lecture 37 - An FMCG Start-up
Lecture 38 - A logistics start-up
Lecture 39 - A Nutraceuticals Start-up
Lecture 40 - A Telecom Fightback
Lecture 41 - Collaborations
Lecture 42 - Strategic Alliances
Lecture 43 - Joint Ventures
Lecture 44 - Subsidiaries
Lecture 45 - Mergers and Acquisitions
Lecture 46 - Value Chain Competencies
Lecture 47 - Functional Competencies
Lecture 48 - Negotiating Skills
Lecture 49 - Cultural Skills
Lecture 50 - Leadership Attributes
Lecture 51 - Growth Strategies
Lecture 52 - Growth Examples
Lecture 53 - Fragmented Industries and Emerging Industries
Lecture 54 - Mature Industries and Declining Industries
Lecture 55 - Global Industries and New Businesses
Lecture 56 - A Pharma Transformation
Lecture 57 - Pharma Strategic Alliances
Lecture 58 - Business Turbulence
Lecture 59 - Creating Value
Lecture 60 - From Starting to scale in Closing

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NPTEL Video Course - Management - NOC:Applied Econometrics (2023)

Subject Co-ordinator - Prof. Sabuj Kumar Mandal

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Instrumental Variable Estimation - Part I
Lecture 2 - Instrumental Variable Estimation - Part II
Lecture 3 - Instrumental Variable Estimation - Part III
Lecture 4 - Instrumental Variable Estimation - Part IV
Lecture 5 - Instrumental Variable Estimation - Part V
Lecture 6 - Instrumental Variable Estimation - Part VI
Lecture 7 - Instrumental Variable Estimation - Part VII
Lecture 8 - Instrumental Variable Estimation - Part VIII
Lecture 9 - Instrumental Variable Estimation - Part IX
Lecture 10 - Instrumental Variable Estimation - Part X
Lecture 11 - Instrumental Variable Estimation - Part XI
Lecture 12 - Simultaneous Equation Model - Part I
Lecture 13 - Simultaneous Equation Model - Part II
Lecture 14 - Simultaneous Equation Model - Part III
Lecture 15 - Simultaneous Equation Model - Part IV
Lecture 16 - Simultaneous Equation Model - Part V
Lecture 17 - Simultaneous Equation Model - Part VI
Lecture 18 - Simultaneous Equation Model - Part VII
Lecture 19 - Simultaneous Equation Model - Part VIII
Lecture 20 - Pooled Data and Panel Data Model Estimation - Part I
Lecture 21 - Pooled Data and Panel Data Model Estimation - Part II
Lecture 22 - Pooled Data and Panel Data Model Estimation - Part III
Lecture 23 - Pooled Data and Panel Data Model Estimation - Part IV
Lecture 24 - Pooled Data and Panel Data Model Estimation - Part V
Lecture 25 - Pooled Data and Panel Data Model Estimation - Part VI
Lecture 26 - Panel Data Model Estimation - Part VII
Lecture 27 - Panel Data Model Estimation - Part IX
Lecture 28 - Qualitative Response Model - Part I
Lecture 29 - Qualitative Response Model - Part II

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Lecture 30 - Qualitative Response Model - Part III
Lecture 31 - Qualitative Response Model - Part IV
Lecture 32 - Qualitative Response Model - Part V
Lecture 33 - Qualitative Response Model - Part VI
Lecture 34 - Multinomial Regression Model - Part I
Lecture 35 - Multinomial Regression Model - Part II
Lecture 36 - Multinomial Regression Model - Part III
Lecture 37 - Multinomial Regression Model - Part IV
Lecture 38 - Dynamic Panel data Model - Part I
Lecture 39 - Dynamic Panel data Model - Part II
Lecture 40 - Dynamic Panel data Model - Part III
Lecture 41 - Dynamic Panel data Model - Part IV
Lecture 42 - Dynamic Panel data Model - Part V
Lecture 43 - Dynamic Panel data Model - Part VI
Lecture 44 - Dynamic Panel data Model - Part VII
Lecture 45 - Dynamic Panel data Model - Part VIII
Lecture 46 - Dynamic Panel data Model - Part IX
Lecture 47 - Dynamic Panel data Model - Part X
Lecture 48 - Dynamic Panel data Model - Part XI
Lecture 49 - Dynamic Panel data Model - Part XII
Lecture 50 - Dynamic Panel data Model - Part XIII
Lecture 51 - Dynamic Panel data Model - Part XIV
Lecture 52 - Dynamic Panel data Model - Part XV
Lecture 53 - Dynamic Panel data Model - Part XVI
Lecture 54 - Dynamic Panel data Model - Part XVII
Lecture 55 - Dynamic Panel data Model - Part XVIII
Lecture 56 - Dynamic Panel data Model - Part XIX
Lecture 57 - Dynamic Panel data Model - Part XX
Lecture 58 - Course outline for Applied Econometrics

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NPTEL Video Course - Management - NOC:Working in Contemporary Teams

Subject Co-ordinator - Prof.Chitra Dey, Prof.M. P Ganesh

Co-ordinating Institute - IITH, VIT Chennai

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to contemporary teams
Lecture 2 - Introduction to virtual teams
Lecture 3 - Virtual teams
Lecture 4 - Factors affecting virtual teams
Lecture 5 - Managing virtualness
Lecture 6 - Cross-cultural teams
Lecture 7 - Factors affecting cross-cultural teams
Lecture 8 - Introduction to start-up teams
Lecture 9 - Factors affecting start-up teams
Lecture 10 - Introduction to IPO model in teams
Lecture 11 - Introduction to Human-AI teams
Lecture 12 - Inputs and Processes in Human-AI teams
Lecture 13 - States and Outcomes in Human-AI teams
Lecture 14 - Multiple Team Membership and Multi-team Systems
Lecture 15 - Introduction to Agile teams
Lecture 16 - Team Dynamics in Agile teams
Lecture 17 - Remote work teams

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NPTEL Video Course - Management - NOC:Foundations of Accounting and Finance

Subject Co-ordinator - Prof. Arun Kumar Gopalaswamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Financial Accounting and Cost Accounting
Lecture 2 - Introduction to Corporate Finance
Lecture 3 - Contents of Income Statement and Balance Sheet - Part I
Lecture 4 - Contents of Income Statement and Balance Sheet - Part II
Lecture 5 - Interaction between Income Statement and Balance Sheet
Lecture 6 - Preparation of Income Statement and Balance Sheet: Example - Part I
Lecture 7 - Preparation of Income Statement and Balance Sheet: Example - Part II
Lecture 8 - Preparation of Income Statement and Balance Sheet: Example - Part III
Lecture 9 - Preparation of Balance Sheet: Lone Pine Cafe A - Part I
Lecture 10 - Preparation of Balance Sheet: Lone Pine Cafe A - Part II
Lecture 11 - Preparation of Income Statement: Lone Pine Cafe B
Lecture 12 - Cash Flow Statement: Concept and Example (Direct Method) - Lone Pine Cafe
Lecture 13 - Classification of Balance Sheet Items: Maynard Company A
Lecture 14 - Preparation of Income Statement: Maynard Company B
Lecture 15 - Preparation of Cash Flow Statement: Lone Pine Cafe (Indirect Method)
Lecture 16 - Preparation of Cash Flow Statement: Lori Crump (Indirect Method)
Lecture 17 - Preparation of cash flow statement: An example (Direct Method)
Lecture 18 - Preparation of cash flow statement: An example (Indirect Method)
Lecture 19 - Ratio Analysis - Part I - Analysis of financial statements
Lecture 20 - Ratio Analysis - Part II - Profitability Ratios
Lecture 21 - Ratio Analysis - Part III - Dividend and Liquidity Ratios
Lecture 22 - Ratio Analysis - Part IV - Efficiency Ratios
Lecture 23 - Cost, Costing and Cost Accounting
Lecture 24 - Classification of Costs
Lecture 25 - Preparation of Cost Sheet - Part I
Lecture 26 - Preparation of Cost Sheet - Part II
Lecture 27 - Allocation and Apportionment of Cost
Lecture 28 - Primary and Secondary Distribution of Overhead
Lecture 29 - Activity Based Costing - Part I

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Lecture 30 - Activity Based Costing - Part II
Lecture 31 - Break-Even Analysis
Lecture 32 - Decision Making using Cost Accounting Informations - Examples - Part I
Lecture 33 - Decision Making using Cost Accounting Informations - Examples - Part II
Lecture 34 - Decision Making using Cost Accounting Informations - Examples - Part III
Lecture 35 - Decision Making using Cost Accounting Informations - Examples - Part IV
Lecture 36 - Decision Making using Cost Accounting Informations - Examples - Part V
Lecture 37 - Introduction to Budgeting: Preparation of Budgets - Part I
Lecture 38 - Introduction to Budgeting: Preparation of Budgets - Part II
Lecture 39 - Introduction to Budgeting: Preparation of Budgets - Part III
Lecture 40 - Flexible Budget and Variance Analysis
Lecture 41 - Foundations of Corporate Finance - Part I
Lecture 42 - Foundations of Corporate Finance - Part II
Lecture 43 - Time Value of Money: Present Value and Future Value in Single and Multiperiod case
Lecture 44 - Simplification of Cash Flows: Annuity, Growing Annuity, Perpetuity and Growing Perpetuity
Lecture 45 - Bond Valuation - Part I
Lecture 46 - Bond Valuation - Part II
Lecture 47 - Stock Valuation
Lecture 48 - Numericals on Bond and Stock Valuation
Lecture 49 - Technique of Evaluating Capital Investment Decisions
Lecture 50 - Numericals on Technique of Evaluating Capital Investment Decisions
Lecture 51 - Risk and Return - Part I
Lecture 52 - Risk and Return - Part II
Lecture 53 - Risk and Return: Individual Securities
Lecture 54 - Risk and Return: Portfolio
Lecture 55 - Cost of Capital and Valuation - Part I
Lecture 56 - Cost of Capital and Valuation - Part II
Lecture 57 - Valuation and Capital Structure
Lecture 58 - Dividend and Other Payouts

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NPTEL Video Course - Management - NOC:Strategic Sourcing

Subject Co-ordinator - Prof. Arshinder Kaur

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of Sourcing and changing paradigms
Lecture 2 - Changing Expectations leading to Supply Management and Strategic Sourcing
Lecture 3 - Supply Chains and Supply Networks
Lecture 4 - Return on Assets
Lecture 5 - Strategic sourcing and Organisation's Strategy Importance of supply management
Lecture 6 - Procure to Pay cycle
Lecture 7 - Recognition of need
Lecture 8 - Purchasing and supply process - 1
Lecture 9 - Purchasing and supply process - 2
Lecture 10 - Need identification and types - 1
Lecture 11 - Need identification and types - 2
Lecture 12 - Indirect contributions of Supply
Lecture 13 - Aligning supply objectives with organisation's strategy
Lecture 14 - Procurement in Organizations - 1
Lecture 15 - Procurement in Organizations - 2
Lecture 16 - Developing supply strategy - 1
Lecture 17 - Developing Sourcing/Supply strategy - 1
Lecture 18 - Developing Sourcing/Supply strategy - 2
Lecture 19 - Technology in Sourcing
Lecture 20 - Reverse Auctions
Lecture 21 - Success stories about technologies in Sourcing
Lecture 22 - Strategic cost management - 1
Lecture 23 - Strategic cost management - 2
Lecture 24 - Strategic cost management - Cost analysis
Lecture 25 - Sustainability in Supply management - 1
Lecture 26 - Sustainability in Supply management - 2
Lecture 27 - Science Based Targets
Lecture 28 - Negotiation supply management
Lecture 29 - Planning for negotiation

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Lecture 30 - Negotiation strategy
Lecture 31 - Negotiation strategy (Continued...)
Lecture 32 - Supply Contracts
Lecture 33 - Types of supply contracts - 1
Lecture 34 - Types of supply contracts - 2
Lecture 35 - Supplier selection and evaluation - 1
Lecture 36 - Supplier selection and evaluation - 2
Lecture 37 - Supplier selection and evaluation - 3
Lecture 38 - Outsourcing decisions - 1
Lecture 39 - Outsourcing decisions - 2
Lecture 40 - TOPSIS
Lecture 41 - Goal Programming
Lecture 42 - Interpretive structural model - 1
Lecture 43 - Interpretive structural model - 2
Lecture 44 - Supply risk management
Lecture 45 - Risk management framework
Lecture 46 - Supply risk examples
Lecture 47 - Assessment of risk
Lecture 48 - Risk metrics

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NPTEL Video Course - Management - NOC:Fundamentals of Cost Accounting

Subject Co-ordinator - Prof. Arindam Banerjee

Co-ordinating Institute - The Institute of Cost Accountants of India (ICMAI)

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cost Accounting - Part I
Lecture 2 - Introduction to Cost Accounting - Part II
Lecture 3 - Material Cost - Part I
Lecture 4 - Material Cost - Part II
Lecture 5 - Labour Cost - Part I
Lecture 6 - Labour Cost - Part II
Lecture 7 - Overhead - Part I
Lecture 8 - Overhead - Part II
Lecture 9 - Cost Sheet - Part I
Lecture 10 - Cost Sheet - Part II
Lecture 11 - Job Costing - Part I
Lecture 12 - Job Costing - Part II
Lecture 13 - Service / Operating Costing - Part I
Lecture 14 - Service / Operating Costing - Part II
Lecture 15 - Contract Costing - Part I
Lecture 16 - Contract Costing - Part II
Lecture 17 - Process Costing - Part I
Lecture 18 - Process Costing - Part II
Lecture 19 - Cost Volume Profit Analysis - Part I
Lecture 20 - Cost Volume Profit Analysis - Part II
Lecture 21 - Cost Volume Profit Analysis - Part III
Lecture 22 - Cost Volume Profit Analysis - Part IV
Lecture 23 - Decision Making - Part I
Lecture 24 - Decision Making - Part II
Lecture 25 - Decision Making - Part III
Lecture 26 - Decision Making - Part IV
Lecture 27 - Decision Making - Part V
Lecture 28 - Budgetary Control - Part I
Lecture 29 - Budgetary Control - Part II

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Lecture 30 - Budgetary Control - Part III
Lecture 31 - Budgetary control - Part IV
Lecture 32 - Budgetary control - Part V
Lecture 33 - Budgetary control - Part VI
Lecture 34 - Standard Costing - Part I
Lecture 35 - Variance Analysis - Part I
Lecture 36 - Variance Analysis - Part II
Lecture 37 - Variance Analysis - Part III
Lecture 38 - Variance Analysis - Part IV
Lecture 39 - Variance Analysis - Part V
Lecture 40 - Interaction with CFO

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NPTEL Video Course - Management - NOC:Introduction to GST

Subject Co-ordinator - Prof. Anil Sharma

Co-ordinating Institute - The Institute of Cost Accountants of India (ICMAI)

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of GST and difference between Direct tax and Indirect tax - Part 1
Lecture 2 - Concept of GST and difference between Direct tax and Indirect tax - Part 2
Lecture 3 - Concept of GST and difference between Direct tax and Indirect tax - Part 3
Lecture 4 - Concept of GST and difference between Direct tax and Indirect tax - Part 4
Lecture 5 - Registration - Part 1
Lecture 6 - Registration - Part 2
Lecture 7 - Registration - Part 3
Lecture 8 - Registration - Part 4
Lecture 9 - Place of Supply - Part 1
Lecture 10 - Place of Supply - Part 2
Lecture 11 - Place of Supply - Part 3
Lecture 12 - Place of Supply - Part 4
Lecture 13 - Place of Supply - Part 5
Lecture 14 - Value of Supply - Part 1
Lecture 15 - Value of Supply - Part 2
Lecture 16 - Value of Supply - Part 3
Lecture 17 - Value of Supply - Part 4
Lecture 18 - Value of Supply - Part 5
Lecture 19 - Input Tax Credit 1 - Part 1
Lecture 20 - Input Tax Credit 1 - Part 2
Lecture 21 - Input Tax Credit 1 - Part 3
Lecture 22 - Input Tax Credit 1 - Part 4
Lecture 23 - Input Tax Credit 1 - Part 5
Lecture 24 - Input Tax Credit 2 - Part 1
Lecture 25 - Input Tax Credit 2 - Part 2
Lecture 26 - Payment of Taxes - Part 1
Lecture 27 - Payment of Taxes - Part 2
Lecture 28 - Returns - Part 1
Lecture 29 - Returns - Part 2

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Lecture 30 - Returns - Part 3
Lecture 31 - Returns - Part 4
Lecture 32 - Overview of GST portal - Part 1
Lecture 33 - Overview of GST portal - Part 2
Lecture 34 - Overview of GST portal - Part 3
Lecture 35 - Overview of GST portal - Part 4
Lecture 36 - Overview of GST portal - Part 5

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NPTEL Video Course - Management - NOC:Research for Marketing Decisions

Subject Co-ordinator - Prof. Vaibhav Chawla

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Market and Marketing?
Lecture 2 - Research, Marketing Research and its Types
Lecture 3 - Introduction to Marketing Research Process
Lecture 4 - Step #1 Problem Definition Discussion with Decision Maker
Lecture 5 - Step #1 Problem Definition Problem Audit, Interview with Experts, Qualitative Research
Lecture 6 - Step #1 Problem Definition Marketing Research Problem and an Example
Lecture 7 - Step #2 Developing an approach to the problem Understanding a Theory
Lecture 8 - Step #2 Developing an approach to the problem Components of an approach
Lecture 9 - Step #2 Developing an approach to the problem Examples
Lecture 10 - Case Studies for Problem Definition Process
Lecture 11 - Research Design: An Introduction
Lecture 12 - Exploratory and Descriptive Research Design: An Introduction
Lecture 13 - Exploratory Research Techniques: Secondary Data and Thematic Analysis
Lecture 14 - Exploratory Research Techniques: Secondary Data and Qualitative Research - Focus Group Discussio
Lecture 15 - Exploratory Research Techniques: Focus Group Discussion Videos
Lecture 16 - Exploratory Research Techniques: Depth Interviews
Lecture 17 - Exploratory Research Techniques: Projective Techniques
Lecture 18 - Descriptive Research Techniques
Lecture 19 - Causal Research Design: Experiments and Confounding Variables
Lecture 20 - Causal Research Design: Experiments and Related Terminologies
Lecture 21 - Causal Research Design: Experiments and its Types
Lecture 22 - Measurement and Scaling: Levels of Measurement
Lecture 23 - Measurement and Scaling: Comparative and Non Comparative Scaling
Lecture 24 - Measurement and Scaling: Non Comparative Scaling - Likert Item Scales
Lecture 25 - Measurement and Scaling: Semantic Differential Scale and Other Scale Decisions
Lecture 26 - Measurement and Scaling: Multi item Scales
Lecture 27 - Measurement and Scaling: Multi item Scales, Conceptual and Operational Definitions
Lecture 28 - Questionnaire Design: Initial Steps 1 to 5
Lecture 29 - Questionnaire Design: Steps 6 onwards and Other Issues

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Lecture 30 - Questionnaire Design: Framing Common Demographic and Screener Questions
Lecture 31 - Data Analysis using SPSS: Entering the Data
Lecture 32 - Data Analysis using SPSS: Data Cleaning and Descriptive Statistics
Lecture 33 - Data Analysis using SPSS: Charts, Outliers, and Descriptive Statistics
Lecture 34 - Data Analysis using SPSS: Cross Tabs
Lecture 35 - Data Analysis using SPSS: Hypothesis Testing for Association
Lecture 36 - Data Analysis using SPSS: Hypothesis Testing for Differences in Means P value, Sampling Distribu
Lecture 37 - Data Analysis using SPSS: Hypothesis Testing for Differences in Means (Independent Sample T test
Lecture 38 - Analysis using SPSS: Hypothesis Testing for Differences in Means Paired Sample T test, One way A

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NPTEL Video Course - Management - NOC:Public Organization and Management

Subject Co-ordinator - Prof. Vaneet Kashyap

Co-ordinating Institute - IIT - Thirupati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Foundations of Public Management - I
Lecture 2 - Foundations of Public Management - II
Lecture 3 - Foundations of Public Management - III
Lecture 4 - Foundations of Public Management - IV
Lecture 5 - Foundations of Public Management - V
Lecture 6 - Approaches to the field of Management - I
Lecture 7 - Approaches to the field of Management - II
Lecture 8 - Approaches to the field of Management - III
Lecture 9 - Approaches to the field of Management - IV
Lecture 10 - Approaches to the field of Management - V
Lecture 11 - Environment of Public organizations - I
Lecture 12 - Environment of Public organizations - II
Lecture 13 - Environment of Public organizations - III
Lecture 14 - Environment of Public organizations - IV
Lecture 15 - Environment of Public organizations - V
Lecture 16 - Accountability and Control - I
Lecture 17 - Accountability and Control - II
Lecture 18 - Accountability and Control - III
Lecture 19 - Accountability and Control - IV
Lecture 20 - Accountability and Control - V
Lecture 21 - Goals, effectiveness and Performance - I
Lecture 22 - Goals, effectiveness and Performance - II
Lecture 23 - Goals, effectiveness and Performance - III
Lecture 24 - Goals, effectiveness and Performance - IV
Lecture 25 - Goals, effectiveness and Performance - V
Lecture 26 - Structure of Public organizations - I
Lecture 27 - Structure of Public organizations - II
Lecture 28 - Structure of Public organizations - III
Lecture 29 - Structure of Public organizations - IV

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Lecture 30 - Structure of Public organizations - V
Lecture 31 - Management of people in public organizations - I
Lecture 32 - Management of people in public organizations - II
Lecture 33 - Management of people in public organizations - III
Lecture 34 - Management of people in public organizations - IV
Lecture 35 - Management of people in public organizations - V
Lecture 36 - Public Service Motivation - I
Lecture 37 - Public Service Motivation - II
Lecture 38 - Public Service Motivation - III
Lecture 39 - Public Service Motivation - IV
Lecture 40 - Public Service Motivation - V
Lecture 41 - Effective Leadership in Public Organizations - I
Lecture 42 - Effective Leadership in Public Organizations - II
Lecture 43 - Effective Leadership in Public Organizations - III
Lecture 44 - Effective Leadership in Public Organizations - IV
Lecture 45 - Effective Leadership in Public Organizations - V
Lecture 46 - Administrative reforms and organizational change in pubilc organizations - I
Lecture 47 - Administrative reforms and organizational change in pubilc organizations - II
Lecture 48 - Administrative reforms and organizational change in pubilc organizations - III
Lecture 49 - Administrative reforms and organizational change in pubilc organizations - IV
Lecture 50 - Administrative reforms and organizational change in pubilc organizations - V
Lecture 51 - Public Management through Collaboration - I
Lecture 52 - Public Management through Collaboration - II
Lecture 53 - Public Management through Collaboration - III
Lecture 54 - Public Management through Collaboration - IV
Lecture 55 - Public Management through Collaboration - V
Lecture 56 - Innovation in Public Sector Organization - I
Lecture 57 - Innovation in Public Sector Organization - II
Lecture 58 - Innovation in Public Sector Organization - III
Lecture 59 - Innovation in Public Sector Organization - IV
Lecture 60 - Innovation in Public Sector Organization - V

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NPTEL Video Course - Management - Research for Marketing Decisions

Subject Co-ordinator - Prof. Vaibhav Chawla

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Market and Marketing ?
Lecture 2 - Research, Marketing Research and its Types
Lecture 3 - Introduction to Marketing Research Process
Lecture 4 - Step #1 - Problem Definition: Discussion with Decision Maker
Lecture 5 - Problem Defn: Problem Audit, Interview with Experts, Qualitative Research, and Secondary Data Ana
Lecture 6 - Step #1 - Problem Definition: Marketing Research Problem and an Example
Lecture 7 - Step #2 - Developing an approach to the problem: Understanding a Theory
Lecture 8 - Step #2 - Developing an approach to the problem: Components of an approach
Lecture 9 - Step #2 - Developing an approach to the problem: Examples
Lecture 10 - Case Studies for Problem Definition Process
Lecture 11 - Research Design: An Introduction
Lecture 12 - Exploratory and Descriptive Research Design: An Introduction
Lecture 13 - Exploratory Research Techniques: Secondary Data and Thematic Analysis
Lecture 14 - Exploratory Research Techniques: Secondary Data and Qualitative Research - Focus Group Discussio
Lecture 15 - Exploratory Research Techniques: Focus Group Discussion Videos
Lecture 16 - Exploratory Research Techniques: Depth Interviews
Lecture 17 - Exploratory Research Techniques: Projective Techniques
Lecture 18 - Descriptive Research Techniques
Lecture 19 - Causal Research Design: Experiments and Confounding Variables
Lecture 20 - Causal Research Design: Experiments and Related Terminologies
Lecture 21 - Causal Research Design: Experiments and its Types
Lecture 22 - Measurement and Scaling: Levels of Measurement
Lecture 23 - Measurement and Scaling: Comparative and Non-Comparative Scaling
Lecture 24 - Measurement and Scaling: Non-Comparative Scaling - Likert-Item Scales
Lecture 25 - Measurement and Scaling: Semantic Differential Scale and Other Scale Decisions
Lecture 26 - Measurement and Scaling: Multi-item Scales
Lecture 27 - Measurement and Scaling: Multi-item Scales, Conceptual and Operational Definitions
Lecture 28 - Questionnaire Design: Initial Steps (1 to 5)
Lecture 29 - Questionnaire Design: Steps 6 onwards and Other Issues

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Lecture 30 - Questionnaire Design: Framing Common Demographic and Screener Questions
Lecture 31 - Data Analysis using SPSS: Entering the Data
Lecture 32 - Data Analysis using SPSS: Data Cleaning and Descriptive Statistics
Lecture 33 - Data Analysis using SPSS: Charts, Outliers, and Descriptive Statistics
Lecture 34 - Data Analysis using SPSS: Cross-Tabs
Lecture 35 - Data Analysis using SPSS: Hypothesis Testing for Association
Lecture 36 - SPSS:Hypothesis Testing for Differences in Means (P-value, Sampling Distribution, One-sample t-t
Lecture 37 - Data Analysis using SPSS: Hypothesis Testing for Differences in Means (Independent Sample T-test
Lecture 38 - Analysis using SPSS: Hypothesis Testing for Differences in Means (Paired Sample T-test,One-way A

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NPTEL Video Course - Management - NOC:Financial Statement Analysis and Reporting

Subject Co-ordinator - Prof. Anil K. Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Accounting Process
Lecture 3 - Accounting Concepts
Lecture 4 - Trial Balance and its Relevance
Lecture 5 - Relevant Accounting Statements
Lecture 6 - Journal (Part-I) - The first and original book of accounting
Lecture 7 - Journal (Part-II) - The first and original book of accounting
Lecture 8 - Ledger-The second book of accounts
Lecture 9 - Financial Statements
Lecture 10 - Financial Statements - Income Statement
Lecture 11 - Financial Statements - Balance Sheet
Lecture 12 - Financial Statements with Adjustments (Part-1)
Lecture 13 - Financial Statements with Adjustments (Part-2)
Lecture 14 - Financial Statements with Adjustments (Part-3)
Lecture 15 - Financial Statements with Adjustments (Part-4)
Lecture 16 - Financial Statements with Adjustments (Part-5)
Lecture 17 - Financial Statements with Adjustments (Part-6)
Lecture 18 - Financial Statements with Adjustments (Part-7)
Lecture 19 - Financial Statements with Adjustments (Part-8)
Lecture 20 - Financial Statements with Adjustments (Part-9)
Lecture 21 - Financial Statements with Adjustments (Part-10)
Lecture 22 - Financial Statements with Adjustments (Part-11)
Lecture 23 - Financial Statements with Adjustments (Part-12)
Lecture 24 - Financial Statements with Adjustments (Part-13)
Lecture 25 - Corporate Financial Statements (Part-1)
Lecture 26 - Corporate Financial Statements (Part-2)
Lecture 27 - Corporate Financial Statements (Part-3)
Lecture 28 - Corporate Financial Statements (Part-4)
Lecture 29 - Corporate Financial Statements (Part-5)

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Lecture 30 - Corporate Financial Statements (Part-6)
Lecture 31 - Corporate Financial Statements (Part-7)
Lecture 32 - Corporate Financial Statements (Part-8)
Lecture 33 - Corporate Financial Statements (Part-9)
Lecture 34 - Financial Statement Analysis
Lecture 35 - Ratio Analysis (Part-1)
Lecture 36 - Ratio Analysis (Part-2)
Lecture 37 - Ratio Analysis (Part-3)
Lecture 38 - Different Sets of Ratios (Part-1)
Lecture 39 - Different Sets of Ratios (Part-2)
Lecture 40 - Ratio Analysis - A case of Grasim Industries (Part-1)
Lecture 41 - Ratio Analysis - A case of Grasim Industries (Part-2)
Lecture 42 - Liquidity Ratios - Grasim Industries (Part-1)
Lecture 43 - Liquidity Ratios - Grasim Industries (Part-2)
Lecture 44 - Liquidity Ratios - Grasim Industries (Part-3)
Lecture 45 - Profitability Ratios- Grasim Industries (Part-1)
Lecture 46 - Profitability Ratios- Grasim Industries (Part-2)
Lecture 47 - Profitability Ratios- Grasim Industries (Part-3)
Lecture 48 - DuPont Ratios (Part-1)
Lecture 49 - DuPont Ratios (Part-2)
Lecture 50 - Valuation or Capital Market Ratios (Part-1)
Lecture 51 - Valuation or Capital Market Ratios (Part-2)
Lecture 52 - Cash Flow Statement - Introduction (Part-1)
Lecture 53 - Cash Flow Statement (Part-2)
Lecture 54 - Preparation of Cash Flow Statement- Basic Cash Flow Statement
Lecture 55 - Cash Flow Statement - Further Analysis (Part-1)
Lecture 56 - Cash Flow Statement - Further Analysis (Part-2)
Lecture 57 - Final Cash Flow Statement (Part-1)
Lecture 58 - Final Cash Flow Statement (Part-2)
Lecture 59 - Financial Reporting (Part-1)
Lecture 60 - Financial Reporting (Part-2)

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NPTEL Video Course - Management - NOC:Supply Chain Analytics

Subject Co-ordinator - Prof. Rajat Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Supply Chain Management
Lecture 2 - Evolution of Supply Chain Management
Lecture 3 - Analytics in Supply Chain Management
Lecture 4 - Supply Chain Planning
Lecture 5 - Different views of Supply Chain
Lecture 6 - Supply Chain Strategy
Lecture 7 - Supply Chain Drivers
Lecture 8 - Developing Supply Chain Strategy
Lecture 9 - Strategic Fit in Supply Chain
Lecture 10 - Demand Forecasting in Supply Chain
Lecture 11 - Bullwhip Effect and Time Series Analysis
Lecture 12 - Exponential Smoothing Method of Forecasting
Lecture 13 - Measures of Forecasting Errors
Lecture 14 - Tracking Signal and Seasonality Models
Lecture 15 - Forecasting using multiple characteristics in Demand Data and Inventory Management in Supply Cha
Lecture 16 - Inventory Management in Supply Chain
Lecture 17 - Multi echelon Inventory Management
Lecture 18 - Multi echelon Inventory Management (Continued...)
Lecture 19 - Multi echelon Inventory Management for four stations
Lecture 20 - Multi echelon Inventory Management for four stations (Numerical Example)
Lecture 21 - Multi echelon Inventory Management for four stations (Numerical Example) (Continued...)
Lecture 22 - Network Design in Supply Chain
Lecture 23 - Network Design of Global Supply Chain
Lecture 24 - Alternative channels of Distribution
Lecture 25 - Location Decisions in Supply Chain
Lecture 26 - Network Optimization Models
Lecture 27 - Using Excel Solver for Network Optimization
Lecture 28 - Uncertainty in Network Design
Lecture 29 - Network Design in Uncertain Environment and Flexibility

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Lecture 30 - Flexibility in Supply Chain
Lecture 31 - Optimal Level of Product Availability in Supply chain
Lecture 32 - Time Value of money in Supply Chain
Lecture 33 - Different types of Analytics in Supply Chain
Lecture 34 - Predictive Modelling in Forecasting in Supply Chain
Lecture 35 - Representation on Uncertainty in Supply Chain
Lecture 36 - Using Decision Tree for handling Uncertainty
Lecture 37 - Example of using Decision Tree incorporating Uncertainty in Single Factor
Lecture 38 - Example of using Decision Tree incorporating Uncertainty in two Key Factors
Lecture 39 - Modelling Flexibility in Supply Chain
Lecture 40 - Trends, Challenges and Future of Supply Chain

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NPTEL Video Course - Management - NOC:Marketing Research and Analysis

Subject Co-ordinator - Prof. Jogendra Kumar Nayak

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Marketing Research
Lecture 2 - Defining Research Problem
Lecture 3 - Developing Research Approach and Developing Research Design: Non-Conclusive
Lecture 4 - Research Design: Conclusive
Lecture 5 - Qualitative Research: Nature and Approaches
Lecture 6 - Qualitative Research: Depth Interview, Focus Group Discussion
Lecture 7 - Projective Technique, Case Study
Lecture 8 - Case Study, Descriptive Research Design and Research Errors
Lecture 9 - Primary and Secondary Data, Research Error
Lecture 10 - Measurement and Scaling: Comparative and Non-comparative Scaling
Lecture 11 - Scale Development Process
Lecture 12 - Questionnaire and Form Design
Lecture 13 - Causal Research and Types
Lecture 14 - Experimental Design and Sampling
Lecture 15 - Sampling Design and Procedure
Lecture 16 - Sampling and Sample Size Determination
Lecture 17 - Hypothesis Development: Null and Alternate, Type I and Type II Errors
Lecture 18 - Data Preparation
Lecture 19 - Hypothesis Testing: T-Test, Z-Test
Lecture 20 - T, Z and F Test
Lecture 21 - Hypothesis Testing: Anova and Manova
Lecture 22 - Cross Tabulation and Chi Square Test
Lecture 23 - Correlation and Regression
Lecture 24 - Regression
Lecture 25 - Factor Analysis
Lecture 26 - Factor Analysis
Lecture 27 - SEM and CFA - 1
Lecture 28 - SEM and CFA - 2
Lecture 29 - SEM and CFA - 3

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Lecture 30 - Cluster Analysis - I
Lecture 31 - Cluster Analysis - II
Lecture 32 - Discriminant Analysis
Lecture 33 - Discriminant Analysis - 1
Lecture 34 - Researching Rural Market
Lecture 35 - International Marketing Research
Lecture 36 - Ethics in Marketing Research
Lecture 37 - Ethics in Marketing Research - 1
Lecture 38 - Report Preparation and Presentation
Lecture 39 - Multi Dimentional Scaling
Lecture 40 - Conjoint Analysis
Lecture 41 - Introduction to Text Analysis
Lecture 42 - Text Analysis Process
Lecture 43 - Importance and Application of Text Analysis
Lecture 44 - Tools and Techniques of Text Analysis
Lecture 45 - Text Preprocessing and Text Representation
Lecture 46 - Text Representation (Continued...)
Lecture 47 - Hands-on â Methodology for Analyzing YouTube Comments on Sustainable Development Goals
Lecture 48 - Data Preprocessing and Cleaning with Python
Lecture 49 - Data Preprocessing and Cleaning with Python (Continued...)
Lecture 50 - Sentiment Analysis
Lecture 51 - Introduction to NRC Lexicon
Lecture 52 - Application of NRC Lexicon using Python
Lecture 53 - Sentiment Analysis: Machine Learning and Deep Learning Algorithms
Lecture 54 - Introduction to Topic Modeling
Lecture 55 - Topic Modeling Techniques
Lecture 56 - Hands-on Exercise: Topic Modeling using LDA
Lecture 57 - Hands-on Exercise: Topic Modeling using NMF
Lecture 58 - Part of Speech Tagging and Named Entity Recognition
Lecture 59 - Hands-on Exercise: Named Entity Recognition
Lecture 60 - Hands-on Exercise: Part of Speech Tagging

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NPTEL Video Course - Management - NOC:Project Management for Managers

Subject Co-ordinator - S. K. Gupta, Prof. Mukesh Kumar Barua

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Project Management
Lecture 2 - Project Success
Lecture 3 - Types of Structure Organizations
Lecture 4 - Project Management Office
Lecture 5 - Stakeholders Management
Lecture 6 - Types of Projects and Project Life Cycle
Lecture 7 - Project Life Cycle Phases and Project Appraisal
Lecture 8 - Methods of Project Selection - I
Lecture 9 - Methods of Project Selection - II
Lecture 10 - Methods of Project Selection - MCDM-I
Lecture 11 - Methods of Project Selection - MCDM-II
Lecture 12 - Methods of Project Selection - MCDM-III
Lecture 13 - Market and Demand Analysis - I
Lecture 14 - Market and Demand Analysis - II
Lecture 15 - Financial Analysis
Lecture 16 - Capital Budgeting Techniques - I
Lecture 17 - Capital Budgeting Techniques - II
Lecture 18 - Financing of Projects
Lecture 19 - Risk Management - I
Lecture 20 - Risk Management - II
Lecture 21 - Risk Management (Control and Documentation)
Lecture 22 - Stand Alone Risk Analysis - I
Lecture 23 - Stand Alone Risk Analysis - II
Lecture 24 - Hillier Model
Lecture 25 - Simulation Analysis
Lecture 26 - Decision Tree Analysis - I
Lecture 27 - Decision Tree Analysis - II
Lecture 28 - Abandonment Analysis
Lecture 29 - Technical Analysis

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Lecture 30 - Product Mix and Plant Capacity Analysis
Lecture 31 - Project Team Building, Conflict and Negotiation
Lecture 32 - HRM Issues and time Management
Lecture 33 - Project Time Management - Introduction
Lecture 34 - Project Time Management - Project Scheduling
Lecture 35 - Project time Management - Numbering of Nodes
Lecture 36 - Project Time Management - PERT Networks
Lecture 37 - Project Time Management - CPM
Lecture 38 - Project Time Management - Laddering in PERT/CPM
Lecture 39 - Probability Models in Networks - I
Lecture 40 - Probability Models in Networks - II
Lecture 41 - Probability Models in Networks - III
Lecture 42 - Probability Models in Networks - IV
Lecture 43 - Simulation of Networks - I
Lecture 44 - Simulation of Networks - II
Lecture 45 - Slacks and Floats - I
Lecture 46 - Slacks and Floats - II
Lecture 47 - Time and Cost Relationship
Lecture 48 - Crashing of Networks - I
Lecture 49 - Crashing of Networks - II
Lecture 50 - Crashing of Networks - III (Free Float Method)
Lecture 51 - Crashing of Networks - IV
Lecture 52 - Introduction to Project Cost Management
Lecture 53 - Cost Control (Tools and Techniques)
Lecture 54 - Cost Estimation
Lecture 55 - Introduction to Quality Management
Lecture 56 - Cost of Quality
Lecture 57 - Quality Management (Source of variability and Six Sigma)
Lecture 58 - Quality Management (Six Sigma Tools)
Lecture 59 - Procurement Management- I
Lecture 60 - Procurement Management- II and Project Termination

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NPTEL Video Course - Management - NOC:Business Analytics and Data Mining Modeling using R

Subject Co-ordinator - Dr. Gaurav Dixit

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Data Mining Process
Lecture 3 - Introduction To R
Lecture 4 - Basic Statistics
Lecture 5 - Basic Statistics - Part 2
Lecture 6 - Partitioning Process
Lecture 7 - Visualization Techniques
Lecture 8 - Visualization Techniques - Part 2
Lecture 9 - Visualization Techniques - Part 3
Lecture 10 - Visualization Techniques - Part 4
Lecture 11 - Visualization Techniques - Part 5
Lecture 12 - Visualization Techniques - Part 6
Lecture 13 - Dimension Reduction Techniques
Lecture 14 - Dimension Reduction Techniques - Part 2
Lecture 15 - Dimension Reduction Techniques - Part 3
Lecture 16 - Performance Metrics
Lecture 17 - Performance Metrics - Part 2
Lecture 18 - Performance Metrics - Part 3
Lecture 19 - Performance Metrics - Part 4
Lecture 20 - Performance Metrics - Part 5
Lecture 21 - Prediction Performance
Lecture 22 - Multiple Linear Regression
Lecture 23 - Multiple Linear Regression - Part 2
Lecture 24 - Multiple Linear Regression - Part 3
Lecture 25 - Multiple Linear Regression - Part 4
Lecture 26 - Multiple Linear Regression - Part 5
Lecture 27 - Multiple Linear Regression - Part 6
Lecture 28 - Machine Learning Technique K-Nn
Lecture 29 - Machine Learning Technique K-Nn - Part 2

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Lecture 30 - Machine Learning Technique K-Nn - Part 3
Lecture 31 - Naive Bayes
Lecture 32 - Naive Bayes - Part 2
Lecture 33 - Naive Bayes - Part 3
Lecture 34 - Naive Bayes - Part 4
Lecture 35 - Naive Bayes - Part 5
Lecture 36 - Classification And Regression Trees
Lecture 37 - Classification And Regression Trees - Part 2
Lecture 38 - Classification And Regression Trees - Part 3
Lecture 39 - Classification And Regression Trees - Part 4
Lecture 40 - Classification And Regression Trees - Part 5
Lecture 41 - Classification And Regression Trees - Part 6
Lecture 42 - Pruning Process
Lecture 43 - Pruning Process - Part 2
Lecture 44 - Pruning Process - Part 3
Lecture 45 - Regression Trees
Lecture 46 - Logistic Regression
Lecture 47 - Logistic Regression - Part 2
Lecture 48 - Logistic Regression - Part 3
Lecture 49 - Logistic Regression - Part 4
Lecture 50 - Logistic Regression - Part 5
Lecture 51 - Logistic Regression - Part 6
Lecture 52 - Logistic Regression - Part 7
Lecture 53 - Artificial Neural Networks
Lecture 54 - Artificial Neural Network - Part 2
Lecture 55 - Artificial Neural Network - Part 3
Lecture 56 - Artificial Neural Network - Part 4
Lecture 57 - Artificial Neural Network - Part 5
Lecture 58 - Artificial Neural Network - Part 6
Lecture 59 - Discriminant Analysis
Lecture 60 - Discriminant Analysis - Part 2

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NPTEL Video Course - Management - NOC:Working Capital Management

Subject Co-ordinator - Prof. Anil K. Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Nature of the Working Capital Management
Lecture 4 - Approaches of Working Capital Management - I
Lecture 5 - Approaches of Working Capital Management - II
Lecture 6 - Trade off between Profitability and Risk - I
Lecture 7 - Trade off between Profitability and Risk - II
Lecture 8 - Working Capital Management in Indian Business - I
Lecture 9 - Working Capital Management in Indian Business - II
Lecture 10 - Operating Cycle
Lecture 11 - Weighted Operating Cycle
Lecture 12 - Working Capital Requirement Assessment - I
Lecture 13 - Working Capital Requirement Assessment - II
Lecture 14 - Assessing Working Capital Requirements - Problem 2 and 5
Lecture 15 - Working Capital Requirement- The Conclusion
Lecture 16 - Working Capital Leverage
Lecture 17 - Risk and Cost of Holding Inventory
Lecture 18 - Inventory Costs
Lecture 19 - Inventory Behaviour
Lecture 20 - Inventory Management - Methods and Strategies
Lecture 21 - EOQ Technique of Inventory Management
Lecture 22 - Stockouts cause Walkouts
Lecture 23 - Rationing of Working Capital - I
Lecture 24 - Rationing of Working Capital - II
Lecture 25 - Different Modes of Bank Finance
Lecture 26 - Incremental Inventory - I
Lecture 27 - Incremental Inventory - II
Lecture 28 - Management of Accounts Receivables - I
Lecture 29 - Management of Accounts Receivables - II

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Lecture 30 - Management of Accounts Receivables - III
Lecture 31 - Motives of Credit Sale - I
Lecture 32 - Motives of Credit Sale - II
Lecture 33 - Limitations of Credit Time Period
Lecture 34 - Written Credit Policy - I
Lecture 35 - Written Credit Policy - II
Lecture 36 - Goals and Functions of Accounts Receivables Management
Lecture 37 - Valuation of Receivables at Cost or Sales Value
Lecture 38 - Credit Policy Changes - I
Lecture 39 - Credit Policy Changes - II
Lecture 40 - Credit Policy Changes - III
Lecture 41 - Optimum Credit Policy
Lecture 42 - Credit Risk Analysis - I
Lecture 43 - Credit Risk Analysis - II
Lecture 44 - Credit Risk Analysis - III
Lecture 45 - Credit Policy Variables
Lecture 46 - Cash Management
Lecture 47 - Cash Flow Presentation
Lecture 48 - Models of Cash Management- Certainty Model by Baumol
Lecture 49 - Certainty Model by Baumol Continued
Lecture 50 - Uncertainty Model by Miller and Orr
Lecture 51 - Miller and Orr (Continued...) and Cash Management Techniques
Lecture 52 - Measures of Liquidity
Lecture 53 - Window Dressing and Management of Current Liabilities
Lecture 54 - Management of Accounts Payable
Lecture 55 - Cost of Stretching Accounts Payable - I
Lecture 56 - Cost of Stretching Accounts Payable - II
Lecture 57 - Other Accruals and Overtrading
Lecture 58 - Bank Finance - Introduction
Lecture 59 - Recommendations of Tondon and Chore Committees
Lecture 60 - Deciding a Suitable Mix

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NPTEL Video Course - Management - NOC:Innovation, Business Models and Entrepreneurship

Subject Co-ordinator - Prof. Vinay Sharma, Prof. Rajat Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Analizing the Current Bussiness Scenario
Lecture 2 - Innovation and Creativity - An Introduction
Lecture 3 - Innovation in Current Environment
Lecture 4 - Types of Innovation
Lecture 5 - School of Innovation
Lecture 6 - Challenges of Innovation
Lecture 7 - Steps of Innovation Management
Lecture 8 - Idea Management System
Lecture 9 - Divergent v/s Convergent Thinking
Lecture 10 - Design Thinking and Entrepreneurship
Lecture 11 - Experimentation in Innovation Management
Lecture 12 - Idea Championship
Lecture 13 - Participation for Innovation
Lecture 14 - Co-creation for Innovation
Lecture 15 - Prototyping to Incubation
Lecture 16 - What is Business Model ?
Lecture 17 - Who is an Entrepreneur ?
Lecture 18 - Social Entrepreneurship ?
Lecture 19 - Blue Ocean Strategy - I
Lecture 20 - Blue Ocean Strategy - II
Lecture 21 - Marketing of Innovation
Lecture 22 - Technology Innovation Process
Lecture 23 - Technological Innovation Management Planning
Lecture 24 - Technological Innovation Management Strategies
Lecture 25 - Technology Forecasting
Lecture 26 - Sustainability Innovation and Entrepreneurship
Lecture 27 - Innovation Sustainable Conditions
Lecture 28 - Innovation
Lecture 29 - SMEâ S strategic involvement in sustainable development

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Lecture 30 - Insight and Entrepreneurship
Lecture 31 - Management of Innovation, creation of IPR - I
Lecture 32 - Management of Innovation, creation of IPR - II
Lecture 33 - Types of IPR
Lecture 34 - Patents and Copyrights
Lecture 35 - Patents in India
Lecture 36 - Business Models and value proposition
Lecture 37 - Business Model Failure
Lecture 38 - Incubators
Lecture 39 - Managing Investors for Innovation
Lecture 40 - Future markets and Innovation needs for India

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NPTEL Video Course - Management - NOC:Business Analytics and Data Mining Modeling Using R - Part II

Subject Co-ordinator - Dr. Gaurav Dixit

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Association Rules - Part I
Lecture 2 - Association Rules - Part II
Lecture 3 - Association Rules - Part III
Lecture 4 - Association Rules - Part IV
Lecture 5 - Cluster Analysis - Part I
Lecture 6 - Cluster Analysis - Part II
Lecture 7 - Cluster Analysis - Part III
Lecture 8 - Cluster Analysis - Part IV
Lecture 9 - Cluster Analysis - Part V
Lecture 10 - Cluster Analysis - Part VI
Lecture 11 - Cluster Analysis - Part VII
Lecture 12 - Understanding Time Series - Part I
Lecture 13 - Understanding Time Series - Part II
Lecture 14 - Understanding Time Series - Part III
Lecture 15 - Understanding Time Series - Part IV
Lecture 16 - Regression Based Forecasting Methods - Part I
Lecture 17 - Regression Based Forecasting Methods - Part II
Lecture 18 - Regression Based Forecasting Methods - Part III
Lecture 19 - Time Series Forecasting - Smoothing Methods - Part I
Lecture 20 - Time Series Forecasting - Smoothing Methods - Part II

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NPTEL Video Course - Management - NOC:Global Marketing Management

Subject Co-ordinator - Prof. Z. Rahman

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Globalization - Part 1
Lecture 2 - Globalization - Part 2
Lecture 3 - Global Economic Environment - Part 1
Lecture 4 - Global Economic Environment - Part 2
Lecture 5 - Global Economic Environment - Part 3
Lecture 6 - Financial Environment - Part 1
Lecture 7 - Financial Environment - Part 2
Lecture 8 - Cultural Issues and Buying Behavior - Part 1
Lecture 9 - Cultural Issues and Buying Behavior - Part 2
Lecture 10 - Political/ Legal Environment - Part 1
Lecture 11 - Political/ Legal Environment - Part 2
Lecture 12 - Global Marketing Research - Part 1
Lecture 13 - Global Marketing Research - Part 2
Lecture 14 - Global Segmentation and Positioning - Part 1
Lecture 15 - Global Segmentation and Positioning - Part 2
Lecture 16 - Global Marketing Strategies - Part 1
Lecture 17 - Global Marketing Strategies - Part 2
Lecture 18 - Global Market Entry Modes - Part 1
Lecture 19 - Global Market Entry Modes - Part 2
Lecture 20 - Global Product Development - Part 1
Lecture 21 - Global Product Development - Part 2
Lecture 22 - Marketing Products and Services - Part 1
Lecture 23 - Marketing Products and Services - Part 2
Lecture 24 - Global Pricing - Part 1
Lecture 25 - Global Pricing - Part 2
Lecture 26 - Communicating with the World Consumer - Part 1
Lecture 27 - Communicating with the World Consumer - Part 2
Lecture 28 - Sales Management - Part 1
Lecture 29 - Sales Management - Part 2

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Lecture 30 - Global Logistics and Distribution - Part 1
Lecture 31 - Global Logistics and Distribution - Part 2
Lecture 32 - Export/Import Management - Part 1
Lecture 33 - Export/Import Management - Part 2
Lecture 34 - Export/Import Management - Part 3
Lecture 35 - Planning, Organization and Control of Global Marketing Operations - Part 1
Lecture 36 - Planning, Organization and Control of Global Marketing Operations - Part 2
Lecture 37 - Marketing in Emerging Markets - Part 1
Lecture 38 - Marketing in Emerging Markets - Part 2
Lecture 39 - Global Marketing and the Internet - Part 1
Lecture 40 - Global Marketing and the Internet - Part 2

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NPTEL Video Course - Management - NOC:Marketing Research and Analysis-II

Subject Co-ordinator - Dr. Jogendra Kumar Nayak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Marketing Research - I
Lecture 2 - Introduction to Marketing Research - II
Lecture 3 - Marketing Research Process - I
Lecture 4 - Marketing Research Process - II
Lecture 5 - Marketing Research Process - III
Lecture 6 - Marketing Research Process - IV
Lecture 7 - Hypothesis and Research Question - I (with real life example)
Lecture 8 - Hypothesis and Research Question - II (with real life example)
Lecture 9 - Hypothesis Development - I (with a real life case)
Lecture 10 - Hypothesis Development - II (with a real life case)
Lecture 11 - Research Design - I
Lecture 12 - Research Design - II
Lecture 13 - Research Design - III
Lecture 14 - Research Design - IV
Lecture 15 - Research Design - V
Lecture 16 - Research Design - VI
Lecture 17 - Data Purification and handling - I
Lecture 18 - Data Purification and handling - II
Lecture 19 - Data Purification and handling - III
Lecture 20 - Data Purification and handling - IV
Lecture 21 - Power of a Test and Sample Size Calculation (Problem Solving)
Lecture 22 - Sample Size Calculation and Hypothesis Testing (Problem Solving)
Lecture 23 - Hypothesis Testing - I (Problem Solving)
Lecture 24 - Hypothesis Testing - II (Problem Solving)
Lecture 25 - Non-Parametric Test - I
Lecture 26 - Non-Parametric Test - II
Lecture 27 - Non-Parametric Test - III
Lecture 28 - Non-Parametric Test - IV
Lecture 29 - Non-Parametric Test - V

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Lecture 30 - Non-Parametric Test - VI
Lecture 31 - Non-Parametric Test - VII
Lecture 32 - Non-Parametric Test - VIII
Lecture 33 - Introduction to ANOVA and ANCOVA
Lecture 34 - Conducting one-way ANOVA
Lecture 35 - Solving n-way ANOVA - I
Lecture 36 - Solving n-way ANOVA - II
Lecture 37 - N-way ANOVA and MANOVA in SPSS
Lecture 38 - MANOVA and ANCOVA in SPSS
Lecture 39 - ANCOVA in SPSS
Lecture 40 - ANCOVA and MANCOVA in SPSS
Lecture 41 - Covariance and Correlation
Lecture 42 - Correlation in SPSS
Lecture 43 - Partial and Multiple Correlation
Lecture 44 - Simple Regression Analysis in SPSS
Lecture 45 - Multiple Regression Analysis in SPSS - I
Lecture 46 - Multiple Regression Analysis in SPSS - II
Lecture 47 - Stepwise Regression and Hierarchical Regression
Lecture 48 - Hierarchical Regression and Dummy Variable Regression
Lecture 49 - Logistic Regression Analysis
Lecture 50 - Discriminant Analysis in SPSS
Lecture 51 - Factor Analysis in SPSS - I
Lecture 52 - Factor Analysis in SPSS - II
Lecture 53 - Exploratory Factor Analysis in SPSS
Lecture 54 - Confirmatory Factor Analysis in SPSS - I
Lecture 55 - Confirmatory Factor Analysis in SPSS - II
Lecture 56 - Confirmatory Factor Analysis in SPSS - III
Lecture 57 - Structural Equation Modelling in SPSS
Lecture 58 - Mediation and Moderation Analysis in SPSS
Lecture 59 - Cluster Analysis in Practice - I
Lecture 60 - Cluster Analysis in Practice - II

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NPTEL Video Course - Management - NOC:Business Statistics

Subject Co-ordinator - Prof. Mukesh Kumar Barua

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Statistics and Data
Lecture 2 - Types of Statistics, types of Data and sources of Data, Population vs Sample
Lecture 3 - Scales of Measurement
Lecture 4 - Data representation techniques - Part 1
Lecture 5 - Data representation techniques - Part 2 and measures of central tendency - Part 1
Lecture 6 - Measures of Central Tendency - Part 2
Lecture 7 - Examples of introduction to data and data representation techniques
Lecture 8 - Measures of Variation
Lecture 9 - Applications of Measures of Central Tendency and Measures of Variation
Lecture 10 - Chapter concepts- Measures of central tendency and measures of variation, Outliers, and shape of
Lecture 11 - Numerical Descriptive Measures
Lecture 12 - Covariance and Coefficient of Correlation, Introduction to Probability
Lecture 13 - Probability - Part 1
Lecture 14 - Probability - Part 2
Lecture 15 - Probability - Part 3
Lecture 16 - Probability Distributions - Part 1
Lecture 17 - Probability Distributions - Part 2
Lecture 18 - Probability Distributions - Part 3
Lecture 19 - Examples for Standardized Normal Distribution
Lecture 20 - Evaluating Normality, Exponential Probability Distribution
Lecture 21 - Chapter Concepts - Probability Distributions
Lecture 22 - Sampling and Sampling Techniques
Lecture 23 - Sampling Distribution - I
Lecture 24 - Sampling Distribution - II
Lecture 25 - Sampling Distribution - III
Lecture 26 - Method of Estimation
Lecture 27 - Interval Estimation
Lecture 28 - Confidence Interval - I
Lecture 29 - Confidence Interval - II

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Lecture 30 - Types of Hypothesis Testing
Lecture 31 - Hypothesis Testing Process - I
Lecture 32 - Hypothesis Testing Process - II
Lecture 33 - Hypothesis Testing Examples
Lecture 34 - Hypothesis Testing of Proportions - I
Lecture 35 - Hypothesis Testing of Proportions - II
Lecture 36 - Hypothesis Testing-One sample Test
Lecture 37 - Hypothesis Testing using Minitab
Lecture 38 - Hypothesis Testing of Proportions using Minitab
Lecture 39 - Hypothesis Testing Two Sample Test - I
Lecture 40 - Hypothesis Testing Two Sample Test - II
Lecture 41 - Hypothesis Testing Two sample Test - III
Lecture 42 - Paired Sample Test
Lecture 43 - Hypothesis Testing of Proportion
Lecture 44 - Example of Hypothesis Testing
Lecture 45 - Design of Experiment
Lecture 46 - Analysis of variance - I
Lecture 47 - Analysis of variance - II
Lecture 48 - Analysis of variance - III
Lecture 49 - Tukey Kramer test
Lecture 50 - Randomized Blocked Design
Lecture 51 - A Factorial Design - I
Lecture 52 - A Factorial Design - II
Lecture 53 - Chi-square test goodness of fit - I
Lecture 54 - Chi-square test goodness of fit - II
Lecture 55 - Chi-square test of independence
Lecture 56 - Simple linear regression - I
Lecture 57 - Simple linear regression - II
Lecture 58 - Assumption of Regression
Lecture 59 - Multiple Regression
Lecture 60 - Example of multiple Regression

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NPTEL Video Course - Management - NOC:MCDM Techniques Using R

Subject Co-ordinator - Dr. Gaurav Dixit

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to MCDM Techniques - Part I
Lecture 2 - Introduction to MCDM Techniques - Part II
Lecture 3 - Introduction to MCDM Techniques - Part III
Lecture 4 - Analytic Hierarchy Process (AHP) - Part I
Lecture 5 - Analytic Hierarchy Process (AHP) - Part II
Lecture 6 - Analytic Hierarchy Process (AHP) - Part III
Lecture 7 - Analytic Hierarchy Process (AHP) - Part IV
Lecture 8 - ELECTRE - Part I
Lecture 9 - ELECTRE - Part II
Lecture 10 - ELECTRE - Part III
Lecture 11 - ELECTRE - Part IV
Lecture 12 - ELECTRE - Part V
Lecture 13 - Introduction of TOPSIS - Part I
Lecture 14 - TOPSIS - Part II
Lecture 15 - VIKOR - Part I
Lecture 16 - VIKOR - Part II
Lecture 17 - Introduction of Fuzzy Sets
Lecture 18 - Fuzzy AHP - Part I
Lecture 19 - Fuzzy AHP - Part II
Lecture 20 - Sensitivity Analysis

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NPTEL Video Course - Management - NOC:Manufacturing Strategy

Subject Co-ordinator - Prof. Rajat Agarwal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Output of Manufacturing
Lecture 2 - Operations Systems
Lecture 3 - Operations Strategy
Lecture 4 - Functional Strategy Within Context of a Firm
Lecture 5 - Functional Dominance within Corporate Strategy
Lecture 6 - World Class Manufacturing Organization
Lecture 7 - Ps of Manufacturing Strategy
Lecture 8 - Contribution of Skinner and Hayes and Wheelwright
Lecture 9 - Alternative Paradigm of Manufacturing Strategy
Lecture 10 - Some Generic Manufacturing Strategies - I
Lecture 11 - Developing Manufacturing Strategy
Lecture 12 - Understanding Markets
Lecture 13 - Concept of Order Winner and Qualifiers
Lecture 14 - Basic Characteristics and Specific Dimensions of Order Winners and Qualifiers
Lecture 15 - Some Specific Order Winners and Qualifiers - I
Lecture 16 - Some Specific Order Winners and Qualifiers - II
Lecture 17 - Some Specific Order Winners and Qualifiers - III
Lecture 18 - Some Specific Order Winners and Qualifiers (non operation related criteria)
Lecture 19 - Developing an Operations Strategy
Lecture 20 - Developing an Operations Strategy
Lecture 21 - Developing an Operations Strategy
Lecture 22 - Enlightened View of Manufacturing
Lecture 23 - Manufacturing Strategy Taxonomy
Lecture 24 - Quality Management and Manufacturing Excellence
Lecture 25 - Total Quality Management and Manufacturing Excellence
Lecture 26 - Deming's Approach to Quality
Lecture 27 - Business Excellence Awards
Lecture 28 - Process Choice
Lecture 29 - Process Choice

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Lecture 30 - Product Profiling
Lecture 31 - Critical Success Factor for World Class Manufacturing
Lecture 32 - Value Added Engineering
Lecture 33 - Total Employee Involvement
Lecture 34 - HR Theories for Operation Strategy
Lecture 35 - Flexible Manufacturing System
Lecture 36 - Concept of Focus
Lecture 37 - Toyota Production System - I
Lecture 38 - Toyota Production System - II
Lecture 39 - World Class Manufacturing and India
Lecture 40 - Achieving World Class Status

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NPTEL Video Course - Management - NOC:Training of Trainers

Subject Co-ordinator - Prof. Santosh Rangnekar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to training - 1
Lecture 2 - Introduction to training - 2
Lecture 3 - Introduction to training - 3
Lecture 4 - Introduction to training - 4
Lecture 5 - Training Needs Assessment
Lecture 6 - Methods of Training Needs Assessment - 1
Lecture 7 - Methods of Training Needs Assessment - 2
Lecture 8 - Methods of Training Needs Assessment - 3
Lecture 9 - Trainings Design and Types of Training - 1
Lecture 10 - Trainings Design and Types of Training - 2
Lecture 11 - Trainings Design and Types of Training - 3
Lecture 12 - Trainings Design and Types of Training - 4
Lecture 13 - Design thinking in training
Lecture 14 - Role of Technology - 1
Lecture 15 - Role of Technology - 2
Lecture 16 - Digital Pedagogy in training
Lecture 17 - Introduction to Training Methods - 1
Lecture 18 - Introduction to Training Methods - 2
Lecture 19 - Choosing a Training Method
Lecture 20 - Examples of Training
Lecture 21 - Understanding training groups and its dynamics
Lecture 22 - Training Methods - Case Study - 1
Lecture 23 - Training Methods - Case Study - 2
Lecture 24 - Training Methods - Case Study - 3
Lecture 25 - Training Methods - Case Study - 4
Lecture 26 - Training Methods - Business Game - 1
Lecture 27 - Training Methods - Business Game - 2
Lecture 28 - Training Methods - Business Game - 3
Lecture 29 - Training Methods - Role Play - 1

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Lecture 30 - Training Methods - Role Play - 2
Lecture 31 - Training Methods - Role Play - 3
Lecture 32 - Training Methods - Behavior Modelling - 1
Lecture 33 - Training Methods - Behavior Modelling - 2
Lecture 34 - Training Methods - Behavior Modelling - 3
Lecture 35 - Cost benefit Analysis
Lecture 36 - Training Methods - Decision Making - 1
Lecture 37 - Training Methods - Decision Making - 2
Lecture 38 - Training Methods - Decision Making - 3
Lecture 39 - Training Methods - Exercise
Lecture 40 - Introduction to group training methods
Lecture 41 - Training Methods - Brainstorming
Lecture 42 - Training Methods - Group discussion
Lecture 43 - Training methods - Panel Discussion
Lecture 44 - A Research Approach in Training - 1
Lecture 45 - A Research Approach in Training - 2
Lecture 46 - Training evaluation - 1
Lecture 47 - Training evaluation - 2
Lecture 48 - Training response

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NPTEL Video Course - Management - NOC:Management Accounting

Subject Co-ordinator - Prof. Anil K. Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction - I
Lecture 2 - An Introduction - II
Lecture 3 - Branches of Accounting and Cost Sheet
Lecture 4 - Statement of Cost- An introduction
Lecture 5 - Fundamentals of Management Accounting - I
Lecture 6 - Fundamentals of Management Accounting - II
Lecture 7 - Cost Sheet - Role and Relevance in Management Decision Making - I
Lecture 8 - Cost Sheet - Role and Relevance in Management Decision Making - II
Lecture 9 - Preparation and Analysis of Cost Sheet - I
Lecture 10 - Preparation and Analysis of Cost Sheet - II
Lecture 11 - Preparation and Analysis of Cost Sheet - III
Lecture 12 - Budget and Budgetary Control - I
Lecture 13 - Budget and Budgetary Control - II
Lecture 14 - Preparation of Budgets
Lecture 15 - Preparation of Master Budget
Lecture 16 - Cash Budget - I
Lecture 17 - Cash Budget - II
Lecture 18 - Cash Budget - III
Lecture 19 - Cash Budget - IV
Lecture 20 - Financial Budget
Lecture 21 - Master Budget - A Mini Case - I
Lecture 22 - Master Budget - A Mini Case - II
Lecture 23 - Master Budget - A Mini Case - III
Lecture 24 - Flexible Budget and Variance Analysis - I
Lecture 25 - Flexible Budget and Variance Analysis - II
Lecture 26 - Flexible Budget and Variance Analysis - III
Lecture 27 - Flexible Budget - A Mini Case - I
Lecture 28 - Flexible Budget - A Mini Case - II
Lecture 29 - Standard Costing and Variance Analysis

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Lecture 30 - Pre-Requisites to Standard Costing
Lecture 31 - Variance Analysis
Lecture 32 - Material Variances - I
Lecture 33 - Material Variances - II
Lecture 34 - Material Variances - III
Lecture 35 - Material Variances - IV
Lecture 36 - Material Variances - V
Lecture 37 - Labor Variances - I
Lecture 38 - Labor Variances - II
Lecture 39 - Labor Variances - III
Lecture 40 - Labor Variances - IV
Lecture 41 - Labor Variances - V
Lecture 42 - Overhead Variances
Lecture 43 - Marginal Costing - I
Lecture 44 - Marginal Costing - II
Lecture 45 - Marginal Costing - III
Lecture 46 - Tools of Marginal Costing
Lecture 47 - CVP Analysis
Lecture 48 - Applications of Marginal Costing - I
Lecture 49 - Applications of Marginal Costing - II
Lecture 50 - Applications of Marginal Costing - III
Lecture 51 - Activity Based Costing- An Introduction
Lecture 52 - Cost Management System and Activity Based Costing - I
Lecture 53 - Cost Management System and Activity Based Costing - II
Lecture 54 - Designing of ABC System
Lecture 55 - Applications of ABC - I
Lecture 56 - Applications of ABC - II
Lecture 57 - Management Control System and Responsibility Accounting - I
Lecture 58 - Management Control System and Responsibility Accounting - II
Lecture 59 - Implementation of Management Control Systems - I
Lecture 60 - Implementation of Management Control Systems - II

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NPTEL Video Course - Management - NOC:Financial Derivatives and Risk Management

Subject Co-ordinator - Prof. J. P. Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Derivatives
Lecture 2 - Forwards
Lecture 3 - Forwards
Lecture 4 - Forwards Pricing
Lecture 5 - Futures
Lecture 6 - Futures
Lecture 7 - Forwards and Futures Prices, Exposure
Lecture 8 - Exposure and Risk
Lecture 9 - Basics of Futures Hedging
Lecture 10 - Futures Hedging
Lecture 11 - Futures Hedging
Lecture 12 - Futures Hedging
Lecture 13 - Mean Variance Portfolio Theory
Lecture 14 - Capital Asset Pricing Model
Lecture 15 - Systematic and Unsystematic Risk
Lecture 16 - Index Futures
Lecture 17 - Hedging with Index Futures
Lecture 18 - Index Futures
Lecture 19 - Spot Interest Rates and YTM
Lecture 20 - YTM, Other Yield Measures
Lecture 21 - Interest Rate Risk
Lecture 22 - Duration and Price Sensitivities, Immunization
Lecture 23 - Interest Rate Futures
Lecture 24 - T-Bill Futures
Lecture 25 - T-Bill Futures
Lecture 26 - T-Bill Futures
Lecture 27 - Tailing the Hedge; Clean and Dirty Price
Lecture 28 - US T-Bond Futures
Lecture 29 - US T-Bond Futures

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Lecture 30 - Options
Lecture 31 - Options
Lecture 32 - Options
Lecture 33 - American Options
Lecture 34 - Basic Option Trading Strategies
Lecture 35 - Option Strategies (Continued...)
Lecture 36 - Option Spread Strategies
Lecture 37 - Stochastic Processes
Lecture 38 - Stochastic Processes
Lecture 39 - Stochastic Processes
Lecture 40 - Stochastic Processes
Lecture 41 - Stochastic Calculus
Lecture 42 - Stock Price Distributions; Fokker Planck Equation and Solution
Lecture 43 - Lognormal Distribution
Lecture 44 - Option Pricing
Lecture 45 - Option Pricing
Lecture 46 - Girsanov Theorem; Black Scholes Model
Lecture 47 - Black Scholes Model (Continued...)
Lecture 48 - Features of BS Model
Lecture 49 - Solution of BS PDE; Option Greeks
Lecture 50 - Option Greeks
Lecture 51 - Option Greeks
Lecture 52 - Option Greeks
Lecture 53 - Option Greeks
Lecture 54 - Option Greeks
Lecture 55 - Forward Rate Agreements; Swaps
Lecture 56 - Swaps
Lecture 57 - Swaps
Lecture 58 - Currency Swaps; Value at Risk
Lecture 59 - Value at Risk
Lecture 60 - Value at Risk

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NPTEL Video Course - Management - NOC:Business Analytics and Text Mining Modeling Using Python

Subject Co-ordinator - Dr. Gaurav Dixit

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part I
Lecture 2 - Introduction - Part II
Lecture 3 - Introduction - Part III
Lecture 4 - Python for Analytics - Part I
Lecture 5 - Python for Analytics - Part II
Lecture 6 - Python for Analytics - Part III
Lecture 7 - Python for Analytics - Part IV
Lecture 8 - Python for Analytics - Part V
Lecture 9 - Built in Capabilities of Python - Part I
Lecture 10 - Built in Capabilities of Python - Part II
Lecture 11 - Built in Capabilities of Python - Part III
Lecture 12 - Built in Capabilities of Python - Part IV
Lecture 13 - Built in Capabilities of Python - Part V
Lecture 14 - Built in Capabilities of Python - Part VI
Lecture 15 - Built in Capabilities of Python - Part VII
Lecture 16 - Built in Capabilities of Python - Part VIII
Lecture 17 - Built in Capabilities of Python - Part IX
Lecture 18 - Built in Capabilities of Python - Part X
Lecture 19 - Numerical Python - Part I
Lecture 20 - Numerical Python - Part II
Lecture 21 - Numerical Python - Part III
Lecture 22 - Numerical Python - Part IV
Lecture 23 - Numerical Python - Part V
Lecture 24 - Numerical Python - Part VI
Lecture 25 - Numerical Python - Part VII
Lecture 26 - Database Using Python Pandas - Part I
Lecture 27 - Database Using Python Pandas - Part II
Lecture 28 - Database Using Python Pandas - Part III
Lecture 29 - Pandas Data Frame Processing Functions

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Lecture 30 - Python Working with Data - Part I
Lecture 31 - Python Working with Data - Part II
Lecture 32 - Python Working with Data - Part III
Lecture 33 - String and Text Processing - Part I
Lecture 34 - String and Text Processing - Part II
Lecture 35 - Data Visualization Using Python
Lecture 36 - Text Collection and Transformation - Part I
Lecture 37 - Text Collection and Transformation - Part II
Lecture 38 - Text Mining and Modeling - Part I
Lecture 39 - Text Mining and Modeling - Part II
Lecture 40 - Text Mining and Modeling - Part III

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NPTEL Video Course - Management - NOC:Toyota Production System

Subject Co-ordinator - Prof. Rajat Agarwal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Manufacturing Excellence
Lecture 2 - Global Environment
Lecture 3 - Production System
Lecture 4 - Operation Strategy
Lecture 5 - The Heart of the TPS
Lecture 6 - Principles of Toyota Way
Lecture 7 - Culture Behind Toyota Way
Lecture 8 - Toyota Way in Action
Lecture 9 - Long Term Philosophy
Lecture 10 - Create Continuous Flow
Lecture 11 - Pull System
Lecture 12 - Leveling Workload
Lecture 13 - Get Quality Right the First Time
Lecture 14 - Standardization of Task
Lecture 15 - Use of Visual Control
Lecture 16 - Use of Reliable Technology
Lecture 17 - Role of Leaders in Manufacturing Philosophy
Lecture 18 - Developing Exceptional Teams
Lecture 19 - Challenge and Respect Extended Networks
Lecture 20 - See Yourself to Understand the Situation
Lecture 21 - Developing Decisions with Consensus
Lecture 22 - Become a Learning Organization
Lecture 23 - Become a Learning Organization
Lecture 24 - Using Toyota Way for Other Organizations (Service and Technical)
Lecture 25 - Lean Manufacturing
Lecture 26 - Lean Vs Agile Manufacturing
Lecture 27 - Sustainable Manufacturing - I
Lecture 28 - Sustainable Manufacturing - II
Lecture 29 - Flexible Manufacturing System

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Lecture 30 - Benchmarking
Lecture 31 - Cultural Issues in Lean
Lecture 32 - Overview of Lean Implementation
Lecture 33 - The Significance of Lead Time
Lecture 34 - Techniques to Reduce Lead Time
Lecture 35 - Value Stream Mapping
Lecture 36 - Kanban Approach
Lecture 37 - Kanban Calculation - I
Lecture 38 - Kanban Calculation - II
Lecture 39 - Theory of Constraints
Lecture 40 - Different Business Excellence Models

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NPTEL Video Course - Management - NOC:Production and Operation Management (Prof. Rajat Agarwal)

Subject Co-ordinator - Prof. Rajat Agarwal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Production
Lecture 2 - Global Environment
Lecture 3 - Operations and Productivity
Lecture 4 - Types and Characteristics of Manufacturing Systems
Lecture 5 - Types and Characteristics of Services Systems
Lecture 6 - Product Design
Lecture 7 - Introduction To Forecasting
Lecture 8 - Time Series Forecasting
Lecture 9 - Time Series Forecasting - Exponential Smoothing - I (Brief)
Lecture 10 - Time Series Forecasting - Exponential Smoothing - II (Classification)
Lecture 11 - Time Series Forecasting - Working Example Of Exponential Smoothing - I
Lecture 12 - Time Series Forecasting - Working Example Of Exponential Smoothing - II
Lecture 13 - Time Series Forecasting - Working Example Of Exponential Smoothing - III
Lecture 14 - Forecasting Errors
Lecture 15 - Causal Or Explanatory Methods
Lecture 16 - Inventory Planning and control
Lecture 17 - Basic Inventory Model
Lecture 18 - Different Variations in Basic EOQ Model
Lecture 19 - Safety Stock and Fixed Time Inventory Model
Lecture 20 - Examples of Safety Stock Calculation
Lecture 21 - Single Period Inventory Model - I (Theory)
Lecture 22 - Single Period Inventory Model - II (Numerical)
Lecture 23 - Inventory Control and Management
Lecture 24 - Material Requirements Planning (MRP)
Lecture 25 - Improvements in the MRP system
Lecture 26 - Lot Sizing in MRP Systems
Lecture 27 - Material Requirements Planning (MRP)
Lecture 28 - Material Requirements Planning (MRP)
Lecture 29 - Aggregate Sales and Operations Planning - I (Intermediate and Aggregate Planning)

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Lecture 30 - Aggregate Sales and Operations Planning - II (Demand and Supply Options)
Lecture 31 - Aggregate planning Techniques - I (Introduction)
Lecture 32 - Aggregate planning Techniques - II (Examples)
Lecture 33 - Aggregate planning Techniques - III (Problems)
Lecture 34 - Production Planning Problems using LP
Lecture 35 - Nature of Quality and Evolution of Quality Management - I (Product Quality Dimensions)
Lecture 36 - Nature of Quality and Evolution of Quality Management - II (Service Quality Dimensions)
Lecture 37 - Modern Quality Management and Total Quality Management
Lecture 38 - Total Quality Management
Lecture 39 - Statistical Concepts in Quality Control - I (Overview of Control Charts)
Lecture 40 - Statistical Concepts in Quality Control - II (p-chart and Examples)
Lecture 41 - Statistical Concepts in Quality Control - III (c-chart and Examples)
Lecture 42 - Statistical Concepts in Quality Control - IV (Run Test and Examples)
Lecture 43 - 7 QC Tools
Lecture 44 - Acceptance Sampling
Lecture 45 - Process Capability
Lecture 46 - Six Sigma
Lecture 47 - Some Current Issues In Quality Management
Lecture 48 - Facility Layout - I (Introduction)
Lecture 49 - Facility Layout - II (Group Technology and other layouts)
Lecture 50 - Facility Layout - III (Layout design and Precedence diagram)
Lecture 51 - Introduction to Project Management
Lecture 52 - PERT and CPM
Lecture 53 - PERT and Crashing
Lecture 54 - Maintenance Management
Lecture 55 - Maintenance Performance Measures and OEE calculations
Lecture 56 - Manufacturing Operations Scheduling - I (Scheduling and Gantt Charts)
Lecture 57 - Manufacturing Operations Scheduling - II (Order Sequencing)
Lecture 58 - JIT and Lean Operations
Lecture 59 - Work Method Analysis, Work Measurement and Learning Curve
Lecture 60 - Some Latest and Future Issues

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NPTEL Video Course - Management - NOC:Services Marketing: Integrating People, Technology, Strategy

Subject Co-ordinator - Prof. Z. Rahman

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - New Perspectives on Marketing in the Service Economy - Part 1
Lecture 2 - New Perspectives on Marketing in the Service Economy - Part 2
Lecture 3 - New Perspectives on Marketing in the Service Economy - Part 3
Lecture 4 - Consumer Behavior in the Service Context - Part 1
Lecture 5 - Consumer Behavior in the Service Context - Part 2
Lecture 6 - Consumer Behavior in the Service Context - Part 3
Lecture 7 - Positioning Services in Competitive Markets - Part 1
Lecture 8 - Positioning Services in Competitive Markets - Part 2
Lecture 9 - Developing Service Products - Part 1
Lecture 10 - Developing Service Products - Part 2
Lecture 11 - Developing Service Products - Part 3
Lecture 12 - Distributing Services through Physical and Electronic Channels - Part 1
Lecture 13 - Distributing Services through Physical and Electronic Channels - Part 2
Lecture 14 - Setting Prices and Implementing Revenue Management - Part 1
Lecture 15 - Setting Prices and Implementing Revenue Management - Part 2
Lecture 16 - Setting Prices and Implementing Revenue Management - Part 3
Lecture 17 - Promoting Services and Educating Customers - Part 1
Lecture 18 - Promoting Services and Educating Customers - Part 2
Lecture 19 - Promoting Services and Educating Customers - Part 3
Lecture 20 - Designing and Managing Service Processes - Part 1
Lecture 21 - Designing and Managing Service Processes - Part 2
Lecture 22 - Balancing Demand and Productive Capacity - Part 1
Lecture 23 - Balancing Demand and Productive Capacity - Part 2
Lecture 24 - Balancing Demand and Productive Capacity - Part 3
Lecture 25 - Crafting Service Environment - Part 1
Lecture 26 - Crafting Service Environment - Part 2
Lecture 27 - Managing People for Service Advantage - Part 1
Lecture 28 - Managing People for Service Advantage - Part 2
Lecture 29 - Managing Relationships and Building Loyalty - Part 3

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Lecture 30 - Managing Relationships and Building Loyalty - Part 1
Lecture 31 - Managing Relationships and Building Loyalty - Part 2
Lecture 32 - Managing Relationships and Building Loyalty - Part 3
Lecture 33 - Complaint Handling and Service Recovery - Part 1
Lecture 34 - Complaint Handling and Service Recovery - Part 2
Lecture 35 - Complaint Handling and Service Recovery - Part 3
Lecture 36 - Improving Service Quality and Productivity - Part 1
Lecture 37 - Improving Service Quality and Productivity - Part 2
Lecture 38 - Improving Service Quality and Productivity - Part 3
Lecture 39 - Striving for Service Leadership and Creating the Seamless Service Firms - Part 1
Lecture 40 - Striving for Service Leadership and Creating the Seamless Service Firms - Part 2
Lecture 41 - Listening Customers Through Research - Part 1
Lecture 42 - Listening Customers Through Research - Part 2
Lecture 43 - Customer-Focused Organization: Structure, Resources and Service Process - Part 1
Lecture 44 - Customer-Focused Organization: Structure, Resources and Service Process - Part 2
Lecture 45 - Customer-defined service standards - Part 1
Lecture 46 - Customer-defined service standards - Part 2
Lecture 47 - Service Innovation and Design - Part 1
Lecture 48 - Service Innovation and Design - Part 2
Lecture 49 - Service Innovation and Design - Part 3
Lecture 50 - Management of public and private nonprofit service organizations - Part 1
Lecture 51 - Management of public and private nonprofit service organizations - Part 2
Lecture 52 - The Financial and Economic Impact of Service - Part 1
Lecture 53 - The Financial and Economic Impact of Service - Part 2
Lecture 54 - The Financial and Economic Impact of Service - Part 3
Lecture 55 - Globalization of Services: Service Management in the International arena
Lecture 56 - Technology and its Impact on Service and their Management - Part 1
Lecture 57 - Technology and its Impact on Service and their Management - Part 2
Lecture 58 - Technology and its Impact on Service and their Management - Part 3
Lecture 59 - Transforming a Manufacturing Firm into a Service Business - Part 1
Lecture 60 - Transforming a Manufacturing Firm into a Service Business - Part 2

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NPTEL Video Course - Management - NOC:Production and Operation Management (Prof. Santosh Rangnekar)

Subject Co-ordinator - Prof. Santosh Rangnekar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Relational Development and Maintenance - I
Lecture 2 - Relational Development and Maintenance - II
Lecture 3 - Relational Development and Maintenance - III
Lecture 4 - Relational Development and Maintenance - IV
Lecture 5 - Fundamental Interpersonal Relationship Orientation - Behavior - I
Lecture 6 - Fundamental Interpersonal Relationship Orientation - Behavior - II
Lecture 7 - Forgiveness - I
Lecture 8 - Forgiveness - II
Lecture 9 - Happiness at Workplace - I
Lecture 10 - Happiness at Workplace - II
Lecture 11 - Trust - I
Lecture 12 - Trust - II
Lecture 13 - Employee Recognition - I
Lecture 14 - Employee Recognition - II
Lecture 15 - Psychological Ownership - I
Lecture 16 - Psychological Ownership - II
Lecture 17 - Managerial Effectiveness - I
Lecture 18 - Managerial Effectiveness - II
Lecture 19 - Managerial Effectiveness - III
Lecture 20 - Servant Leadership
Lecture 21 - Moods and Emotions - I
Lecture 22 - Moods and Emotions - II
Lecture 23 - Moods and Emotions - III
Lecture 24 - Optimism - I
Lecture 25 - Optimism - II
Lecture 26 - Career Engagement - I
Lecture 27 - Career Engagement - II
Lecture 28 - Adaptability - I
Lecture 29 - Adaptability - II

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Lecture 30 - Spiritual Intelligence - I
Lecture 31 - Spiritual Intelligence - II
Lecture 32 - Spiritual Intelligence - III
Lecture 33 - Insult and Interpersonal Dynamics
Lecture 34 - Work motivation - I
Lecture 35 - Work motivation - II
Lecture 36 - Employee Involvement
Lecture 37 - Humour at Workplace
Lecture 38 - Preparedness and performance
Lecture 39 - Maturity at Workplace
Lecture 40 - Hope
Lecture 41 - Ego Defense Mechanism and Group Dynamics
Lecture 42 - Dyadic Relationship at Workplace
Lecture 43 - Emotional Negotiation - I
Lecture 44 - Emotional Negotiation - II
Lecture 45 - Anger, Anxiety and Depression - I
Lecture 46 - Anger, Anxiety and Depression - II
Lecture 47 - Expectations
Lecture 48 - Thinking Process
Lecture 49 - Managerial Flexibility
Lecture 50 - Reinstating Relationships
Lecture 51 - Buddhist approach to MSID - I
Lecture 52 - Buddhist approach to MSID - II
Lecture 53 - Panchatantra and Interpersonal Dynamics
Lecture 54 - Emotion, Nutrition and Brain
Lecture 55 - Bhagwat Gita and Interpersonal Dynamics
Lecture 56 - Flexibility, Quality of Life and Work family Enrichment - I
Lecture 57 - Flexibility, Quality of Life and Work family Enrichment - II
Lecture 58 - Employee Loyalty - I
Lecture 59 - Employee Loyalty - II
Lecture 60 - Chanakya and Interpersonal Dynamics

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NPTEL Video Course - Management - NOC:Financial Management for Managers

Subject Co-ordinator - Prof. Anil K. Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Financial Management - Part I
Lecture 2 - Fundamentals of Financial Management - Part II
Lecture 3 - Fundamentals of Financial Management - Part III
Lecture 4 - Fundamentals of Financial Management - Part IV
Lecture 5 - Fundamentals of Financial Management - Part V
Lecture 6 - Financial Planning and Forecasting - Part I
Lecture 7 - Financial Planning and Forecasting - Part II
Lecture 8 - Financial Planning and Forecasting - Part III
Lecture 9 - Financial Planning and Forecasting - Part IV
Lecture 10 - Time Value of Money - Part I
Lecture 11 - Time Value of Money - Part II
Lecture 12 - Time Value of Money - Part III
Lecture 13 - Time Value of Money - Part IV
Lecture 14 - Time Value of Money - Part V
Lecture 15 - Time Value of Money - Part VI
Lecture 16 - Time Value of Money - Part VII
Lecture 17 - Capital Budgeting - Part I
Lecture 18 - Capital Budgeting - Part II
Lecture 19 - Capital Budgeting - Part III
Lecture 20 - Capital Budgeting - Part IV
Lecture 21 - Capital Budgeting - Part V
Lecture 22 - Capital Budgeting - Part VI
Lecture 23 - Capital Budgeting - Part VII
Lecture 24 - Capital Budgeting - Part VIII
Lecture 25 - Capital Budgeting - Part IX
Lecture 26 - Capital Budgeting - Part X
Lecture 27 - Capital Budgeting - Part XI
Lecture 28 - Capital Budgeting - Part XII
Lecture 29 - Estimation of Project Cash Flows - Part I

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Lecture 30 - Estimation of Project Cash Flows - Part II
Lecture 31 - Estimation of Project Cash Flows - Part III
Lecture 32 - Estimation of Project Cash Flows - Part IV
Lecture 33 - Estimation of Project Cash Flows - Part V
Lecture 34 - Estimation of Project Cash Flows - Part VI
Lecture 35 - Estimation of Project Cash Flows - Part VII
Lecture 36 - Estimation of Project Cash Flows - Part VIII
Lecture 37 - Estimation of Project Cash Flows - Part IX
Lecture 38 - Estimation of Project Cash Flows - Part X
Lecture 39 - Estimation of Project Cash Flows - Part XI
Lecture 40 - Risk Analysis in Capital Budgeting - Part I
Lecture 41 - Risk Analysis in Capital Budgeting - Part II
Lecture 42 - Risk Analysis in Capital Budgeting - Part III
Lecture 43 - Risk Analysis in Capital Budgeting - Part IV
Lecture 44 - Risk Analysis in Capital Budgeting - Part V
Lecture 45 - Risk Analysis in Capital Budgeting - Part VI
Lecture 46 - Risk Analysis in Capital Budgeting - Part VII
Lecture 47 - Cost of Capital - Part I
Lecture 48 - Cost of Capital - Part II
Lecture 49 - Cost of Capital - Part III
Lecture 50 - Cost of Capital - Part IV
Lecture 51 - Cost of Capital - Part V
Lecture 52 - Cost of Capital - Part VI
Lecture 53 - Cost of Capital - Part VII
Lecture 54 - Capital Structure - Part I
Lecture 55 - Capital Structure - Part II
Lecture 56 - Capital Structure - Part III
Lecture 57 - Capital Structure - Part IV
Lecture 58 - Capital Structure - Part V
Lecture 59 - Dividend Decisions - Part I
Lecture 60 - Dividend Decisions - Part II

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NPTEL Video Course - Management - NOC:International Business

Subject Co-ordinator - Dr. Jogendra Kumar Nayak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to International Business
Lecture 2 - Importance, Nature and Scope
Lecture 3 - Modes of Entry - I
Lecture 4 - Modes of Entry - II
Lecture 5 - Challenges and Approaches, EPRG Framework
Lecture 6 - New Economic Policy, LPG Framework
Lecture 7 - Patterns of International Trade, Trade Theories, Export-Import
Lecture 8 - International Trade Theories - I
Lecture 9 - International Trade Theories - II
Lecture 10 - Leonteiff's Paradox, PLC Theory, National Competitive Advantage and Factor Mobility Theory
Lecture 11 - Trade and Factor Mobility, Bangladesh Textile Case
Lecture 12 - Multiplier Effect, Types and its Characteristics
Lecture 13 - Multiplier Effect with Numericals
Lecture 14 - Commercial/Trade Policy, Business Cycle, Tariff Barriers, Subsidies
Lecture 15 - Non-Tariff Barriers, India's Foreign Trade Policy, Make in India, Trade Protectionism
Lecture 16 - International Business Environment, PESTEL Analysis, Culture and Business
Lecture 17 - Language, Religion, Behavioural Practices, Communication
Lecture 18 - Political Environment, Beliefs, Types of Democracy
Lecture 19 - Political Systems, Beliefs, Risks
Lecture 20 - Legal Environment, Legal Protection, Legal Systems, IPR
Lecture 21 - Economic Factors, Economic Environment
Lecture 22 - Components of an Economy, Inflation, Unemployment, Debt
Lecture 23 - Income Distribution, Poverty, Productivity
Lecture 24 - BOP, Components, Economic Freedom, Economic Transitions
Lecture 25 - Technology and Its Impact, IT, Technology Transfer
Lecture 26 - Hofstede's Cultural Dimensions
Lecture 27 - BOP, Balance of Trade
Lecture 28 - BOP, Capital Account, Financial Account, Numericals, Reserve Account, SDR
Lecture 29 - Foreign Exchange, Foreign Exchange Market, Features, Participants

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Lecture 30 - Functions of Foreign Exchange Market, Interest Rate, Relative Inflation Rate
Lecture 31 - Factors Affecting Exchange Rate, Current Account Deficit, Government Debt, Exchange Rate
Lecture 32 - Exchange Rate Systems, Currency Convertibility, Types
Lecture 33 - Currency Convertibility, Theories of Exchange Rate, Purchasing Power Parity
Lecture 34 - PPP Theory, Interest Rate Parity Theory, Fischer Effect, Numericals
Lecture 35 - Foreign Exchange Exposure, Type Of Exposure
Lecture 36 - Exposure Management Theory, Hedging, FERA and FEMA, RBI and its Power
Lecture 37 - Financial Market, Importance and its Function, Financial Intermediaries, Money Market
Lecture 38 - International Money Market, Euro Credit, Capital Market, Features, Component, ADR and GDR
Lecture 39 - Trade Promotion, Foreign Trade Regulations in India, Exporting, Stages, Difficulties
Lecture 40 - Export-Import Plan, Foreign Trade Promotion Measures, Schemes, Trade Regulations
Lecture 41 - Trade Promotions, Institution Involved in Export Finance, Foreign Trade Organisations
Lecture 42 - Foreign Trade Organizations, PNB Scam
Lecture 43 - Bretton Woods Agreement, IMF, Its Role and Function
Lecture 44 - World Bank
Lecture 45 - WTO, GATT, Origin and Functions, MFN Principles, Agreements
Lecture 46 - Uruguay Round Agreement on Agriculture, GATS
Lecture 47 - TRIMS, TRIPS, Patents, Copyrights
Lecture 48 - Multifiber Agreement, Agreement on Textiles and Clothing, UNCTAD, GSP, GSTP
Lecture 49 - Regional Economic Integration
Lecture 50 - Regionalism, Multilateralism, NAFTA, EU, EURO
Lecture 51 - International Marketing, Segmentation, Positioning
Lecture 52 - Product Strategies, Product Adaptations, Pricing, Communication, Logistics
Lecture 53 - Global Firms Success Strategies
Lecture 54 - Marketing Orientations, Market Research
Lecture 55 - Estimating Market Demand, Pitfalls in Research
Lecture 56 - Survey Methods For International Research
Lecture 57 - Supply Chain Management, Global Production and Distribution, Manufacturing Strategy
Lecture 58 - Global Sourcing, Distribution System, Role Of Interest
Lecture 59 - International HRM
Lecture 60 - Recruitment and Training in International HRM

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NPTEL Video Course - Management - NOC:Path Integral Methods in Physics and Finance

Subject Co-ordinator - Prof. J. P. Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Setting The Scene
Lecture 2 - Introduction to the Path Integral
Lecture 3 - Probability Fundamentals, Generating Functions
Lecture 4 - Generating Functions, Gaussian Distribution
Lecture 5 - Gaussian Distribution, Gaussian Integration
Lecture 6 - Gaussian Integration, Central Limit Theorem
Lecture 7 - Elementary Theory of Stochastic Processes
Lecture 8 - Evolutionary Equations of Stochastic Processes
Lecture 9 - Brownian Motion
Lecture 10 - Diffusion Equation
Lecture 11 - Diffusion Equation Path Integral - 1
Lecture 12 - Diffusion Equation Path Integral - 2, Autocorrelators
Lecture 13 - Schrodinger Equation Path Integral, Langevin Equation
Lecture 14 - Langevin- Equation
Lecture 15 - Statistical Formalism of Path Integral
Lecture 16 - Langevin Equation Path Integral - 1
Lecture 17 - Langevin Equation Path Integral - 2
Lecture 18 - Langevin and Fokker Planck Equation; CLT Example
Lecture 19 - Basic Machinery of Quantum Mechanics
Lecture 20 - Quantum Mechanical Path Integral
Lecture 21 - Harmonic Oscillator Path Integral
Lecture 22 - Free Particle Path Integral
Lecture 23 - Equivalence of Schrodinger and Path Integral Formalisms, Matrix Elements of Operators
Lecture 24 - Ground State Expectation Values
Lecture 25 - Vacuum Persistence Amplitude
Lecture 26 - Harmonic Oscillator 2-Point Problem
Lecture 27 - Relativistic Path Integral
Lecture 28 - Interpretation of Path Integral
Lecture 29 - Need For Quantum Field Theory

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Lecture 30 - Quantum Field Theory, Introduction
Lecture 31 - Field Theory Basics
Lecture 32 - Field Theory In Zero Dimensions - 1
Lecture 33 - Field Theory In Zero Dimensions - 2
Lecture 34 - Schwinger Dyson Eqs, Convergence Of Integrals
Lecture 35 - Sde, Feynman Diagrams
Lecture 36 - Feynman Diagrams and Sde
Lecture 37 - Effective Action, Renormalization
Lecture 38 - Renormalization In 0-d
Lecture 39 - Field Theory In 1-D - 1
Lecture 40 - Field Theory in 1-d - 2
Lecture 41 - Euclidean Field Theory - 1
Lecture 42 - Euclidean Field Theory - 2
Lecture 43 - Euclidean Field Theory - 3
Lecture 44 - Field Theory In Minkowski Space
Lecture 45 - Propagator In Minkowski Space
Lecture 46 - Propagator Properties In Minkowski Space
Lecture 47 - Interactive Field Theory In Minkowski Space
Lecture 48 - Causality, Sde In Minkowski Space
Lecture 49 - Sde For Field Theory In Minkowski Space
Lecture 50 - Spinor Fields Path Integral
Lecture 51 - Gauge Fields - 1
Lecture 52 - Gauge Fields - 2
Lecture 53 - Ito Equation, Stock Price Modelling
Lecture 54 - Financial Derivatives
Lecture 55 - Properties Of Options
Lecture 56 - Pricing Of Options
Lecture 57 - Pricing Of Options
Lecture 58 - Black Scholes Model
Lecture 59 - Path Integral Solution Of Black Scholes Pde
Lecture 60 - Misc Financial Applications Of Path Integrals

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NPTEL Video Course - Management - NOC:Introduction to Marketing Essentials

Subject Co-ordinator - Prof. Zillur Rahman

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Creating Customer Relationships and Value through Marketing - 1
Lecture 2 - Creating Customer Relationships and Value through Marketing - 2
Lecture 3 - The new realities of marketing
Lecture 4 - Developing Successful Marketing and Organizational Strategies - 1
Lecture 5 - Developing Successful Marketing and Organizational Strategies - 2
Lecture 6 - Organizing and managing marketing department
Lecture 7 - Developing marketing strategy
Lecture 8 - Understanding the Marketing Environment, Ethical Behavior, and Social Responsibility - 1
Lecture 9 - Understanding the Marketing Environment, Ethical Behavior, and Social Responsibility - 2
Lecture 10 - Understanding Consumer Behavior - 1
Lecture 11 - Understanding Consumer Behavior - 2
Lecture 12 - Understanding Consumer Behavior - 3
Lecture 13 - Understanding Organizations as Customers - 1
Lecture 14 - Understanding Organizations as Customers - 2
Lecture 15 - Understanding Organizations as Customers - 3
Lecture 16 - Understanding and Reaching Global Consumers and Markets - 1
Lecture 17 - Understanding and Reaching Global Consumers and Markets - 2
Lecture 18 - Understanding and Reaching Global Consumers and Markets - 3
Lecture 19 - Marketing Research: From Customer Insights to Actions - 1
Lecture 20 - Marketing Research: From Customer Insights to Actions - 2
Lecture 21 - Market Segmentation, Targeting, and Positioning - 1
Lecture 22 - Market Segmentation, Targeting, and Positioning - 2
Lecture 23 - Market Segmentation, Targeting, and Positioning - 3
Lecture 24 - Crafting customer value proposition, sustainable competitive advantage and positioning - 1
Lecture 25 - Crafting customer value proposition, sustainable competitive advantage and positioning - 2
Lecture 26 - Developing New Products and Services - 1
Lecture 27 - Developing New Products and Services - 2
Lecture 28 - Developing New Products and Services - 3
Lecture 29 - Developing New Products and Services - 4

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Lecture 30 - Developing New Products and Services - 5
Lecture 31 - Developing New Products and Services - 6
Lecture 32 - Developing New Products and Services - 7
Lecture 33 - Managing Successful Products, Services, and Brands - 1
Lecture 34 - Managing Successful Products, Services, and Brands - 2
Lecture 35 - Managing Successful Products, Services, and Brands - 3
Lecture 36 - Managing Successful Products, Services, and Brands - 4
Lecture 37 - Managing Successful Products, Services, and Brands - 5
Lecture 38 - Pricing Products and Services - 1
Lecture 39 - Pricing Products and Services - 2
Lecture 40 - Pricing Products and Services - 3
Lecture 41 - Managing Marketing Channels and Supply Chains - 1
Lecture 42 - Managing Marketing Channels and Supply Chains - 2
Lecture 43 - Retailing and Wholesaling - 1
Lecture 44 - Retailing and Wholesaling - 2
Lecture 45 - Retailing and Wholesaling - 3
Lecture 46 - Integrated Marketing Communications and Direct Marketing - 1
Lecture 47 - Integrated Marketing Communications and Direct Marketing - 2
Lecture 48 - Advertising, Sales Promotion, and Public Relations - 1
Lecture 49 - Advertising, Sales Promotion, and Public Relations - 2
Lecture 50 - Using Social Media to Connect with Consumers - 1
Lecture 51 - Using Social Media to Connect with Consumers - 2
Lecture 52 - Personal Selling and Sales Management - 1
Lecture 53 - Personal Selling and Sales Management - 2
Lecture 54 - Implementing Interactive and Multichannel Marketing - 1
Lecture 55 - Implementing Interactive and Multichannel Marketing - 2
Lecture 56 - Addressing Competition And Driving Growth - 1
Lecture 57 - Addressing Competition And Driving Growth - 2
Lecture 58 - Building Customer Loyalty - 1
Lecture 59 - Building Customer Loyalty - 2
Lecture 60 - Socially Responsible Marketing

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NPTEL Video Course - Management - NOC:Principles of Management (2021)

Subject Co-ordinator - Prof. Usha Lenka

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Management - I
Lecture 2 - Introduction to Management - II
Lecture 3 - Introduction to Management - III
Lecture 4 - Introduction to Management - IV
Lecture 5 - Evolution of Management - I
Lecture 6 - Evolution of Management - II
Lecture 7 - Evolution of Management - III
Lecture 8 - Evolution of Management - IV
Lecture 9 - Planning - I
Lecture 10 - Planning - II
Lecture 11 - Planning - III
Lecture 12 - Planning - IV
Lecture 13 - Planning - V
Lecture 14 - Forecasting and Premising - I
Lecture 15 - Forecasting and Premising - II
Lecture 16 - Forecasting and Premising - III
Lecture 17 - Forecasting and Premising - IV
Lecture 18 - Decision Making - I
Lecture 19 - Decision Making - II
Lecture 20 - Decision Making - III
Lecture 21 - Decision Making - IV
Lecture 22 - Decision Making - V
Lecture 23 - Management by Objectives - I
Lecture 24 - Management by Objectives - II
Lecture 25 - Management by Objectives - III
Lecture 26 - Styles of Management - I
Lecture 27 - Styles of Management - II
Lecture 28 - Styles of Management - III
Lecture 29 - Organizing and Directing - I

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Lecture 30 - Organizing and Directing - II
Lecture 31 - Organizing and Directing - III
Lecture 32 - Organizing and Directing - IV
Lecture 33 - Organizing and Directing - V
Lecture 34 - Staffing and Coordination - I
Lecture 35 - Staffing and Coordination - II
Lecture 36 - Staffing and Coordination - III
Lecture 37 - Staffing and Coordination - IV
Lecture 38 - Staffing and Coordination - V
Lecture 39 - Staffing and Coordination - VI
Lecture 40 - Staffing and Coordination - VII
Lecture 41 - Staffing and Coordination - VIII
Lecture 42 - Career Development Strategy - I
Lecture 43 - Career Development Strategy - II
Lecture 44 - Career Development Strategy - III
Lecture 45 - Career Development Strategy - IV
Lecture 46 - Career Development Strategy - V
Lecture 47 - Leadership Styles of Managers - I
Lecture 48 - Leadership Styles of Managers - II
Lecture 49 - Leadership Styles of Managers - III
Lecture 50 - Leadership Styles of Managers - IV
Lecture 51 - Organizational Communication - I
Lecture 52 - Organizational Communication - II
Lecture 53 - Organizational Communication - III
Lecture 54 - Organizational Communication - IV
Lecture 55 - Organizational Communication - V
Lecture 56 - Change Management - I
Lecture 57 - Change Management - II
Lecture 58 - Change Management - III
Lecture 59 - Organizational Change - IV
Lecture 60 - Change Management - V
Lecture 61 - Organizational Change - VI
Lecture 62 - Change Management - VII

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NPTEL Video Course - Management - NOC:Organization Theory-Structure and Design (2021)

Subject Co-ordinator - Prof. Zillur Rahman

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview - Part 1
Lecture 2 - An Overview - Part 2
Lecture 3 - The Evolution of Organization Theory - Part 1
Lecture 4 - The Evolution of Organization Theory - Part 2
Lecture 5 - Organizational Effectiveness - Part 1
Lecture 6 - Organizational Effectiveness - Part 2
Lecture 7 - Organizational Effectiveness - Part 3
Lecture 8 - Dimensions of Organization Structure - Part 1
Lecture 9 - Dimensions of Organization Structure - Part 2
Lecture 10 - Dimensions of Organization Structure - Part 3
Lecture 11 - Strategy - Part 1
Lecture 12 - Strategy - Part 2
Lecture 13 - Strategy - Part 3
Lecture 14 - Organization Size - Part 1
Lecture 15 - Organization Size - Part 2
Lecture 16 - Technology - Part 1
Lecture 17 - Technology - Part 2
Lecture 18 - Environment - Part 1
Lecture 19 - Environment - Part 2
Lecture 20 - Environment - Part 3
Lecture 21 - Power Control - Part 1
Lecture 22 - Power Control - Part 2
Lecture 23 - Power Control - Part 3
Lecture 24 - Organizational Design Options - Part 1
Lecture 25 - Organizational Design Options - Part 2
Lecture 26 - Organizational Design Options - Part 3
Lecture 27 - Bureaucracy - Part 1
Lecture 28 - Bureaucracy - Part 2
Lecture 29 - Adhocracy - Part 1

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Lecture 30 - Adhocracy - Part 2
Lecture 31 - Managing the Environment - Part 1
Lecture 32 - Managing the Environment - Part 2
Lecture 33 - Managing Organizational Change - Part 1
Lecture 34 - Managing Organizational Change - Part 2
Lecture 35 - Managing Organizational Conflict - Part 1
Lecture 36 - Managing Organizational Conflict - Part 2
Lecture 37 - Managing Organizational Culture - Part 1
Lecture 38 - Managing Organizational Culture - Part 2
Lecture 39 - Managing Organizational Evolution - Part 1
Lecture 40 - Managing Organizational Evolution - Part 2

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NPTEL Video Course - Management - NOC:Talent Acquisition and Management

Subject Co-ordinator - Prof. S. Rangnekar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Talent Acquisition and Management - I
Lecture 2 - Introduction to talent Acquisition and Management - II
Lecture 3 - Introduction to Talent Acquisition and Management - III
Lecture 4 - Introduction to Talent Acquisition and Management - IV
Lecture 5 - Nurturing the Leaders of Tomorrow
Lecture 6 - Talent Acquisition
Lecture 7 - Talent Acquisition Practices - Infosys
Lecture 8 - Talent Acquisition Practices - IBM
Lecture 9 - Talent Acquisition and Attracting Talent at Fedex
Lecture 10 - Talent Acquisition and Attracting Talent at Google
Lecture 11 - Introduction of Psychometric Test
Lecture 12 - Six principles of Talent Management
Lecture 13 - Employee Engagement
Lecture 14 - Employer Brand
Lecture 15 - Employee Retention
Lecture 16 - The Zinger Model of Employee Engagement
Lecture 17 - Integrating Competencies into Talent Process
Lecture 18 - Integrated Talent Management
Lecture 19 - Global Talent Management - Drivers-I
Lecture 20 - Global Talent Management - Drivers-II
Lecture 21 - Global Leadership Competencies - I
Lecture 22 - Global Leadership Competencies - II
Lecture 23 - Global Leadership Competencies - III
Lecture 24 - Global Leadership Competencies - IV
Lecture 25 - Talent Analytics
Lecture 26 - Talent Management Challenges - In the near Future
Lecture 27 - Talent Development
Lecture 28 - Talent Enhancement
Lecture 29 - Talent Mobility

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Lecture 30 - Rewards Programs in Talent Management
Lecture 31 - Integrated Talent Management Models - I
Lecture 32 - Integrated Talent Management Models - II
Lecture 33 - Rewards Strategy for Talent Management - I
Lecture 34 - Rewards Strategy for Talent Management - II
Lecture 35 - Coaching and Development
Lecture 36 - Talent Development - I
Lecture 37 - Talent Development - II
Lecture 38 - Talent Development - III
Lecture 39 - Meta Analysis and Talent Analytics - I
Lecture 40 - Meta Analysis and Talent Analytics - II
Lecture 41 - Organization Culture - I
Lecture 42 - Organization Culture - II
Lecture 43 - Organization Culture - III
Lecture 44 - Coaching with Compassion - I
Lecture 45 - Coaching with Compassion - II
Lecture 46 - Talent Success Drivers
Lecture 47 - Talent Acquisition Strategy - I
Lecture 48 - Talent Acquisition Strategy - II
Lecture 49 - Talent Management at PepsiCo - I
Lecture 50 - Talent Management at PepsiCo - II
Lecture 51 - Automated Screening - Talent Analytics
Lecture 52 - Big Data - Talent Analytics
Lecture 53 - Management in the New Economy
Lecture 54 - Employment to Consultation
Lecture 55 - Embedding and Sustaining Talent Power
Lecture 56 - Talent Enhancement and Drivers of Success
Lecture 57 - Building Sustainable Talent through Talent Management
Lecture 58 - Talent Powered Organization
Lecture 59 - Critical issues in Talent Management
Lecture 60 - Feeling and Sentiments Analysis

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NPTEL Video Course - Management - NOC:Econometric Modelling

Subject Co-ordinator - Prof. Sujata Kar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview
Lecture 2 - Formulation of Econometric Modelling
Lecture 3 - Review of Basic Concepts - I
Lecture 4 - Review of Basic Concepts - II
Lecture 5 - Types of Data
Lecture 6 - Simple Regression - I
Lecture 7 - Simple Regression - II
Lecture 8 - Assumptions of Classical Linear Regression
Lecture 9 - Properties of OLS Estimators
Lecture 10 - Hypothesis Testing
Lecture 11 - Multiple Regression - I
Lecture 12 - Multiple Regression - II
Lecture 13 - Multiple Regression - III
Lecture 14 - Problem of Multicollinearity
Lecture 15 - Omitted Variables and Parameter Stability - I
Lecture 16 - Omitted Variables and Parameter Stability - II
Lecture 17 - Problem of Heteroscedasticity - I
Lecture 18 - Problem of Heteroscedasticity - II
Lecture 19 - T- Test
Lecture 20 - Wald Test
Lecture 21 - F-test - I
Lecture 22 - F-Test - II
Lecture 23 - Chow Test
Lecture 24 - Problem of Serial Correlation - I
Lecture 25 - Problem of Serial Correlation - II
Lecture 26 - AR, MA and ARMA Processes - I
Lecture 27 - AR, MA and ARMA Processes - II
Lecture 28 - Modelling Trend and Seasonal Variations - I
Lecture 29 - Modelling Trend and Seasonal Variations - II

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Lecture 30 - Spline function and Categorical Variables
Lecture 31 - Linear Probability Model
Lecture 32 - Probit and Logit Models
Lecture 33 - Tobit and Multinomial Logit Models
Lecture 34 - Panel Data Methods
Lecture 35 - Simultaneous Equations System - I
Lecture 36 - Simultaneous Equations System - II
Lecture 37 - Introduction to VARs
Lecture 38 - Stationarity and Unit Root Testing - I
Lecture 39 - Stationarity and Unit Root Testing - II
Lecture 40 - Basics of Cointegeration

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NPTEL Video Course - Management - NOC:Security Analysis and Portfolio Management

Subject Co-ordinator - Prof. J. P. Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview and Introduction
Lecture 2 - Introduction (Debt and Equity)
Lecture 3 - Introduction (Derivatives I)
Lecture 4 - Introduction (Derivatives II)
Lecture 5 - Financial Risk
Lecture 6 - Risk and Arbitrage - I
Lecture 7 - Risk and Arbitrage - II
Lecture 8 - Arbitrage Theorems, EMH, Money Markets
Lecture 9 - Money Market Instruments, Bond Terminology
Lecture 10 - Intrinsic Value of Bonds
Lecture 11 - Yield to Maturity - I
Lecture 12 - Yield to Maturity - II
Lecture 13 - Yield to Maturity - III
Lecture 14 - Yield to Maturity - IV
Lecture 15 - Yield to Maturity - V
Lecture 16 - Holding Period Yield etc.
Lecture 17 - Clean and Dirty Price, Interest Rate Risk - I
Lecture 18 - Interest Rate Risk - II
Lecture 19 - Interest Rate Risk - III
Lecture 20 - Immunization
Lecture 21 - Immunization Example
Lecture 22 - Price Sensitivities, Key Rates
Lecture 23 - Term Structure of Interest Rates
Lecture 24 - Yield Spreads, Equity Valuation - I
Lecture 25 - Equity Valuation - II
Lecture 26 - Equity Valuation - III
Lecture 27 - Equity Valuation - IV
Lecture 28 - Equity Valuation - V
Lecture 29 - Equity Valuation - VI

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Lecture 30 - Equity Valuation - VII
Lecture 31 - Equity Valuation - VIII
Lecture 32 - Equity Valuation - IX
Lecture 33 - Fundamental Analysis
Lecture 34 - Balance Sheet Analysis - I
Lecture 35 - Balance Sheet Analysis - II
Lecture 36 - Balance Sheet Analysis - III
Lecture 37 - Balance Sheet Analysis - IV
Lecture 38 - Balance Sheet Analysis - V
Lecture 39 - Balance Sheet Analysis - VI
Lecture 40 - Income Statement, Cash Flow Statement, Ratio Analysis
Lecture 41 - Mean Variance Portfolio Optimization - I
Lecture 42 - Mean Variance Portfolio Optimization - II
Lecture 43 - Mean Variance Portfolio Optimization - III
Lecture 44 - Mean Variance Portfolio Optimization - IV
Lecture 45 - Mean Variance Portfolio Optimization - V
Lecture 46 - Mean Variance Portfolio Optimization - VI
Lecture 47 - Mean Variance Portfolio Optimization - VII
Lecture 48 - Mean Variance Portfolio Optimization - VIII
Lecture 49 - Single Index Model - I
Lecture 50 - Single Index Model - II
Lecture 51 - Capital Asset Pricing Model - I
Lecture 52 - Capital Asset Pricing Model - II
Lecture 53 - Capital Asset Pricing Model - III
Lecture 54 - Arbitrage Pricing Model - I
Lecture 55 - Arbitrage Pricing Model - II
Lecture 56 - Arbitrage Pricing Model - III, Portfolio Performance Evaluation
Lecture 57 - Efficient Market Hypothesis - I
Lecture 58 - Efficient Market Hypothesis - II, Financial Derivatives - I
Lecture 59 - Financial Derivatives - II
Lecture 60 - Financial Derivatives - III

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NPTEL Video Course - Management - NOC:Decision Making with Spreadsheet

Subject Co-ordinator - Prof. Ramesh Anbanandam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Cost, Revenue, and Profit Models, Break Even Analysis
Lecture 3 - Linear Programming Problem: Formulation and Assumptions
Lecture 4 - Linear Programming Problem: Graphical Solution Method
Lecture 5 - Graphical Calculator and Excel Solver for solving LPP
Lecture 6 - Sensitivity Analysis - 1
Lecture 7 - Sensitivity Analysis - 2
Lecture 8 - Sensitivity Analysis - 3
Lecture 9 - LPP Applications in Marketing
Lecture 10 - LPP Applications in Finance
Lecture 11 - LPP Applications in Operations - 1
Lecture 12 - LPP Applications in Operations - 2
Lecture 13 - LPP Applications in Operations - 3
Lecture 14 - Advanced LP Applications - Data Envelopment Analysis
Lecture 15 - Game Theory - 1
Lecture 16 - Game Theory - 2
Lecture 17 - Portfolio Management
Lecture 18 - Revenue Management
Lecture 19 - Distribution and Network Problems: Transportation Problem
Lecture 20 - Assignment and Shortest Path Problem
Lecture 21 - Maximal Flow, Production and Inventory Application, Scheduling and Assignment Problems
Lecture 22 - Integer Linear Programming
Lecture 23 - Integer Programming Distribution Problem
Lecture 24 - Nonlinear Optimization Models - I
Lecture 25 - Nonlinear Optimization Models - II
Lecture 26 - Nonlinear Optimization Models - III
Lecture 27 - Nonlinear Optimization Models - IV
Lecture 28 - Nonlinear Optimization Models - V
Lecture 29 - Project Scheduling: PERT/CPM - I

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Lecture 30 - Project Scheduling: PERT/CPM - II
Lecture 31 - Project Scheduling For Uncertain Activity Duration: PERT/CPM - III
Lecture 32 - Project Scheduling: PERT/CPM - IV
Lecture 33 - Inventory Models: Economic Order Quantity (EOQ) Model - I
Lecture 34 - Inventory Models: Economic Order Quantity (EOQ) Model - Iâ I
Lecture 35 - Economic Production Lot Size Model
Lecture 36 - Inventory Model with Planned Shortages
Lecture 37 - Inventory Model - III
Lecture 38 - Single-period Inventory model with Probabilistic demand
Lecture 39 - Multi-period Order-Quantity, Reorder Point Model with Probabilistic Demand
Lecture 40 - Periodic Review Model (P-type) with Probabilistic Demand
Lecture 41 - Financial risks associated with the development of a new product - I
Lecture 42 - Financial risks associated with the development of a new product - II
Lecture 43 - Inventory Simulation
Lecture 44 - Simulation - III
Lecture 45 - Simulation - IV
Lecture 46 - Decision Analysis - I
Lecture 47 - Decision Analysis - II
Lecture 48 - Decision Analysis - III
Lecture 49 - Decision Analysis - IV
Lecture 50 - Decision Analysis - V
Lecture 51 - Formulation Of Goal Programming - I
Lecture 52 - Formulation Of Goal Programming - II
Lecture 53 - Multicriteria Decisions - I
Lecture 54 - Multicriteria Decisions - II
Lecture 55 - Multicriteria Decisions - III
Lecture 56 - Time Series Analysis and Forecasting - I
Lecture 57 - Time Series Analysis and Forecasting - II
Lecture 58 - Time Series Analysis and Forecasting - III
Lecture 59 - Time Series Analysis and Forecasting - IV
Lecture 60 - Time Series Analysis and Forecasting - V

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NPTEL Video Course - Management - NOC:Integrated Marketing Communication

Subject Co-ordinator - Prof. Vinay Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Integrated Marketing Communication (IMC)
Lecture 2 - Defining Marketing Communication, Marketing and IMC
Lecture 3 - Relationship with Marketing and IMC
Lecture 4 - Effective Marketing Communication
Lecture 5 - Emerging trends in IMC - Part I
Lecture 6 - Emerging Trends in IMC - Part II
Lecture 7 - Design Thinking in IMC - Part I
Lecture 8 - Design Thinking in IMC - Part II
Lecture 9 - Effectiveness of Communication - Part I
Lecture 10 - Effectiveness of Communication - Part II
Lecture 11 - Communication Process and Reflexivity in IMC
Lecture 12 - Role of Consumer Behaviour in IMC
Lecture 13 - Consumer Decision Making Process - Part I
Lecture 14 - Consumer Decision Making Process - Part II
Lecture 15 - Relationship Between Consumer Behaviour and IMC
Lecture 16 - Role of Persuasion in IMC
Lecture 17 - Objectives and Budgeting
Lecture 18 - IMC as a Strategic Tool - Part I
Lecture 19 - IMC as a Strategic Tool - Part II
Lecture 20 - IMC and Branding
Lecture 21 - History of Advertising
Lecture 22 - History of Advertising Indian Perspective
Lecture 23 - Contribution of IMC in Brand Attitude
Lecture 24 - Advertising Agencies
Lecture 25 - Association of Research with IMC
Lecture 26 - Advertising Research Methods
Lecture 27 - IMC Planning - Part I
Lecture 28 - IMC Planning - Part II
Lecture 29 - IMC Planning - Part III

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Lecture 30 - Case Studies
Lecture 31 - Advertising and Marketing Mix
Lecture 32 - Advertising and Support Media
Lecture 33 - Media Planning - Part I
Lecture 34 - Media Planning - Part II
Lecture 35 - Introduction to Creativity
Lecture 36 - Creativity Elements - Part I
Lecture 37 - Creativity Elements - Part II
Lecture 38 - Creative Execution in Advertising - Part I
Lecture 39 - Creative Execution in Advertising - Part II
Lecture 40 - Creative Execution in Print Advertising
Lecture 41 - Sales Promotion - Part I
Lecture 42 - Sales Promotion - Part II
Lecture 43 - Sales Promotion - Part III
Lecture 44 - Personal Selling - Part I
Lecture 45 - Personal Selling - Part II
Lecture 46 - Direct Marketing - Part I
Lecture 47 - Direct Marketing - Part II
Lecture 48 - Cause-Related Marketing
Lecture 49 - Public Relations
Lecture 50 - Word-of-Mouth and Corporate Advertising
Lecture 51 - Digital Advertising
Lecture 52 - Search Engine Optimization (SEO)
Lecture 53 - Social Media Advertising - Part I
Lecture 54 - Social Media Advertising - Part II
Lecture 55 - Social Media Advertising - Part III
Lecture 56 - Content Marketing
Lecture 57 - Ethics and Marketing Communications
Lecture 58 - Measuring Effectiveness of IMC - Part I
Lecture 59 - Measuring Effectiveness of IMC - Part II
Lecture 60 - Conclusion

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NPTEL Video Course - Management - NOC:Leadership and Team Effectiveness

Subject Co-ordinator - Prof. Santosh Rangnekar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Leadership and Team Management
Lecture 2 - Leadership Myths and Facts - I
Lecture 3 - Leadership Myths and Facts - II
Lecture 4 - Interactional Framework for Analyzing Leadership
Lecture 5 - Leadership Development: The First 90 Days as a Leader
Lecture 6 - Leader Development: The Action-Observation-Reflection Model
Lecture 7 - Leaderâ Member Exchange (LMX) Theory
Lecture 8 - Normative Decision Model
Lecture 9 - Situational Leadership Model
Lecture 10 - Contingency Model and Path-Goal Theory
Lecture 11 - Charismatic and Transformational Leadership
Lecture 12 - Leadership for Tomorrow
Lecture 13 - Leadership Attributes
Lecture 14 - Personality Traits and Leadership
Lecture 15 - Personality Types and Leadership
Lecture 16 - Intelligence and Leadership
Lecture 17 - Emotional Intelligence and Leadership
Lecture 18 - Power and Leadership
Lecture 19 - The Art of Influence in Leadership
Lecture 20 - Leadership and â Doing the Right Things
Lecture 21 - Character Based Approach to Leadership
Lecture 22 - Role of Ethics and Values in Organisational Leadership
Lecture 23 - Leadership Behaviour
Lecture 24 - Leadership Pipeline
Lecture 25 - Assessing Leadership Behaviors: Multi-rater feedback instruments
Lecture 26 - The Dark Side of Leadership- Destructive Leadership
Lecture 27 - Managerial Incompetence and Derailment
Lecture 28 - Negotiation and Leadership
Lecture 29 - Leadership in Crisis Situation

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Lecture 30 - The Situation and The Environment
Lecture 31 - Culture and Leadership
Lecture 32 - Global Leadership
Lecture 33 - Motivation and Leadership
Lecture 34 - Introduction to Groups and Teams
Lecture 35 - Characteristics of Leader, Follower and Situation
Lecture 36 - Group Dynamics
Lecture 37 - Team Formation
Lecture 38 - Delegation and Empowerment
Lecture 39 - Leading Teams: Enhancing Teamwork within a Group
Lecture 40 - The Leaderâ s Role in Team-Based Organizations
Lecture 41 - Leader Actions That Foster Team Effectiveness
Lecture 42 - Offsite Training and Team Development
Lecture 43 - Understanding Team Processes and Team Coaching
Lecture 44 - Team Decision Making and Conflict Management
Lecture 45 - Virtual teams
Lecture 46 - Managing Multicultural Teams
Lecture 47 - Building Great Teams
Lecture 48 - Experiential Learning
Lecture 49 - Action Learning
Lecture 50 - Development Planning: GAPS Analysis
Lecture 51 - Coaching and Mentoring
Lecture 52 - Women in Leadership Roles
Lecture 53 - Building Effective Relationship with Subordinates and Peers
Lecture 54 - Fostering Followers Satisfaction
Lecture 55 - The Art of Communication
Lecture 56 - Setting Goals and Providing Constructive Feedback
Lecture 57 - Enhancing Creativity Problem Solving Skills
Lecture 58 - Building High-Performance Teams: The Rocket Model
Lecture 59 - Building Credibility and Trust
Lecture 60 - Skills for Developing Others

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NPTEL Video Course - Management - NOC:Product and Brand Management

Subject Co-ordinator - Prof. Vinay Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Product and Brand Management
Lecture 2 - Defining Product
Lecture 3 - Terminologies Associated with Product - 1
Lecture 4 - Terminologies Associated with Product - 2
Lecture 5 - Terminologies Associated with Product - 3
Lecture 6 - Terminologies Associated with Product - 4
Lecture 7 - Product Management and Concepts Associated with Product
Lecture 8 - Product Classification
Lecture 9 - Product Differentiation and its Elements - 1
Lecture 10 - Product Differentiation and its Elements - 2
Lecture 11 - Product Positioning - 1
Lecture 12 - Product Positioning - 2
Lecture 13 - Product Life cycle - 1
Lecture 14 - Product Life Cycle - 2
Lecture 15 - Product Life Cycle - 3
Lecture 16 - Saddle Effect and Relationship of Product with Marketing Mix Elements
Lecture 17 - Market and Product Planning - 1
Lecture 18 - Market and Product Planning - 2
Lecture 19 - Product Strategy and Decisions - 1
Lecture 20 - Product Strategy and Decisions - 2
Lecture 21 - Product Decisions
Lecture 22 - Product Portfolio Management
Lecture 23 - Product Category Management
Lecture 24 - Customer Analysis
Lecture 25 - Competitors Analysis
Lecture 26 - Product Pricing
Lecture 27 - Product Pricing and Packaging
Lecture 28 - Product Distribution
Lecture 29 - Design Thinking - 1

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Lecture 30 - Design Thinking - 2
Lecture 31 - Design Thinking - 3
Lecture 32 - Product Innovation - 1
Lecture 33 - Product Innovation - 2
Lecture 34 - New Product Development
Lecture 35 - Reflexivity, Insight, and Value Co-Creation
Lecture 36 - Brand Management
Lecture 37 - Defining Brand
Lecture 38 - Strategic Brand Management Process
Lecture 39 - Brand Proposition
Lecture 40 - Customer-based Brand Equity - 1
Lecture 41 - Customer-based Brand Equity - 2
Lecture 42 - Brand Positioning
Lecture 43 - Brand Resonance Model
Lecture 44 - Brand Value Chain - 1
Lecture 45 - Brand Value Chain - 2
Lecture 46 - Brand Equity Elements - 1
Lecture 47 - Brand Equity Elements - 2
Lecture 48 - Designing Marketing Programs to Build Brand Equity
Lecture 49 - Secondary Brand Associations
Lecture 50 - Brand Audit and Research
Lecture 51 - Brand Architecture Strategies And Brand Portfolio
Lecture 52 - Brand Portfolio And Brand Hierarchies
Lecture 53 - Brand Equity: Measuring Outcomes - 1
Lecture 54 - Brand Equity: Measuring Outcomes - 2
Lecture 55 - Brand Extension
Lecture 56 - Brand Experience and Brand Loyalty
Lecture 57 - Brand Continuum and Brand Reinforcement
Lecture 58 - Brand Revitalization and Repositioning
Lecture 59 - Rebranding, Brand Demise and Brand Lifecycle
Lecture 60 - Product and Brand Management - Conclusion

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NPTEL Video Course - Management - NOC:Quantitative Investment Management

Subject Co-ordinator - Prof. J P Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview and Introduction, Debt and Equity
Lecture 2 - Hybrids, Derivatives
Lecture 3 - Financial Risk
Lecture 4 - Arbitrage
Lecture 5 - Arbitrage Free Pricing
Lecture 6 - Arbitrage Free Pricing of Bonds
Lecture 7 - Forward Rates, Bond Pricing with Forward Rates
Lecture 8 - Binomial Interest Rate Tree
Lecture 9 - Bond Pricing with Binomial Trees
Lecture 10 - Bond Pricing (Continued...)
Lecture 11 - Valuation of Bonds with Embedded Options
Lecture 12 - Features of Option Embedded Bonds
Lecture 13 - Yield to Maturity
Lecture 14 - Bond Yields and Yield Spreads
Lecture 15 - Z Spread and Option Adjusted Spread (OAS)
Lecture 16 - Yield Spreads
Lecture 17 - Interest Rate Risk
Lecture 18 - Duration and Immunization
Lecture 19 - Immunization and Bond Dynamics
Lecture 20 - Duration: Properties
Lecture 21 - Effective Duration
Lecture 22 - Key Rate Duration
Lecture 23 - One Sided Duration
Lecture 24 - Modeling of Fixed Income Returns
Lecture 25 - Immunizing a Single Liability
Lecture 26 - The Barbell Strategy - 1
Lecture 27 - The Barbell Strategy - 2
Lecture 28 - Yield Shifts and Immunization
Lecture 29 - Fixed Income Portfolio Strategies - 1

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Lecture 30 - Fixed Income Portfolio Strategies - 2
Lecture 31 - Fixed Income Portfolio Strategies - 3
Lecture 32 - Floaters, Caps and Floors
Lecture 33 - Derivatives, A Recapitulation
Lecture 34 - Forward Pricing - Investment Assets
Lecture 35 - Forward Pricing - Consumption Assets
Lecture 36 - Introduction to Options
Lecture 37 - Put Call Parity and Arbitrage
Lecture 38 - American Options - 1
Lecture 39 - American Options - 2
Lecture 40 - Option Trading Strategies - 1
Lecture 41 - Option Trading Strategies - 2
Lecture 42 - Option Trading Strategies - 3
Lecture 43 - Option Pricing - Binomial Model - 1
Lecture 44 - Option Pricing - Binomial Model - 2
Lecture 45 - Option Pricing - American Options
Lecture 46 - Random Walks
Lecture 47 - Brownian Motion
Lecture 48 - Stochastic Calculus
Lecture 49 - Stock Price Modelling
Lecture 50 - Black Scholes Model
Lecture 51 - Futures - 1
Lecture 52 - Futures - 2
Lecture 53 - Forward vs Futures Prices
Lecture 54 - Futures Hedging
Lecture 55 - Issues in Futures Hedging
Lecture 56 - Perfect Futures Hedge, Cross Hedge, Tailing the Hedge
Lecture 57 - Stock Index Futures - 1
Lecture 58 - Stock Index Futures - 2
Lecture 59 - Interest Rate Futures - 1
Lecture 60 - Interest Rate Futures - 2

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NPTEL Video Course - Management - NOC:Strategic Sales Management

Subject Co-ordinator - Prof. Kalpak Kulkarni, Prof. Sourabh Arora

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Breaking the Myths and Learning the Basics
Lecture 2 - Evolution and Role of Sales Management
Lecture 3 - Tactical Role of Sales Management
Lecture 4 - Complexities in Sales Management and Characteristics of Modern Selling
Lecture 5 - Difference Between Sales and Marketing
Lecture 6 - Selling in a VUCA World
Lecture 7 - Place of Selling in Overall Marketing Plan
Lecture 8 - Use of Marketing Principles in Creating Strategic Sales Plan
Lecture 9 - Sales Forecasting Methods for Informed Decision-Making
Lecture 10 - Tools to Assess Market While Developing Strategic Sales Plan
Lecture 11 - Models of Sales planning
Lecture 12 - Types of sales man and what makes a good sales man
Lecture 13 - Buying Centre and stages of sales call
Lecture 14 - Transformative Factors And Evolved Selling Process And Theories
Lecture 15 - Miller Heiman approach and virtual framework strategic selling
Lecture 16 - Miller Heiman Approach And Virtual Framework Strategic Selling (Continued...)
Lecture 17 - Buyer Persona and Consumer and B2B Decision Making process
Lecture 18 - Consumer and B2B Decision Making process Selling and Consumer Behavior
Lecture 19 - B2B Decision Making Process and Difference in B2B and B2C Selling
Lecture 20 - Key Account Management and Customer Centric Selling
Lecture 21 - Key Account Management, Customer Centric Selling and CRM Strategies (Continued...)
Lecture 22 - Key Responsibilities of Salespeople
Lecture 23 - Preparing for a Sales Role
Lecture 24 - Preparing for a Sales Role (Continued...)
Lecture 25 - Personal Selling Skills and Motivating Sales Team
Lecture 26 - Personal Selling Skills and Motivating Sales Team (Continued...)
Lecture 27 - Meaning and Role of Sales Intelligence
Lecture 28 - Data for Sales intelligence
Lecture 29 - Ideal Customer Profile

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Lecture 30 - Data-Driven Approaches to Selling
Lecture 31 - Social Media for Lead Generation
Lecture 32 - Understanding International Selling
Lecture 33 - Global Sales Dynamics and Sales Force Management
Lecture 34 - Do's and Don'ts of International Selling
Lecture 35 - Role of culture in International Selling
Lecture 36 - Challenges of Selling in International Markets
Lecture 37 - Role of technology management in selling
Lecture 38 - Use of Sales force Automation for Effective Selling
Lecture 39 - Role of AR/VR and AI in Selling
Lecture 40 - Managing a Diversified Sales-force
Lecture 41 - Ethical and Social issues in Selling

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NPTEL Video Course - Management - NOC:Retail Marketing Strategy

Subject Co-ordinator - Prof. Sourabh Arora

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Retailing from a Strategic Standpoint
Lecture 2 - Why is Retailing so Important: Strategic Perspectives
Lecture 3 - Strategic Standpoint and Evolution of Retailing
Lecture 4 - Evolution of Retailing
Lecture 5 - Value Creation
Lecture 6 - Retailing Theories Role in Supply Chain
Lecture 7 - Retailing Theories and Retailers Role in Supply Chain
Lecture 8 - Retailers Role in Supply Chain and Retail Management Decision Process
Lecture 9 - Retail Management Decision Process (Continued...) and Kahn's Retailing Success Matrix
Lecture 10 - Retail Management Decision Process and Kahn's Retailing Success Matrix
Lecture 11 - Retail Management Decision Process, Kahn's Retailing Success Matrix and Success Factors
Lecture 12 - Kahn's Retailing Success Matrix and Success Factors for Retailing
Lecture 13 - Success Factors for Retailing and View of Consumer Decision Making Processes
Lecture 14 - Success Factors for Retailing and View of Consumer Decision Making Processes (Continued...)
Lecture 15 - Consumer Decision Making Processes (Continued...)
Lecture 16 - Consumer Decision Making Processes (Continued...)
Lecture 17 - Consumer Decision Making Processes (Continued...) and Consumer Motives
Lecture 18 - Tenets of Customer Centric Approach: A Retailers Perspective
Lecture 19 - Private Label Brands
Lecture 20 - Types of Private Label Brands and Introduction to Multi and Omni-Channel Retail
Lecture 21 - Introduction to Multi and Omni-Channel Retail
Lecture 22 - Introduction to Multi and Omni-Channel Retail (Continued...)
Lecture 23 - Introduction to Multi and Omni-Channel Retail (Continued...)
Lecture 24 - Formulating a Successful Retail Strategy
Lecture 25 - Formulating a Successful Retail Strategy
Lecture 26 - Formulating a Successful Retail Strategy (Continued...)
Lecture 27 - Formulating a Successful Retail Strategy (Continued...)
Lecture 28 - Formulating a Successful Retail Strategy (Continued...)
Lecture 29 - Formulating a Successful Retail Strategy (Continued...)

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Lecture 30 - Formulating a Successful Retail Strategy (Continued...)
Lecture 31 - Location Decisions
Lecture 32 - Location Decisions
Lecture 33 - Pricing Decisions
Lecture 34 - Merchandise Management and Planning
Lecture 35 - Merchandise Management and Planning (Continued...)
Lecture 36 - Role of HRM in Retailing
Lecture 37 - Role of HRM in Retailing (Continued...)
Lecture 38 - Motivating Employees
Lecture 39 - Showrooming and Webrooming
Lecture 40 - Showrooming and Webrooming
Lecture 41 - Virtual Reality, Augmented Reality and Artificial Intelligence in Retailing

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NPTEL Video Course - Management - NOC:Business to Business Marketing (B2B)

Subject Co-ordinator - Prof. Jogendra Nayak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Business to Business Marketing
Lecture 2 - Classification of Products and Customers in B2B
Lecture 3 - B2B vs B2C Marketing - 1
Lecture 4 - B2B vs B2C Marketing - 2
Lecture 5 - Some Important Concepts and Case Study
Lecture 6 - Value Chain Analysis, Core Competence and Outsourcing
Lecture 7 - Introduction to Organisational Buying Behaviour
Lecture 8 - Howard's Seth Model
Lecture 9 - Seth's Model
Lecture 10 - Webster and Wind Model, Buying Center and Buygrid Framework
Lecture 11 - Purchasing function Goals and Kralijic's Model
Lecture 12 - Purchasing Cycle and Procurement Development Process
Lecture 13 - Strategic Sourcing and Case Study
Lecture 14 - E-Procurement and Supplier Assesment
Lecture 15 - B2B Marketing Strategy Formulation
Lecture 16 - B2B Marketing Strategy Formulation and Balance Scorecard
Lecture 17 - Balance Scorecard, Strategy Maps and Case Study
Lecture 18 - Managing Products in B2B Markets: PLC Approach
Lecture 19 - Managing Products in B2B Markets: TA Life Cycle Approach
Lecture 20 - Managing Services in B2B Markets
Lecture 21 - Introduction to STP
Lecture 22 - Segmentation in B2B Markets
Lecture 23 - Bonama and Shapiro's Nested Approach and Targeting in B2B
Lecture 24 - Target Market Strategies
Lecture 25 - Positioning in B2B Markets
Lecture 26 - B2B Positioning Strategies
Lecture 27 - Business Market Communication: Personal Selling
Lecture 28 - Business Market Communication: Sales Force Management
Lecture 29 - Business Market Communication: Advertising

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Lecture 30 - Business Market Communication: Social Media, Trade shows and more
Lecture 31 - Business Market Communication: Promotional Budgeting
Lecture 32 - Demand Forecasting in B2B Markets: Introduction
Lecture 33 - Demand Forecasting in B2B Markets: Qualitative Methods
Lecture 34 - Demand Forecasting in B2B Markets: Quantitative Methods - 1
Lecture 35 - Demand Forecasting in B2B Markets: Quantitative Methods - 2
Lecture 36 - B2B Product Management: New Product Development
Lecture 37 - B2B Product Management: Identifying New Products
Lecture 38 - B2B Product Management: Customer Value, Product Launch and more
Lecture 39 - B2B Product Management: Branding
Lecture 40 - B2B Pricing: Introduction
Lecture 41 - B2B Pricing: Price Setting Process - 1
Lecture 42 - B2B Pricing: Price Setting Process - 2
Lecture 43 - B2B Pricing: Pricing Methods
Lecture 44 - B2B Pricing: Geographical and Value Based Pricing
Lecture 45 - B2B Pricing: Competitive Bidding
Lecture 46 - Introduction to Relationship Management in B2B Markets
Lecture 47 - Types of Relationships in B2B Markets and Customer Profitability
Lecture 48 - Customer Relationship Management
Lecture 49 - Customer Lifetime Value
Lecture 50 - B2B Marketing Research: Introduction
Lecture 51 - B2B Marketing Research: Research Methods
Lecture 52 - Business Marketing Channels: Introduction and its Types
Lecture 53 - Business Marketing Channels: Types of Participants
Lecture 54 - Business Marketing Channels: E-Commerce
Lecture 55 - Supply Chain Management and its Drivers
Lecture 56 - Approaches to SCM and Logistics Management
Lecture 57 - Strategic Business Units (SBU) and BCG Matrix
Lecture 58 - GE Matrix and McKinsey 7S Framework
Lecture 59 - Marketing Techniques Implementation and Control
Lecture 60 - A Comprehensive Case Study

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NPTEL Video Course - Management - NOC:Designing Work Organization

Subject Co-ordinator - Prof. Santosh Rangnekar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organization Design
Lecture 2 - Evolution of Organization Theory and Design
Lecture 3 - Approaches to Design Based on Different Models
Lecture 4 - Role of Strategy in Organization Design
Lecture 5 - A Framework for Selecting Strategy and Design
Lecture 6 - Assessing Organizational Effectiveness - 1
Lecture 7 - Assessing Organizational Effectiveness - 2
Lecture 8 - Understanding Organizational Structure
Lecture 9 - Dimension of Organization Structure - 1
Lecture 10 - Dimension of Organization Structure - 2
Lecture 11 - Dimension of Organization Structure - 3
Lecture 12 - Interorganizational Relationship - 1
Lecture 13 - Interorganizational Relationship - 2
Lecture 14 - The Impact of External Environment
Lecture 15 - Framework for Response to Environmental Change
Lecture 16 - Organization Resilience and Adaptability
Lecture 17 - Introduction to Organization Decision-making
Lecture 18 - Models of Organizational decision-making
Lecture 19 - Contingency Decision-Making Framework
Lecture 20 - Role of IT in decision making
Lecture 21 - Strategic Role of Change
Lecture 22 - Model of Change Management
Lecture 23 - Managing Technology Change
Lecture 24 - Leading in VUCA World
Lecture 25 - Enhancing Organizational Readiness for Change
Lecture 26 - Designing Organizations for Competitive Success
Lecture 27 - Understanding and Developing Organization culture
Lecture 28 - Managing Culture by Design
Lecture 29 - Learning Organization

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Lecture 30 - Ethical values and Social Responsibility
Lecture 31 - Organizational Design Challenges
Lecture 32 - Interdepartmental Conflict in Organization
Lecture 33 - Power and Organization
Lecture 34 - Political Processes in an organization
Lecture 35 - Communications Structure of Organization
Lecture 36 - Leadership in Organization Design
Lecture 37 - The strategic value of Information Technology
Lecture 38 - E-business Organization Design
Lecture 39 - Workplace Technology and Design - 1
Lecture 40 - Workplace Technology and Design - 2
Lecture 41 - Innovation Management and its Principles
Lecture 42 - Models of Organizational Innovation
Lecture 43 - Innovation for Impact
Lecture 44 - Design Thinking for Innovation - 1
Lecture 45 - Design Thinking for Innovation - 2
Lecture 46 - Growth and Organization Life cycle
Lecture 47 - Organization Size and Complexity of Organization
Lecture 48 - Organization Bureaucracy and Control
Lecture 49 - Organization Development and Tools - 1
Lecture 50 - Organization Development and Tools - 2
Lecture 51 - Understanding Global Organizational Design
Lecture 52 - Designing Structure to Fit Global Strategy
Lecture 53 - Building Global Capabilities
Lecture 54 - Sustainable Organization Design
Lecture 55 - Job Crafting
Lecture 56 - Workplace Design for Well-being
Lecture 57 - Organization Building in Context of Employee Engagement
Lecture 58 - The Experience-Centric Organization
Lecture 59 - The Wheel of Experience Centricity
Lecture 60 - Designing Organization for Meaningful Experiences

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NPTEL Video Course - Management - NOC:Project Management (2024)

Subject Co-ordinator - Prof. Ramesh Anbanandam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Project Management - I
Lecture 2 - Introduction to Project Management - II
Lecture 3 - Agile Project Management
Lecture 4 - Project Selection Models
Lecture 5 - Examples of Project Selection Models
Lecture 6 - Project Manager
Lecture 7 - Attributes of Effective Project Manager
Lecture 8 - Managing for Stakeholders
Lecture 9 - Resolving Conflicts
Lecture 10 - Negotiation
Lecture 11 - Project in the Organization structure
Lecture 12 - Human factors and the Project Team
Lecture 13 - Traditional Project Activity Planning
Lecture 14 - Agile Project Planning, Project Charter
Lecture 15 - Coordination through Integration Management
Lecture 16 - Project Feasibility Analysis
Lecture 17 - Estimating Project Budgets
Lecture 18 - Project Risk Management
Lecture 19 - Quantitative Risk Assessment Methodologies
Lecture 20 - Critical Path Method (CPM)
Lecture 21 - Programme Evaluation And Review Technique PERT
Lecture 22 - Risk Analysis with simulation for scheduling
Lecture 23 - Gantt Chart and Scheduling with scrum
Lecture 24 - Crashing a project
Lecture 25 - Resource Loading
Lecture 26 - Resource Levelling
Lecture 27 - Goldratt's critical chain
Lecture 28 - Planning monitoring controlling cycle
Lecture 29 - Earned value analysis

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Lecture 30 - Agile tools for tracking project
Lecture 31 - Three types of Project Controlling
Lecture 32 - Control of change scope and scope creep
Lecture 33 - Project Audit
Lecture 34 - Essentials of an audit evaluation
Lecture 35 - When to close a project ?
Lecture 36 - Benefits realization, Case study on the success of Chandrayan 3
Lecture 37 - Software for Project Management
Lecture 38 - Demo on project management software
Lecture 39 - Simulations Software for Project Management
Lecture 40 - Course Summary

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NPTEL Video Course - Management - NOC:AI in Marketing

Subject Co-ordinator - Prof. Zillur Rahman

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding the basics of AI in Marketing - I
Lecture 2 - Understanding the basics of AI in Marketing - II
Lecture 3 - Understanding the basics of AI in Marketing - III
Lecture 4 - Introduction to AI Algorithms
Lecture 5 - Designs of AI, Transition process and AI matrix
Lecture 6 - Customer value and Role of AI in Value Delivery Process
Lecture 7 - Transforming Marketing Strategy using AI - I
Lecture 8 - Transforming Marketing Strategy using AI - II
Lecture 9 - Transforming Marketing Strategy using AI - III
Lecture 10 - Transforming Marketing Strategy using AI - IV
Lecture 11 - Transforming Marketing Strategy using AI - V
Lecture 12 - Using AI for STP
Lecture 13 - Application of AI in Marketing Mix - I
Lecture 14 - Application of AI in Marketing Mix - II
Lecture 15 - Marketing Information Systems and its Components
Lecture 16 - What is Marketing Research - I
Lecture 17 - What is Marketing Research - II
Lecture 18 - Individual Dynamics and its influence on Consumer Behaviour
Lecture 19 - Consumer Buying Decision Process
Lecture 20 - Understanding Customer Journey - I
Lecture 21 - Understanding Customer Journey - II
Lecture 22 - Customer Experience: Meaning and Characteristics
Lecture 23 - Personalization: Going Beyond Segmentation - I
Lecture 24 - Personalization: Going Beyond Segmentation - II
Lecture 25 - Avatar marketing
Lecture 26 - Standardization, Personalization and Relationalization of Brands using AI
Lecture 27 - Understanding Networks and Brand Network Effect
Lecture 28 - Understanding the Use of AI for Addressing Competition
Lecture 29 - AI and Brand Equity

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Lecture 30 - AI and New Brand Realities - I
Lecture 31 - AI and New Brand Realities - II
Lecture 32 - AI for Value Creation and Product Development
Lecture 33 - Personalization and hyper-personalization Using AI - I
Lecture 34 - Personalization and hyper-personalization Using AI - II
Lecture 35 - Personalization and hyper-personalization Using AI - III
Lecture 36 - Personalization and hyper-personalization Using AI - IV
Lecture 37 - Personalization and hyper-personalization Using AI - V
Lecture 38 - Implementation of AI by Product Managers
Lecture 39 - AI in Service
Lecture 40 - Pricing Strategies Using AI - I
Lecture 41 - Pricing Strategies Using AI - II
Lecture 42 - Pricing Strategies Using AI - III
Lecture 43 - Pricing Strategies Using AI - IV
Lecture 44 - Role of AI in Advertising - I
Lecture 45 - Role of AI in Advertising - II
Lecture 46 - AI in Sales promotion and Direct Marketing
Lecture 47 - AI in PR and Publicity and Social Media Marketing - I
Lecture 48 - AI in PR and Publicity and Social Media Marketing - II
Lecture 49 - Personal Selling using AI
Lecture 50 - Sales management using AI
Lecture 51 - AI and Marketing Channel Management
Lecture 52 - Omnichannel Marketing and Retailing
Lecture 53 - Changing face of Retailing in the age of AI
Lecture 54 - AI in Logistics Management - I
Lecture 55 - AI in Logistics Management - II
Lecture 56 - Navigating Ethical Challenges in AI - I
Lecture 57 - Navigating Ethical Challenges in AI - II
Lecture 58 - Navigating Ethical Challenges in AI - III
Lecture 59 - Navigating Ethical Challenges in AI - IV
Lecture 60 - AI and Sustainability

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NPTEL Video Course - Management - NOC:Innovation in Marketing and Marketing of Innovation

Subject Co-ordinator - Prof. Vinay Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Innovation
Lecture 3 - Innovations in Marketing and Marketing of Innovations
Lecture 4 - Innovations in Marketing
Lecture 5 - Need for Innovations in Marketing - 1
Lecture 6 - Need for Innovations in Marketing - 2
Lecture 7 - Change in Consumer Behaviour - 1
Lecture 8 - Change in Consumer Behaviour - 2
Lecture 9 - Innovative Perspectives about 4Pâ s for Innovation
Lecture 10 - Innovator's Dilemma
Lecture 11 - Go-To-Market Strategy
Lecture 12 - Targeting - Evolutionary Perspective
Lecture 13 - Innovations in Targeting and Positioning
Lecture 14 - Changing Concepts in Marketing of Products and Services
Lecture 15 - Changing Concepts of Marketing and Innovations in Service Marketing
Lecture 16 - Countering Commoditization: An Innovative Perspective
Lecture 17 - Innovations and Branding
Lecture 18 - Innovation in Pricing and Factors Affecting Pricing Innovations
Lecture 19 - Innovation in Pricing
Lecture 20 - Innovation in Pricing Strategies - 1
Lecture 21 - Innovation in Pricing Strategies - 2
Lecture 22 - Innovation in Distribution Channels
Lecture 23 - Innovation in Channel Management
Lecture 24 - Innovation in Retailing - 1
Lecture 25 - Innovation in Retailing - 2
Lecture 26 - Influence of distribution innovation on Marketing Mix
Lecture 27 - Innovation in Marketing Communication - 1
Lecture 28 - Innovation in Marketing Communication - 2
Lecture 29 - Innovation in Marketing Communication - 3

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Lecture 30 - Innovative Marketing Communications: Direct Marketing
Lecture 31 - Innovative Marketing Communications: Sales Promotion and Public Relations
Lecture 32 - Innovative Marketing Communications: Advertising - Print, Radio and Television
Lecture 33 - Innovative Marketing Communications: Digital and Social Media Marketing
Lecture 34 - Influence of Innovation in Marketing Communications on the Marketing Mix
Lecture 35 - Co-Creation of Value and Value Co-Creation
Lecture 36 - Innovation and Value Chains - 1
Lecture 37 - Innovation and Value Chains - 2
Lecture 38 - Beyond Business
Lecture 39 - What is Marketing of Innovation? - Part 1
Lecture 40 - What is Marketing of Innovation? - Part 2
Lecture 41 - What is Marketing of Innovation? - Part 3
Lecture 42 - Marketing of Innovation - new products/new usage/ new services/ new perspective?
Lecture 43 - Marketing Research on Marketing of Innovation - Part 1
Lecture 44 - Marketing Research on Marketing of Innovation - Part 2
Lecture 45 - Marketing of Innovation - A fundamental change of thought process
Lecture 46 - Introduction to Innovation
Lecture 47 - Sources and Principles of Innovation
Lecture 48 - Strategy and Innovation
Lecture 49 - Connecting Innovation to Strategy
Lecture 50 - Understanding Consumers
Lecture 51 - Consumer Behavior and Innovations
Lecture 52 - Product Life Cycle in case of Innovations; Is it different?
Lecture 53 - Branding of Innovation
Lecture 54 - Marketing of Innovation in Service Industry - Part 1
Lecture 55 - Marketing of Innovation in Service Industry - Part 2
Lecture 56 - Positioning of Innovation
Lecture 57 - New Product Development
Lecture 58 - Monetizing and Delivering Innovation
Lecture 59 - What if it did not happen?
Lecture 60 - Conclusion

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NPTEL Video Course - Management - NOC:Strategic Services Marketing

Subject Co-ordinator - Prof. Kalpak Kulkarni

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Services and their Unique Characteristics
Lecture 2 - Services in Modern Economy
Lecture 3 - Trends and Challenges in Services Marketing
Lecture 4 - Service Marketing Mix and Value Creation
Lecture 5 - Services Ecosystem and Stakeholder Analysis
Lecture 6 - Customer Journey Mapping and Touchpoint Analysis
Lecture 7 - Designing memorable customer experiences
Lecture 8 - Personalization and Customization in Services
Lecture 9 - Emotional and Sensory marketing in Services
Lecture 10 - Technology-enabled customer experiences
Lecture 11 - Service Design Thinking and Design-driven Innovation
Lecture 12 - Open Innovation and Collaboration in Services
Lecture 13 - Crowdsourcing and customer involvement in service development
Lecture 14 - Managing Service Failures and Service Recovery Strategies
Lecture 15 - Leveraging Customer Feedback for Continuous Improvement
Lecture 16 - Digitalization of Services and Digital Service Platforms
Lecture 17 - Online Customer Engagement and Social Media Marketing
Lecture 18 - Mobile Marketing and Location-based Services
Lecture 19 - Artificial Intelligence and Chatbot Integration in Services
Lecture 20 - Blockchain and its application in service industries
Lecture 21 - Data-driven Decision-making in Services Marketing
Lecture 22 - Customer Analytics and Segmentation Strategies
Lecture 23 - Predictive Analytics for Personalized Marketing
Lecture 24 - Sentiment Analysis and Social Listening in Services
Lecture 25 - Ethical Considerations in Handling Customer Data
Lecture 26 - Building a Strong Service Brand Identity
Lecture 27 - Brand Positioning and Differentiation Strategies
Lecture 28 - Online Brand Management and Reputation Monitoring
Lecture 29 - Managing Brand Extensions and Brand Partnerships

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Lecture 30 - Internal Branding and Aligning Employees with the Brand
Lecture 31 - Measuring and Improving Service Quality
Lecture 32 - SERVQUAL and Other Service Quality Measurement Tools
Lecture 33 - Service Guarantees and Service-level Agreements
Lecture 34 - Service Recovery Strategies and Complaint Handling
Lecture 35 - Cultivating a Culture of Service Excellence
Lecture 36 - Pricing Strategies for Services and Value-based Pricing
Lecture 37 - Dynamic Pricing and Revenue Optimization Techniques
Lecture 38 - Bundling and Packaging Strategies in Service Pricing
Lecture 39 - Subscription Models and Revenue Diversification
Lecture 40 - Pricing Strategies for Freemium and Subscription-based Services
Lecture 41 - Cultural Nuances and Their Impact on Service Marketing
Lecture 42 - Adapting Services for Different Cultural Contexts
Lecture 43 - Global Branding and Localization Strategies
Lecture 44 - Managing Diversity and Inclusivity in Service Delivery
Lecture 45 - Cross-cultural Communication and Customer Relationship Management
Lecture 46 - Sustainable practices and corporate social responsibility in services
Lecture 47 - Environmental consciousness and green marketing
Lecture 48 - Eco-friendly service design and operations
Lecture 49 - Ethical sourcing and responsible supply chain management
Lecture 50 - Consumer attitudes towards sustainable services
Lecture 51 - Developing service leadership skills
Lecture 52 - Motivating and empowering service employees
Lecture 53 - Service culture and service-oriented organizational behaviour
Lecture 54 - Training and development for service excellence
Lecture 55 - Managing service teams and fostering collaboration
Lecture 56 - Innovations in Service Delivery and Technology
Lecture 57 - Augmented Reality and Virtual Reality in Services
Lecture 58 - Internet of Things (IoT) in Service Ecosystem
Lecture 59 - Servitization and Product-Service Systems
Lecture 60 - Future Prospects and Challenges in Services Marketing

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NPTEL Video Course - Management - NOC:HR Analytics

Subject Co-ordinator - Prof. Santosh Rangnekar, Prof. Abhishek Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to HR Analytics
Lecture 2 - HR Data Preparation and Development of HR metrics
Lecture 3 - Data science framework
Lecture 4 - Pitfalls of data science framework and Basics of data visualization
Lecture 5 - Developing HR analytics unit and culture
Lecture 6 - List of books
Lecture 7 - Introduction to data visualization
Lecture 8 - Data Visualization Power BI - 1
Lecture 9 - Data Visualization Power BI - 2
Lecture 10 - Data Visualization Power BI - 3
Lecture 11 - Data Visualization Excel - 1
Lecture 12 - Data Visualization Excel - 2
Lecture 13 - Steps of recruitment
Lecture 14 - Managerial challenges of recruitment - 1
Lecture 15 - Managerial challenges of recruitment - 2
Lecture 16 - Recruitment Analytics - 1
Lecture 17 - Recruitment Analytics - 2
Lecture 18 - Recruitment Analytics - 3
Lecture 19 - Recruitment Analytics - 4
Lecture 20 - Steps of employee selection process
Lecture 21 - Managerial challenges of employee selection - 1
Lecture 22 - Managerial challenges of employee selection - 2
Lecture 23 - Selection Analytics - 1
Lecture 24 - Selection Analytics - 2
Lecture 25 - Selection Analytics - 3
Lecture 26 - Selection Analytics - 4
Lecture 27 - Data Visualization of Recruitment and Selection
Lecture 28 - Steps of training
Lecture 29 - Managerial challenges of employee training - 1

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Lecture 30 - Managerial challenges of employee training - 2
Lecture 31 - Training Analytics - 1
Lecture 32 - Training Analytics - 2
Lecture 33 - Training Analytics - 3
Lecture 34 - Training Analytics - 4
Lecture 35 - Steps of Employee Development
Lecture 36 - Managerial Challenges of Employee Development - 1
Lecture 37 - Managerial challenges of employee development - 2
Lecture 38 - Employee Development Analytics - 1
Lecture 39 - Employee Development Analytics - 2
Lecture 40 - Employee Development Analytics - 3
Lecture 41 - Employee Development Analytics - 4
Lecture 42 - Data Visualization of Training and Development
Lecture 43 - Steps of performance management
Lecture 44 - Managerial challenges of performance management - 1
Lecture 45 - Managerial challenges of performance management - 2
Lecture 46 - Performance Analytics - 1
Lecture 47 - Performance Analytics - 2
Lecture 48 - Performance Analytics - 3
Lecture 49 - Performance Analytics - 4
Lecture 50 - Steps of compensation management
Lecture 51 - Managerial challenges of compensation management - 1
Lecture 52 - Managerial challenges of compensation management - 2
Lecture 53 - Compensation Analytics - 1
Lecture 54 - Compensation Analytics - 2
Lecture 55 - Compensation Analytics - 3
Lecture 56 - Compensation Analytics - 4
Lecture 57 - Data Visualization of Performance and Compensation
Lecture 58 - Data Visualization Tableau - 1
Lecture 59 - Data Visualization Tableau - 2
Lecture 60 - Data Visualization Tableau - 3
Lecture 61 - Data Visualization Tableau - 4
Lecture 62 - Data Visualization Tableau - 5

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NPTEL Video Course - Management - NOC:Strategic Management

Subject Co-ordinator - Prof. Vinay Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Strategic Management?
Lecture 2 - Concepts of Strategy - 1
Lecture 3 - Concepts of Strategy - 2
Lecture 4 - Concepts of Strategy - 3
Lecture 5 - Strategy, Strategic Plan and Tactics
Lecture 6 - Strategic Planning, Thinking and Business Policy
Lecture 7 - Importance of Strategic Management
Lecture 8 - Corporate Culture
Lecture 9 - Leadership - 1
Lecture 10 - Leadership - 2
Lecture 11 - Developing and Communicating a Strategic Vision
Lecture 12 - Communicating a Strategic Vision
Lecture 13 - Developing a Companyâ s Mission Statement and Linking it with Companyâ s Core Values
Lecture 14 - Strategic Management Process - 1
Lecture 15 - Strategic Management Process - 2
Lecture 16 - Concept of Organizational Life Cycle
Lecture 17 - Generic Competitive Strategies - 1
Lecture 18 - Generic Competitive Strategies - 2
Lecture 19 - Ethics as a Strategy - 1
Lecture 20 - Ethics as a Strategy - 2
Lecture 21 - Sustainability as a Strategic Approach - 1
Lecture 22 - Sustainability as a Strategic Approach - 2
Lecture 23 - Environment and Strategy - 1
Lecture 24 - Environment and Strategy - 2
Lecture 25 - Internal Environment
Lecture 26 - Environmental Analysis - Resource Based Model
Lecture 27 - I/O Model, Resources, Capabilities, Core Competencies and Value Chain
Lecture 28 - Industry Life Cycle
Lecture 29 - Competition as Basis for Strategy Formulation and Red Ocean Strategy

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Lecture 30 - Blue Ocean Strategy - 1
Lecture 31 - Blue Ocean Strategy - 2
Lecture 32 - Blue Ocean Strategy - 3
Lecture 33 - Blue Ocean Strategy - 4
Lecture 34 - Blue Ocean Strategy - 5
Lecture 35 - Strategic Entrepreneurship
Lecture 36 - Strategy for Value Creation
Lecture 37 - Strategy from Different Perspectives: Fortune at the Bottom of the Pyramid
Lecture 38 - Strategy from Different Perspectives: Capitalism at the Crossroads
Lecture 39 - Strategy from Different Perspectives: Sustainable Value Framework
Lecture 40 - Strategy from Different Perspectives: Development as Freedom
Lecture 41 - Designing Business Level Strategies
Lecture 42 - Designing and Strengthening Business Strategies
Lecture 43 - Corporate Level Strategy - 1
Lecture 44 - Corporate Level Strategy - 2
Lecture 45 - Designing Corporate Level Strategy
Lecture 46 - Designing and Strengthening Corporate Level Strategy
Lecture 47 - Strengthening Companyâ s Competitive Position - 1
Lecture 48 - Strengthening Companyâ s Competitive Position - 2
Lecture 49 - Mergers and Acquisitions - 1
Lecture 50 - Mergers and Acquisitions - 2
Lecture 51 - Corporate Governance - 1
Lecture 52 - Corporate Governance - 2
Lecture 53 - Corporate Governance - 3
Lecture 54 - Managing Internal Operations
Lecture 55 - Strategy Implementation
Lecture 56 - Strategy Evaluation
Lecture 57 - The Black Swan
Lecture 58 - ESG and SDG
Lecture 59 - Stop Predicting
Lecture 60 - Conclusion

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NPTEL Video Course - Management - NOC:AI in Product Management

Subject Co-ordinator - Prof. Zillur Rahman

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Product management
Lecture 2 - Role of AI in Product Management - Part 1
Lecture 3 - Role of AI in Product Management - Part 2
Lecture 4 - Role of AI in Product Management - Part 3
Lecture 5 - AI-Powered Market Research
Lecture 6 - AI-Powered Market Research Tools
Lecture 7 - Analyzing Qualitative Data with AI
Lecture 8 - Enhancing Quantitative Research with AI
Lecture 9 - AI in Customer Sentiment Analysis
Lecture 10 - Predictive Analytics in Market Research
Lecture 11 - AI in Brainstorming and Idea Generation
Lecture 12 - Validating Ideas using AI
Lecture 13 - AI-Driven Prioritization
Lecture 14 - Integrating AI into Marketing Planning
Lecture 15 - Market And Category Analysis with AI
Lecture 16 - AI Tools for Customer Segmentation
Lecture 17 - Personalization Engines using AI
Lecture 18 - AI in Omni-Channel Customer Engagement
Lecture 19 - AI Driven Customer Journey Mapping
Lecture 20 - Introduction to Competitor Analysis using AI
Lecture 21 - Competitive Intelligence with AI
Lecture 22 - Competitor Monitoring using AI
Lecture 23 - Using AI to Predict Competitor Moves
Lecture 24 - Case Studies on AI in Competitor Analysis
Lecture 25 - Sales Forecasting Models using AI
Lecture 26 - AI Tools for Demand Planning
Lecture 27 - AI for Sales Strategy Development
Lecture 28 - AI in Sales Training
Lecture 29 - Risk Modeling and Scenario Analysis with AI

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Lecture 30 - Strategic Planning with AI Insights
Lecture 31 - Positioning and Differentiation using AI
Lecture 32 - AI in Brand Management
Lecture 33 - Product Lifecycle Management with AI
Lecture 34 - Case Studies on AI in Product Strategy
Lecture 35 - Product-Led Growth using AI
Lecture 36 - New Product Development using AI - Part 1
Lecture 37 - New Product Development using AI - Part 2
Lecture 38 - Transforming New Product Development: The impact of AI - Part 1
Lecture 39 - Transforming New Product Development: The impact of AI - Part 2
Lecture 40 - AI in Go-To-Market Strategies
Lecture 41 - Price Optimization using AI - Part 1
Lecture 42 - Price Optimization using AI - Part 2
Lecture 43 - Price Optimization using AI - Part 3
Lecture 44 - Price Optimization using AI - Part 4
Lecture 45 - Price Optimization using AI - Part 5
Lecture 46 - Agile Development using AI
Lecture 47 - Roadmap Development using AI
Lecture 48 - AI for MVP (Minimum Viable Product) - Part 1
Lecture 49 - AI for MVP (Minimum Viable Product) - Part 2
Lecture 50 - AI-Powered Advertising - Part 1
Lecture 51 - AI-Powered Advertising - Part 2
Lecture 52 - AI in Channel Management
Lecture 53 - Distribution Optimization using AI - Part 1
Lecture 54 - Distribution Optimization using AI - Part 2
Lecture 55 - AI in Performance Monitoring
Lecture 56 - Revenue and profitability Analysis using AI
Lecture 57 - Benchmarking and Adjustments using AI
Lecture 58 - Customer support using AI
Lecture 59 - Challenges and Ethical Considerations
Lecture 60 - Future Trends in AI for Product Management

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NPTEL Video Course - Management - NOC:Operations and Revenue Analytics

Subject Co-ordinator - Prof. Rajat Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Operations Analytics: Introduction
Lecture 2 - Operations Analytics Applications
Lecture 3 - Descriptive Analytics
Lecture 4 - Predictive Analytics: Forecasts based on historical demand data
Lecture 5 - Predictive Analytics: Exponential Smoothing and Regression Analysis
Lecture 6 - Predictive Analytics: Estimation of Errors in Forecasting
Lecture 7 - Exponential Smoothing with Trend and Seasonality
Lecture 8 - Exponential Smoothing (Winterâ s Model)
Lecture 9 - Inventory Management and Uncertainties
Lecture 10 - Managing Uncertainty through Safety Inventory
Lecture 11 - Supply Uncertainty, Quantity Discounts and Production Lot Sizing
Lecture 12 - Decision Making under Uncertainty: Decision Tree
Lecture 13 - Decision Tree Example
Lecture 14 - Monte Carlo Simulation for Inventory Management
Lecture 15 - Newsvendor problem: Optimal Stocking Quantity in a Single Period
Lecture 16 - Optimal Stocking Quantity in a Single Period (Continued...)
Lecture 17 - Optimal Product Availability in Continuous Stocking
Lecture 18 - Material Requirements Planning
Lecture 19 - Material Requirements Planning (Continued...)
Lecture 20 - Improvements in Material Requirements Planning
Lecture 21 - Pricing and Revenue Management: Introduction
Lecture 22 - Levels and Strategy of Revenue Management
Lecture 23 - Case of Constrained Supply - Part A
Lecture 24 - Case of Constrained Supply - Part B
Lecture 25 - Booking Control and Nesting
Lecture 26 - Managing Cancellations and Two-Class model
Lecture 27 - Capacity Allocation
Lecture 28 - Capacity Allocation: Two-class and Multiclass Models
Lecture 29 - Multiclass Models: EMSR-a and EMSR-b

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Lecture 30 - EMSR-a and EMSR-b: Illustration on Excel
Lecture 31 - Network Management
Lecture 32 - Network Management: Virtual Nesting
Lecture 33 - Virtual Nesting: Excel Illustration
Lecture 34 - Overbooking
Lecture 35 - Overbooking Policies
Lecture 36 - Revenue Management: Price Based
Lecture 37 - Single- Product Dynamic Pricing Without Replenishment
Lecture 38 - Auctions
Lecture 39 - Markdown Pricing
Lecture 40 - Markdown Pricing and Conclusion

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NPTEL Video Course - Management - NOC:Project Selection and Finance for Professionals

Subject Co-ordinator - Prof. Anil Kumar Sharma

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Project Selection Process
Lecture 3 - Project Selection Process and Analysis
Lecture 4 - Generation and Screening of Project Ideas - I
Lecture 5 - Generation and Screening of Project Ideas - II
Lecture 6 - Generation and Screening of Project Ideas - III
Lecture 7 - Screening of Project Ideas
Lecture 8 - Screening of Project Ideas and Entrepreneurship
Lecture 9 - Market and Demand analysis
Lecture 10 - Market and Demand analysis process
Lecture 11 - Market and Demand Analysis and Demand Forecasting - I
Lecture 12 - Market and Demand Analysis and Demand Forecasting - II
Lecture 13 - Market and Demand Analysis and Demand Forecasting - III
Lecture 14 - Technical Analysis - I
Lecture 15 - Technical Analysis - II
Lecture 16 - Technical Analysis - III
Lecture 17 - Technical Analysis - IV
Lecture 18 - Technical Analysis - V
Lecture 19 - Financial Estimate and Projections - I
Lecture 20 - Financial Estimate and Projections - II
Lecture 21 - Financial Estimate and Projections - III
Lecture 22 - Financial Estimate and Projections - IV
Lecture 23 - Financial Estimate and Projections - V
Lecture 24 - Financial Estimate and Projections - VI
Lecture 25 - Financial Estimate and Projections - An Illustration - I
Lecture 26 - Financial Estimate and Projections - An Illustration - II
Lecture 27 - Financial Estimate and Projections - An Illustration - III
Lecture 28 - Time Value of Money - I
Lecture 29 - Time Value of Money - II

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Lecture 30 - Time Value of Money - III
Lecture 31 - Time Value of Money - IV
Lecture 32 - Time Value of Money - V
Lecture 33 - Investment Criteria (Capital Budgeting) - I
Lecture 34 - Investment Criteria (Capital Budgeting) - II
Lecture 35 - Investment Criteria (Capital Budgeting) - III
Lecture 36 - Investment Criteria (Capital Budgeting) - IV
Lecture 37 - Investment Criteria (Capital Budgeting) - V
Lecture 38 - Investment Criteria (Capital Budgeting) - VI
Lecture 39 - Investment Criteria (Capital Budgeting) - VII
Lecture 40 - Estimation of Project Cash Flows - I
Lecture 41 - Estimation of Project Cash Flows - II
Lecture 42 - Estimation of Project Cash Flows - III
Lecture 43 - Estimation of Project Cash Flows - IV
Lecture 44 - Estimation of Project Cash Flows - V
Lecture 45 - Cost of Capital - I
Lecture 46 - Cost of Capital - II
Lecture 47 - Cost of Capital - III
Lecture 48 - Cost of Capital - IV
Lecture 49 - Cost of Capital - V
Lecture 50 - Cost of Capital - VI
Lecture 51 - Project Risk Analysis - I
Lecture 52 - Project Risk Analysis - II
Lecture 53 - Project Risk Analysis - III
Lecture 54 - Project Risk Analysis - IV
Lecture 55 - Project Risk Analysis - V
Lecture 56 - Financing of New Projects - I
Lecture 57 - Financing of New Projects - II
Lecture 58 - Networking Techniques for Project Management - I
Lecture 59 - Networking Techniques for Project Management - II
Lecture 60 - Networking Techniques for Project Management - III

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NPTEL Video Course - Management - NOC:Principles of Behavioral Economics

Subject Co-ordinator - Prof. Sujata Kar

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Behavioral Economics - What and Why
Lecture 2 - Behavioral Economics in Relation to other Sciences and Economics
Lecture 3 - Evolution of Behavioral Economics
Lecture 4 - The Neoclassical Tradition: An Introduction
Lecture 5 - Methodology - Types of Empirical Studies
Lecture 6 - Introduction to Motivation and Hierarchical Needs
Lecture 7 - Achievement and Craftsmanship: Driving Forces in Economic Behavior
Lecture 8 - Social Drivers of Economic Decisions
Lecture 9 - The Standard Model in Neoclassical Economics
Lecture 10 - Axioms and Assumptions of Neoclassical Model
Lecture 11 - Utility
Lecture 12 - Types of Utility
Lecture 13 - Bounded Rationality and Heuristics
Lecture 14 - Biases
Lecture 15 - Heuristics and Framing Effects
Lecture 16 - Menu Effects and Expectations Effects
Lecture 17 - A Few Effects and Choice Architecture
Lecture 18 - Nudges
Lecture 19 - Fundamentals of Probability Theory
Lecture 20 - Bayesian Updating and Confirmation Bias
Lecture 21 - Prospects and Risk Attitude
Lecture 22 - Risk Attitude and Axioms of EUT
Lecture 23 - Other Axioms and Violations of EUT
Lecture 24 - Anomalies of EUT and Prospect Theory
Lecture 25 - Prospect Theory - Evaluation
Lecture 26 - The Prospect Theory Value Function
Lecture 27 - The Weighting Function
Lecture 28 - Cumulative Prospect Theory - I
Lecture 29 - Cumulative Prospect Theory - II

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Lecture 30 - Criticism of Prospect Theory
Lecture 31 - Mental Accounting - Introduction
Lecture 32 - Hedonic Editing Hypothesis
Lecture 33 - Hedonic Framing, Acquisition Utility, and Transaction Utility
Lecture 34 - Applications of Mental Accounting
Lecture 35 - Payment Decoupling and Budgeting
Lecture 36 - Behavioral and Classical Life-Cycle Theories
Lecture 37 - Budgeting and Choice Bracketing
Lecture 38 - Choice Bracketing and Dynamic Mental Accounting
Lecture 39 - Policy Implications of Mental Accounting - I
Lecture 40 - Policy Implications of Mental Accounting - II
Lecture 41 - Intertemporal Choice Models
Lecture 42 - Optimal Consumption in the Two-Period Model
Lecture 43 - Projection Bias
Lecture 44 - Discounted Utility Model
Lecture 45 - Features of the Discounted Utility Model
Lecture 46 - Anomalies in the Discounted Utility Model
Lecture 47 - Anomalies of DUM and Time-Inconsistent Behavior
Lecture 48 - NaÃ¯ve Hyperbolic Discounting
Lecture 49 - NaÃ¯ve Quasi-Hyperbolic Discounting
Lecture 50 - Some Special Discounting Cases
Lecture 51 - Introduction to Strategic Interactions
Lecture 52 - Analytical Game Theory
Lecture 53 - Sequential Game and Types of Games
Lecture 54 - Problems with Classical Game Theory - I
Lecture 55 - Problems with Classical Game Theory - II
Lecture 56 - Problems with Classical Game Theory - III
Lecture 57 - Introduction to Behavioral Games
Lecture 58 - Ultimatum and Dictator Games
Lecture 59 - Ultimatum and Public Goods Games
Lecture 60 - Trust Games

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NPTEL Video Course - Management - NOC:Organizations Theory, Structure and Design

Subject Co-ordinator - Prof. Usha Lenka

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Organization: An Overview
Lecture 2 - Evolution of Organization Theory
Lecture 3 - An Overview of Organizational Theories: Type 1, Type 2, Type 3, and Type 4
Lecture 4 - An Overview of Type 1 Organizational Theories
Lecture 5 - An Overview of Type 2 Organizational Theories
Lecture 6 - Type 3 Organizational Theories
Lecture 7 - Type 4 Organizational Theories
Lecture 8 - Organizational Effectiveness
Lecture 9 - Approaches of Organizational Effectiveness
Lecture 10 - Advantages and Disadvantages of Approaches of Organizational Effectiveness
Lecture 11 - Organizational Design and Structure
Lecture 12 - Organization and Organization Theory: The Determinants of Organizational Structure
Lecture 13 - The Determinants of Organizational Structure
Lecture 14 - Organizational Design and Structures
Lecture 15 - Types of Organizational Structure
Lecture 16 - Impact of Strategy on Structure
Lecture 17 - Frameworks of Strategy
Lecture 18 - Organizational Size
Lecture 19 - Technology - I
Lecture 20 - Technology - II
Lecture 21 - Advanced Manufacturing Technology
Lecture 22 - Environment - Part I
Lecture 23 - Environment - Part II
Lecture 24 - Environmental Uncertainty and Resource Dependency
Lecture 25 - Power and Influence in the Workplace
Lecture 26 - Power Control, Politics, and Negotiation
Lecture 27 - Minztbergâ S Typology of Organizational Structure
Lecture 28 - Strengths and Weaknesses of Design Configurations
Lecture 29 - Organizational Design Options - I

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Lecture 30 - Organizational Design Options - II
Lecture 31 - Organizational Design Options - III
Lecture 32 - Basic Challenges of Organizational Design
Lecture 33 - Designing Organizational Structure: Authority and Control
Lecture 34 - Bureaucrcay: A Closer Look - I
Lecture 35 - Bureaucracy: A Closer Look - II
Lecture 36 - Adhocracy: A Closer Look - I
Lecture 37 - Designing Organizational Structure: Specialization and Coordination
Lecture 38 - Adhocracy - II
Lecture 39 - Adhocracy - III
Lecture 40 - Managing The Environment - I
Lecture 41 - Managing The Environment - II
Lecture 42 - Managing Organizational Change - I
Lecture 43 - Managing Organizational Change - II
Lecture 44 - Managing Organizational Conflict - I
Lecture 45 - Managing Organizational Conflict - II
Lecture 46 - Conflict Resolution Strategies
Lecture 47 - Managing Conflict, Power, and Politics
Lecture 48 - Creating and Managing Organizational Culture
Lecture 49 - Organizational Culture - II
Lecture 50 - Managing Organizational Evolution - I
Lecture 51 - Managing Organizational Evolution - II

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NPTEL Video Course - Management - Strategic Management

Subject Co-ordinator - Prof. R. Srinivasan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Strategic Management
Lecture 2 - Concept of Corporate Strategy
Lecture 3 - Strategic Management Process - 1
Lecture 4 - Strategic Management Process - 2
Lecture 5 - The 7-S Framework
Lecture 6 - Corporate Policy and Planning in India
Lecture 7 - Board of Directors - Role and Functions
Lecture 8 - Board of Directors - Role and Functions, Top Management - Role and Skills, Board Functioning - Ir
Lecture 9 - Board Functioning - Indian Context and Environmental Scanning
Lecture 10 - Environmental Scanning and Industry Analysis
Lecture 11 - The synthesis of External Factors and External Factors Analysis Summary (EFAS)
Lecture 12 - Internal Corporate Analysis and Impact Matrix
Lecture 13 - Value Chain Analysis
Lecture 14 - Synthesis of Internal Factors - 1
Lecture 15 - Synthesis of Internal Factors - 2
Lecture 16 - Internal Factors Analysis Summary (IFAS) and Case Study - 1
Lecture 17 - Case Analysis
Lecture 18 - Key Financial Ratios
Lecture 19 - Case Analysis - 2 and SFAS Matrix
Lecture 20 - Business Strategy
Lecture 21 - Corporate Strategy - 1
Lecture 22 - Corporate Strategy - 2
Lecture 23 - Corporate Strategy - 3 and Functional Strategy
Lecture 24 - Functional Strategy - 1
Lecture 25 - Functional Strategy - 2
Lecture 26 - Functional Strategy - 3 and Strategic Choice
Lecture 27 - Strategy Implementation - 1
Lecture 28 - Strategy Implementation - 2
Lecture 29 - Evaluation and Control

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Lecture 30 - Strategic Information Systems - 1
Lecture 31 - Strategic Information Systems - 2
Lecture 32 - Other Strategic Issues - 1
Lecture 33 - Other Strategic Issues - 2
Lecture 34 - Small and Medium Enterprises
Lecture 35 - Non- Profit Organizations
Lecture 36 - Summary - 1
Lecture 37 - Summary - 2

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NPTEL Video Course - Management - Global Supply Chain Management

Subject Co-ordinator - Prof. N. Viswanadham

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Global Supply Chain Networks Part - 1
Lecture 2 - Introduction to Global Supply Chain Networks Part - 2
Lecture 3 - Zara - fast fashion
Lecture 4 - The Supply Chain Eco-System Framework
Lecture 5 - Supply Chain Eco-System Framework
Lecture 6 - Supply Chain Eco-System Framework
Lecture 7 - Metro Cash and Carry
Lecture 8 - Performance Analysis
Lecture 9 - Supply Chain Risk - Part-1
Lecture 10 - Supply Chain Risk - Part-2
Lecture 11 - Supply Chain Risk - Part-3
Lecture 12 - Mattel Toy Recalls and Supply Chain Management
Lecture 13 - Innovation in Emerging markets
Lecture 14 - Innovations in Supply Chain Ecosystem
Lecture 15 - Indian Telecom and Bharti Airtel
Lecture 16 - CEMEX - Part-1
Lecture 17 - CEMEX - Part-2
Lecture 18 - Governance
Lecture 19 - Governance of networked organizations
Lecture 20 - The Orchestration Governance Model
Lecture 21 - Orchestration-Examples
Lecture 22 - Li & Fung - Part-1
Lecture 23 - Li & Fung - Part-2
Lecture 24 - Supply Chain Design - Part-1
Lecture 25 - Supply Chain Design - Part-2
Lecture 26 - Green supply chain design - Part-1
Lecture 27 - Green supply chain design - Part-2
Lecture 28 - Green Supply Chain Ecosystem Analysis
Lecture 29 - GRIP Framework

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Lecture 30 - Location Selection
Lecture 31 - Ecosystem Aware Location Analysis
Lecture 32 - Food supply chain in India
Lecture 33 - Food supply chain ecosystem - Grip frame work
Lecture 34 - Food Security in India
Lecture 35 - Smart Villages and Cities - Part-1
Lecture 36 - Smart Villages and Cities - Part-2
Lecture 37 - Overview of the Course
Lecture 38 - How to use the Video lectures

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NPTEL Video Course - Management - NOC:Integrated Marketing Management

Subject Co-ordinator - Prof. R. Srinivasan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of Marketing
Lecture 2 - Marketing Management
Lecture 3 - Marketing in India
Lecture 4 - Role of Marketing
Lecture 5 - Case Analysis
Lecture 6 - Case Analysis
Lecture 7 - Case of Suryodaya
Lecture 8 - Marketing System
Lecture 9 - Input-Output Map
Lecture 10 - Competition
Lecture 11 - Consumer Behaviour Model
Lecture 12 - BCG Matrix, Strategic Marketing
Lecture 13 - Marketing Strategy
Lecture 14 - Market Segmentation, VALS Model
Lecture 15 - Sales Function and Marketing Mix
Lecture 16 - B-B Markets, Macro Environment
Lecture 17 - Analytical Marketing System
Lecture 18 - Decision Models
Lecture 19 - E-Business
Lecture 20 - Market Demand, Concept Testing
Lecture 21 - Product, Product Mix, PLC
Lecture 22 - PLC (Continued...)
Lecture 23 - Pricing Strategies
Lecture 24 - Brands, Channels
Lecture 25 - Channel Management, Marketing Communication
Lecture 26 - Advertising, Marketing Organisation
Lecture 27 - Role of Product Manager, Industrial Buying
Lecture 28 - Sales Forecasting, Marketing Control
Lecture 29 - Marketing Expense Analysis

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Lecture 30 - Toyota Strategy
Lecture 31 - Cafe Coffee Day(CCD)
Lecture 32 - CCD (Continued...)
Lecture 33 - I flex (OFSS)
Lecture 34 - OFSS
Lecture 35 - Oilseeds Growers Cooperative Society (OGCS)
Lecture 36 - OGCS

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NPTEL Video Course - Management - NOC:Strategic Management - The Competitive Edge

Subject Co-ordinator - Prof. R Srinivasan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Long Range/Strategic Planning
Lecture 2 - Purpose, Mission, Goals
Lecture 3 - Different types of Strategies
Lecture 4 - Different types of Strategies
Lecture 5 - Strategic Management Process (SMP)
Lecture 6 - Modes of Strategic decisions
Lecture 7 - 7-S Frame work
Lecture 8 - Director, powers
Lecture 9 - Functions of BoD
Lecture 10 - Responsibilities of Business
Lecture 11 - Taxonomy of Company Environment
Lecture 12 - Competitive Landscape
Lecture 13 - Global Uncertainty Internal Corporate Analysis
Lecture 14 - Industry structure, Competitor Analysis
Lecture 15 - Firm's value chain
Lecture 16 - Key factors of Success, Porter's Industry Competition Model
Lecture 17 - S and W Profile Analysis
Lecture 18 - Competitive Advantage(CA), IFAS,SFAS
Lecture 19 - Case Analysis
Lecture 20 - Case Analysis (Continued...)
Lecture 21 - Case Study - 1
Lecture 22 - Case Study - 2
Lecture 23 - Business Strategy
Lecture 24 - BEA, Doom Loops, Corporate Strategy, Portfolio Analysis
Lecture 25 - Corporate Strategy, Display Matrices
Lecture 26 - Display Matrices
Lecture 27 - Display Matrices
Lecture 28 - National Diamond
Lecture 29 - Functional Strategy

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Lecture 30 - Strategic Choice
Lecture 31 - Stage I, II, III, IV organizations
Lecture 32 - Risk, Corporate Diversification
Lecture 33 - Mergers and Acquisitions
Lecture 34 - Model for Evaluation
Lecture 35 - Rewards
Lecture 36 - Technology Road Map
Lecture 37 - IT and Strategy, R&D Strategy
Lecture 38 - Summary

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NPTEL Video Course - Mathematics - Elementary Numerical Analysis

Subject Co-ordinator - Prof. Rekha P. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Polynomial Approximation
Lecture 3 - Interpolating Polynomials
Lecture 4 - Properties of Divided Difference
Lecture 5 - Error in the Interpolating polynomial
Lecture 6 - Cubic Hermite Interpolation
Lecture 7 - Piecewise Polynomial Approximation
Lecture 8 - Cubic Spline Interpolation
Lecture 9 - Tutorial 1
Lecture 10 - Numerical Integration
Lecture 11 - Composite Numerical Integration
Lecture 12 - Gauss 2-point Rule
Lecture 13 - Gauss 2-point Rule
Lecture 14 - Convergence of Gaussian Integration
Lecture 15 - Tutorial 2
Lecture 16 - Numerical Differentiation
Lecture 17 - Gauss Elimination
Lecture 18 - L U decomposition
Lecture 19 - Cholesky decomposition
Lecture 20 - Gauss Elimination with partial pivoting
Lecture 21 - Vector and Matrix Norms
Lecture 22 - Perturbed Linear Systems
Lecture 23 - Ill-conditioned Linear System
Lecture 24 - Tutorial 3
Lecture 25 - Effect of Small Pivots
Lecture 26 - Solution of Non-linear Equations
Lecture 27 - Quadratic Convergence of Newton's Method
Lecture 28 - Jacobi Method
Lecture 29 - Gauss-Seidel Method

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Lecture 30 - Tutorial 4
Lecture 31 - Initial Value Problem
Lecture 32 - Multi-step Methods
Lecture 33 - Predictor-Corrector Formulae
Lecture 34 - Boundary Value Problems
Lecture 35 - Eigenvalues and Eigenvectors
Lecture 36 - Spectral Theorem
Lecture 37 - Power Method
Lecture 38 - Inverse Power Method
Lecture 39 - Q R Decomposition
Lecture 40 - Q R Method

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NPTEL Video Course - Mathematics - Measure and Integration

Subject Co-ordinator - Prof. Inder K Rana

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Extended Real numbers
Lecture 2 - Algebra and Sigma Algebra of a subset of a set
Lecture 3 - Sigma Algebra generated by a class
Lecture 4 - Monotone Class
Lecture 5 - Set function
Lecture 6 - The Length function and its properties
Lecture 7 - Countably additive set functions on intervals
Lecture 8 - Uniqueness Problem for Measure
Lecture 9 - Extension of measure
Lecture 10 - Outer measure and its properties
Lecture 11 - Measurable sets
Lecture 12 - Lebesgue measure and its properties
Lecture 13 - Characterization of Lebesque measurable sets
Lecture 14 - Measurable functions
Lecture 15 - Properties of measurable functions
Lecture 16 - Measurable functions on measure spaces
Lecture 17 - Integral of non negative simple measurable functions
Lecture 18 - Properties of non negative simple measurable functions
Lecture 19 - Monotone convergence theorem & Fatou's Lemma
Lecture 20 - Properties of Integral functions & Dominated Convergence Theorem
Lecture 21 - Dominated Convergence Theorem and applications
Lecture 22 - Lebesgue Integral and its properties
Lecture 23 - Denseness of continuous function
Lecture 24 - Product measures, an Introduction
Lecture 25 - Construction of Product Measure
Lecture 26 - Computation of Product Measure - I
Lecture 27 - Computation of Product Measure - II
Lecture 28 - Integration on Product spaces
Lecture 29 - Fubini's Theorems

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Lecture 30 - Lebesgue Measure and integral on R2
Lecture 31 - Properties of Lebesgue Measure and integral on Rn
Lecture 32 - Lebesgue integral on R2
Lecture 33 - Integrating complex-valued functions
Lecture 34 - Lp - spaces
Lecture 35 - L2(X,S,mue)
Lecture 36 - Fundamental Theorem of calculas for Lebesgue Integral - I
Lecture 37 - Fundamental Theorem of calculus for Lebesgue Integral - II
Lecture 38 - Absolutely continuous measures
Lecture 39 - Modes of convergence
Lecture 40 - Convergence in Measure

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NPTEL Video Course - Mathematics - Mathematics in India - From Vedic Period to Modern Times

Subject Co-ordinator - Prof. M.D. Srinivas, Prof. K. Ramasubramanian, Prof. M.S. Sriram

Co-ordinating Institute - Centre for Policy Studies, Chennai | IIT - Bombay | University of Madras, Chennai

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Indian Mathematics
Lecture 2 - Vedas and Sulbasutras - Part 1
Lecture 3 - Vedas and Sulbasutras - Part 2
Lecture 4 - Panini's Astadhyayi
Lecture 5 - Pingala's Chandahsastra
Lecture 6 - Decimal place value system
Lecture 7 - Aryabhatiya of Aryabhata - Part 1
Lecture 8 - Aryabhatiya of Aryabhata - Part 2
Lecture 9 - Aryabhatiya of Aryabhata - Part 3
Lecture 10 - Aryabhatiya of Aryabhata - Part 4 and Introduction to Jaina Mathematics
Lecture 11 - Brahmasphutasiddhanta of Brahmagupta - Part 1
Lecture 12 - Brahmasphutasiddhanta of Brahmagupta - Part 2
Lecture 13 - Brahmasphutasiddhanta of Brahmagupta - Part 3
Lecture 14 - Brahmasphutasiddhanta of Brahmagupta - Part 4 and The Bakhshali Manuscript
Lecture 15 - Mahaviras Ganitasarasangraha - Part 1
Lecture 16 - Mahaviras Ganitasarasangraha - Part 2
Lecture 17 - Mahaviras Ganitasarasangraha - Part 3
Lecture 18 - Development of Combinatorics - Part 1
Lecture 19 - Development of Combinatorics - Part 2
Lecture 20 - Lilavati of Bhaskaracarya - Part 1
Lecture 21 - Lilavati of Bhaskaracarya - Part 2
Lecture 22 - Lilavati of Bhaskaracarya - Part 3
Lecture 23 - Bijaganita of Bhaskaracarya - Part 1
Lecture 24 - Bijaganita of Bhaskaracarya - Part 2
Lecture 25 - Ganitakaumudi of Narayana Pandita - Part 1
Lecture 26 - Ganitakaumudi of Narayana Pandita - Part 2
Lecture 27 - Ganitakaumudi of Narayana Pandita - Part 3
Lecture 28 - Magic Squares - Part 1
Lecture 29 - Magic Squares - Part 2

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Lecture 30 - Development of Calculus in India - Part 1
Lecture 31 - Development of Calculus in India - Part 2
Lecture 32 - Jyanayanam
Lecture 33 - Trigonometry and Spherical Trigonometry - Part 1
Lecture 34 - Trigonometry and Spherical Trigonometry - Part 2
Lecture 35 - Trigonometry and Spherical Trigonometry - Part 3
Lecture 36 - Proofs in Indian Mathematics - Part 1
Lecture 37 - Proofs in Indian Mathematics - Part 2
Lecture 38 - Proofs in Indian Mathematics - Part 3
Lecture 39 - Mathematics in Modern India - Part 1
Lecture 40 - Mathematics in Modern India - Part 2

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NPTEL Video Course - Mathematics - NOC:Measure Theory

Subject Co-ordinator - Prof. Inder K Rana

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - (1A) Introduction, Extended Real Numbers
Lecture 2 - (1B) Introduction, Extended Real Numbers
Lecture 3 - (2A) Algebra and Sigma Algebra of Subsets of a Set
Lecture 4 - (2B) Algebra and Sigma Algebra of Subsets of a Set
Lecture 5 - (3A) Sigma Algebra generated by a Class
Lecture 6 - (3B) Sigma Algebra generated by a Class
Lecture 7 - (4A) Monotone Class
Lecture 8 - (4B) Monotone Class
Lecture 9 - (5A) Set Functions
Lecture 10 - (5B) Set Functions
Lecture 11 - (6A) The Length Function and its Properties
Lecture 12 - (6B) The Length Function and its Properties
Lecture 13 - (7A) Countably Additive Set Functions on Intervals
Lecture 14 - (7B) Countably Additive Set Functions on Intervals
Lecture 15 - (8A) Uniqueness Problem for Measure
Lecture 16 - (8B) Uniqueness Problem for Measure
Lecture 17 - (9A) Extension of Measure
Lecture 18 - (9B) Extension of Measure
Lecture 19 - (10A) Outer Measure and its Properties
Lecture 20 - (10B) Outer Measure and its Properties
Lecture 21 - (11A) Measurable Sets
Lecture 22 - (11B) Measurable Sets
Lecture 23 - (12A) Lebesgue Measure and its Properties
Lecture 24 - (12B) Lebesgue Measure and its Properties
Lecture 25 - (13A) Characterization of Lebesgue Measurable Sets
Lecture 26 - (13B) Characterization of Lebesgue Measurable Sets
Lecture 27 - (14A) Measurable Functions
Lecture 28 - (14B) Measurable Functions
Lecture 29 - (15A) Properties of Measurable Functions

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Lecture 30 - (15B) Properties of Measurable Functions
Lecture 31 - (16A) Measurable Functions on Measure Spaces
Lecture 32 - (16B) Measurable Functions on Measure Spaces
Lecture 33 - (17A) Integral of Nonnegative Simple Measurable Functions
Lecture 34 - (17B) Integral of Nonnegative Simple Measurable Functions
Lecture 35 - (18A) Properties of Nonnegative Simple Measurable Functions
Lecture 36 - (18B) Properties of Nonnegative Simple Measurable Functions
Lecture 37 - (19A) Monotone Convergence Theorem and Fatou's Lemma
Lecture 38 - (19B) Monotone Convergence Theorem and Fatou's Lemma
Lecture 39 - (20A) Properties of Integrable Functions and Dominated Convergence Theorem
Lecture 40 - (20B) Properties of Integrable Functions and Dominated Convergence Theorem
Lecture 41 - (21A) Dominated Convergence Theorem and Applications
Lecture 42 - (21B) Dominated Convergence Theorem and Applications
Lecture 43 - (22A) Lebesgue Integral and its Properties
Lecture 44 - (22B) Lebesgue Integral and its Properties
Lecture 45 - (23A) Product Measure, an Introduction
Lecture 46 - (23B) Product Measure, an Introduction
Lecture 47 - (24A) Construction of Product Measures
Lecture 48 - (24B) Construction of Product Measures
Lecture 49 - (25A) Computation of Product Measure - I
Lecture 50 - (25B) Computation of Product Measure - I
Lecture 51 - (26A) Computation of Product Measure - II
Lecture 52 - (26B) Computation of Product Measure - II
Lecture 53 - (27A) Integration on Product Spaces
Lecture 54 - (27B) Integration on Product Spaces
Lecture 55 - (28A) Fubini's Theorems
Lecture 56 - (28B) Fubini's Theorems
Lecture 57 - (29A) Lebesgue Measure and Integral on R2
Lecture 58 - (29B) Lebesgue Measure and Integral on R2
Lecture 59 - (30A) Properties of Lebesgue Measure on R2
Lecture 60 - (30B) Properties of Lebesgue Measure on R2
Lecture 61 - (31A) Lebesgue Integral on R2
Lecture 62 - (31B) Lebesgue Integral on R2

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NPTEL Video Course - Mathematics - NOC:Calculus for Economics, Commerce and Management

Subject Co-ordinator - Prof.Inder Kumar Rana

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Concept of a Set, Ways of Representing Sets
Lecture 3 - Venn Diagrams, Operations on Sets
Lecture 4 - Operations on Sets, Cardinal Number, Real Numbers
Lecture 5 - Real Numbers, Sequences
Lecture 6 - Sequences, Convergent Sequences, Bounded Sequences
Lecture 7 - Limit Theorems, Sandwich Theorem, Monotone Sequences, Completeness of Real Numbers
Lecture 8 - Relations and Functions
Lecture 9 - Functions, Graph of a Functions, Function Formulas
Lecture 10 - Function Formulas, Linear Models
Lecture 11 - Linear Models, Elasticity, Linear Functions, Nonlinear Models, Quadratic Functions
Lecture 12 - Quadratic Functions, Quadratic Models, Power Function, Exponential Function
Lecture 13 - Exponential Function, Exponential Models, Logarithmic Function
Lecture 14 - Limit of a Function at a Point, Continuous Functions
Lecture 15 - Limit of a Function at a Point
Lecture 16 - Limit of a Function at a Point, Left and Right Limits
Lecture 17 - Computing Limits, Continuous Functions
Lecture 18 - Applications of Continuous Functions
Lecture 19 - Applications of Continuous Functions, Marginal of a Function
Lecture 20 - Rate of Change, Differentiation
Lecture 21 - Rules of Differentiation
Lecture 22 - Derivatives of Some Functions, Marginal, Elasticity
Lecture 23 - Elasticity, Increasing and Decreasing Functions, Optimization, Mean Value Theorem
Lecture 24 - Mean Value Theorem, Marginal Analysis, Local Maxima and Minima
Lecture 25 - Local Maxima and Minima
Lecture 26 - Local Maxima and Minima, Continuity Test, First Derivative Test, Successive Differentiation
Lecture 27 - Successive Differentiation, Second Derivative Test
Lecture 28 - Average and Marginal Product, Marginal of Revenue and Cost, Absolute Maximum and Minimum
Lecture 29 - Absolute Maximum and Minimum

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Lecture 30 - Monopoly Market, Revenue and Elasticity
Lecture 31 - Property of Marginals, Monopoly Market, Publisher v/s Author Problem
Lecture 32 - Convex and Concave Functions
Lecture 33 - Derivative Tests for Convexity, Concavity and Points of Inflection, Higher Order Derivative Conc
Lecture 34 - Convex and Concave Functions, Asymptotes
Lecture 35 - Asymptotes, Curve Sketching
Lecture 36 - Functions of Two Variables, Visualizing Graph, Level Curves, Contour Lines
Lecture 37 - Partial Derivatives and Application to Marginal Analysis
Lecture 38 - Marginals in Cobb-Douglas model, partial derivatives and elasticity, chain rules
Lecture 39 - Chain Rules, Higher Order Partial Derivatives, Local Maxima and Minima, Critical Points
Lecture 40 - Saddle Points, Derivative Tests, Absolute Maxima and Minima
Lecture 41 - Some Examples, Constrained Maxima and Minima

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NPTEL Video Course - Mathematics - NOC:Basic Linear Algebra

Subject Co-ordinator - Prof.Inder Kumar Rana

Co-ordinating Institute - IIT - Bombay

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Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Introduction - III
Lecture 4 - Systems of Linear Equations - I
Lecture 5 - Systems of Linear Equations - II
Lecture 6 - Systems of Linear Equations - III
Lecture 7 - Reduced Row Echelon Form and Rank - I
Lecture 8 - Reduced Row Echelon Form and Rank - II
Lecture 9 - Reduced Row Echelon Form and Rank - III
Lecture 10 - Solvability of a Linear System, Linear Span, Basis - I
Lecture 11 - Solvability of a Linear System, Linear Span, Basis - II
Lecture 12 - Solvability of a Linear System, Linear Span, Basis - III
Lecture 13 - Linear Span, Linear Independence and Basis - I
Lecture 14 - Linear Span, Linear Independence and Basis - II
Lecture 15 - Linear Span, Linear Independence and Basis - III
Lecture 16 - Row Space, Column Space, Rank-Nullity Theorem - I
Lecture 17 - Row Space, Column Space, Rank-Nullity Theorem - II
Lecture 18 - Row Space, Column Space, Rank-Nullity Theorem - III
Lecture 19 - Determinants and their Properties - I
Lecture 20 - Determinants and their Properties - II
Lecture 21 - Determinants and their Properties - III
Lecture 22 - Linear Transformations - I
Lecture 23 - Linear Transformations - II
Lecture 24 - Linear Transformations - III
Lecture 25 - Orthonormal Basis, Geometry in R^2 - I
Lecture 26 - Orthonormal Basis, Geometry in R^2 - II
Lecture 27 - Orthonormal Basis, Geometry in R^2 - III
Lecture 28 - Isometries, Eigenvalues and Eigenvectors - I
Lecture 29 - Isometries, Eigenvalues and Eigenvectors - II

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Lecture 30 - Isometries, Eigenvalues and Eigenvectors - III
Lecture 31 - Diagonalization and Real Symmetric Matrices - I
Lecture 32 - Diagonalization and Real Symmetric Matrices - II
Lecture 33 - Diagonalization and Real Symmetric Matrices - III
Lecture 34 - Diagonalization and its Applications - I
Lecture 35 - Diagonalization and its Applications - II
Lecture 36 - Diagonalization and its Applications - III
Lecture 37 - Abstract Vector Spaces - I
Lecture 38 - Abstract Vector Spaces - II
Lecture 39 - Abstract Vector Spaces - III
Lecture 40 - Inner Product Spaces - I
Lecture 41 - Inner Product Spaces - II

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NPTEL Video Course - Mathematics - NOC:Commutative Algebra

Subject Co-ordinator - Prof. Dilip P. Patil

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Zariski Topology and K-Spectrum
Lecture 2 - Algebraic Varieties and Classical Nullstelensatz
Lecture 3 - Motivation for Krulls Dimension
Lecture 4 - Chevalleys dimension
Lecture 5 - Associated Prime Ideals of a Module
Lecture 6 - Support of a Module
Lecture 7 - Primary Decomposition
Lecture 8 - Primary Decomposition (Continued...)
Lecture 9 - Uniqueness of Primary Decomposition
Lecture 10 - Modules of Finite Length
Lecture 11 - Modules of Finite Length (Continued...)
Lecture 12 - Introduction to KrullÃ¢â ¬â ¢s Dimension
Lecture 13 - Noether Normalization Lemma (Classical Version)
Lecture 14 - Consequences of Noether Normalization Lemma
Lecture 15 - Nil Radical and Jacobson Radical of Finite type Algebras over a Field and digression of Integral
Lecture 16 - NagataÃ¢â ¬â ¢s version of NNL
Lecture 17 - Dimensions of Polynomial ring over Noetherian rings
Lecture 18 - Dimension of Polynomial Algebra over arbitrary Rings
Lecture 19 - Dimension Inequalities
Lecture 20 - HilbertÃ¢â ¬â ¢s Nullstelensatz
Lecture 21 - Computational rules for PoincarÃ Â© Series
Lecture 22 - Graded Rings, Modules and PoincarÃ Â© Series
Lecture 23 - Hilbert-Samuel Polynomials
Lecture 24 - Hilbert-Samuel Polynomials (Continued...)
Lecture 25 - Numerical Function of polynomial type
Lecture 26 - Hilbert-Samuel Polynomial of a Local ring
Lecture 27 - Filtration on a Module
Lecture 28 - Artin-Rees Lemma
Lecture 29 - Dimension Theorem

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Lecture 30 - Dimension Theorem (Continued...)
Lecture 31 - Consequences of Dimension Theorem
Lecture 32 - Generalized KrullÃ¢â ¬â ¢s Principal Ideal Theorem
Lecture 33 - Second proof of KrullÃ¢â ¬â ¢s Principal Ideal Theorem
Lecture 34 - The Spec Functor
Lecture 35 - Prime ideals in Polynomial rings
Lecture 36 - Characterization of Equidimensional Affine Algebra
Lecture 37 - Connection between Regular local rings and associated graded rings
Lecture 38 - Statement of the Jacobian Criterion for Regularity
Lecture 39 - Hilbert function for Affine Algebra
Lecture 40 - Hilbert Serre Theorem
Lecture 41 - Jacobian Matrix and its Rank
Lecture 42 - Jacobian Matrix and its Rank (Continued...)
Lecture 43 - Proof of Jacobian Critrerion
Lecture 44 - Proof of Jacobian Critrerion (Continued...)
Lecture 45 - Preparation for Homological Dimension
Lecture 46 - Complexes of Modules and Homology
Lecture 47 - Projective Modules
Lecture 48 - Homological Dimension and Projective module
Lecture 49 - Global Dimension
Lecture 50 - Homological characterization of Regular Local Rings (RLR)
Lecture 51 - Homological characterization of Regular Local Rings (Continued...)
Lecture 52 - Homological Characterization of Regular Local Rings (Continued...)
Lecture 53 - Regular Local Rings are UFD
Lecture 54 - RLR-Prime ideals of height 1
Lecture 55 - Discrete Valuation Ring
Lecture 56 - Discrete Valuation Ring (Continued...)
Lecture 57 - Dedekind Domains
Lecture 58 - Fractionary Ideals and Dedekind Domains
Lecture 59 - Characterization of Dedekind Domain
Lecture 60 - Dedekind Domains and prime factorization of ideals

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NPTEL Video Course - Mathematics - NOC:Galois Theory

Subject Co-ordinator - Prof. Dilip P. Patil

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical Perspectives
Lecture 2 - Examples of Fields
Lecture 3 - Polynomials and Basic properties
Lecture 4 - Polynomial Rings
Lecture 5 - Unit and Unit Groups
Lecture 6 - Division with remainder and prime factorization
Lecture 7 - Zeroes of Polynomials
Lecture 8 - Polynomial functions
Lecture 9 - Algebraically closed Fields and statement of FTA
Lecture 10 - GaussÃ¢â ¬â ¢s Theorem(Uniqueness of factorization)
Lecture 11 - Digression on Rings homomorphism, Algebras
Lecture 12 - Kernel of homomorphisms and ideals in K[X],Z
Lecture 13 - Algebraic elements
Lecture 14 - Examples
Lecture 15 - Minimal Polynomials
Lecture 16 - Characterization of Algebraic elements
Lecture 17 - Theorem of Kronecker
Lecture 18 - Examples
Lecture 19 - Digression on Groups
Lecture 20 - Some examples and Characteristic of a Ring
Lecture 21 - Finite subGroups of the Unit Group of a Field
Lecture 22 - Construction of Finite Fields
Lecture 23 - Digression on Group action - I
Lecture 24 - Automorphism Groups of a Field Extension
Lecture 25 - Dedekind-Artin Theorem
Lecture 26 - Galois Extension
Lecture 27 - Examples of Galois extension
Lecture 28 - Examples of Automorphism Groups
Lecture 29 - Digression on Linear Algebra

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Lecture 30 - Minimal and Characteristic Polynomials, Norms, Trace of elements
Lecture 31 - Primitive Element Theorem for Galois Extension
Lecture 32 - Fundamental Theorem of Galois Theory
Lecture 33 - Fundamental Theorem of Galois Theory (Continued...)
Lecture 34 - Cyclotomic extensions
Lecture 35 - Cyclotomic Polynomials
Lecture 36 - Irreducibility of Cyclotomic Polynomials over Q
Lecture 37 - Reducibility of Cyclotomic Polynomials over Finite Fields
Lecture 38 - Galois Group of Cyclotomic Polynomials
Lecture 39 - Extension over a fixed Field of a finite subGroup is Galois Extension
Lecture 40 - Digression on Group action - II
Lecture 41 - Correspondence of Normal SubGroups and Galois sub-extensions
Lecture 42 - Correspondence of Normal SubGroups and Galois sub-extensions (Continued...)
Lecture 43 - Inverse Galois problem for Abelian Groups
Lecture 44 - Elementary Symmetric Polynomials
Lecture 45 - Fundamental Theorem on Symmetric Polynomials
Lecture 46 - Gal (K[X1,X2,Ã¢â ¬Â¦,Xn]/K[S1,S2,...,Sn])
Lecture 47 - Digression on Symmetric and Alternating Group
Lecture 48 - Discriminant of a Polynomial
Lecture 49 - Zeroes and Embeddings
Lecture 50 - Normal Extensions
Lecture 51 - Existence of Algebraic Closure
Lecture 52 - Uniqueness of Algebraic Closure
Lecture 53 - Proof of The Fundamental Theorem of Algebra
Lecture 54 - Galois Group of a Polynomial
Lecture 55 - Perfect Fields
Lecture 56 - Embeddings
Lecture 57 - Characterization of finite Separable extension
Lecture 58 - Primitive Element Theorem
Lecture 59 - Equivalence of Galois extensions and Normal-Separable extensions
Lecture 60 - Operation of Galois Group of Polynomial on the set of zeroes
Lecture 61 - Discriminants
Lecture 62 - Examples for further study

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NPTEL Video Course - Mathematics - NOC:Basic Real Analysis

Subject Co-ordinator - Prof. I. K. Rana

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Real Numbers and Sequences - Part I
Lecture 2 - Real Numbers and Sequences - Part II
Lecture 3 - Real Numbers and Sequences - Part III
Lecture 4 - Convergence of Sequences - Part I
Lecture 5 - Convergence of Sequences - Part II
Lecture 6 - Convergence of Sequences - Part III
Lecture 7 - The LUB Property and Consequences - Part I
Lecture 8 - The LUB Property and Consequences - Part II
Lecture 9 - The LUB Property and Consequences - Part III
Lecture 10 - Topology of Real Numbers
Lecture 11 - Topology of Real Numbers
Lecture 12 - Topology of Real Numbers
Lecture 13 - Topology of Real Numbers
Lecture 14 - Topology of Real Numbers
Lecture 15 - Topology of Real Numbers
Lecture 16 - Topology of Real Numbers
Lecture 17 - Topology of Real Numbers
Lecture 18 - Topology of Real Numbers
Lecture 19 - Topology of Real Numbers
Lecture 20 - Topology of Real Numbers
Lecture 21 - Topology of Real Numbers
Lecture 22 - Continuity and Uniform continuity - Part I
Lecture 23 - Continuity and Uniform continuity - Part II
Lecture 24 - Continuity and Uniform continuity - Part III
Lecture 25 - Uniform continuity and connected sets - Part I
Lecture 26 - Uniform continuity and connected sets - Part II
Lecture 27 - Uniform continuity and connected sets - Part III
Lecture 28 - Connected sets and continuity - Part I
Lecture 29 - Connected sets and continuity - Part II

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Lecture 30 - Connected sets and continuity - Part III
Lecture 31 - Differentiability - Part I
Lecture 32 - Differentiability - Part II
Lecture 33 - Differentiability - Part III
Lecture 34 - Differentiability - Part IV
Lecture 35 - Differentiability - Part V
Lecture 36 - Differentiability - Part VI
Lecture 37 - Riemann Integration - Part I
Lecture 38 - Riemann Integration - Part II
Lecture 39 - Riemann Integration - Part III
Lecture 40 - Riemann Integration - Part IV
Lecture 41 - Riemann Integration - Part V
Lecture 42 - Riemann Integration - Part VI
Lecture 43 - Riemann Sum and Riemann Integrals - Part I
Lecture 44 - Riemann Sum and Riemann Integrals - Part II
Lecture 45 - Riemann Sum and Riemann Integrals - Part III
Lecture 46 - Optimization in several variables - Part I
Lecture 47 - Optimization in several variables - Part II
Lecture 48 - Optimization in several variables - Part III
Lecture 49 - Integration in several variables - Part I
Lecture 50 - Integration in several variables - Part II
Lecture 51 - Integration in several variables - Part III
Lecture 52 - Change of variables - Part I
Lecture 53 - Change of variables - Part II
Lecture 54 - Change of variables - Part III
Lecture 55 - Change of variables - Part IV
Lecture 56 - Metric Spaces - Part I
Lecture 57 - Metric Spaces - Part II
Lecture 58 - Metric Spaces - Part III
Lecture 59 - L^p Metrics - Part I
Lecture 60 - L^p Metrics - Part II
Lecture 61 - L^p Metrics - Part III
Lecture 62 - Pointwise and Uniform convergence - Part I
Lecture 63 - Pointwise and Uniform convergence - Part II
Lecture 64 - Pointwise and Uniform convergence - Part III
Lecture 65 - Pointwise and Uniform convergence - Part IV
Lecture 66 - Series of Numbers - Part I
Lecture 67 - Series of Numbers - Part II
Lecture 68 - Series of Numbers - Part III

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Lecture 69 - Alternating Series and Power Series

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NPTEL Video Course - Mathematics - NOC:A Basic Course in Number Theory

Subject Co-ordinator - Prof. Shripad Garge

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Integers
Lecture 2 - Divisibility and primes
Lecture 3 - Infinitude of primes
Lecture 4 - Division algorithm and the GCD
Lecture 5 - Computing the GCD and Euclidâ s lemma
Lecture 6 - Fundamental theorem of arithmetic
Lecture 7 - Stories around primes
Lecture 8 - Winding up on `Primes' and introducing Congruences'
Lecture 9 - Basic results in congruences
Lecture 10 - Residue classes modulo n
Lecture 11 - Arithmetic modulo n, theory and examples
Lecture 12 - Arithmetic modulo n, more examples
Lecture 13 - Solving linear polynomials modulo n - I
Lecture 14 - Solving linear polynomials modulo n - II
Lecture 15 - Solving linear polynomials modulo n - III
Lecture 16 - Solving linear polynomials modulo n - IV
Lecture 17 - Chinese remainder theorem, the initial cases
Lecture 18 - Chinese remainder theorem, the general case and examples
Lecture 19 - Chinese remainder theorem, more examples
Lecture 20 - Using the CRT, square roots of 1 in â ¤n
Lecture 21 - Wilson's theorem
Lecture 22 - Roots of polynomials over â ¤p
Lecture 23 - Euler ð• -function - I
Lecture 24 - Euler ð• -function - II
Lecture 25 - Primitive roots - I
Lecture 26 - Primitive roots - II
Lecture 27 - Primitive roots - III
Lecture 28 - Primitive roots - IV
Lecture 29 - Structure of Un - I

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Lecture 30 - Structure of Un - II
Lecture 31 - Quadratic residues
Lecture 32 - The Legendre symbol
Lecture 33 - Quadratic reciprocity law - I
Lecture 34 - Quadratic reciprocity law - II
Lecture 35 - Quadratic reciprocity law - III
Lecture 36 - Quadratic reciprocity law - IV
Lecture 37 - The Jacobi symbol
Lecture 38 - Binary quadratic forms
Lecture 39 - Equivalence of binary quadratic forms
Lecture 40 - Discriminant of a binary quadratic form
Lecture 41 - Reduction theory of integral binary quadratic forms
Lecture 42 - Reduced forms up to equivalence - I
Lecture 43 - Reduced forms up to equivalence - II
Lecture 44 - Reduced forms up to equivalence - III
Lecture 45 - Sums of squares - I
Lecture 46 - Sums of squares - II
Lecture 47 - Sums of squares - III
Lecture 48 - Beyond sums of squares - I
Lecture 49 - Beyond sums of squares - II
Lecture 50 - Continued fractions - basic results
Lecture 51 - Dirichlet's approximation theorem
Lecture 52 - Good rational approximations
Lecture 53 - Continued fraction expansion for real numbers - I
Lecture 54 - Continued fraction expansion for real numbers - II
Lecture 55 - Convergents give better approximations
Lecture 56 - Convergents are the best approximations - I
Lecture 57 - Convergents are the best approximations - II
Lecture 58 - Quadratic irrationals as continued fractions
Lecture 59 - Some basics of algebraic number theory
Lecture 60 - Units in quadratic fields
Lecture 61 - Units in quadratic fields
Lecture 62 - Brahmagupta-Pell equations
Lecture 63 - Tying some loose ends

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NPTEL Video Course - Mathematics - NOC:Introduction to Algebraic Topology - Part I

Subject Co-ordinator - Prof. Anant R. Shastri

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Problem in Topology
Lecture 2 - Concept of homotopy
Lecture 3 - Bird's eye-view of the course
Lecture 4 - Path Homotopy
Lecture 5 - Composition of paths
Lecture 6 - Fundamental group Ï 1
Lecture 7 - Computation of Fund. Group of a circle
Lecture 8 - Computation (Continued...)
Lecture 9 - Computation concluded
Lecture 10 - Van-Kampen's Theorem
Lecture 11 - Function Spaces
Lecture 12 - Quotient Maps
Lecture 13 - Group Actions
Lecture 14 - Examples of Group Actions
Lecture 15 - Assorted Results on Quotient Spaces
Lecture 16 - Quotient Constructions Typical to Alg. Top
Lecture 17 - Quotient Constructions (Continued...)
Lecture 18 - Relative Homotopy
Lecture 19 - Construction of a typical SDR
Lecture 20 - Generalized construction of SDRs
Lecture 21 - A theoretical application
Lecture 22 - The Harvest
Lecture 23 - NDR pairs
Lecture 24 - General Remarks
Lecture 25 - Basics A ne Geometry
Lecture 26 - Abstract Simplicial Complex
Lecture 27 - Geometric Realization
Lecture 28 - Topology on |K|
Lecture 29 - Simplical maps

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Lecture 30 - Polyhedrons
Lecture 31 - Point Set topological Aspects
Lecture 32 - Barycentric Subdivision
Lecture 33 - Finer Subdivisions
Lecture 34 - Simplical Approximation
Lecture 35 - Sperner Lemma
Lecture 36 - Invariance of domain
Lecture 37 - Proof of controled homotopy
Lecture 38 - Links and Stars
Lecture 39 - Homotopical Aspects of Simplicial Complexes
Lecture 40 - Homotopical Aspects
Lecture 41 - Covering Spaces and Fund. Groups
Lecture 42 - Lifting Properties
Lecture 43 - Homotopy Lifting
Lecture 44 - Relation with the fund. Group
Lecture 45 - Regular covering
Lecture 46 - Lifting Problem
Lecture 47 - Classification of Coverings
Lecture 48 - Classification
Lecture 49 - Existence of Simply connected coverings
Lecture 50 - Construction of Simply connected covering
Lecture 51 - Properties Shared by total space and base
Lecture 52 - Examples
Lecture 53 - G-coverings
Lecture 54 - Pull-backs
Lecture 55 - Classification of G-coverings
Lecture 56 - Proof of classification
Lecture 57 - Pushouts and Free products
Lecture 58 - Existence of Free Products, pushouts
Lecture 59 - Free Products and free groups
Lecture 60 - Seifert-Van Kampen Theorems
Lecture 61 - Applications
Lecture 62 - Applications (Continued...)

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NPTEL Video Course - Mathematics - NOC:Introduction to Algebraic Topology - Part II

Subject Co-ordinator - Prof. Anant R. Shastri

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Attaching cells
Lecture 3 - Subcomplexes and Examples
Lecture 4 - More examples
Lecture 5 - More Examples
Lecture 6 - Topological Properties
Lecture 7 - Coinduced Topology
Lecture 8 - Compactly generated topology on Products
Lecture 9 - Product of Cell complexes
Lecture 10 - Product of Cell complexes (Continued...)
Lecture 11 - Partition of Unity on CW-complexes
Lecture 12 - Partition of Unity (Continued...)
Lecture 13 - Homotopical Aspects
Lecture 14 - Homotopical Aspects (Continued...)
Lecture 15 - Cellular Maps
Lecture 16 - Cellular Maps (Continued...)
Lecture 17 - Homotopy exact sequence of a pair
Lecture 18 - Homotopy exact sequence of a fibration
Lecture 19 - Categories-Definitions and Examples
Lecture 20 - More Examples
Lecture 21 - Functors
Lecture 22 - Equivalence of Functors (Continued...)
Lecture 23 - Universal Objects
Lecture 24 - Basic Homological Algebra
Lecture 25 - Diagram-Chasing
Lecture 26 - Homology of Chain Complexes
Lecture 27 - Euler Characteristics
Lecture 28 - Singular Homology Groups
Lecture 29 - Basic Properties of Singular Homology

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Lecture 30 - Excision
Lecture 31 - Examples of Excision-Mayer Vietoris
Lecture 32 - Applications
Lecture 33 - Applications (Continued...)
Lecture 34 - The Singular Simplicial Homology
Lecture 35 - Simplicial Homology
Lecture 36 - Simplicial Homology (Continued...)
Lecture 37 - CW-Homology and Cellular Singular Homology
Lecture 38 - Construction of CW-chain complex
Lecture 39 - CW structure and CW homology of Lens Spaces
Lecture 40 - Assorted Topics
Lecture 41 - Some Applications of Homology
Lecture 42 - Applications of LFT
Lecture 43 - Jordan-Brouwer
Lecture 44 - Proof of Lemmas
Lecture 45 - Relation between ?1 and H1
Lecture 46 - All Postponed Proofs
Lecture 47 - Proofs (Continued...)
Lecture 48 - Definitions and Examples
Lecture 49 - Paracompactness
Lecture 50 - Manifolds with Boundary
Lecture 51 - Embeddings and Homotopical Aspects
Lecture 52 - Homotopical Aspects (Continued...)
Lecture 53 - Classification of 1-manifolds
Lecture 54 - Classification of 1-manifolds (Continued...)
Lecture 55 - Triangulation of Manifolds
Lecture 56 - Pseudo-Manifolds
Lecture 57 - One result due to PoincaÅ e and another due to Munkres
Lecture 58 - Some General Remarks
Lecture 59 - Classification of Compact Surface
Lecture 60 - Final Reduction-Completion of the Proof
Lecture 61 - Proof of Part B
Lecture 62 - Orientability

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NPTEL Video Course - Mathematics - NOC:Partial Differential Equations

Subject Co-ordinator - Prof. Sivaji Ganesh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Partial Differential Equations - Basic concepts and Nomenclature
Lecture 2 - First Order Partial Differential Equations- How they arise? Cauchy Problems, IVPs, IBVPs
Lecture 3 - First order Partial Differential Equations - Geometry of Quasilinear equations
Lecture 4 - FOPDE's - General Solutions to Linear and Semilinear equations
Lecture 5 - First order Partial Differential Equations- Lagrange's method for Quasilinear equations
Lecture 6 - Relation between Characteristic curves and Integral surfaces for Quasilinear equations
Lecture 7 - Relation between Characteristic curves and Integral surfaces for Quasilinear equations
Lecture 8 - FOPDE's - Method of characteristics for Quasilinear equations - 1
Lecture 9 - First order Partial Differential Equations - Failure of transversality condition
Lecture 10 - First order Partial Differential Equations - Tutorial of Quasilinear equations
Lecture 11 - FOPDE's - General nonlinear equations 1 - Search for a characteristic direction
Lecture 12 - FOPDE's - General nonlinear equations 2 - Characteristic direction and characteristic strip
Lecture 13 - FOPDE's - General nonlinear equations 3 - Finding an initial strip
Lecture 14 - FOPDE's - General nonlinear equations 4 - Local existence and uniqueness theorem
Lecture 15 - First order Partial Differential Equations - Tutorial on General nonlinear equations
Lecture 16 - First order Partial Differential Equations - Initial value problems for Burgers equation
Lecture 17 - FOPDE's - Conservation laws with a view towards global solutions to Burgers equation
Lecture 18 - Second Order Partial Differential Equations - Special Curves associated to a PDE
Lecture 19 - Second Order Partial Differential Equations - Curves of discontinuity
Lecture 20 - Second Order Partial Differential Equations - Classification
Lecture 21 - SOPDE's - Canonical form for an equation of Hyperbolic type
Lecture 22 - SOPDE's - Canonical form for an equation of Parabolic type
Lecture 23 - SOPDE's - Canonical form for an equation of Elliptic type
Lecture 24 - Second Order Partial Differential Equations - Characteristic Surfaces
Lecture 25 - SOPDE's - Canonical forms for constant coefficient PDEs
Lecture 26 - Wave Equation - A mathematical model for vibrating strings
Lecture 27 - Wave Equation in one space dimension - d'Alembert formula
Lecture 28 - Tutorial on One dimensional wave equation
Lecture 29 - Wave Equation in d space dimensions - Equivalent Cauchy problems via Spherical means

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Lecture 30 - Cauchy problem for Wave Equation in 3 space dimensions - Poisson-Kirchhoff formulae
Lecture 31 - Cauchy problem for Wave Equation in 2 space dimensions - Hadamard's method of descent
Lecture 32 - Nonhomogeneous Wave Equation - Duhamel principle
Lecture 33 - Wellposedness of Cauchy problem for Wave Equation
Lecture 34 - Wave Equation on an interval in? - Solution to an IBVP from first principles
Lecture 35 - Tutorial on IBVPs for wave equation
Lecture 36 - IBVP for Wave Equation - Separation of Variables Method
Lecture 37 - Tutorial on Separation of variables method for wave equation
Lecture 38 - Qualitative analysis of Wave equation - Parallelogram identity
Lecture 39 - Qualitative analysis of Wave equation - Domain of dependence, domain of influence
Lecture 40 - Qualitative analysis of Wave equation - Causality Principle, Finite speed of propagation
Lecture 41 - Qualitative analysis of Wave equation - Uniqueness by Energy method
Lecture 42 - Qualitative analysis of Wave equation - Huygens Principle
Lecture 43 - Qualitative analysis of Wave equation - Generalized solutions to Wave equation
Lecture 44 - Qualitative analysis of Wave equation - Propagation of waves
Lecture 45 - Laplace equation - Associated Boundary value problems
Lecture 46 - Laplace equation - Fundamental solution
Lecture 47 - Dirichlet BVP for Laplace equation - Green's function and Poisson's formula
Lecture 48 - Laplace equation - Weak maximum principle and its applications
Lecture 49 - Laplace equation - Dirichlet BVP on a disk in R2 for Laplace equations
Lecture 50 - Tutorial 1 on Laplace equation
Lecture 51 - Laplace equation - Mean value property
Lecture 52 - Laplace equation - More qualitative properties
Lecture 53 - Laplace equation - Strong Maximum Principle and Dirichlet Principle
Lecture 54 - Tutorial 2 on Laplace equation
Lecture 55 - Cauchy Problem for Heat Equation - 1
Lecture 56 - Cauchy Problem for Heat Equation - 2
Lecture 57 - IBVP for Heat equation Subtitle: Method of Separation of Variables
Lecture 58 - Maximum principle for heat equation
Lecture 59 - Tutorial on heat equation
Lecture 60 - Heat equation Subheading : Infinite speed of propagation, Energy, Backward Problem

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NPTEL Video Course - Mathematics - NOC:An Introduction to Point-Set-Topology - Part I

Subject Co-ordinator - Prof. Anant R Shastri

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Introduction
Lecture 5 - Introduction
Lecture 6 - Introduction
Lecture 7 - Introduction
Lecture 8 - Introduction
Lecture 9 - Introduction
Lecture 10 - Introduction
Lecture 11 - Introduction
Lecture 12 - Introduction
Lecture 13 - Introduction
Lecture 14 - Introduction
Lecture 15 - Introduction
Lecture 16 - Introduction
Lecture 17 - Introduction
Lecture 18 - Introduction
Lecture 19 - Introduction
Lecture 20 - Introduction
Lecture 21 - Introduction
Lecture 22 - Creating New Spaces
Lecture 23 - Creating New Spaces
Lecture 24 - Creating New Spaces
Lecture 25 - Creating New Spaces
Lecture 26 - Creating New Spaces
Lecture 27 - Creating New Spaces
Lecture 28 - Creating New Spaces
Lecture 29 - Creating New Spaces

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Lecture 30 - Creating New Spaces
Lecture 31 - Creating New Spaces
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38 - Smallness Properties of Topological Spaces
Lecture 39 - Smallness Properties of Topological Spaces
Lecture 40 - Smallness Properties of Topological Spaces
Lecture 41 - Smallness Properties of Topological Spaces
Lecture 42 - Smallness Properties of Topological Spaces
Lecture 43 - Smallness Properties of Topological Spaces
Lecture 44 - Smallness Properties of Topological Spaces
Lecture 45 - Smallness Properties of Topological Spaces
Lecture 46 - Smallness Properties of Topological Spaces
Lecture 47 - Largeness properties
Lecture 48 - Largeness properties
Lecture 49 - Largeness properties
Lecture 50 - Largeness properties
Lecture 51 - Largeness properties
Lecture 52 - Largeness properties
Lecture 53 - Largeness properties
Lecture 54 - Largeness properties
Lecture 55 - Largeness properties
Lecture 56
Lecture 57
Lecture 58
Lecture 59
Lecture 60
Lecture 61

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NPTEL Video Course - Mathematics - NOC:An Introduction to Point-Set-Topology - Part II

Subject Co-ordinator - Prof. Anant R Shastri

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Welcome Speech
Lecture 2 - Preliminaries from Banach spaces
Lecture 3 - Differentiation on Banach spaces
Lecture 4 - Preliminaries from one-variable real analysis
Lecture 5 - Implicit and Inverse function theorems
Lecture 6 - Compact Hausdorff spaces
Lecture 7 - Local Compactness
Lecture 8 - Local Compactness (Continued...)
Lecture 9 - The retraction functor k(X)
Lecture 10 - Compactly generated spaces
Lecture 11 - Paracompactness
Lecture 12 - Partition of Unity
Lecture 13 - Paracompactness (Continued...)
Lecture 14 - Paracompactness (Continued...)
Lecture 15 - Various Notions of Compactness
Lecture 16 - Total Boundedness
Lecture 17 - Arzel`a- Ascoli Theorem
Lecture 18 - Generalities on Compactification
Lecture 19 - AlexandroffÃ¢'s compactifiction
Lecture 20 - Proper maps
Lecture 21 - Stone-Cech compactification
Lecture 22 - Stone-WeierstrassÃ¢'s Theorems
Lecture 23 - Real Stone-Weierstrass Theorem
Lecture 24 - Complex and extended Stone-Weierstrass theorem
Lecture 25 - (Missing)
Lecture 26 - UrysohnÃ¢'s Metrization theorem
Lecture 27 - Nagata Smyrnov Metrization theorem
Lecture 28 - Nets
Lecture 29 - Cofinal families subnets

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Lecture 30 - Basics of Filters
Lecture 31 - Convergence Properties of Filters
Lecture 32 - Ultrafilters and TychonoffÃ¢'s theorem
Lecture 33 - Ultraclosed filters
Lecture 34 - Wallman compactification
Lecture 35 - Wallman compactification (Continued...)
Lecture 36 - Global Separation of Sets
Lecture 37 - More examples
Lecture 38 - Knaster-Kuratowski Example
Lecture 39 - Separation of Sets (Continued...)
Lecture 40 - Definition of dimension and examples
Lecture 41 - Dimensions of subspaces and Unions
Lecture 42 - Sum theorem for higher dimensions
Lecture 43 - Analytic Proof of BrouwerÃ¢'s Fixed Point Theorem
Lecture 44 - Local Separation to Global Separation
Lecture 45 - Partially Ordered sets
Lecture 46 - Principle of Transfinite Induction
Lecture 47 - Order topology
Lecture 48 - Ordinals
Lecture 49 - Ordinal Topology (Continued...)
Lecture 50 - The Long Line
Lecture 51 - Motivation and definition
Lecture 52 - The Exponential Correspondence
Lecture 53 - An Application to Quotient Maps
Lecture 54 - Groups of Homeomoprhisms
Lecture 55 - Definition and Exampels of Manifolds
Lecture 56 - Manifolds with Boundary
Lecture 57 - Homogeneity
Lecture 58 - Homogeneity (Continued...)
Lecture 59 - Classification of 1-dim. manifolds
Lecture 60 - Classification of 1-dim. Manifolds (Continued...)
Lecture 61 - Surfaces
Lecture 62 - Connected Sum

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NPTEL Video Course - Mathematics - NOC:Fourier Analysis and its Applications

Subject Co-ordinator - Prof. G. K Srinivasan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Genesis and a little history
Lecture 2 - Basic convergence theorem
Lecture 3 - Riemann Lebesgue Lemma
Lecture 4 - The ubiquitous Gaussian
Lecture 5 - Jacobi theta function identity
Lecture 6 - The Riemann zeta function
Lecture 7 - Bessel's functions of the first kind
Lecture 8 - Least square approximation
Lecture 9 - Parseval formula. Isoperimetric theorem
Lecture 10 - Dirichlet problem for a disc
Lecture 11 - The Poisson kernel
Lecture 12 - Cesaro summability and Fejer's theorem
Lecture 13 - Fejer's theorem (Continued...)
Lecture 14 - Kronecker's theorem
Lecture 15 - Weyl's equidistribution theorem
Lecture 16 - Borel's theorem and beyond
Lecture 17 - Fourier transform and Schwartz space
Lecture 18 - Hermite's differential equation
Lecture 19 - Fourier inversion theorem Riemann Lebesgue lemma
Lecture 20 - Plancherel's Theorem
Lecture 21 - Heat equation. The heat kernel
Lecture 22 - The Airy's function
Lecture 23 - Exercises on Fourier Transform
Lecture 24 - Principle of equipartitioning of energy
Lecture 25 - A formula of Srinivasa Ramanujan
Lecture 26 - Sturm Liouville problems. Orthogonal systems
Lecture 27 - Vibrations of a circular membrane
Lecture 28 - Fourier Bessel Series
Lecture 29 - Properties of Legendre Polynomials

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Lecture 30 - Properties of Legendre polynomials (Continued...)
Lecture 31 - Legendre polynomials - interlacing of zeros
Lecture 32 - Laplace's integrals for Legendre polynomials
Lecture 33 - Regular Sturm-Liouville problems
Lecture 34 - Variational properties of eigen-values
Lecture 35 - The Dirichlet principle
Lecture 36 - Regular Sturm-Liouville problems - Existence of eigen-values
Lecture 37 - The Bergman space
Lecture 38 - The Banach Steinhaus' Theorem
Lecture 39 - Hilbert space basics
Lecture 40 - Completeness of Hermite functions
Lecture 41 - Hermite, Laugerre and Tchebycheff's polynomials
Lecture 42 - Orthonormal bases in Hilbert spaces
Lecture 43 - Non-separable Hilbert-spaces. Almost periodic functions
Lecture 44 - Hilbert-Schmidt operators. Green's functions
Lecture 45 - Spectrum of a bounded linear operator
Lecture 46 - Weak (sequential) compactness of the closed unit ball
Lecture 47 - Compact self-adjoint operators. Existence of eigen values
Lecture 48 - Compact self-adjoint operators. Existence of eigen values (Continued...)
Lecture 49 - Celestial Mechanics
Lecture 50 - Inverting the Kepler equation using Fourier series
Lecture 51 - Odds and Ends
Lecture 52 - Dirichlet's Theorem on Fourier Series
Lecture 53 - Dirichlet's Theorem on Fourier Series (Continued...)
Lecture 54 - Topology on the Schwartz space
Lecture 55 - Examples of tempered distributions
Lecture 56 - Operations on distributions
Lecture 57 - Fourier Transform of tempered distribution
Lecture 58 - Support of a Distribution. Distributions with point support
Lecture 59 - Distributional solutions of ODEs. Continuity of the Fourier transform and differentiation
Lecture 60 - The Poisson summation formula

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NPTEL Video Course - Mathematics - NOC:Numerical Analysis (2023)

Subject Co-ordinator - Prof. S. Baskar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mathematical Preliminaries: Taylor Approximation
Lecture 3 - Mathematical Preliminaries: Order of Convergence
Lecture 4 - Arithmetic Error: Floating-point Approximation
Lecture 5 - Arithmetic Error: Significant Digits
Lecture 6 - Arithmetic Error: Condition Number and Stable Computation
Lecture 7 - Tutorial Session-1: Problem Solving
Lecture 8 - Python Coding: Introduction
Lecture 9 - Linear Systems: Gaussian Elimination Method
Lecture 10 - Linear Systems: LU-Factorization (Doolittle and Crout)
Lecture 11 - Linear Systems: LU-Factorization (Cholesky)
Lecture 12 - Linear Systems: Operation Count for Direct Methods
Lecture 13 - Tutorial Session-2: Python Coding for Naive Gaussian Elimination Method
Lecture 14 - Tutorial Session-3: Python Coding for Thomas Algorithm
Lecture 15 - Matrix Norms: Subordinate Matrix Norms
Lecture 16 - Matrix Norms: Condition Number of a Matrix
Lecture 17 - Iterative Methods: Jacobi Method
Lecture 18 - Iterative Methods: Convergence of Jacobi Method
Lecture 19 - Iterative Methods: Gauss-Seidel Method
Lecture 20 - Iterative Methods: Convergence Analysis of Iterative Methods
Lecture 21 - Iterative Methods: Successive Over Relaxation Method
Lecture 22 - Tutorial Session-4: Python implementation of Jacobi Method
Lecture 23 - Eigenvalues and Eigenvectors: Power Method (Construction)
Lecture 24 - Eigenvalues and Eigenvectors: Power Method (Convergence Theorem)
Lecture 25 - Eigenvalues and Eigenvectors: Gerschgorin's Theorem and Applications
Lecture 26 - Eigenvalues and Eigenvectors: Power Method (Inverse and Shifted Methods)
Lecture 27 - Nonlinear Equations: Overview
Lecture 28 - Nonlinear Equations: Bisection Method
Lecture 29 - Tutorial Session-5: Implementation of Bisection Method

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Lecture 30 - Nonlinear Equations: Regula-falsi and Secant Methods
Lecture 31 - Nonlinear Equations: Convergence Theorem of Secant Method
Lecture 32 - Nonlinear Equations: Newton-Raphson's method
Lecture 33 - Nonlinear Equations: Newton-Raphson's method (Convergence Theorem)
Lecture 34 - Nonlinear Equations: Fixed-point Iteration Methods
Lecture 35 - Nonlinear Equations: Fixed-point Iteration Methods (Convergence) and Modified Newton's Method
Lecture 36 - Nonlinear Equations: System of Nonlinear Equations
Lecture 37 - Nonlinear Equations: Implementation of Newton-Raphson's Method as Python Code
Lecture 38 - Polynomial Interpolation: Existence and Uniqueness
Lecture 39 - Polynomial Interpolation: Lagrange and Newton Forms
Lecture 40 - Polynomial Interpolation: Newtonâ s Divided Difference Formula
Lecture 41 - Polynomial Interpolation: Mathematical Error in Interpolating Polynomial
Lecture 42 - Polynomial Interpolation: Arithmetic Error in Interpolating Polynomials
Lecture 43 - Polynomial Interpolation: Implementation of Lagrange Form as Python Code
Lecture 44 - Polynomial Interpolation: Runge Phenomenon and Piecewise Polynomial Interpolation
Lecture 45 - Polynomial Interpolation: Hermite Interpolation
Lecture 46 - Polynomial Interpolation: Cubic Spline Interpolation
Lecture 47 - Polynomial Interpolation: Tutorial Session
Lecture 48 - Numerical Integration: Rectangle Rule
Lecture 49 - Numerical Integration: Trapezoidal Rule
Lecture 50 - Numerical Integration: Simpson's Rule
Lecture 51 - Numerical Integration: Gaussian Quadrature Rule
Lecture 52 - Numerical Integration: Tutorial Session
Lecture 53 - Numerical Differentiation: Primitive Finite Difference Formulae
Lecture 54 - Numerical Differentiation: Method of Undetermined Coefficients and Arithmetic Error
Lecture 55 - Numerical ODEs: Euler Methods
Lecture 56 - Numerical ODEs: Euler Methods (Error Analysis)
Lecture 57 - Numerical ODEs: Runge-Kutta Methods
Lecture 58 - Numerical ODEs: Modified Euler's Methods
Lecture 59 - Numerical ODEs: Multistep Methods
Lecture 60 - Numerical ODEs: Stability Analysis
Lecture 61 - Numerical ODEs: Two-point Boundary Value Problems

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NPTEL Video Course - Mathematics - NOC:Point Set Topology

Subject Co-ordinator - Prof. Ronnie Sebastian

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition and examples of topological spaces
Lecture 2 - Examples of topological spaces
Lecture 3 - Basis for topology
Lecture 4 - Subspace Topology
Lecture 5 - Product Topology
Lecture 6 - Product Topology (Continued...)
Lecture 7 - Continuous maps
Lecture 8 - Continuity of addition and multiplication maps
Lecture 9 - Continuous maps to a product
Lecture 10 - Projection from a point
Lecture 11 - Closed subsets
Lecture 12 - Closure
Lecture 13 - Joining continuous maps
Lecture 14 - Metric spaces
Lecture 15 - Connectedness
Lecture 16 - Connectedness (Continued...)
Lecture 17 - Connectedness (Continued...)
Lecture 18 - Connected components
Lecture 19 - Path connectedness
Lecture 20 - Path connectedness (Continued...)
Lecture 21 - Connectedness of GL(n,R)^+ (math symbol)
Lecture 22 - Connectedness of GL(n,C), SL(n,C), SL(n,R)
Lecture 23 - Compactness
Lecture 24 - Compactness (Continued...)
Lecture 25 - Compactness (Continued...)
Lecture 26 - Compactness (Continued...)
Lecture 27 - SO(n) is connected
Lecture 28 - Compact metric spaces
Lecture 29 - Lebesgue Number Lemma

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Lecture 30 - Locally compact spaces
Lecture 31 - One point compactification
Lecture 32 - One point compactification (Continued...)
Lecture 33 - Uniqueness of one point compatification
Lecture 34 - Part 1 : Quotient topology
Lecture 35 - Part 2 : Quotient topology on G/H
Lecture 36 - Part 3 : Grassmannian
Lecture 37 - Normal topological spaces
Lecture 38 - Urysohn's Lemma
Lecture 39 - Tietze Extension Theorem
Lecture 40 - Regular and Second Countable spaces
Lecture 41 - Product Topology on mathbb{R}^{mathbb{N}}
Lecture 42 - Urysohn's Metrization Theorem

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NPTEL Video Course - Mathematics - NOC:High Performance Scientific Computing

Subject Co-ordinator - Prof. Shivasubramanian Gopalakrishnan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Introduction to High Performance Scientific Computing
Lecture 1 - Introduction to Operating System
Lecture 2 - Linux Kernel Explained
Lecture 3 - Mastering Linux Directory and File Management
Lecture 4 - Understanding File Permissions and Ownership in Linux
Lecture 5 - Mastering Linux Text Processing and File Management
Lecture 6 - Linux Memory and Networking Commands
Lecture 7 - Understanding Shell Scripting: Parent-Child Processes and User Input Handling
Lecture 8 - Shell Scripting Tutorial for Beginners
Lecture 9 - Introduction to High-Performance Computing (HPC) and Its Key Components
Lecture 10 - Exploring Computing Platform Architecture and CPU Optimization Techniques
Lecture 11 - Hierarchical Memory Systems and Scalable Architectures in Large-Scale Computing
Lecture 12 - Concurrency and Synchronization in Parallel Programming:Techniques and Frameworks
Lecture 13 - Need for Parallel Computing
Lecture 14 - Role of Numerical Models in Solving complex problems on Computers
Lecture 15 - Common Challenges with Memory in Computer Architecture
Lecture 16 - Organization of hardware in Large HPC systems
Lecture 17 - Architecture of Nvidias Grace Hopper Superchip
Lecture 18 - Introduction to Shared Memory Programming using OpenMP
Lecture 19 - Distribution of work using multiple OpenMP Threads
Lecture 20 - Synchronization and Parallel Loops in OpenMP
Lecture 21 - Storage attributes of different variables in OpenMP
Lecture 22 - OpenMP Memory Model, Irregular Parallelism, and Tasks
Lecture 23 - Parallelization of example codes using OpenMP - Part 1
Lecture 24 - Parallelization of example codes using OpenMP - Part 2
Lecture 25 - Introduction to Message Passing Interface (MPI)
Lecture 26 - Sending and Receiving the messages using MPI
Lecture 27 - Collective Communication in MPI
Lecture 28 - Domain Decomposition

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Lecture 29 - Parallelization of example code using MPI
Lecture 30 - Performance Analysis Frameworks for Parallel Programming
Lecture 31 - Examples of Collective Communication in MPI - Part 1
Lecture 32 - Examples of Collective Communication in MPI - Part 2
Lecture 33 - Introduction to GPU Computing
Lecture 34 - A Dive into Software Stack and Nvidia Architecture
Lecture 35 - Comparative Analysis of NVIDIA and Intel GPU Architectures
Lecture 36 - Understanding FLOPS and Memory Bandwidth Calculations for NVIDIA GPUs
Lecture 37 - SIMD vs. SIMT: Thread Mapping, Scheduling, and Pipelining in NVIDIA GPUs
Lecture 38 - Understanding 1D, 2D, and 3D Grid Arrangements - Part 1
Lecture 39 - Understanding 1D, 2D, and 3D Grid Arrangements - Part 2
Lecture 40 - Thread Block Mapping and Warp Scheduling in GPU
Lecture 41 - Exploring Warp Scheduling and Latency Management in NVIDIA GPUs
Lecture 42 - An Introduction to GPU Programming: Tools, Techniques, and CUDA - Part 1
Lecture 43 - An Introduction to GPU Programming: Tools, Techniques, and CUDA - Part 2
Lecture 44 - Understanding NVIDIA GPU Memory Types and Efficient Memory Management - Part 1
Lecture 45 - Understanding NVIDIA GPU Memory Types and Efficient Memory Management - Part 2
Lecture 46 - Understanding Third Divergence in Parallel Computing and Its Impact on GPU Performance
Lecture 47 - Memory Layouts and Their Role in Optimizing Computing Performance
Lecture 48 - CUDA Program Compilation and Execution: A Step-by-Step Guide - Part 1
Lecture 49 - CUDA Program Compilation and Execution: A Step-by-Step Guide - Part 2
Lecture 50 - Introduction to OpenACC
Lecture 51 - Parallelization of loops using OpenACC
Lecture 52 - OpenACC Data Management
Lecture 53 - OpenACC Loop Optimizations
Lecture 54 - Implementing Asynchronous behavior in OpenACC
Lecture 55 - Programming for multiple-device architecture using OpenACC
Lecture 56 - Profiling and Parallelizing the serial code using OpenACC
Lecture 57 - Programming for multiple-device architecture using MPI and CUDA
Lecture 58 - Programming for multiple-device architecture using MPI and OpenACC
Lecture 59 - Profiling Serial codes using GNU gprof
Lecture 60 - Profiling and Debugging of the codes using Valgrind
Lecture 61 - Code Debugging using GDB
Lecture 62 - Performance Analysis of MPI codes
Lecture 63 - Parallel Debugging of MPI Programs using Open Source Tools
Lecture 64 - Role of Numerical Methods in High Performance Scientific Computing
Lecture 65 - Libraries used in High Performance Scientific Computing
Lecture 66 - Introduction to HPC Schedulers using SLURM and PBS
Lecture 67 - Scientific Visualization

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Lecture 68 - Revision and challenges in the future
Lecture 69 - OpenMP Revision
Lecture 70 - CUDA Revision
Lecture 71 - MPI Revision
Lecture 72 - OpenACC Revision
Lecture 73 - Heterogeneous Computing
Lecture 74 - Trends in Microprocessor Architectures

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NPTEL Video Course - Mathematics - Stochastic Processes

Subject Co-ordinator - Dr. S. Dharmaraja

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Stochastic Processes
Lecture 2 - Introduction to Stochastic Processes (Continued.)
Lecture 3 - Problems in Random Variables and Distributions
Lecture 4 - Problems in Sequences of Random Variables
Lecture 5 - Definition, Classification and Examples
Lecture 6 - Simple Stochastic Processes
Lecture 7 - Stationary Processes
Lecture 8 - Autoregressive Processes
Lecture 9 - Introduction, Definition and Transition Probability Matrix
Lecture 10 - Chapman-Kolmogrov Equations
Lecture 11 - Classification of States and Limiting Distributions
Lecture 12 - Limiting and Stationary Distributions
Lecture 13 - Limiting Distributions, Ergodicity and Stationary Distributions
Lecture 14 - Time Reversible Markov Chain, Application of Irreducible Markov Chain in Queueing Models
Lecture 15 - Reducible Markov Chains
Lecture 16 - Definition, Kolmogrov Differential Equations and Infinitesimal Generator Matrix
Lecture 17 - Limiting and Stationary Distributions, Birth Death Processes
Lecture 18 - Poisson Processes
Lecture 19 - M/M/1 Queueing Model
Lecture 20 - Simple Markovian Queueing Models
Lecture 21 - Queueing Networks
Lecture 22 - Communication Systems
Lecture 23 - Stochastic Petri Nets
Lecture 24 - Conditional Expectation and Filtration
Lecture 25 - Definition and Simple Examples
Lecture 26 - Definition and Properties
Lecture 27 - Processes Derived from Brownian Motion
Lecture 28 - Stochastic Differential Equations
Lecture 29 - Ito Integrals

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Lecture 30 - Ito Formula and its Variants
Lecture 31 - Some Important SDE`s and Their Solutions
Lecture 32 - Renewal Function and Renewal Equation
Lecture 33 - Generalized Renewal Processes and Renewal Limit Theorems
Lecture 34 - Markov Renewal and Markov Regenerative Processes
Lecture 35 - Non Markovian Queues
Lecture 36 - Non Markovian Queues Cont,,
Lecture 37 - Application of Markov Regenerative Processes
Lecture 38 - Galton-Watson Process
Lecture 39 - Markovian Branching Process

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NPTEL Video Course - Mathematics - NOC:Stochastic Processes - 1

Subject Co-ordinator - Dr. S. Dharmaraja

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and motivation for studying stochastic processes
Lecture 2 - Probability space and conditional probability
Lecture 3 - Random variable and cumulative distributive function
Lecture 4 - Discrete Uniform Distribution, Binomial Distribution, Geometric Distribution, Continuous Uniform
Lecture 5 - Joint Distribution of Random Variables
Lecture 6 - Independent Random Variables, Covariance and Correlation Coefficient and Conditional Distributior
Lecture 7 - Conditional Expectation and Covariance Matrix
Lecture 8 - Generating Functions, Law of Large Numbers and Central Limit Theorem
Lecture 9 - Problems in Random variables and Distributions
Lecture 10 - Problems in Random variables and Distributions (Continued...)
Lecture 11 - Problems in Random variables and Distributions (Continued...)
Lecture 12 - Problems in Random variables and Distributions (Continued...)
Lecture 13 - Problems in Sequences of Random Variables
Lecture 14 - Problems in Sequences of Random Variables (Continued...)
Lecture 15 - Problems in Sequences of Random Variables (Continued...)
Lecture 16 - Problems in Sequences of Random Variables (Continued...)
Lecture 17 - Definition of Stochastic Processes, Parameter and State Spaces
Lecture 18 - Classification of Stochastic Processes
Lecture 19 - Examples of Classification of Stochastic Processes
Lecture 20 - Examples of Classification of Stochastic Processes (Continued...)
Lecture 21 - Bernoulli Process
Lecture 22 - Poisson Process
Lecture 23 - Poisson Process (Continued...)
Lecture 24 - Simple Random Walk and Population Processes
Lecture 25 - Introduction to Discrete time Markov Chain
Lecture 26 - Introduction to Discrete time Markov Chain (Continued...)
Lecture 27 - Examples of Discrete time Markov Chain
Lecture 28 - Examples of Discrete time Markov Chain (Continued...)
Lecture 29 - Introduction to Chapman-Kolmogorov equations

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Lecture 30 - State Transition Diagram and Examples
Lecture 31 - Examples
Lecture 32 - Introduction to Classification of States and Periodicity
Lecture 33 - Closed set of States and Irreducible Markov Chain
Lecture 34 - First Passage time and Mean Recurrence Time
Lecture 35 - Recurrent State and Transient State
Lecture 36 - Introduction and example of Classification of states
Lecture 37 - Example of Classification of states (Continued...)
Lecture 38 - Example of Classification of states (Continued...)
Lecture 39 - Example of Classification of states (Continued...)
Lecture 40 - Introduction and Limiting Distribution
Lecture 41 - Example of Limiting Distribution and Ergodicity
Lecture 42 - Stationary Distribution and Examples
Lecture 43 - Examples of Stationary Distributions
Lecture 44 - Time Reversible Markov Chain and Examples
Lecture 45 - Definition of Reducible Markov Chains and Types of Reducible Markov Chains
Lecture 46 - Stationary Distributions and Types of Reducible Markov chains
Lecture 47 - Type of Reducible Markov Chains (Continued...)
Lecture 48 - Gambler's Ruin Problem
Lecture 49 - Introduction to Continuous time Markov Chain
Lecture 50 - Waiting time Distribution
Lecture 51 - Chapman-Kolmogorov Equation
Lecture 52 - Infinitesimal Generator Matrix
Lecture 53 - Introduction and Example Of Continuous time Markov Chain
Lecture 54 - Limiting and Stationary Distributions
Lecture 55 - Time reversible CTMC and Birth Death Process
Lecture 56 - Steady State Distributions, Pure Birth Process and Pure Death Process
Lecture 57 - Introduction to Poisson Process
Lecture 58 - Definition of Poisson Process
Lecture 59 - Superposition and Deposition of Poisson Process
Lecture 60 - Compound Poisson Process and Examples
Lecture 61 - Introduction to Queueing Systems and Kendall Notations
Lecture 62 - M/M/1 Queueing Model
Lecture 63 - Little's Law, Distribution of Waiting Time and Response Time
Lecture 64 - Burke's Theorem and Simulation of M/M/1 queueing Model
Lecture 65 - M/M/c Queueing Model
Lecture 66 - M/M/1/N Queueing Model
Lecture 67 - M/M/c/K Model, M/M/c/c Loss System, M/M/? Self Service System
Lecture 68 - Transient Solution of Finite Birth Death Process and Finite Source Markovian Queueing Model

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Lecture 69 - Queueing Networks Characteristics and Types of Queueing Networks
Lecture 70 - Tandem Queueing Networks
Lecture 71 - Stationary Distribution and Open Queueing Network
Lecture 72 - Jackson's Theorem, Closed Queueing Networks, Gordon and Newell Results
Lecture 73 - Wireless Handoff Performance Model and System Description
Lecture 74 - Description of 3G Cellular Networks and Queueing Model
Lecture 75 - Simulation of Queueing Systems
Lecture 76 - Definition and Basic Components of Petri Net and Reachability Analysis
Lecture 77 - Arc Extensions in Petri Net, Stochastic Petri Nets and examples

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NPTEL Video Course - Mathematics - NOC:Stochastic Processes

Subject Co-ordinator - Dr. S. Dharmaraja

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and motivation for studying stochastic processes
Lecture 2 - Probability space and conditional probability
Lecture 3 - Random variable and cumulative distributive function
Lecture 4 - Discrete Uniform Distribution, Binomial Distribution, Geometric Distribution, Continuous Uniform
Lecture 5 - Joint Distribution of Random Variables
Lecture 6 - Independent Random Variables, Covariance and Correlation Coefficient and Conditional Distributior
Lecture 7 - Conditional Expectation and Covariance Matrix
Lecture 8 - Generating Functions, Law of Large Numbers and Central Limit Theorem
Lecture 9 - Problems in Random variables and Distributions
Lecture 10 - Problems in Random variables and Distributions (Continued...)
Lecture 11 - Problems in Random variables and Distributions (Continued...)
Lecture 12 - Problems in Random variables and Distributions (Continued...)
Lecture 13 - Problems in Sequences of Random Variables
Lecture 14 - Problems in Sequences of Random Variables (Continued...)
Lecture 15 - Problems in Sequences of Random Variables (Continued...)
Lecture 16 - Problems in Sequences of Random Variables (Continued...)
Lecture 17 - Definition of Stochastic Processes, Parameter and State Spaces
Lecture 18 - Classification of Stochastic Processes
Lecture 19 - Examples of Classification of Stochastic Processes
Lecture 20 - Examples of Classification of Stochastic Processes (Continued...)
Lecture 21 - Bernoulli Process
Lecture 22 - Poisson Process
Lecture 23 - Poisson Process (Continued...)
Lecture 24 - Simple Random Walk and Population Processes
Lecture 25 - Introduction to Discrete time Markov Chain
Lecture 26 - Introduction to Discrete time Markov Chain (Continued...)
Lecture 27 - Examples of Discrete time Markov Chain
Lecture 28 - Examples of Discrete time Markov Chain (Continued...)
Lecture 29 - Introduction to Chapman-Kolmogorov equations

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Lecture 30 - State Transition Diagram and Examples
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Lecture 37 - Example of Classification of states (Continued...)
Lecture 38 - Example of Classification of states (Continued...)
Lecture 39 - Example of Classification of states (Continued...)
Lecture 40 - Introduction and Limiting Distribution
Lecture 41 - Example of Limiting Distribution and Ergodicity
Lecture 42 - Stationary Distribution and Examples
Lecture 43 - Examples of Stationary Distributions
Lecture 44 - Time Reversible Markov Chain and Examples
Lecture 45 - Definition of Reducible Markov Chains and Types of Reducible Markov Chains
Lecture 46 - Stationary Distributions and Types of Reducible Markov chains
Lecture 47 - Type of Reducible Markov Chains (Continued...)
Lecture 48 - Gambler's Ruin Problem
Lecture 49 - Introduction to Continuous time Markov Chain
Lecture 50 - Waiting time Distribution
Lecture 51 - Chapman-Kolmogorov Equation
Lecture 52 - Infinitesimal Generator Matrix
Lecture 53 - Introduction and Example Of Continuous time Markov Chain
Lecture 54 - Limiting and Stationary Distributions
Lecture 55 - Time reversible CTMC and Birth Death Process
Lecture 56 - Steady State Distributions, Pure Birth Process and Pure Death Process
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Lecture 64 - Burke's Theorem and Simulation of M/M/1 queueing Model
Lecture 65 - M/M/c Queueing Model
Lecture 66 - M/M/1/N Queueing Model
Lecture 67 - M/M/c/K Model, M/M/c/c Loss System, M/M/? Self Service System
Lecture 68 - Transient Solution of Finite Birth Death Process and Finite Source Markovian Queueing Model

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Lecture 75 - Simulation of Queueing Systems
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Lecture 77 - Arc Extensions in Petri Net, Stochastic Petri Nets and examples
Lecture 78 - Generalized Stochastic Petri Net
Lecture 79 - Generalized Stochastic Petri Net (Continued...)
Lecture 80 - Conditional Expectation and Examples
Lecture 81 - Filtration in Discrete time
Lecture 82 - Remarks of Conditional Expectation and Adaptabilty
Lecture 83 - Definition and Examples of Martingale
Lecture 84 - Examples of Martingale (Continued...)
Lecture 85 - Examples of Martingale (Continued...)
Lecture 86 - Doob's Martingale Process, Sub martingale and Super Martingale
Lecture 87 - Definition of Brownian Motion
Lecture 88 - Definition of Brownian Motion (Continued...)
Lecture 89 - Properties of Brownian Motion
Lecture 90 - Processes Derived from Brownian Motion
Lecture 91 - Processes Derived from Brownian Motion (Continued...)
Lecture 92 - Processes Derived from Brownian Motion (Continued...)
Lecture 93 - Stochastic Differential Equations
Lecture 94 - Stochastic Differential Equations (Continued...)
Lecture 95 - Stochastic Differential Equations (Continued...)
Lecture 96 - Ito Integrals
Lecture 97 - Ito Integrals (Continued...)
Lecture 98 - Ito Integrals (Continued...)
Lecture 99 - Renewal Function and Renewal Equation
Lecture 100 - Renewal Function and Renewal Equation (Continued...)
Lecture 101 - Renewal Function and Renewal Equation (Continued...)
Lecture 102 - Generalized Renewal Processes and Renewal Limit Theorems
Lecture 103 - Generalized Renewal Processes and Renewal Limit Theorems (Continued...)
Lecture 104 - Generalized Renewal Processes and Renewal Limit Theorems (Continued...)
Lecture 105 - Markov Renewal and Markov Regenerative Processes
Lecture 106 - Markov Renewal and Markov Regenerative Processes (Continued...)
Lecture 107 - Markov Renewal and Markov Regenerative Processes (Continued...)

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Lecture 108 - Markov Renewal and Markov Regenerative Processes (Continued...)
Lecture 109 - Non Markovian Queues
Lecture 110 - Non Markovian Queues (Continued...)
Lecture 111 - Non Markovian Queues (Continued...)
Lecture 112 - Stationary Processes
Lecture 113 - Stationary Processes (Continued...)
Lecture 114 - Stationary Processes (Continued...)
Lecture 115 - Stationary Processes (Continued...) and Ergodicity
Lecture 116 - G1/M/1 queue
Lecture 117 - G1/M/1 queue (Continued...)
Lecture 118 - G1/M/1/N queue and examples
Lecture 119 - Galton-Watson Process
Lecture 120 - Examples and Theorems
Lecture 121 - Theorems and Examples (Continued...)
Lecture 122 - Markov Branching Process
Lecture 123 - Markov Branching Process Theorems and Properties
Lecture 124 - Markov Branching Process Theorems and Properties (Continued...)

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NPTEL Video Course - Mathematics - NOC:Chaotic Dynamical Systems

Subject Co-ordinator - Dr. Anima Nagar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The beginning
Lecture 2 - Elementary Concepts
Lecture 3 - Elementary Concepts (Continued...)
Lecture 4 - More on orbits
Lecture 5 - Peiods of Periodic Points
Lecture 6 - Scrambled Sets
Lecture 7 - Sensitive Dependence on Initial Conditions
Lecture 8 - A Population Dynamics Model
Lecture 9 - Bifurcations
Lecture 10 - Nonlinear Systems
Lecture 11 - Horseshoe Attractor
Lecture 12 - Dynamics of the Horseshoe Attractor
Lecture 13 - Recurrence
Lecture 14 - Recurrence (Continued...)
Lecture 15 - Transitivity
Lecture 16 - Devaneyâ s Chaos
Lecture 17 - Transitivity = Chaos on Intervals
Lecture 18 - Stronger forms of Transitivity
Lecture 19 - Chaotic Properties of Mixing Systems
Lecture 20 - Weakly Mixing and Chaos
Lecture 21 - Strongly Transitive Systems
Lecture 22 - Strongly Transitive Systems (Continued...)
Lecture 23 - Introduction to Symbolic Dynamics
Lecture 24 - Shift Spaces
Lecture 25 - Subshifts of Finite Type
Lecture 26 - Subshifts of Finite Type (Continued...), Chatoic Dynamical Systems
Lecture 27 - Measuring Chaos - Topological Entropy
Lecture 28 - Topological Entropy - Adlerâ s Version
Lecture 29 - Bowenâ s Definition of Topological Entropy

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Lecture 30 - Equivalance of the two definitions of Topological Entropy
Lecture 31 - Linear Systems in Two Dimentions
Lecture 32 - Asymptotic Properties of Orbits of Linear Transformation in IR2
Lecture 33 - Hyperbolic Toral Automorphisms
Lecture 34 - Chaos in Toral Automorphisms
Lecture 35 - Chaotic Attractors of Henon Maps

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NPTEL Video Course - Mathematics - NOC:Introduction to Probability Theory and Stochastic Processes

Subject Co-ordinator - Dr. S. Dharmaraja

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Random experiment, sample space, axioms of probability, probability space
Lecture 2 - Random experiment, sample space, axioms of probability, probability space (Continued...)
Lecture 3 - Random experiment, sample space, axioms of probability, probability space (Continued...)
Lecture 4 - Conditional probability, independence of events.
Lecture 5 - Multiplication rule, total probability rule, Bayes's theorem.
Lecture 6 - Definition of Random Variable, Cumulative Distribution Function
Lecture 7 - Definition of Random Variable, Cumulative Distribution Function (Continued...)
Lecture 8 - Definition of Random Variable, Cumulative Distribution Function (Continued...)
Lecture 9 - Type of Random Variables, Probability Mass Function, Probability Density Function
Lecture 10 - Type of Random Variables, Probability Mass Function, Probability Density Function (Continued...)
Lecture 11 - Distribution of Function of Random Variables
Lecture 12 - Mean and Variance
Lecture 13 - Mean and Variance (Continued...)
Lecture 14 - Higher Order Moments and Moments Inequalities
Lecture 15 - Higher Order Moments and Moments Inequalities (Continued...)
Lecture 16 - Generating Functions
Lecture 17 - Generating Functions (Continued...)
Lecture 18 - Common Discrete Distributions
Lecture 19 - Common Discrete Distributions (Continued...)
Lecture 20 - Common Continuous Distributions
Lecture 21 - Common Continuous Distributions (Continued...)
Lecture 22 - Applications of Random Variable
Lecture 23 - Applications of Random Variable (Continued...)
Lecture 24 - Random vector and joint distribution
Lecture 25 - Joint probability mass function
Lecture 26 - Joint probability density function
Lecture 27 - Independent random variables
Lecture 28 - Independent random variables (Continued...)
Lecture 29 - Functions of several random variables

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Lecture 30 - Functions of several random variables (Continued...)
Lecture 31 - Some important results
Lecture 32 - Order statistics
Lecture 33 - Conditional distributions
Lecture 34 - Random sum
Lecture 35 - Moments and Covariance
Lecture 36 - Variance Covariance matrix
Lecture 37 - Multivariate Normal distribution
Lecture 38 - Probability generating function and Moment generating function
Lecture 39 - Correlation coefficient
Lecture 40 - Conditional Expectation
Lecture 41 - Conditional Expectation (Continued...)
Lecture 42 - Modes of Convergence
Lecture 43 - Mode of Convergence (Continued...)
Lecture 44 - Law of Large Numbers
Lecture 45 - Central Limit Theorem
Lecture 46 - Central Limit Theorem (Continued...)
Lecture 47 - Motivation for Stochastic Processes
Lecture 48 - Definition of a Stochastic Process
Lecture 49 - Classification of Stochastic Processes
Lecture 50 - Examples of Stochastic Process
Lecture 51 - Examples Of Stochastic Process (Continued...)
Lecture 52 - Bernoulli Process
Lecture 53 - Poisson Process
Lecture 54 - Poisson Process (Continued...)
Lecture 55 - Simple Random Walk
Lecture 56 - Time Series and Related Definitions
Lecture 57 - Strict Sense Stationary Process
Lecture 58 - Wide Sense Stationary Process and Examples
Lecture 59 - Examples of Stationary Processes (Continued...)
Lecture 60 - Discrete Time Markov Chain (DTMC)
Lecture 61 - DTMC (Continued...)
Lecture 62 - Examples of DTMC
Lecture 63 - Examples of DTMC (Continued...)
Lecture 64 - Chapman-Kolmogorov equations and N-step transition matrix
Lecture 65 - Examples based on N-step transition matrix
Lecture 66 - Examples (Continued...)
Lecture 67 - Classification of states
Lecture 68 - Classification of states (Continued...)

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Lecture 69 - Calculation of N-Step - 9
Lecture 70 - Calculation of N-Step - 10
Lecture 71 - Limiting and Stationary distributions
Lecture 72 - Limiting and Stationary distributions (Continued...)
Lecture 73 - Continuous time Markov chain (CTMC)
Lecture 74 - CTMC (Continued...)
Lecture 75 - State transition diagram and Chapman-Kolmogorov equation
Lecture 76 - Infinitesimal generator and Kolmogorov differential equations
Lecture 77 - Limiting distribution
Lecture 78 - Limiting and Stationary distributions - 1
Lecture 79 - Birth death process
Lecture 80 - Birth death process (Continued...)
Lecture 81 - Poisson process - 1
Lecture 82 - Poisson process (Continued...)
Lecture 83 - Poisson process (Continued...)
Lecture 84 - Non-homogeneous and compound Poisson process
Lecture 85 - Introduction to Queueing Models and Kendall Notation
Lecture 86 - M/M/1 Queueing Model
Lecture 87 - M/M/1 Queueing Model (Continued...)
Lecture 88 - M/M/1 Queueing Model and Burke's Theorem
Lecture 89 - M/M/c Queueing Model
Lecture 90 - M/M/c (Continued...) and M/M/1/N Model
Lecture 91 - Other Markovian Queueing Models
Lecture 92 - Transient Solution of Finite Capacity Markovian Queues

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NPTEL Video Course - Mathematics - NOC:Statistical Inference

Subject Co-ordinator - Prof. Nilladri Chaterjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Statistical Inference - 1
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Lecture 4 - Statistical Inference - 4
Lecture 5 - Statistical Inference - 5
Lecture 6 - Statistical Inference - 6
Lecture 7 - Statistical Inference - 7
Lecture 8 - Statistical Inference - 8
Lecture 9 - Statistical Inference - 9
Lecture 10 - Statistical Inference - 10
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Lecture 18 - Statistical Inference - 18
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Lecture 20 - Stasistical Inference - 20
Lecture 21 - Stasistical Inference - 21

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NPTEL Video Course - Mathematics - NOC:Integral Transforms and their Applications

Subject Co-ordinator - Prof. Sarthok Sircar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fourier Transforms - Part 1
Lecture 2 - Introduction to Fourier Transforms - Part 2
Lecture 3 - Introduction to Fourier Transforms - Part 3
Lecture 4 - Properties of Fourier transforms, Shannon Sampling Theorem, Gibb's Phenomena - Part 1
Lecture 5 - Properties of Fourier transforms, Shannon Sampling Theorem, Gibb's Phenomena - Part 2
Lecture 6 - Properties of Fourier transforms, Shannon Sampling Theorem, Gibb's Phenomena - Part 3
Lecture 7 - Applications of Fourier Transforms - Part 1
Lecture 8 - Applications of Fourier Transforms - Part 2
Lecture 9 - Applications of Fourier Transforms - Part 3
Lecture 10 - Introduction to Laplace Transforms - Part 1
Lecture 11 - Introduction to Laplace Transforms - Part 2
Lecture 12 - Introduction to Laplace Transforms - Part 3
Lecture 13 - Inverse Laplace Transform, Initial and Final Value Theorems - Part 1
Lecture 14 - Inverse Laplace Transform, Initial and Final Value Theorems - Part 2
Lecture 15 - Inverse Laplace Transform, Initial and Final Value Theorems - Part 3
Lecture 16 - Applications of Laplace Transforms - Part 1
Lecture 17 - Applications of Laplace Transforms - Part 2
Lecture 18 - Applications of Laplace Transforms - Part 3
Lecture 19 - Applications of Laplace Transforms (Continued) - Part 1
Lecture 20 - Applications of Laplace Transforms (Continued) - Part 2
Lecture 21 - Applications of Laplace Transforms (Continued) - Part 3
Lecture 22 - Applications of Fourier-Laplace Transforms - Part 1
Lecture 23 - Applications of Fourier-Laplace Transforms - Part 2
Lecture 24 - Applications of Fourier-Laplace Transforms - Part 3
Lecture 25 - Introduction to Hankel Transforms - Part 1
Lecture 26 - Introduction to Hankel Transforms - Part 2
Lecture 27 - Introduction to Hankel Transforms - Part 3
Lecture 28 - Introduction to Mellin Transforms - Part 1
Lecture 29 - Introduction to Mellin Transforms - Part 2

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Lecture 30 - Introduction to Mellin Transforms - Part 3
Lecture 31 - Introduction to Hilbert Transforms - Part 1
Lecture 32 - Introduction to Hilbert Transforms - Part 2
Lecture 33 - Introduction to Hilbert Transforms - Part 3
Lecture 34 - Applications of Hilbert Transfroms, Introduction to Stieltjes Transform - Part 1
Lecture 35 - Applications of Hilbert Transfroms, Introduction to Stieltjes Transform - Part 2
Lecture 36 - Applications of Hilbert Transfroms, Introduction to Stieltjes Transform - Part 3
Lecture 37 - Applications of Stieltjes Transform, Generalized Stieltjes Transform - Part 1
Lecture 38 - Applications of Stieltjes Transform, Generalized Stieltjes Transform - Part 2
Lecture 39 - Applications of Stieltjes Transform, Generalized Stieltjes Transform - Part 3
Lecture 40 - Introduction to Legendre Transform - Part 1
Lecture 41 - Introduction to Legendre Transform - Part 2
Lecture 42 - Introduction to Legendre Transform - Part 3
Lecture 43 - Introduction to Z-transform - Part 1
Lecture 44 - Introduction to Z-transform - Part 2
Lecture 45 - Introduction to Z-transform - Part 3
Lecture 46 - Inverse Z-transfrom, Applciations of Z-Transform - Part 1
Lecture 47 - Inverse Z-transfrom, Applciations of Z-Transform - Part 2
Lecture 48 - Inverse Z-transfrom, Applciations of Z-Transform - Part 3
Lecture 49 - Introduction to Radon Transform - Part 1
Lecture 50 - Introduction to Radon Transform - Part 2
Lecture 51 - Introduction to Radon Transform - Part 3
Lecture 52 - Inverse Radon Transform, Applications to Radon Transform - Part 1
Lecture 53 - Inverse Radon Transform, Applications to Radon Transform - Part 2
Lecture 54 - Inverse Radon Transform, Applications to Radon Transform - Part 3
Lecture 55 - Introduction to Fractional Calculus - Part 1
Lecture 56 - Introduction to Fractional Calculus - Part 2
Lecture 57 - Introduction to Fractional Calculus - Part 3
Lecture 58 - Fractional ODEs, Abel's Integral Equations - Part 1
Lecture 59 - Fractional ODEs, Abel's Integral Equations - Part 2
Lecture 60 - Fractional ODEs, Abel's Integral Equations - Part 3
Lecture 61 - Fractional PDEs - Part 1
Lecture 62 - Fractional PDEs - Part 2
Lecture 63 - Fractional PDEs - Part 3
Lecture 64 - Fractional ODEs and PDEs (Continued) - Part 1
Lecture 65 - Fractional ODEs and PDEs (Continued) - Part 2
Lecture 66 - Fractional ODEs and PDEs (Continued) - Part 3
Lecture 67 - Introduction to Wavelet Transform - Part 1
Lecture 68 - Introduction to Wavelet Transform - Part 2

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Lecture 69 - Introduction to Wavelet Transform - Part 3
Lecture 70 - Discrete Haar, Shanon and Debauchies Wavelet - Part 1
Lecture 71 - Discrete Haar, Shanon and Debauchies Wavelet - Part 2
Lecture 72 - Discrete Haar, Shanon and Debauchies Wavelet - Part 3

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NPTEL Video Course - Mathematics - NOC:Introduction to Fuzzy Set Theory, Arithmetic and Logic

Subject Co-ordinator - Prof. Nilladri Chaterjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fuzzy Sets Arithmetic and Logic - 1
Lecture 2 - Fuzzy Sets Arithmetic and Logic - 2
Lecture 3 - Fuzzy Sets Arithmetic and Logic - 3
Lecture 4 - Fuzzy Sets Arithmetic and Logic - 4
Lecture 5 - Fuzzy Sets Arithmetic and Logic - 5
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Lecture 28 - Fuzzy Sets Arithmetic and Logic - 28
Lecture 29 - Fuzzy Sets Arithmetic and Logic - 29

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Lecture 30 - Fuzzy Sets Arithmetic and Logic - 30

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NPTEL Video Course - Mathematics - NOC:Introduction to Methods of Applied Mathematics

Subject Co-ordinator - Prof. Vivek Kumar Aggarwal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to First Order Differential Equations
Lecture 2 - Introduction to First Order Differential Equations (Continued...)
Lecture 3 - Introduction to Second Order Linear Differential Equations
Lecture 4 - Second Order Linear Differential Equations With Constant Coefficients
Lecture 5 - Second Order Linear Differential Equations With Constant Coefficients (Continued...)
Lecture 6 - Second Order Linear Differential Equations With Variable Coefficients
Lecture 7 - Factorization of Second order Differential Operator and Euler Cauchy Equation
Lecture 8 - Power Series Solution of General Differential Equation
Lecture 9 - Green's function
Lecture 10 - Method of Green's Function for Solving Initial Value and Boundary Value Problems
Lecture 11 - Adjoint Linear Differential Operator
Lecture 12 - Adjoint Linear Differential Operator (Continued...)
Lecture 13 - Sturm-Liouvile Problems
Lecture 14 - Laplace transformation
Lecture 15 - Laplace transformation (Continued...)
Lecture 16 - Laplace Transform Method for Solving Ordinary Differential Equations
Lecture 17 - Laplace Transform Applied to Differential Equations and Convolution
Lecture 18 - Fourier Series
Lecture 19 - Fourier Series (Continued...)
Lecture 20 - Gibbs Phenomenon and Parseval's Identity
Lecture 21 - Fourier Integral and Fourier Transform
Lecture 22 - Fourier Integral and Fourier Transform (Continued...)
Lecture 23 - Fourier Transform Method for Solving Ordinary Differential Equations
Lecture 24 - Frames, Riesz Bases and Orthonormal Bases
Lecture 25 - Frames, Riesz Bases and Orthonormal Bases (Continued...)
Lecture 26 - Fourier Series and Fourier Transform
Lecture 27 - Time-Frequency Analysis and Gabor Transform
Lecture 28 - Window Fourier Transform and Multiresolution Analysis
Lecture 29 - Construction of Scaling Functions and Wavelets Using Multiresolution Analysis

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Lecture 30 - Daubechies Wavelet
Lecture 31 - Daubechies Wavelet (Continued...)
Lecture 32 - Wavelet Transform and Shannon Wavelet

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NPTEL Video Course - Mathematics - NOC:Advanced Probability Theory

Subject Co-ordinator - Prof. Niladri Chatterjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Advanced Probability Theory
Lecture 2 - Advanced Probability Theory
Lecture 3 - Advanced Probability Theory
Lecture 4 - Advanced Probability Theory
Lecture 5 - Advanced Probability Theory
Lecture 6 - Advanced Probability Theory
Lecture 7 - Advanced Probability Theory
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Lecture 14 - Advanced Probability Theory
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Lecture 18 - Advanced Probability Theory
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Lecture 23 - Advanced Probability Theory
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Lecture 27 - Advanced Probability Theory
Lecture 28 - Advanced Probability Theory
Lecture 29 - Advanced Probability Theory

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Lecture 30 - Advanced Probability Theory

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NPTEL Video Course - Mathematics - NOC:Scientific Computing using Matlab

Subject Co-ordinator - Prof. Vivek Kumar Aggarwal, Prof. Mani Mehra

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Matlab
Lecture 2 - Plotting of Functions in Matlab
Lecture 3 - Symbolic Computation in Matlab
Lecture 4 - Functions definition in Matlab
Lecture 5 - In continuation of basics of Matlab
Lecture 6 - In continuation of basics of Matlab (Continued...)
Lecture 7 - Floating point representation of a number
Lecture 8 - Errors arithmetic
Lecture 9 - Iterative method for solving nonlinear equations
Lecture 10 - Bisection method for solving nonlinear equations
Lecture 11 - Order of Convergence of an Iterative Method
Lecture 12 - Regula-Falsi and Secant Method for Solving Nonlinear Equations
Lecture 13 - Raphson method for solving nonlinear equations
Lecture 14 - Newton-Raphson Method for Solving Nonlinear System of Equations
Lecture 15 - Matlab Code for Fixed Point Iteration Method
Lecture 16 - Matlab Code for Newton-Raphson and Regula-Falsi Method
Lecture 17 - Matlab Code for Newton Method for Solving System of Equations
Lecture 18 - Linear System of Equations
Lecture 19 - Linear System of Equations (Continued...)
Lecture 20 - Gauss Elimination Method for solving Linear System of Equation
Lecture 21 - Matlab Code for Gauss Elimination Method
Lecture 22 - LU Decomposition Method for Solving Linear System of Equations
Lecture 23 - LU Decomposition Method for Solving Linear System of Equations (Continued...)
Lecture 24 - Iterative Method for Solving Linear System of Equations
Lecture 25 - Iterative Method for Solving Linear System of Equations (Continued...)
Lecture 26 - Matlab Code for Gauss Jacobi Method
Lecture 27 - Matlab Code for Gauss Seidel Method
Lecture 28 - Matlab Code for Gauss Seidel Method
Lecture 29 - Power Method for Solving Eigenvalues of a Matrix

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Lecture 30 - Power Method for Solving Eigenvalues of a Matrix (Continued...)
Lecture 31 - Gershgorin Circle Theorem for Estimating Eigenvalues of a Matrix
Lecture 32 - Gershgorin Circle Theorem for Estimating Eigenvalues of a Matrix
Lecture 33 - Matlab Code for Power Method/ Shifted Inverse Power Method
Lecture 34 - Interpolation
Lecture 35 - Interpolation (Continued...)
Lecture 36 - Interpolation (Continued...)
Lecture 37 - Interpolating Polynomial Using Newton's Forward Difference Formula
Lecture 38 - Error Estimates in Polynomial Approximation
Lecture 39 - Interpolating Polynomial Using Newton's Backward Difference Formula
Lecture 40 - Stirling's Formula and Lagrange's Interpolating Polynomial
Lecture 41 - In Continuation of Lagrange's Interpolating Formula
Lecture 42 - Interpolating Polynomial Using Newton's Divided Difference Formula
Lecture 43 - Examples Based on Lagrange's and Newton's Divided Difference Interpolation
Lecture 44 - Spline Interpolation
Lecture 45 - Cubic Spline
Lecture 46 - Cubic Spline (Continued...)
Lecture 47 - Curve Fitting
Lecture 48 - Quadratic Polynomial Fitting and Code for Lagrange's Interpolating Polynomial using Octave
Lecture 49 - Matlab Code for Newton's Divided Difference and Least Square Approximation
Lecture 50 - Matlab Code for Cubic Spline
Lecture 51 - Numerical Differentiation
Lecture 52 - Various Numerical Differentiation Formulas
Lecture 53 - Higher Order Accurate Numerical Differentiation Formula For First Order Derivative
Lecture 54 - Higher Order Accurate Numerical Differentiation Formula For Second Order Derivative
Lecture 55 - Numerical Integration
Lecture 56 - Trapezoidal Rule for Numerical Integration
Lecture 57 - Simpson's 1/3 rule for Numerical Integration
Lecture 58 - Simpson's 3/8 Rule for Numerical Integration
Lecture 59 - Method of Undetermined Coefficients
Lecture 60 - Octave Code for Trapezoidal and Simpson's Rule
Lecture 61 - Taylor Series Method for Ordinary Differential Equations
Lecture 62 - Linear Multistep Method (LMM) for Ordinary Differential Equations
Lecture 63 - Convergence and Zero Stability for LMM
Lecture 64 - Matlab/Octave Code for Initial Value Problems
Lecture 65 - Advantage of Implicit and Explicit Methods Over Each other via Matlab/Octave Codes for Initial v

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NPTEL Video Course - Mathematics - NOC:Non-parametric Statistical Inference

Subject Co-ordinator - Prof. Niladri Chatterjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10

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NPTEL Video Course - Mathematics - NOC:Matrix Computation and its applications

Subject Co-ordinator - Prof. Vivek K. Aggarwal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Binary Operation and Groups
Lecture 2 - Vector Spaces
Lecture 3 - Some Examples of Vector Spaces
Lecture 4 - Some Examples of Vector Spaces (Continued...)
Lecture 5 - Subspace of a Vector Space
Lecture 6 - Spanning Set
Lecture 7 - Properties of Subspaces
Lecture 8 - Properties of Subspaces (Continued...)
Lecture 9 - Linearly Independent and Dependent Vectors
Lecture 10 - Linearly Independent and Dependent Vectors (Continued...)
Lecture 11 - Properties of Linearly Independent and Dependent Vectors
Lecture 12 - Properties of Linearly Independent and Dependent Vectors (Continued...)
Lecture 13 - Basis and Dimension of a Vector Space
Lecture 14 - Example of Basis and Standard Basis of a Vector Space
Lecture 15 - Linear Functions
Lecture 16 - Range Space of a Matrix and Row Reduced Echelon Form
Lecture 17 - Row Equivalent Matrices
Lecture 18 - Row Equivalent Matrices (Continued...)
Lecture 19 - Null Space of a Matrix
Lecture 20 - Four Subspaces Associated with a Given Matrix
Lecture 21 - Four Subspaces Associated with a Given Matrix (Continued...)
Lecture 22 - Linear Independence of the rows and columns of a Matrix
Lecture 23 - Application of Diagonal Dominant Matrices
Lecture 24 - Application of Zero Null Space: Interpolating Polynomial and Wronskian Matrix
Lecture 25 - Characterization of basic of a Vector Space and its Subspaces
Lecture 26 - Coordinate of a Vector with respect to Ordered Basis
Lecture 27 - Examples of different subspaces of a vector space of polynomials having degree less than or equa
Lecture 28 - Linear Transformation
Lecture 29 - Properties of Linear Transformation

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Lecture 30 - Determining Linear Transformation on a Vector Space by its value on the basis element
Lecture 31 - Range space and null space of a Linear Transformation
Lecture 32 - Rank and Nuility of a Linear Transformation
Lecture 33 - Rank Nuility Theorem
Lecture 34 - Application of Rank Nuility Theorem and Inverse of a Linear Transformation
Lecture 35 - Matrix Associated with Linear Transformation
Lecture 36 - Matrix Representation of a Linear Transformation Relative to Ordered Bases
Lecture 37 - Matrix Representation of a Linear Transformation Relative to Ordered Bases (Continued...)
Lecture 38 - Linear Map Associated with a Matrix
Lecture 39 - Similar Matrices and Diagonalisation of Matrix
Lecture 40 - Orthonormal bases of a Vector Space
Lecture 41 - Gram-Schmidt Orthogonalisation Process
Lecture 42 - QR Factorisation
Lecture 43 - Inner Product Spaces
Lecture 44 - Inner Product of different real vector spaces and basics of complex vector space
Lecture 45 - Inner Product on complex vector spaces and Cauchy-Schwarz inequality
Lecture 46 - Norm of a Vector
Lecture 47 - Matrix Norm
Lecture 48 - Sensitivity Analysis of a System of Linear Equations
Lecture 49 - Orthoganality of the four subspaces associated with a matrix
Lecture 50 - Best Approximation: Least Square Method
Lecture 51 - Best Approximation: Least Square Method (Continued...)
Lecture 52 - Jordan-Canonical Form
Lecture 53 - Some examples on the Jordan form of a given matrix and generalised eigon vectors
Lecture 54 - Singular value decomposition (SVD) theorem
Lecture 55 - Matlab/Octave code for Solving SVD
Lecture 56 - Pseudo-Inverse/Moore-Penrose Inverse
Lecture 57 - Householder Transformation
Lecture 58 - Matlab/Octave code for Householder Transformation

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NPTEL Video Course - Mathematics - NOC:Introduction to Probability Theory and Statistics

Subject Co-ordinator - Prof. S Dharmaraja

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Random experiment, sample space, axioms of probability, probability space
Lecture 2 - Random experiment, sample space, axioms of probability, probability space (Continued...)
Lecture 3 - Random experiment, sample space, axioms of probability, probability space (Continued...)
Lecture 4 - Conditional probability, independence of events
Lecture 5 - Multiplication rule, total probability rule, Bayes's theorem
Lecture 6 - Definition of Random Variable, Cumulative Distribution Function
Lecture 7 - Definition of Random Variable, Cumulative Distribution Function (Continued...)
Lecture 8 - Definition of Random Variable, Cumulative Distribution Function (Continued...)
Lecture 9 - Type of Random Variables, Probability Mass Function, Probability Density Function
Lecture 10 - Type of Random Variables, Probability Mass Function, Probability Density Function (Continued...)
Lecture 11 - Distribution of Function of Random Variables
Lecture 12 - Mean and Variance
Lecture 13 - Mean and Variance (Continued...)
Lecture 14 - Higher Order Moments and Moments Inequalities
Lecture 15 - Higher Order Moments and Moments Inequalities (Continued...)
Lecture 16 - Generating Functions
Lecture 17 - Generating Functions (Continued...)
Lecture 18 - Common Discrete Distributions
Lecture 19 - Common Discrete Distributions (Continued...)
Lecture 20 - Common Continuous Distributions
Lecture 21 - Common Continuous Distributions (Continued...)
Lecture 22 - Applications of Random Variable
Lecture 23 - Applications of Random Variable (Continued...)
Lecture 24 - Random vector and joint distribution
Lecture 25 - Joint probability mass function
Lecture 26 - Joint probability density function
Lecture 27 - Independent random variables
Lecture 28 - Independent random variables (Continued...)
Lecture 29 - Functions of several random variables

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Lecture 30 - Functions of several random variables (Continued...)
Lecture 31 - Some important results
Lecture 32 - Order statistics
Lecture 33 - Conditional distributions
Lecture 34 - Random sum
Lecture 35 - Moments and Covariance
Lecture 36 - Variance Covariance matrix
Lecture 37 - Multivariate Normal distribution
Lecture 38 - Probability generating function and Moment generating function
Lecture 39 - Correlation coefficient
Lecture 40 - Conditional Expectation
Lecture 41 - Conditional Expectation (Continued...)
Lecture 42 - Mode of Convergence
Lecture 43 - Mode of Convergence (Continued...)
Lecture 44 - Law of Large Numbers
Lecture 45 - Central Limit Theorem
Lecture 46 - Central Limit Theorem (Continued...)
Lecture 47 - Descriptive Statistics and Sampling Distributions
Lecture 48 - Descriptive Statistics and Sampling Distributions (Continued...)
Lecture 49 - Descriptive Statistics and Sampling Distributions (Continued...)
Lecture 50 - Point estimation
Lecture 51 - Methods of Point estimation
Lecture 52 - Interval Estimation
Lecture 53 - Testing of Statistical Hypothesis
Lecture 54 - Nonparametric Statistical Tests
Lecture 55 - Analysis of Variance
Lecture 56 - Correlation
Lecture 57 - Regression
Lecture 58 - Logistic Regression

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NPTEL Video Course - Mathematics - NOC:Introduction to Probability Theory and Stochastic Processes (Tamil)

Subject Co-ordinator - Prof. S Dharmaraja

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Random Experiment, Sample Space and Sigma Field
Lecture 2 - Axiomatic Definition of Probability
Lecture 3 - Properties of Axiomatic Definition of Probability and Classical Definition of Probability
Lecture 4 - Conditional Probability, Independent Events and Baye's Rule
Lecture 5 - Definition of Random Variable
Lecture 6 - Cumulative Distribution Function
Lecture 7 - Discrete and Continuous Type Random Variables
Lecture 8 - Mixed Type Random Variable
Lecture 9 - Function of a Random Variable
Lecture 10 - Mean
Lecture 11 - Variance and Higher Order Moments
Lecture 12 - Inequalities of Markov and Chebyshev
Lecture 13 - Generating Functions
Lecture 14 - Standard Discrete Distributions
Lecture 15 - Standard Discrete Distributions (Continued...)
Lecture 16 - Standard Continuous Distributions
Lecture 17 - Standard Continuous Distributions (Continued...)
Lecture 18 - Definition and Joint Distribution of a Random Vector
Lecture 19 - Joint Probability Mass Function
Lecture 20 - Joint Probability Density Function
Lecture 21 - Independent Random Vector
Lecture 22 - Distribution of Functions of Random Variables (Discrete Type)
Lecture 23 - Distribution of Functions of Random Variables (Continuous Type)
Lecture 24 - Conditional Distribution of Random Variables (Discrete Type)
Lecture 25 - Conditional Distribution of Random Variables (Continuous Type)
Lecture 26 - Expectation for Several Random Variables
Lecture 27 - Covariance and Correlation Coefficient
Lecture 28 - Generating Functions for Several Random Variables
Lecture 29 - Conditional Expectation

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Lecture 30 - Modes of Convergence
Lecture 31 - Modes of Convergence (Continued...)
Lecture 32 - Law of Large Numbers
Lecture 33 - Central Limit Theorem
Lecture 34 - Definition and Classification of Stochastic Processes
Lecture 35 - Properties of Stochastic Processes
Lecture 36 - Properties of Stochastic Processes (Continued...)
Lecture 37 - Standard Simple Stochastic Processes
Lecture 38 - Definition of Discrete Time Markov Chain (DTMC)
Lecture 39 - Chapman-Kolmogorov Equation
Lecture 40 - Classification of States
Lecture 41 - Classification of States (Continued...)
Lecture 42 - Limiting Distribution
Lecture 43 - Stationary Distribution
Lecture 44 - Reducible Markov Chains
Lecture 45 - Definition of Continuous Time Markov Chain (CTMC)
Lecture 46 - Infinitesimal Generator Matrix
Lecture 47 - Kolmogorov Differential Equations
Lecture 48 - Limiting Distribution and Steady-State Distribution
Lecture 49 - Birth Death Processes
Lecture 50 - Introduction to Queueing Models and Kendall Notation
Lecture 51 - Single-Server Queueing Models
Lecture 52 - Single-Server Queueing Models (Continued...)
Lecture 53 - Multi-Server Queueing Models

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NPTEL Video Course - Mathematics - NOC:Scientific Computing using Python (Hindi)

Subject Co-ordinator - Prof. Mani Mehra, Prof. Vivek K. Aggarwal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Python
Lecture 2 - Introduction to Python (Continued...)
Lecture 3 - Introduction to Python (Continued...)
Lecture 4 - Introduction to Python (Continued...)
Lecture 5 - Introduction to Python (Continued...)
Lecture 6 - Introduction to Python (Continued...)
Lecture 7 - Errors in Computation
Lecture 8 - Errors in Computation (Continued...)
Lecture 9 - Solution of Non-Linear Equation
Lecture 10 - Solution of Non-Linear Equation (Continued...)
Lecture 11 - Solution of Non-Linear Equation (Continued...)
Lecture 12 - Vector and Matrix Norms
Lecture 13 - Solution of System of Linear Equations
Lecture 14 - Solution of System of Linear Equations (Continued...)
Lecture 15 - Positive Definite Matrices
Lecture 16 - Jacobi and Gauss-Seidal Iterative Methods
Lecture 17 - Matrix Eigenvalue Computation: Power Method
Lecture 18 - Gershgorin Theorem
Lecture 19 - Polynomial Interpolation
Lecture 20 - Polynomial Interpolation (Continued...)
Lecture 21 - Polynomial Interpolation (Continued...)
Lecture 22 - Polynomial Interpolation (Continued...)
Lecture 23 - Polynomial Interpolation (Continued...)
Lecture 24 - Polynomial Interpolation (Continued...)
Lecture 25 - Polynomial Interpolation (Continued...) (Spline Method)
Lecture 26 - Least Square Approximation
Lecture 27 - Least Square Approximation (Continued...)
Lecture 28 - Numerical Differentiation
Lecture 29 - Numerical Differentiation (Continued...)

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Lecture 30 - Numerical Integration
Lecture 31 - Numerical Integration (Continued...)
Lecture 32 - Numerical Integration (Continued...)
Lecture 33 - Numerical Solution of Initial Value Problems
Lecture 34 - Numerical Solution of Initial Value Problems (Continued...)
Lecture 35 - Numerical Solution of Initial Value Problems (Continued...)
Lecture 36 - Numerical Solution of Boundary Value Problems

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NPTEL Video Course - Mathematics - NOC:Introduction to Probability and Statistics (in Hindi)

Subject Co-ordinator - Prof. Abhay Gopal Bhatt

Co-ordinating Institute - ISI - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Random Experiments
Lecture 2 - Axioms of Probability
Lecture 3 - Determining Probabilities
Lecture 4 - Determining Probabilities (Continued...)
Lecture 5 - Equally Likely Events
Lecture 6 - Equally Likely Events (Continued...)
Lecture 7 - Conditional Probability
Lecture 8 - Bayesâ Theorem
Lecture 9 - Independent Events
Lecture 10 - Independent Events (Continued...)
Lecture 11 - Discrete Random Variables
Lecture 12 - Probability Mass Function
Lecture 13 - Cumulative Distribution Function
Lecture 14 - Expectation of a Discrete Random Variable
Lecture 15 - Variance
Lecture 16 - Binomial Distribution
Lecture 17 - Negative Binomial Distribution
Lecture 18 - Hypergeometric and Poisson Distributions
Lecture 19 - Hypergeometric and Poisson Distributions (Continued...)
Lecture 20 - Continuous Random Variables
Lecture 21 - CDF Of A Continuous Distribution
Lecture 22 - Expectation Of A Continuous Random Variable
Lecture 23 - Expectation of A Continuous Random Variable (Continued...)
Lecture 24 - Normal Distribution
Lecture 25 - Jointly Distributed Discrete Random Variables
Lecture 26 - Jointly Distributed Continuous Random Variables
Lecture 27 - Expectations Of Functions Of Several Variables
Lecture 28 - Covariance
Lecture 29 - Correlation Coefficient

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Lecture 30 - Statistic
Lecture 31 - Sampling Distributions
Lecture 32 - Distribution of Sample Mean
Lecture 33 - Central Limit Theorem, Distribution of a Linear Combination
Lecture 34 - Estimation
Lecture 35 - Unbiased Estimators
Lecture 36 - Standard Error of Estimators
Lecture 37 - Method of Moments
Lecture 38 - Maximum Likelihood Estimation
Lecture 39 - Invariance Principle; Confidence Intervals
Lecture 40 - Large Sample Confidence Intervals
Lecture 41 - Student's t-distribution
Lecture 42 - Tests of Hypotheses - 1
Lecture 43 - Tests of Hypotheses - 2
Lecture 44 - Tests For Population Means

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NPTEL Video Course - Mathematics - Formal Languages and Automata Theory

Subject Co-ordinator - Dr. K.V. Krishna, Dr. Diganta Goswami

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Alphabet, Strings, Languages
Lecture 3 - Finite Representation
Lecture 4 - Grammars (CFG)
Lecture 5 - Derivation Trees
Lecture 6 - Regular Grammars
Lecture 7 - Finite Automata
Lecture 8 - Nondeterministic Finite Automata
Lecture 9 - NFA <=> DFA
Lecture 10 - Myhill-Nerode Theorem
Lecture 11 - Minimization
Lecture 12 - RE => FA
Lecture 13 - FA => RE
Lecture 14 - FA <=> RG
Lecture 15 - Variants of FA
Lecture 16 - Closure Properties of RL
Lecture 17 - Homomorphism
Lecture 18 - Pumping Lemma
Lecture 19 - Simplification of CFG
Lecture 20 - Normal Forms of CFG
Lecture 21 - Properties of CFLs
Lecture 22 - Pushdown Automata
Lecture 23 - PDA <=> CFG
Lecture 24 - Turing Machines
Lecture 25 - Turing Computable Functions
Lecture 26 - Combining Turing Machines
Lecture 27 - Multi Input
Lecture 28 - Turing Decidable Languages
Lecture 29 - Varients of Turing Machines

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Lecture 30 - Structured Grammars
Lecture 31 - Decidability
Lecture 32 - Undecidability 1
Lecture 33 - Undecidability 2
Lecture 34 - Undecidability 3
Lecture 35 - Time Bounded Turing Machines
Lecture 36 - P and NP
Lecture 37 - NP-Completeness
Lecture 38 - NP-Complete Problems 1
Lecture 39 - NP-Complete Problems 2
Lecture 40 - NP-Complete Problems 3
Lecture 41 - Chomsky Hierarchy

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NPTEL Video Course - Mathematics - Complex Analysis

Subject Co-ordinator - Prof. P.A.S. Sree Krishna

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Complex Numbers
Lecture 3 - de Moivreâ s Formula and Stereographic Projection
Lecture 4 - Topology of the Complex Plane - Part-I
Lecture 5 - Topology of the Complex Plane - Part-II
Lecture 6 - Topology of the Complex Plane - Part-III
Lecture 7 - Introduction to Complex Functions
Lecture 8 - Limits and Continuity
Lecture 9 - Differentiation
Lecture 10 - Cauchy-Riemann Equations and Differentiability
Lecture 11 - Analytic functions; the exponential function
Lecture 12 - Sine, Cosine and Harmonic functions
Lecture 13 - Branches of Multifunctions; Hyperbolic Functions
Lecture 14 - Problem Solving Session I
Lecture 15 - Integration and Contours
Lecture 16 - Contour Integration
Lecture 17 - Introduction to Cauchyâ s Theorem
Lecture 18 - Cauchyâ s Theorem for a Rectangle
Lecture 19 - Cauchyâ s theorem - Part-II
Lecture 20 - Cauchyâ s Theorem - Part-III
Lecture 21 - Cauchyâ s Integral Formula and its Consequences
Lecture 22 - The First and Second Derivatives of Analytic Functions
Lecture 23 - Moreraâ s Theorem and Higher Order Derivatives of Analytic Functions
Lecture 24 - Problem Solving Session II
Lecture 25 - Introduction to Complex Power Series
Lecture 26 - Analyticity of Power Series
Lecture 27 - Taylorâ s Theorem
Lecture 28 - Zeroes of Analytic Functions
Lecture 29 - Counting the Zeroes of Analytic Functions

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Lecture 30 - Open mapping theorem - Part-I
Lecture 31 - Open mapping theorem - Part-II
Lecture 32 - Properties of Mobius Transformations - Part-I
Lecture 33 - Properties of Mobius Transformations - Part-II
Lecture 34 - Problem Solving Session III
Lecture 35 - Removable Singularities
Lecture 36 - Poles Classification of Isolated Singularities
Lecture 37 - Essential Singularity & Introduction to Laurent Series
Lecture 38 - Laurentâ s Theorem
Lecture 39 - Residue Theorem and Applications
Lecture 40 - Problem Solving Session IV

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NPTEL Video Course - Mathematics - NOC:Mathematical Finance

Subject Co-ordinator - Prof. Siddhartha Pratim Chakrabarty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Financial Markets and Bonds
Lecture 2 - Introduction to Stocks, Futures and Forwards and Swaps
Lecture 3 - Introduction to Options
Lecture 4 - Interest Rates and Present Value
Lecture 5 - Present and Future Values, Annuities, Amortization and Bond Yield
Lecture 6 - Price Yield Curve and Term Structure of Interest Rates
Lecture 7 - Markowitz Theory, Return and Risk and Two Asset Portfolio
Lecture 8 - Minimum Variance Portfolio and Feasible Set
Lecture 9 - Multi Asset Portfolio, Minimum Variance Portfolio, Efficient Frontier and Minimum Variance Line
Lecture 10 - Minimum Variance Line (Continued), Market Portfolio
Lecture 11 - Capital Market Line, Capital Asset Pricing Model
Lecture 12 - Performance Analysis
Lecture 13 - No-Arbitrage Principle and Pricing of Forward Contracts
Lecture 14 - Futures, Options and Put-Call-Parity
Lecture 15 - Bounds on Options
Lecture 16 - Derivative Pricing in a Single Period Binomial Model
Lecture 17 - Derivative Pricing in Multiperiod Binomial Model
Lecture 18 - Derivative Pricing in Binomial Model and Path Dependent Options
Lecture 19 - Discrete Probability Spaces
Lecture 20 - Filtrations and Conditional Expectations
Lecture 21 - Properties of Conditional Expectations
Lecture 22 - Examples of Conditional Expectations, Martingales
Lecture 23 - Risk-Neutral Pricing of European Derivatives in Binomial Model
Lecture 24 - Actual and Risk-Neutral Probabilities, Markov Process, American Options
Lecture 25 - General Probability Spaces, Expectations, Change of Measure
Lecture 26 - Filtrations, Independence, Conditional Expectations
Lecture 27 - Brownian Motion and its Properties
Lecture 28 - ItÃ´ Integral and its Properties
Lecture 29 - ItÃ´ Formula, ItÃ´ Processes

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Lecture 30 - Multivariable Stochastic Calculus, Stochastic Differential Equations
Lecture 31 - Black-Scholes-Merton (BSM) Model, BSM Equation, BSM Formula
Lecture 32 - Greeks, Put-Call Parity, Change of Measure
Lecture 33 - Girsanov Theorem, Risk-Neutral Pricing of Derivatives, BSM Formula
Lecture 34 - MRT and Hedging, Multidimensional Girsanov and MRT
Lecture 35 - Multidimensional BSM Model, Fundamental Theorems of Asset Pricing
Lecture 36 - BSM Model with Dividend-Paying Stocks

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NPTEL Video Course - Mathematics - NOC:Mathematical Portfolio Theory

Subject Co-ordinator - Prof. Siddhartha Pratim Chakrabarty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Probability space and their properties, Random variables
Lecture 2 - Mean, variance, covariance and their properties
Lecture 3 - Linear regression; Binomial and normal distribution; Central Limit Theorem
Lecture 4 - Financial markets
Lecture 5 - Bonds and stocks
Lecture 6 - Binomial and geometric Brownian motion (gBm) asset pricing models
Lecture 7 - Expected return, risk and covariance of returns
Lecture 8 - Expected return and risk of a portfolio; Minimum variance portfolio
Lecture 9 - Multi-asset portfolio and Efficient frontier
Lecture 10 - Capital Market Line and Derivation of efficient frontier
Lecture 11 - Capital Asset Pricing Model and Single index model
Lecture 12 - Portfolio performance analysis
Lecture 13 - Utility functions and expected utility
Lecture 14 - Risk preferences of investors
Lecture 15 - Absolute Risk Aversion and Relative Risk Aversion
Lecture 16 - Portfolio theory with utility functions
Lecture 17 - Geometric Mean Return and Roy's Safety-First Criterion
Lecture 18 - Kataoka's Safety-First Criterion and Telser's Safety-First Criterion
Lecture 19 - Semi-variance framework
Lecture 20 - Stochastic dominance; First order stochastic dominance
Lecture 21 - Second order stochastic dominance and Third order stochastic dominance
Lecture 22 - Discrete time model and utility function
Lecture 23 - Optimal portfolio for single-period discrete time model
Lecture 24 - Optimal portfolio for multi-period discrete time model; Discrete Dynamic Programming
Lecture 25 - Continuous time model; Hamilton-Jacobi-Bellman PDE
Lecture 26 - Hamilton-Jacobi-Bellman PDE; Duality/Martingale Approach
Lecture 27 - Duality/Martingale Approach in Discrete and Continuous Time
Lecture 28 - Interest rates and bonds; Duration
Lecture 29 - Duration; Immunization

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Lecture 30 - Convexity; Hedging and Immunization
Lecture 31 - Quantiles and their properties
Lecture 32 - Value-at-Risk and its properties
Lecture 33 - Average Value-at-Risk and its properties
Lecture 34 - Asset allocation
Lecture 35 - Portfolio optimization
Lecture 36 - Portfolio optimization with constraints, Value-at-Risk

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NPTEL Video Course - Mathematics - NOC:Discrete-time Markov Chains and Poission Processes

Subject Co-ordinator - Prof. Ayon Ganguly, Prof. Subhamay Saha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Basic Probability - I
Lecture 2 - Review of Basic Probability - II
Lecture 3 - Review of Basic Probability - III
Lecture 4 - Stochastic Processes
Lecture 5 - Definition of Markov Chain and Transition Probabilities
Lecture 6 - Markov Property and Chapman-Kolmogorov Equations
Lecture 7 - Chapman-Kolmogorov Equations: Examples
Lecture 8 - Accessibility and Communication of States
Lecture 9 - Hitting Time - I
Lecture 10 - Hitting Time - II
Lecture 11 - Hitting Time - III
Lecture 12 - Strong Markov Property
Lecture 13 - Passage Time and Excursion
Lecture 14 - Number of Visits
Lecture 15 - Class Property
Lecture 16 - Transience and Recurrence of Random Walks
Lecture 17 - Stationary Distribution - I
Lecture 18 - Stationary Distribution - II
Lecture 19 - Stationary Distribution - III
Lecture 20 - Limit Theorems - I
Lecture 21 - Limit Theorems - II
Lecture 22 - Some Problems - I
Lecture 23 - Some Problems - II
Lecture 24 - Time Reversibility
Lecture 25 - Properties of Exponential Distribution
Lecture 26 - Some Problems
Lecture 27 - Order Statistics
Lecture 28 - Poisson Processes
Lecture 29 - Poisson Thinning - I

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Lecture 30 - Poisson Thinning - II
Lecture 31 - Conditional Arrival Times
Lecture 32 - Independent Poisson Processes
Lecture 33 - Some Problems
Lecture 34 - Compound Poisson Processes

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NPTEL Video Course - Mathematics - NOC:Introduction to Queueing Theory

Subject Co-ordinator - Prof. N. Selvaraju

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Queueing Systems, System Performance Measures
Lecture 2 - Characteristics of Queueing Systems, Kendall's Notation
Lecture 3 - Little's Law, General Relationships
Lecture 4 - Laplace and Laplace-Stieltjes Transforms, Probability Generating Functions
Lecture 5 - An Overview of Stochastic Processes
Lecture 6 - Markov Chains: Definition, Transition Probabilities
Lecture 7 - Classification Properties of Markov Chains
Lecture 8 - Long-Term Behaviour of Markov Chains
Lecture 9 - Exponential Distribution and its Properties, Poisson Process
Lecture 10 - Poisson Process and its Properties, Generalizations
Lecture 11 - Continuous-Time Markov Chains, Generator Matrix, Kolmogorov Equations
Lecture 12 - Stationary and Limiting Distributions of CTMC, Balance Equations, Birth-Death Processes
Lecture 13 - Birth-Death Queues: General Theory, M/M/1 Queues and their Steady State Solution
Lecture 14 - M/M/1 Queues: Performance Measures, PASTA Property, Waiting Time Distributions
Lecture 15 - M/M/c Queues, Erlang Delay Formula
Lecture 16 - M/M/c/K Queues
Lecture 17 - Erlang's Loss System, Erlang Loss Formula, Infinite-Server Queues
Lecture 18 - Finite-Source Queues, Engset Loss System, State-Dependent Queues, Queues with Impatience
Lecture 19 - Transient Solutions: M/M/1/1, Infinite-Server and M/M/1 Queues, Busy Period Analysis
Lecture 20 - Queues with Bulk Arrivals
Lecture 21 - Queues with Bulk Service
Lecture 22 - Erlang and Phase-Type Distributions
Lecture 23 - Erlangian Queues: Erlangian Arrivals, Erlangian Service Times
Lecture 24 - Nonpreemptive Priority Queues
Lecture 25 - Nonpreemptive and Preemptive Priority Queues
Lecture 26 - M/M/1 Retrial Queues
Lecture 27 - Discrete-Time Queues: Geo/Geo/1 (EAS), Geo/Geo/1 (LAS)
Lecture 28 - Introduction to Queueing Networks, Two-Node Network
Lecture 29 - Burke's Theorem, General Setup, Tandem Networks

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Lecture 30 - Queueing Networks with Blocking, Open Jackson Networks
Lecture 31 - Waiting Times and Multiple Classes in Open Jackson Networks
Lecture 32 - Closed Jackson Networks
Lecture 33 - Closed Jackson Networks, Convolution Algorithm
Lecture 34 - Mean-Value Analysis Algorithm
Lecture 35 - Cyclic Queueing Networks, Extensions of Jackson Networks
Lecture 36 - Renewal Processes
Lecture 37 - Regenerative Processes, Semi-Markov Processes
Lecture 38 - M/G/1 Queues, The Pollaczek-Khinchin Mean Formula
Lecture 39 - M/G/1 Queues, The Pollaczek-Khinchin Transform Formula
Lecture 40 - M/G/1 Queues: Waiting Times and Busy Period
Lecture 41 - M/G/1/K Queues, Additional Insights on M/G/1 Queues
Lecture 42 - M/G/c, M/G/â and M/G/c/c Queues
Lecture 43 - G/M/1 Queues
Lecture 44 - G/G/1 Queues: Lindley's Integral Equation
Lecture 45 - G/G/1 Queues: Bounds
Lecture 46 - Vacation Queues: Introduction, M/M/1 Queues with Vacations
Lecture 47 - M/G/1 Queues with Vacations

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NPTEL Video Course - Mathematics - NOC:Calculus-II

Subject Co-ordinator - Prof. M. Guru Prem Prasad, Prof. Arup Chattopadhyay

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Coordinates Systems 2-D and 3-D
Lecture 2 - Vector Algebra R^n
Lecture 3 - Euclidean space R^n and some of its properties
Lecture 4 - Sequences in R^n
Lecture 5 - Functions of Several Variables and Concept of Limit
Lecture 6 - Properties of Limit, Iterated Limit and Double limit
Lecture 7 - Concept of Continuity and Some of Its Properties
Lecture 8 - Properties of Continuous Functions
Lecture 9 - Concept of Differentiability for Vector-valued Functions
Lecture 10 - Properties of Differentiable Functions, Chain Rule
Lecture 11 - Applications of Differentiability
Lecture 12 - Concept of Partial Derivates, Examples and Properties
Lecture 13 - Higher order Partial Derivatives and notion of Directional Derivatives
Lecture 14 - Concept of Total Derivative and related properties
Lecture 15 - Gradient Vector and Necessary condition for Differentiability
Lecture 16 - Sufficient condition for Differentiability and Chain rule
Lecture 17 - Applications: Tangent Plane and Normal Line for a Surface
Lecture 18 - Mixed Partial Derivatives and Examples
Lecture 19 - Mixed Derivative Theorem and Examples
Lecture 20 - Concept of Mean Value Theorem
Lecture 21 - Notion of Hessian
Lecture 22 - Taylorâ s theorem and Linear approximation
Lecture 23 - Maxima, Minima and Saddle point
Lecture 24 - Necessary condition for extremum and quadratic forms
Lecture 25 - Hessian matrix, Method to find the extremum values of f
Lecture 26 - Global extrema, Constrained extrema
Lecture 27 - The method of Lagrange multiplies, Exact differentials
Lecture 28 - Definition of Double integrals in terms of Upper and Lower sums
Lecture 29 - Definition of Double integrals in terms of Riemaan Sum and Properties

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Lecture 30 - Iterated integral and Fubiniâ s theorem
Lecture 31 - Double integral on simple regions and Fubiniâ s theorem
Lecture 32 - Change of Variables in a Double Integral and Applications
Lecture 33 - Definition of Triple integrals as Riemann Integral and Examples
Lecture 34 - Triple integral on simple regions and Fubiniâ s theorem
Lecture 35 - More on Triple integral on simple regions and Fubiniâ s theorem
Lecture 36 - Change of Variables in Triple Integral and Examples
Lecture 37 - Definition of Vector Fields and visualization of them by arrows
Lecture 38 - Integral curves of Vector Fields, conservative and non-conservative vector fields, Gradient
Lecture 39 - Necessary and sufficient conditions for a conservative/gradient vector field
Lecture 40 - Concept of Divergence and Curl
Lecture 41 - Curl, rotational vector field, Divergence of curl, Laplace operator
Lecture 42 - Recall of Curves, Smooth Curves, Piecewise Smooth Curves
Lecture 43 - Definition of Scalar Line Integral, Some examples and properties
Lecture 44 - Orientation of smooth curve and definition of Vector Line Integral
Lecture 45 - Definition of Vector Line Integral, Examples, Properties and Applications
Lecture 46 - Definition of surfaces, smooth surfaces, and parametrization of surfaces
Lecture 47 - Definition of scalar surface integral and some examples
Lecture 48 - Oriented surfaces and the definition of vector surface integral
Lecture 49 - Vector surface integral and some examples
Lecture 50 - Recall the definition of curves, orientation of curves, Jordan curve theorem
Lecture 51 - Statement, and proof of Green's theorem ona simply connected region
Lecture 52 - Application of Green's theorem and Green's theorem for multiply connected regions
Lecture 53 - Application of Green's theorem for multiply connected regions and Examples
Lecture 54 - Recall the definition of surfaces, smooth surfaces, and orientation of surfaces
Lecture 55 - Oriented surfaces, Stokes theorem on smooth surfaces with examples
Lecture 56 - Stokes theorem on smooth surfaces with finitely many holes, Gauss Divergence theorem and example
Lecture 57 - Gauss Divergence theorem, Application of Divergence theorem and examples

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NPTEL Video Course - Mathematics - Applied Multivariate Analysis

Subject Co-ordinator - Dr. Sharmishtha Mitra

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prologue
Lecture 2 - Basic concepts on multivariate distribution
Lecture 3 - Basic concepts on multivariate distribution
Lecture 4 - Multivariate normal distribution â I
Lecture 5 - Multivariate normal distribution â II
Lecture 6 - Multivariate normal distribution â III
Lecture 7 - Some problems on multivariate distributions â I
Lecture 8 - Some problems on multivariate distributions â II
Lecture 9 - Random sampling from multivariate normal distribution and Wishart distribution - I
Lecture 10 - Random sampling from multivariate normal distribution and Wishart distribution - II
Lecture 11 - Random sampling from multivariate normal distribution and Wishart distribution - III
Lecture 12 - Wishart distribution and itâ s properties - I
Lecture 13 - Wishart distribution and itâ s properties - II
Lecture 14 - Hotellingâ s T2 distribution and itâ s applications
Lecture 15 - Hotellingâ s T2 distribution and various confidence intervals and regions
Lecture 16 - Hotellingâ s T2 distribution and Profile analysis
Lecture 17 - Profile analysis - I
Lecture 18 - Profile analysis - II
Lecture 19 - MANOVA - I
Lecture 20 - MANOVA - II
Lecture 21 - MANOVA - III
Lecture 22 - MANOVA & Multiple Correlation Coefficient
Lecture 23 - Multiple Correlation Coefficient
Lecture 24 - Principal Component Analysis
Lecture 25 - Principal Component Analysis
Lecture 26 - Principal Component Analysis
Lecture 27 - Cluster Analysis
Lecture 28 - Cluster Analysis
Lecture 29 - Cluster Analysis

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Lecture 30 - Cluster Analysis
Lecture 31 - Discriminant Analysis and Classification
Lecture 32 - Discriminant Analysis and Classification
Lecture 33 - Discriminant Analysis and Classification
Lecture 34 - Discriminant Analysis and Classification
Lecture 35 - Discriminant Analysis and Classification
Lecture 36 - Discriminant Analysis and Classification
Lecture 37 - Discriminant Analysis and Classification
Lecture 38 - Factor_Analysis
Lecture 39 - Factor_Analysis
Lecture 40 - Factor_Analysis
Lecture 41 - Cannonical Correlation Analysis
Lecture 42 - Cannonical Correlation Analysis
Lecture 43 - Cannonical Correlation Analysis
Lecture 44 - Cannonical Correlation Analysis

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NPTEL Video Course - Mathematics - Calculus of Variations and Integral Equations

Subject Co-ordinator - Dr. Malay Banerjee, Prof. D. Bahuguna

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Calculus of Variations and Integral Equations
Lecture 2 - Calculus of Variations and Integral Equations
Lecture 3 - Calculus of Variations and Integral Equations
Lecture 4 - Calculus of Variations and Integral Equations
Lecture 5 - Calculus of Variations and Integral Equations
Lecture 6 - Calculus of Variations and Integral Equations
Lecture 7 - Calculus of Variations and Integral Equations
Lecture 8 - Calculus of Variations and Integral Equations
Lecture 9 - Calculus of Variations and Integral Equations
Lecture 10 - Calculus of Variations and Integral Equations
Lecture 11 - Calculus of Variations and Integral Equations
Lecture 12 - Calculus of Variations and Integral Equations
Lecture 13 - Calculus of Variations and Integral Equations
Lecture 14 - Calculus of Variations and Integral Equations
Lecture 15 - Calculus of Variations and Integral Equations
Lecture 16 - Calculus of Variations and Integral Equations
Lecture 17 - Calculus of Variations and Integral Equations
Lecture 18 - Calculus of Variations and Integral Equations
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Lecture 24 - Calculus of Variations and Integral Equations
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Lecture 28 - Calculus of Variations and Integral Equations
Lecture 29 - Calculus of Variations and Integral Equations

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Lecture 30 - Calculus of Variations and Integral Equations
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Lecture 32 - Calculus of Variations and Integral Equations
Lecture 33 - Calculus of Variations and Integral Equations
Lecture 34 - Calculus of Variations and Integral Equations
Lecture 35 - Calculus of Variations and Integral Equations
Lecture 36 - Calculus of Variations and Integral Equations
Lecture 37 - Calculus of Variations and Integral Equations
Lecture 38 - Calculus of Variations and Integral Equations
Lecture 39 - Calculus of Variations and Integral Equations
Lecture 40 - Calculus of Variations and Integral Equations

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NPTEL Video Course - Mathematics - Linear programming and Extensions

Subject Co-ordinator - Prof. Prabha Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Linear Programming Problems
Lecture 2 - Vector space, Linear independence and dependence, basis
Lecture 3 - Moving from one basic feasible solution to another, optimality criteria
Lecture 4 - Basic feasible solutions, existence & derivation
Lecture 5 - Convex sets, dimension of a polyhedron, Faces, Example of a polytope
Lecture 6 - Direction of a polyhedron, correspondence between bfs and extreme points
Lecture 7 - Representation theorem, LPP solution is a bfs, Assignment 1
Lecture 8 - Development of the Simplex Algorithm, Unboundedness, Simplex Tableau
Lecture 9 - Simplex Tableau & algorithm ,Cycling, Blandâ s anti-cycling rules, Phase I & Phase II
Lecture 10 - Big-M method,Graphical solutions, adjacent extreme pts and adjacent bfs
Lecture 11 - Assignment 2, progress of Simplex algorithm on a polytope, bounded variable LPP
Lecture 12 - LPP Bounded variable, Revised Simplex algorithm, Duality theory, weak duality theorem
Lecture 13 - Weak duality theorem, economic interpretation of dual variables, Fundamental theorem of duality
Lecture 14 - Examples of writing the dual, complementary slackness theorem
Lecture 15 - Complementary slackness conditions, Dual Simplex algorithm, Assignment 3
Lecture 16 - Primal-dual algorithm
Lecture 17 - Problem in lecture 16, starting dual feasible solution, Shortest Path Problem
Lecture 18 - Shortest Path Problem, Primal-dual method, example
Lecture 19 - Shortest Path Problem-complexity, interpretation of dual variables, post-optimality analysis-cha
Lecture 20 - Assignment 4, postoptimality analysis, changes in b, adding a new constraint, changes in {aij} ,
Lecture 21 - Parametric LPP-Right hand side vector
Lecture 22 - Parametric cost vector LPP
Lecture 23 - Parametric cost vector LPP, Introduction to Min-cost flow problem
Lecture 24 - Mini-cost flow problem-Transportation problem
Lecture 25 - Transportation problem degeneracy, cycling
Lecture 26 - Sensitivity analysis
Lecture 27 - Sensitivity analysis
Lecture 28 - Bounded variable transportation problem, min-cost flow problem
Lecture 29 - Min-cost flow problem

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Lecture 30 - Starting feasible solution, Lexicographic method for preventing cycling ,strongly feasible solut
Lecture 31 - Assignment 6, Shortest path problem, Shortest Path between any two nodes,Detection of negative c
Lecture 32 - Min-cost-flow Sensitivity analysis Shortest path problem sensitivity analysis
Lecture 33 - Min-cost flow changes in arc capacities , Max-flow problem, assignment 7
Lecture 34 - Problem 3 (assignment 7), Min-cut Max-flow theorem, Labelling algorithm
Lecture 35 - Max-flow - Critical capacity of an arc, starting solution for min-cost flow problem
Lecture 36 - Improved Max-flow algorithm
Lecture 37 - Critical Path Method (CPM)
Lecture 38 - Programme Evaluation and Review Technique (PERT)
Lecture 39 - Simplex Algorithm is not polynomial time- An example
Lecture 40 - Interior Point Methods

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NPTEL Video Course - Mathematics - Convex Optimization

Subject Co-ordinator - Dr. Joydeep Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Convex Optimization
Lecture 2 - Convex Optimization
Lecture 3 - Convex Optimization
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Lecture 5 - Convex Optimization
Lecture 6 - Convex Optimization
Lecture 7 - Convex Optimization
Lecture 8 - Convex Optimization
Lecture 9 - Convex Optimization
Lecture 10 - Convex Optimization
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Lecture 29 - Convex Optimization

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Lecture 40 - Convex Optimization
Lecture 41 - Convex Optimization
Lecture 42 - Convex Optimization

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NPTEL Video Course - Mathematics - Foundations of Optimization

Subject Co-ordinator - Dr. Joydeep Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Optimization
Lecture 2 - Optimization
Lecture 3 - Optimization
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Lecture 5 - Optimization
Lecture 6 - Optimization
Lecture 7 - Optimization
Lecture 8 - Optimization
Lecture 9 - Optimization
Lecture 10 - Optimization
Lecture 11 - Optimization
Lecture 12 - Optimization
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Lecture 29 - Optimization

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Lecture 36 - Optimization
Lecture 37 - Optimization
Lecture 38 - Optimization

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NPTEL Video Course - Mathematics - Probability Theory and Applications

Subject Co-ordinator - Prof. Prabha Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic principles of counting
Lecture 2 - Sample space, events, axioms of probability
Lecture 3 - Conditional probability, Independence of events
Lecture 4 - Random variables, cumulative density function, expected value
Lecture 5 - Discrete random variables and their distributions
Lecture 6 - Discrete random variables and their distributions
Lecture 7 - Discrete random variables and their distributions
Lecture 8 - Continuous random variables and their distributions
Lecture 9 - Continuous random variables and their distributions
Lecture 10 - Continuous random variables and their distributions
Lecture 11 - Function of random variables, Momement generating function
Lecture 12 - Jointly distributed random variables, Independent r. v. and their sums
Lecture 13 - Independent r. v. and their sums
Lecture 14 - Chi â square r. v., sums of independent normal r. v., Conditional distr
Lecture 15 - Conditional disti, Joint distr. of functions of r. v., Order statistics
Lecture 16 - Order statistics, Covariance and correlation
Lecture 17 - Covariance, Correlation, Cauchy- Schwarz inequalities, Conditional expectation
Lecture 18 - Conditional expectation, Best linear predictor
Lecture 19 - Inequalities and bounds
Lecture 20 - Convergence and limit theorems
Lecture 21 - Central limit theorem
Lecture 22 - Applications of central limit theorem
Lecture 23 - Strong law of large numbers, Joint mgf
Lecture 24 - Convolutions
Lecture 25 - Stochastic processes
Lecture 26 - Transition and state probabilities
Lecture 27 - State prob., First passage and First return prob
Lecture 28 - First passage and First return prob. Classification of states
Lecture 29 - Random walk, periodic and null states

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Lecture 30 - Reducible Markov chains
Lecture 31 - Time reversible Markov chains
Lecture 32 - Poisson Processes
Lecture 33 - Inter-arrival times, Properties of Poisson processes
Lecture 34 - Queuing Models
Lecture 35 - Analysis of L, Lq ,W and Wq , M/M/S model
Lecture 36 - M/M/S , M/M/I/K models
Lecture 37 - M/M/I/K and M/M/S/K models
Lecture 38 - Application to reliability theory failure law
Lecture 39 - Exponential failure law, Weibull law
Lecture 40 - Reliability of systems

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NPTEL Video Course - Mathematics - NOC:Basic Calculus for Engineers, Scientists and Economists

Subject Co-ordinator - Dr. Joydeep Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Numbers
Lecture 2 - Functions-1
Lecture 3 - Sequence-1
Lecture 4 - Sequence-2
Lecture 5 - Limits and Continuity-1
Lecture 6 - Limits and Continuity-2
Lecture 7 - Limits And Continuity-3
Lecture 8 - Derivative-1
Lecture 9 - Derivative-2
Lecture 10 - Maxima And Minima
Lecture 11 - Mean-Value Theorem And Taylors Expansion-1
Lecture 12 - Mean-Value Theorem And Taylors Expansion-2
Lecture 13 - Integration-1
Lecture 14 - Integration-2
Lecture 15 - Integration By Parts
Lecture 16 - Definite Integral
Lecture 17 - Riemann Integration-1
Lecture 18 - Riemann Integration-2
Lecture 19 - Functions Of Two Or More Variables
Lecture 20 - Limits And Continuity Of Functions Of Two Variable
Lecture 21 - Differentiation Of Functions Of Two Variables-1
Lecture 22 - Differentiation Of Functions Of Two Variables-2
Lecture 23 - Unconstrained Minimization Of Funtions Of Two Variables
Lecture 24 - Constrained Minimization And Lagrange Multiplier Rules
Lecture 25 - Infinite Series-1
Lecture 26 - Infinite Series-2
Lecture 27 - Infinite Series-3
Lecture 28 - Multiple Integrals-1
Lecture 29 - Multiple Integrals-2

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Lecture 30 - Multiple Integrals-3

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NPTEL Video Course - Mathematics - NOC:Probability and Stochastics for finance

Subject Co-ordinator - Dr. Joydeep Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Probability
Lecture 2 - Interesting Problems In Probability
Lecture 3 - Random variables, distribution function and independence
Lecture 4 - Chebyshev inequality, Borel-Cantelli Lemmas and related issues
Lecture 5 - Law of Large Number and Central Limit Theorem
Lecture 6 - Conditional Expectation - I
Lecture 7 - Conditional Expectation - II
Lecture 8 - Martingales
Lecture 9 - Brownian Motion - I
Lecture 10 - Brownian Motion - II
Lecture 11 - Brownian Motion - III
Lecture 12 - Ito Integral - I
Lecture 13 - Ito Integral - II
Lecture 14 - Ito Calculus - I
Lecture 15 - Ito Calculus - II
Lecture 16 - Ito Integral In Higher Dimension
Lecture 17 - Application to Ito Integral - I
Lecture 18 - Application to Ito Integral - II
Lecture 19 - Black Scholes Formula - I
Lecture 20 - Black Scholes Formula - II

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NPTEL Video Course - Mathematics - NOC:Differential Calculus in Several Variables

Subject Co-ordinator - Prof. Sudipta Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Several Variables and Notion Of distance in Rn
Lecture 2 - Countinuity And Compactness
Lecture 3 - Countinuity And Connectdness
Lecture 4 - Derivatives
Lecture 5 - Matrix Of Linear Transformation
Lecture 6 - Examples for Differentiable function
Lecture 7 - Sufficient condition of differentiability
Lecture 8 - Chain Rule
Lecture 9 - Mean Value Theorem
Lecture 10 - Higher Order Derivatives
Lecture 11 - Taylor's Formula
Lecture 12 - Maximum And Minimum
Lecture 13 - Second derivative test for maximum, minimum and saddle point
Lecture 14 - We formalise the second derivative test discussed in Lecture 2 and do examples
Lecture 15 - Specialisation to functions of two variables
Lecture 16 - Implicit Function Theorem
Lecture 17 - Implicit Function Theorem -a
Lecture 18 - Application of IFT
Lecture 19 - Application of IFT
Lecture 20 - Application of IFT
Lecture 21 - Application of IFT

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NPTEL Video Course - Mathematics - NOC:Curves and Surfaces

Subject Co-ordinator - Prof. Sudipta Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Level curves and locus, definition of parametric curves, tangent, arc length, arc length parametr
Lecture 2 - How much a curve is Â curvedÂ , signed unit normal and signed curvature, rigid motions, constant
Lecture 3 - Curves in R^3, principal normal and binormal, torsion
Lecture 4 - Frenet-Serret formula
Lecture 5 - Simple closed curve and isoperimetric inequality
Lecture 6 - Surfaces and parametric surfaces, examples, regular surface and non-example of regular surface, t
Lecture 7 - Transition maps of smooth surfaces, smooth function between surfaces, diffeomorphism
Lecture 8 - Reparameterization
Lecture 9 - Tangent, Normal
Lecture 10 - Orientable surfaces
Lecture 11 - Examples of Surfaces
Lecture 12 - First Fundamental Form
Lecture 13 - Conformal Mapping
Lecture 14 - Curvature of Surfaces
Lecture 15 - Euler's Theorem
Lecture 16 - Regular Surfaces locally as Quadratic Surfaces
Lecture 17 - Geodesics
Lecture 18 - Existence of Geodesics, Geodesics on Surfaces of revolution
Lecture 19 - Geodesics on surfaces of revolution; Clairaut's Theorem
Lecture 20 - Pseudosphere
Lecture 21 - Classification of Quadratic Surface
Lecture 22 - Surface Area and Equiareal Map

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NPTEL Video Course - Mathematics - NOC:Linear Regression Analysis and Forecasting

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Fundamental Concepts Of Modelling
Lecture 2 - Regression Model - A Statistical Tool
Lecture 3 - Simple Linear Regression Analysis
Lecture 4 - Estimation Of Parameters In Simple Linear Regression Model
Lecture 5 - Estimation Of Parameters In Simple Linear Regression Model (Continued...)
Lecture 6 - Estimation Of Parameters In Simple Linear Regression Model (Continued...)
Lecture 7 - Maximum Likelihood Estimation of Parameters in Simple Linear Regression Model
Lecture 8 - Testing of Hypotheis and Confidence Interval Estimation in Simple Linear Regression Model
Lecture 9 - Testing of Hypotheis and Confidence Interval Estimation in Simple Linear Regression Model (Contir
Lecture 10 - Software Implementation in Simple Linear Regression Model using MINITAB
Lecture 11 - Multiple Linear Regression Model
Lecture 12 - Estimation of Model Parameters in Multiple Linear Regression Model
Lecture 13 - Estimation of Model Parameters in Multiple Linear Regression Model (Continued...)
Lecture 14 - Standardized Regression Coefficients and Testing of Hypothesis
Lecture 15 - Testing of Hypothesis (Continued...) and Goodness of Fit of the Model
Lecture 16 - Diagnostics in Multiple Linear Regression Model
Lecture 17 - Diagnostics in Multiple Linear Regression Model (Continued...)
Lecture 18 - Diagnostics in Multiple Linear Regression Model (Continued...)
Lecture 19 - Software Implementation of Multiple Linear Regression Model using MINITAB
Lecture 20 - Software Implementation of Multiple Linear Regression Model using MINITAB (Continued...)
Lecture 21 - Forecasting in Multiple Linear Regression Model
Lecture 22 - Within Sample Forecasting
Lecture 23 - Outside Sample Forecasting
Lecture 24 - Software Implementation of Forecasting using MINITAB

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NPTEL Video Course - Mathematics - NOC:Introduction to R Software

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - How to Learn and Follow the Course
Lecture 2 - Why R and Installation Procedure
Lecture 3 - Introduction _Help_ Demo examples_ packages_ libraries
Lecture 4 - Introduction _Command line_ Data editor _ Rstudio
Lecture 5 - Basics in Calculations
Lecture 6 - Basics of Calculations _ Calculator _Built in Functions Assignments
Lecture 7 - Basics of Calculations _Functions _Matrices
Lecture 8 - Basics Calculations
Lecture 9 - Basics Calculations
Lecture 10 - Basics Calculations
Lecture 11 - Basics Calculations
Lecture 12 - Basics Calculations
Lecture 13 - Basics Calculations
Lecture 14 - Basics Calculations
Lecture 15 - Data management - Sequences
Lecture 16 - Data management - sequences
Lecture 17 - Data management - Repeats
Lecture 18 - Data management - Sorting and Ordering
Lecture 19 - Data management - Lists
Lecture 20 - Data management - Lists (Continued...)
Lecture 21 - Data management - Vector indexing
Lecture 22 - Data management - Vector Indexing (Continued...)
Lecture 23 - Data management - Factors
Lecture 24 - Data management - factors (Continued...)
Lecture 25 - Strings - Display and Formatting, Print and Format Functions
Lecture 26 - Strings - Display and Formatting, Print and Format with Concatenate
Lecture 27 - Strings - Display and Formatting, Paste Function
Lecture 28 - Strings - Display and Formatting, Splitting
Lecture 29 - Strings - Display and Formatting, Replacement_ Manipulations _Alphabets

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Lecture 30 - Strings - Display and Formatting, Replacement and Evaluation of Strings
Lecture 31 - Data frames
Lecture 32 - Data frames (Continued...)
Lecture 33 - Data frames (Continued...)
Lecture 34 - Data Handling - Importing CSV and Tabular Data Files
Lecture 35 - Data Handling - Importing Data Files from Other Software
Lecture 36 - Statistical Functions - Frequency and Partition values
Lecture 37 - Statistical Functions - Graphics and Plots
Lecture 38 - Statistical Functions - Central Tendency and Variation
Lecture 39 - Statistical Functions - Boxplots, Skewness and Kurtosis
Lecture 40 - Statistical Functions - Bivariate three dimensional plot
Lecture 41 - Statistical Functions - Correlation and Examples of Programming
Lecture 42 - Examples of Programming
Lecture 43 - Examples of More Programming

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NPTEL Video Course - Mathematics - NOC:Descriptive Statistics with R Software

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to R Software
Lecture 2 - Basics and R as a Calculator
Lecture 3 - Calculations with Data Vectors
Lecture 4 - Built-in Commands and Missing Data Handling
Lecture 5 - Operations with Matrices
Lecture 6 - Objectives, Steps and Basic Definitions
Lecture 7 - Variables and Types of Data
Lecture 8 - Absolute Frequency, Relative Frequency and Frequency Distribution
Lecture 9 - Frequency Distribution and Cumulative Distribution Function
Lecture 10 - Bar Diagrams
Lecture 11 - Subdivided Bar Plots and Pie Diagrams
Lecture 12 - 3D Pie Diagram and Histogram
Lecture 13 - Kernel Density and Stem - Leaf Plots
Lecture 14 - Arithmetic Mean
Lecture 15 - Median
Lecture 16 - Quantiles
Lecture 17 - Mode, Geometric Mean and Harmonic Mean
Lecture 18 - Range, Interquartile Range and Quartile Deviation
Lecture 19 - Absolute Deviation and Absolute Mean Deviation
Lecture 20 - Mean Squared Error, Variance and Standard Deviation
Lecture 21 - Coefficient of Variation and Boxplots
Lecture 22 - Raw and Central Moments
Lecture 23 - Sheppard's Correction, Absolute Moments and Computation of Moments
Lecture 24 - Skewness and Kurtosis
Lecture 25 - Univariate and Bivariate Scatter Plots
Lecture 26 - Smooth Scatter Plots
Lecture 27 - Quantile- Quantile and Three Dimensional Plots
Lecture 28 - Correlation Coefficient
Lecture 29 - Correlation Coefficient Using R Software

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Lecture 30 - Rank Correlation Coefficient
Lecture 31 - Measures of Association for Discrete and Counting Variables - Part 1
Lecture 32 - Measures of Association for Discrete and Counting Variables - Part 2
Lecture 33 - Least Squares Method - One Variable
Lecture 34 - Least Squares Method - R Commands and More than One Variables

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NPTEL Video Course - Mathematics - NOC:Calculus of Several Real Variables

Subject Co-ordinator - Dr. Joydeep Dutta

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Vectors in plane and space
Lecture 2 - Inner product and distance
Lecture 3 - Application to real world problems
Lecture 4 - Matrices and determinants
Lecture 5 - Cross product of two vectors
Lecture 6 - Higher dimensional Euclidean space
Lecture 7 - Functions of more than one real-variable
Lecture 8 - Partial derivatives and Continuity
Lecture 9 - Vector-valued maps and Jacobian matrix
Lecture 10 - Chain rule for partial derivatives
Lecture 11 - The Gradient Vector and Directional Derivative
Lecture 12 - The Implicit Function Theorem
Lecture 13 - Higher Order Partial Derivatives
Lecture 14 - Taylor's Theorem in Higher Dimension
Lecture 15 - Maxima and Minima for Several Variables
Lecture 16 - Second Derivative Test for Maximum and Minimum
Lecture 17 - Constrained Optimization and The Lagrange Multiplier Rule
Lecture 18 - Vector Valued Function and Classical Mechanics
Lecture 19 - Arc Length
Lecture 20 - Vector Fields
Lecture 21 - Multiple Integral - I
Lecture 22 - Multiple Integral - II
Lecture 23 - Multiple Integral - III
Lecture 24 - Multiple Integral - IV
Lecture 25 - Cylindrical and Spherical Coordinates
Lecture 26 - Multiple Integrals and Mechanics
Lecture 27 - Line Integral - I
Lecture 28 - Line Integral - II
Lecture 29 - Parametrized Surfaces

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Lecture 30 - Area of a surface Integral
Lecture 31 - Area of parametrized surface
Lecture 32 - Surface Integrals
Lecture 33 - Green's Theorem
Lecture 34 - Stoke's Theorem
Lecture 35 - Examples of Stoke's Theorem
Lecture 36 - Gauss Divergence Theorem
Lecture 37 - Facts about vector fields

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NPTEL Video Course - Mathematics - NOC:Linear Algebra (Prof. A.K. Lal)

Subject Co-ordinator - Prof. A.K. Lal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Notations, Motivation and Definition
Lecture 2 - Matrix: Examples, Transpose and Addition
Lecture 3 - Matrix Multiplication
Lecture 4 - Matrix Product Recalled
Lecture 5 - Matrix Product (Continued...)
Lecture 6 - Inverse of a Matrix
Lecture 7 - Introduction to System of Linear Equations
Lecture 8 - Some Initial Results on Linear Systems
Lecture 9 - Row Echelon Form (REF)
Lecture 10 - LU Decomposition - Simplest Form
Lecture 11 - Elementary Matrices
Lecture 12 - Row Reduced Echelon Form (RREF)
Lecture 13 - Row Reduced Echelon Form (RREF) (Continued...)
Lecture 14 - RREF and Inverse
Lecture 15 - Rank of a matrix
Lecture 16 - Solution Set of a System of Linear Equations
Lecture 17 - System of n Linear Equations in n Unknowns
Lecture 18 - Determinant
Lecture 19 - Permutations and the Inverse of a Matrix
Lecture 20 - Inverse and the Cramer's Rule
Lecture 21 - Vector Spaces
Lecture 22 - Vector Subspaces and Linear Span
Lecture 23 - Linear Combination, Linear Independence and Dependence
Lecture 24 - Basic Results on Linear Independence
Lecture 25 - Results on Linear Independence (Continued...)
Lecture 26 - Basis of a Finite Dimensional Vector Space
Lecture 27 - Fundamental Spaces associated with a Matrix
Lecture 28 - Rank - Nullity Theorem
Lecture 29 - Fundamental Theorem of Linear Algebra

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Lecture 30 - Definition and Examples of Linear Transformations
Lecture 31 - Results on Linear Transformations
Lecture 32 - Rank-Nullity Theorem and Applications
Lecture 33 - Isomorphism of Vector Spaces
Lecture 34 - Ordered Basis of a Finite Dimensional Vector Space
Lecture 35 - Ordered Basis (Continued...)
Lecture 36 - Matrix of a Linear Transformation
Lecture 37 - Matrix of a Linear Transformation (Continued...)
Lecture 38 - Matrix of a Linear Transformation (Continued...)
Lecture 39 - Similarity of Matrices
Lecture 40 - Inner Product Space
Lecture 41 - Inner Product (Continued...)
Lecture 42 - Cauchy Schwartz Inequality
Lecture 43 - Projection on a Vector
Lecture 44 - Results on Orthogonality
Lecture 45 - Results on Orthogonality (Continued...)
Lecture 46 - Gram-Schmidt Orthonormalization Process
Lecture 47 - Orthogonal Projections
Lecture 48 - Gram-Schmidt Process: Applications
Lecture 49 - Examples and Applications on QR-decomposition
Lecture 50 - Recapitulate ideas on Inner Product Spaces
Lecture 51 - Motivation on Eigenvalues and Eigenvectors
Lecture 52 - Examples and Introduction to Eigenvalues and Eigenvectors
Lecture 53 - Results on Eigenvalues and Eigenvectors
Lecture 54 - Results on Eigenvalues and Eigenvectors (Continued...)
Lecture 55 - Results on Eigenvalues and Eigenvectors (Continued...)
Lecture 56 - Diagonalizability
Lecture 57 - Diagonalizability (Continued...)
Lecture 58 - Schur's Unitary Triangularization (SUT)
Lecture 59 - Applications of Schur's Unitary Triangularization
Lecture 60 - Spectral Theorem for Hermitian Matrices
Lecture 61 - Cayley Hamilton Theorem
Lecture 62 - Quadratic Forms
Lecture 63 - Sylvester's Law of Inertia
Lecture 64 - Applications of Quadratic Forms to Analytic Geometry
Lecture 65 - Examples of Conics and Quartics
Lecture 66 - Singular Value Decomposition (SVD)

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NPTEL Video Course - Mathematics - NOC:Computational Number Theory and Algebra

Subject Co-ordinator - Prof. Nitin Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Background
Lecture 3 - GCD algorithm and Chinese Remainder Theorem
Lecture 4 - Fast polynomial multiplication
Lecture 5 - Fast polynomial multiplication (Continued...)
Lecture 6 - Fast integer multiplication and division
Lecture 7 - Fast integer arithmetic and matrix multiplication
Lecture 8 - Matrix Multiplication Tensor
Lecture 9 - Polynomial factoring over finite fields
Lecture 10 - Equi-degree factorization and idea of Berlekamp's algorithm
Lecture 11 - Berlekamp's algorithm as a reduction method
Lecture 12 - Factoring over finite fields
Lecture 13 - Reed Solomon Error Correcting Codes
Lecture 14 - List Decoding
Lecture 15 - Bivariate Factorization - Hensel Lifting
Lecture 16 - Bivariate polynomial factoring (Continued...)
Lecture 17 - Multivariate Polynomial Factorization
Lecture 18 - Multivariate Factoring - Hilbert's Irreducibility Theorem
Lecture 19 - Multivariate factoring (Continued...)
Lecture 20 - Analysis of LLL algorithm
Lecture 21 - Analysis of LLL algorithm (Continued...)
Lecture 22 - Analysis of LLL-reduced basis algorithm and Introduction to NTRU cryptosystem
Lecture 23 - NTRU cryptosystem (Continued...) and Introduction to Primality testing
Lecture 24 - Randomized Primality testing
Lecture 25 - Deterministic primality test (AKS) and RSA cryptosystem
Lecture 26 - Integer factoring
Lecture 27 - Pollard's p-1, Fermat, Morrison-Brillhart, Quadratic and Number field sieve methods

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NPTEL Video Course - Mathematics - NOC:Basic Calculus 1 and 2

Subject Co-ordinator - Prof. Parasar Mohanty

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Real numbers and Archimedean property
Lecture 2 - Supremum and Decimal representation of Reals
Lecture 3 - Functions
Lecture 4 - Functions continued and Limits
Lecture 5 - Limits (Continued...)
Lecture 6 - Limits (Continued...) and Continuity
Lecture 7 - Continuity and Intermediate Value Property
Lecture 8 - Differentiation
Lecture 9 - Chain Rule
Lecture 10 - Nth derivative of a function
Lecture 11 - Local extrema and Rolle's theorem
Lecture 12 - Mean value theorem and Monotone functions
Lecture 13 - Local extremum tests
Lecture 14 - Concavity and points of inflection
Lecture 15 - Asymptotes and plotting graph of functions
Lecture 16 - Optimization and L'Hospital Rule
Lecture 17 - L'Hospital Rule continued and Cauchy Mean value theorem
Lecture 18 - Approximation of Roots
Lecture 19 - Antiderivative and Riemann Integration
Lecture 20 - Riemann's criterion for Integrability
Lecture 21 - Integration and its properties
Lecture 22 - Area and Mean value theorem for integrals
Lecture 23 - Fundamental theorem of Calculus
Lecture 24 - Integration by parts and Trapezoidal rule
Lecture 25 - Simpson's rule and Substitution in integrals
Lecture 26 - Area between curves
Lecture 27 - Arc Length and Parametric curves
Lecture 28 - Polar Co-ordinates
Lecture 29 - Area of curves in polar coordinates

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Lecture 30 - Volume of solids
Lecture 31 - Improper Integrals
Lecture 32 - Sequences
Lecture 33 - Algebra of sequences and Sandwich theorem
Lecture 34 - Subsequences
Lecture 35 - Series
Lecture 36 - Comparison tests for Series
Lecture 37 - Ratio and Root test for series
Lecture 38 - Integral test and Leibniz test for series
Lecture 39 - Revision - I
Lecture 40 - Revision - II

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NPTEL Video Course - Mathematics - NOC:Advanced Partial Differential Equations

Subject Co-ordinator - Prof. Kaushik Bal

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Mathematics - NOC:Essentials of Data Science With R Software 1: Probability and Statisti

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Data Science - Why, What, and How?
Lecture 2 - Installation and Working with R
Lecture 3 - Installation and Working with R Studio
Lecture 4 - Calculations with R as a Calculator
Lecture 5 - Calculations with Data Vectors
Lecture 6 - Built-in Commands and Bivariate Plots
Lecture 7 - Logical Operators and Selection of Sample
Lecture 8 - Introduction to Probability
Lecture 9 - Sample Space and Events
Lecture 10 - Set Theory and Events using Venn Diagrams
Lecture 11 - Relative Frequency and Probability
Lecture 12 - Probability and Relative Frequency - An Example
Lecture 13 - Axiomatic Definition of Probability
Lecture 14 - Some Rules of Probability
Lecture 15 - Basic Principles of Counting - Ordered Set, Unordered Set, and Permutations
Lecture 16 - Basic Principles of Counting - Combination
Lecture 17 - Conditional Probability
Lecture 18 - Multiplication Theorem of Probability
Lecture 19 - Bayes' Theorem
Lecture 20 - Independent Events
Lecture 21 - Computation of Probability using R
Lecture 22 - Random Variables - Discrete and Continuous
Lecture 23 - Cumulative Distribution and Probability Density Function
Lecture 24 - Discrete Random Variables, Probability Mass Function and Cumulative Distribution Function
Lecture 25 - Expectation of Variables
Lecture 26 - Moments and Variance
Lecture 27 - Data Based Moments and Variance in R Software
Lecture 28 - Skewness and Kurtosis
Lecture 29 - Quantiles and Tschebyschevâ s Inequality

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Lecture 30 - Degenerate and Discrete Uniform Distributions
Lecture 31 - Discrete Uniform Distribution in R
Lecture 32 - Bernoulli and Binomial Distribution
Lecture 33 - Binomial Distribution in R
Lecture 34 - Poisson Distribution
Lecture 35 - Poisson Distribution in R
Lecture 36 - Geometric Distribution
Lecture 37 - Geometric Distribution in R
Lecture 38 - Continuous Random Variables and Uniform Distribution
Lecture 39 - Normal Distribution
Lecture 40 - Normal Distribution in R
Lecture 41 - Normal Distribution - More Results
Lecture 42 - Exponential Distribution
Lecture 43 - Bivariate Probability Distribution for Discrete Random Variables
Lecture 44 - Bivariate Probability Distribution in R Software
Lecture 45 - Bivariate Probability Distribution for Continuous Random Variables
Lecture 46 - Examples in Bivariate Probability Distribution Functions
Lecture 47 - Covariance and Correlation
Lecture 48 - Covariance and Correlation â • Examples and R Software
Lecture 49 - Bivariate Normal Distribution
Lecture 50 - Chi square Distribution
Lecture 51 - t-Distribution
Lecture 52 - F-Distribution
Lecture 53 - Distribution of Sample Mean, Convergence in Probability and Weak Law of Large Numbers
Lecture 54 - Central Limit Theorem
Lecture 55 - Needs for Drawing Statistical Inferences
Lecture 56 - Unbiased Estimators
Lecture 57 - Efficiency of Estimators
Lecture 58 - CramÃ©râ Rao Lower Bound and Efficiency of Estimators
Lecture 59 - Consistency and Sufficiency of Estimators
Lecture 60 - Method of Moments
Lecture 61 - Method of Maximum Likelihood and Rao Blackwell Theorem
Lecture 62 - Basic Concepts of Confidence Interval Estimation
Lecture 63 - Confidence Interval for Mean in One Sample with Known Variance
Lecture 64 - Confidence Interval for Mean and Variance
Lecture 65 - Basics of Tests of Hypothesis and Decision Rules
Lecture 66 - Test Procedures for One Sample Test for Mean with Known Variance
Lecture 67 - One Sample Test for Mean with Unknown Variance
Lecture 68 - Two Sample Test for Mean with Known and Unknown Variances

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Lecture 69 - Test of Hypothesis for Variance in One and Two Samples

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NPTEL Video Course - Mathematics - NOC:Essentials of Data Science With R Software 2: Sampling Theory and Line

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Data Science ?
Lecture 2 - Installation and Working with R
Lecture 3 - Calculations with R as a Calculator
Lecture 4 - Calculations with Data Vectors
Lecture 5 - Built-in Commands and Missing Data Handling
Lecture 6 - Operations with Matrices
Lecture 7 - Data Handling
Lecture 8 - Graphics and Plots
Lecture 9 - Sampling, Sampling Unit, Population and Sample
Lecture 10 - Terminologies and Concepts
Lecture 11 - Ensuring Representativeness and Type of Surveys
Lecture 12 - Conducting Surveys and Ensuring Representativeness
Lecture 13 - SRSWOR, SRSWR, and Selection of Unit - 1
Lecture 14 - SRSWOR, SRSWR, and Selection of Unit - 2
Lecture 15 - Probabilities of Selection of Samples
Lecture 16 - SRSWOR and SRSWR with R with sample Package
Lecture 17 - Examples of SRS with R using sample Package
Lecture 18 - Simple Random Sampling : SRS with R using sampling and sample Packages
Lecture 19 - Simple Random Sampling : Estimation of Population Mean
Lecture 20 - Simple Random Sampling : Estimation of Population Variance
Lecture 21 - Simple Random Sampling : Estimation of Population Variance
Lecture 22 - SRS: Confidence Interval Estimation of Population Mean
Lecture 23 - SRS: Estimation of Mean, Variance and Confidence Interval in SRSWOR using R
Lecture 24 - SRS: Estimation of Mean, Variance and Confidence Interval in SRSWR using R
Lecture 25 - Sampling for Proportions and Percentages : Basic Concepts
Lecture 26 - Sampling for Proportions and Percentages : Mean and Variance of Sample Proportion
Lecture 27 - Sampling for Proportions and Percentages : Sampling for Proportions with R
Lecture 28 - Stratified Random Sampling : Drawing the Sample and Sampling Procedure
Lecture 29 - Stratified Random Sampling : Estimation of Population Mean, Population Variance and Confidence I

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Lecture 30 - Stratified Random Sampling : Sample Allocation and Variances Under Allocation
Lecture 31 - Stratified Random Sampling : Drawing of Sample Using sampling and strata Packages in R
Lecture 32 - Stratified Random Sampling : Drawing of Sample Using survey Package in R
Lecture 33 - Bootstrap Methodology : What is Bootstrap and Methodology
Lecture 34 - Bootstrap Methodology : EDF, Bootstrap Bias and Bootstrap Standard Errors
Lecture 35 - Bootstrap Methodology : Bootstrap Analysis Using boot Package in R
Lecture 36 - Bootstrap Methodology : Bootstrap Confidence Interval
Lecture 37 - Bootstrap Methodology : Bootstrap Confidence Interval Using boot and bootstrap Packages in R
Lecture 38 - Bootstrap Methodology : Example of Bootstrap Analysis Using boot Package
Lecture 39 - Introduction to Linear Models and Regression : Introduction and Basic Concepts
Lecture 40 - Simple Linear Regression Analysis : Basic Concepts and Least Squares Estimation
Lecture 41 - Simple Linear Regression Analysis : Fitting Linear Model With R Software
Lecture 42 - Simple Linear Regression Analysis : Properties of Least Squares Estimators
Lecture 43 - Simple Linear Regression Analysis : Maximum Likelihood and Confidence Interval Estimation
Lecture 44 - Simple Linear Regression Analysis : Test of Hypothesis and Confidence Interval Estimation With R
Lecture 45 - Multiple Linear Regression Analysis : Basic Concepts
Lecture 46 - Multiple Linear Regression Analysis : OLSE, Fitted Model and Residuals
Lecture 47 - Multiple Linear Regression Analysis : Model Fitting With R Software
Lecture 48 - Multiple Linear Regression Analysis : Properties of OLSE and Maximum Likelihood Estimation
Lecture 49 - Multiple Linear Regression Analysis : Test of Hypothesis and Confidence Interval Estimation on I
Lecture 50 - Analysis of Variance and Implementation in R Software
Lecture 51 - Goodness of Fit and Implementation in R Software
Lecture 52 - Variable Selection using LASSO Regression : Introduction and Basic Concepts
Lecture 53 - Variable Selection using LASSO Regression : LASSO with R

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NPTEL Video Course - Mathematics - NOC:Measure Theoretic Probability 1

Subject Co-ordinator - Prof. Suprio Bhar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course Measure Theoretic Probability 1
Lecture 2 - Sigma-fields and Measurable spaces
Lecture 3 - Fields and Generating sets for Sigma-fields
Lecture 4 - Borel Sigma-field on R and other sets
Lecture 5 - Limits of sequences of sets and Monotone classes
Lecture 6 - Measures and Measure spaces
Lecture 7 - Probability Measures
Lecture 8 - Properties of Measures - I
Lecture 9 - Properties of Measures - II
Lecture 10 - Properties of Measures - III
Lecture 11 - Measurable functions
Lecture 12 - Borel Measurable functions
Lecture 13 - Algebraic properties of Measurable functions
Lecture 14 - Limiting behaviour of measurable functions
Lecture 15 - Random Variables and Random Vectors
Lecture 16 - Law or Distribution of an RV
Lecture 17 - Distribution Function of an RV
Lecture 18 - Decomposition of Distribution functions
Lecture 19 - Construction of RVs with a specified law
Lecture 20 - Caratheodery Extension Theorem
Lecture 21 - From Distribution Functions to Probability Measures - I
Lecture 22 - From Distribution Functions to Probability Measures - II
Lecture 23 - Lebesgue-Stieltjes Measures
Lecture 24 - Properties of Lebesgue Measure on R
Lecture 25 - Distribution Functions and Probability Measures in higher dimensions
Lecture 26 - Integration of measurable functions
Lecture 27 - Properties of Measure Theoretic Integration - I
Lecture 28 - Properties of Measure Theoretic Integration - II
Lecture 29 - Monotone Convergence Theorem

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Lecture 30 - Computation of Expectation for Discrete RVs
Lecture 31 - MCT and the Linearity of Measure Theoretic Integration
Lecture 32 - Sets of measure zero and Measure Theoretic Integration
Lecture 33 - Fatou's Lemma and Dominated Convergence Theorem
Lecture 34 - Riemann and Lebesgue integration
Lecture 35 - Computations involving Lebesgue Integration
Lecture 36 - Decomposition of Measures
Lecture 37 - Absolutely Continuous RVs
Lecture 38 - Expectation of Absolutely Continuous RVs
Lecture 39 - Inequalities involving moments of RVs
Lecture 40 - Conclusion to the course Measure Theoretic Probability 1

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NPTEL Video Course - Mathematics - NOC:Foundations of R Software

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Mathematics - NOC:Foundations of R Software (In Hindi)

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Mathematics - NOC:An Introduction to Hyperbolic Geometry

Subject Co-ordinator - Prof. Abhijit Pal

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Mathematics - NOC:A Primer to Mathematical Optimization

Subject Co-ordinator - Prof. Debdas Ghosh

Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Introduction and History of Optimization
Lecture 2 - Basics of Linear Algebra
Lecture 3 - Definiteness of Matrices
Lecture 4 - Sets in R^n
Lecture 5 - Limit Superior and Limit Inferior
Lecture 6 - Order of Convergence
Lecture 7 - Lipschitz and Uniform Continuity
Lecture 8 - Partial and Directional Derivatives and Differnentiability (8,9)
Lecture 9 - Taylor's Theorem
Lecture 10 - Convex Sets and Convexity Preserving Operations
Lecture 11 - Sepration Results
Lecture 12 - Theorems of Alternatives (13 and 14)
Lecture 13 - Convex Functions
Lecture 14 - Properties and Zeroth Order Characterization of Convex Function
Lecture 15 - First-Order and Second-Order Characterization of Convex Functions
Lecture 16 - Convexity Preserving Operations
Lecture 17 - Optimality and Coerciveness
Lecture 18 - First-Order Optimality Condition (20 Part 1)
Lecture 19 - Second-Order Optimality Condition (20 Part 2)
Lecture 20 - General Structure of Unconstrained Optimization Algorithms
Lecture 21 - Inexact Line Search
Lecture 22 - Globel Convergence of Descent Methods (23,24)
Lecture 23 - Where Do Descent Methods Converge?
Lecture 24 - Scaling of Variables
Lecture 25 - Practical Stoping Criteria
Lecture 26 - Steepest Descent Method (28,29)
Lecture 27 - Newton's Method (30,31,32)
Lecture 28 - Quasi Newton Methods (33,34,35)
Lecture 29 - Conjugate Direction Methods (36,37)

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Lecture 30 - Trust Region Methods - Part I
Lecture 31 - Trust Region Methods - Part II
Lecture 32 - A Revisit to Lagrange Multipliears Method
Lecture 33 - Special Cones for Contrained Optimization
Lecture 34 - Tangent Cone
Lecture 35 - First-Order KKT Optimality Conditions (42,43)
Lecture 36 - Second-Order KKT Optimality Conditions
Lecture 37 - Constraint Qualifications
Lecture 38 - Lagrangian Duality Theory (46 to 50)
Lecture 39 - Methods for Linearly Constrained Problems (51,52,53)
Lecture 40 - Interior-Point Method for QPP
Lecture 41 - Penalty Methods
Lecture 42 - Sequential Quadratic Programming Method

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NPTEL Video Course - Mathematics - NOC:Measure Theoretic Probability 2

Subject Co-ordinator - Prof. Suprio Bhar

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Mathematics - NOC:Set Theory and Mathematical Logic

Subject Co-ordinator - Prof. Amit Kuber

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Set Theory
Lecture 2 - Operations on Sets, and Functions
Lecture 3 - Bijective Functions
Lecture 4 - Equivalence Relations and Partitions
Lecture 5 - Cantor-Schroder-Bernstein Theorem
Lecture 6 - Natural Numbers in ZF Set Theory
Lecture 7 - Standard Number Systems in ZF Set Theory
Lecture 8 - (Finitary) Power Sets and Countability
Lecture 9 - Bijections of the set of real numbers: Dedekind cut and Cantor's middle-third set
Lecture 10 - Bijections of the real numbers: Continued Fractions
Lecture 11 - Principles of Mathematical Induction
Lecture 12 - Ordinal Numbers
Lecture 13 - Ordinal Arithmetic
Lecture 14 - Cardinal Numbers and Cardinal Arithmetic
Lecture 15 - Tutorial - Week 4
Lecture 16 - Partial Orders
Lecture 17 - Lattices
Lecture 18 - Equivalents of the Axiom of Choice (AC): Zorn's Lemma (ZL) and Well-ordering theorem (WOT)
Lecture 19 - Tutorial - Week 5
Lecture 20 - Boolean Algebras
Lecture 21 - Stone's Representation Theorems for Boolean Algebras
Lecture 22 - Some Exercises on Boolean Algebras
Lecture 23 - Ultrafilters in Boolean Algebras
Lecture 24 - Introduction to Mathematical Logic
Lecture 25 - Propositional Logic: Language, Formulas and Valuations
Lecture 26 - Propositional Logic: Logical Equivalence and Lindenbaum-Tarski Algebra
Lecture 27 - Tutorial - Week 7
Lecture 28 - Propositional Logic: Normal Forms of Formulas and Adequacy of Connectives
Lecture 29 - Propositional Logic: Semantic Consequence Relation

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Lecture 30 - Propositional Logic: Syntactic Consequence Relation
Lecture 31 - Deduction Theorem (Continued...)
Lecture 32 - Tutorial - Week 8
Lecture 33 - Propositional Logic: Consistency and Soundness Theorem
Lecture 34 - Propositional Logic: Completeness Theorem - Part I
Lecture 35 - Propositional Logic: Completeness Theorem - Part II
Lecture 36 - Compactness Theorem and Konig's Lemma
Lecture 37 - Tutorial - Week 9
Lecture 38 - Introduction to First-Order Predicate Logic
Lecture 39 - Predicate Logic: Terms and Formulas
Lecture 40 - Predicate Logic: Validity of Formulas
Lecture 41 - Tutorial - Week 10
Lecture 42 - Predicate Logic Substructures, Semantic Consequence Relation, and Models of Theories
Lecture 43 - Predicate Logic: Standard Logical Equivalences, Normal Forms, and Definable Sets
Lecture 44 - Tutorial - Week 11
Lecture 45 - Hyperreal Numbers
Lecture 46 - Predicate Logic: Ultraproduct of Structures and Los's Theorem
Lecture 47 - Predicate Logic: Compactness Theorem
Lecture 48 - Tutorial - Week 12
Lecture 49 - Predicate Logic: Lowenheim-Skolem Theorems
Lecture 50 - Predicate Logic: Reduced Products, Categoricity
Lecture 51 - Predicate Logic: Categoricity (Continued...) and Quantifier Elimination
Lecture 52 - Godel's Incompleteness Theorems

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NPTEL Video Course - Mathematics - NOC:Introduction to Fourier Analysis

Subject Co-ordinator - Prof. Parasar Mohanty

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Origin of Fourier series
Lecture 2 - Convergence of a series and Riemann integration
Lecture 3 - Riemann integration and periodic functions
Lecture 4 - Fourier coefficients and series
Lecture 5 - Complex Fourier series
Lecture 6 - Riemann Lebesgue lemma and Dirichlet kernel
Lecture 7 - Convolution of two Riemann integrable functions
Lecture 8 - Properties of convolution
Lecture 9 - Cesaro summability and summation by parts
Lecture 10 - Fejer kernel
Lecture 11 - Fejer theorem and applications
Lecture 12 - Good kernels and Poisson kernel
Lecture 13 - Abel summability
Lecture 14 - Dirichlet problem
Lecture 15 - Convergence at jump discontinuity
Lecture 16 - Orthonormal families
Lecture 17 - Pythagoras theorem and Parseval identity
Lecture 18 - Pointwise convergence
Lecture 19 - Parseval identity applications
Lecture 20 - Divergent Fourier series
Lecture 21 - Pointwise convergence of S_N(f)
Lecture 22 - Isoperimetric problem
Lecture 23 - Weyl's equidistribution theorem
Lecture 24 - on Equidistributed sequences
Lecture 25 - Proof of Weyl's criterion
Lecture 26 - Fourier analysis on finite groups
Lecture 27 - Fourier transform on Z(N)
Lecture 28 - Inversion theorem and Parseval identity
Lecture 29 - Results on Fourier coefficients of two functions

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Lecture 30 - Fast Fourier transform
Lecture 31 - Fourier analysis on finite abelian group
Lecture 32 - Fourier analysis on finite abelian groups
Lecture 33 - Simultaneously diagonalizable operators and characters
Lecture 34 - Results of Fourier series on finite abelian group
Lecture 35 - Applications in Number theory
Lecture 36 - Fourier transform on R
Lecture 37 - Properties of Fourier transform
Lecture 38 - Inversion formula and convolution
Lecture 39 - Fejer kernel on R
Lecture 40 - Schwartz space
Lecture 41 - Convolution and Good kernel in Schwartz space
Lecture 42 - Multiplication formula and Fourier inversion theorem
Lecture 43 - Plancherel formula and Poisson summation formula
Lecture 44 - Application of Poisson summation formula
Lecture 45 - Weierstrass theorem and Heisenberg uncertainty principle
Lecture 46 - Hermite operator
Lecture 47 - Solution of ODE by using Fourier transform
Lecture 48 - Laplacian equation
Lecture 49 - Poisson kermal and mean value theorem for harmonic functions
Lecture 50 - Wave equation
Lecture 51 - Eigenvalues of Fourier transform
Lecture 52 - Fourier transform on R^n
Lecture 53 - Properties of Fourier transform on R^n
Lecture 54 - Inversion theorem and Plancherel theorem
Lecture 55 - Wave equation, heat equation and Poisson kernel
Lecture 56 - Fourier series in higher dimension
Lecture 57 - Poission summation formula
Lecture 58 - Application of Poission summation formula
Lecture 59 - Radon transform
Lecture 60 - Reconstruction formula

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NPTEL Video Course - Mathematics - NOC:Ordinary Differential Equations

Subject Co-ordinator - Prof. Kaushik Bal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vector Spaces
Lecture 2 - Linear Transformation
Lecture 3 - Matrices
Lecture 4 - Calculus in Several Variable
Lecture 5 - Lipchitz Continuity
Lecture 6 - Cauchy-Schwatz and Gronwall Inequality
Lecture 7 - Ordinary Differential Equations: Introduction
Lecture 8 - Differential Inequalities
Lecture 9 - 2nd Order Constant coefficient linear equations
Lecture 10 - Picard Existence and Uniqueness Theorem
Lecture 11 - Linear System
Lecture 12 - Well-Posedness of a ODE
Lecture 13 - Linear System - 1
Lecture 14 - Linear System - 2
Lecture 15 - Fundamental Matrix
Lecture 16 - Exponential of a Linear Operator
Lecture 17 - Fundamental theorem of linear Systems
Lecture 18 - Higher Dimensional Matrix Exponential - 1
Lecture 19 - Higher Dimensional Matrix Exponential - 2
Lecture 20 - Method of Eigenvalue
Lecture 21 - Method of Eigenvalue (Continued...)
Lecture 22 - Maximal Interval of Existence
Lecture 23 - Maximal Interval of Existence: Worked out examples
Lecture 24 - Periodic Linear System
Lecture 25 - Asymptotic behavior of solution to linear system - I
Lecture 26 - Asymptotic behavior of solution to linear system - II
Lecture 27 - Asymptotic Behavior of Linear Systems - III
Lecture 28 - Exact and Adjoint equations
Lecture 29 - Sturm Comparison Theory

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Lecture 30 - Oscillation Theory - 2
Lecture 31 - Linear Boundary Value Problem
Lecture 32 - Maximum Principle
Lecture 33 - Sturm Liouville Theory - 1
Lecture 34 - Sturm Liouville Theory - 2
Lecture 35 - Periodic Sturm Liouville Problem
Lecture 36 - Eigenfunction Expansion
Lecture 37 - Stability in the sense of Lyapunov - I
Lecture 38 - Stability in the sense of Lyapunov - II
Lecture 39 - Lyapunov Direct method
Lecture 40 - Linear two-dimensional phase space dynamics (Continued...)
Lecture 41 - Phase Portrait for Planar Systems

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NPTEL Video Course - Mathematics - NOC:Category Theory

Subject Co-ordinator - Prof. Amit Kuber

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Category Theory
Lecture 2 - Examples of Categories
Lecture 3 - Functors
Lecture 4 - Natural Transformations and Equivalences of Categories
Lecture 5 - Equivalence of Categories and some properties of morphisms
Lecture 6 - The Yoneda lemma and Representable functors
Lecture 7 - Limits and colimits - Part 1
Lecture 8 - Limits and colimits - Part 2
Lecture 9 - Limits and colimits - Part 3 - Interaction with functors - Adjuctions - I Definitions
Lecture 10 - Adjunctions - II Examples
Lecture 11 - Adjunctions - III Triangular identities
Lecture 12 - Adjunctions - IV General adjoint functor theorem
Lecture 13 - Adjunctions - V Special adjoint functor theorem Filtered colimits-I Basics
Lecture 14 - Filtered colimits - II Locally finitely presentable (LFP) categories
Lecture 15 - Monads - I Eilenberg-Moore and Kleisli categories
Lecture 16 - Monads - II Monadicity theorem
Lecture 17 - Monoidal categories and enriched categories
Lecture 18 - Abelian categories
Lecture 19 - Grothendieck categories and localization
Lecture 20 - Freyd-Mitchell embedding theorem Homological algebra I Diagram chasing
Lecture 21 - Homological algebra II Chain homotopy, projective resolutions and the derived category
Lecture 22 - Model categories
Lecture 23 - Topos Theory - I Elementary toposes
Lecture 24 - Topos Theory - II Grothendieck toposes

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NPTEL Video Course - Mathematics - NOC:Multivariate Procedures with R (Hindi)

Subject Co-ordinator - Prof. Shalabh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - How to Learn and Follow the Course
Lecture 1 - R Software and its Installation
Lecture 2 - Help, Demonstration, Examples, Packages and Libraries
Lecture 3 - Command line and Data Editor
Lecture 4 - Introduction to R Studio
Lecture 5 - R as a Calculator
Lecture 6 - Calculations with Data Vectors and Built-in Functions
Lecture 7 - Matrix Operations
Lecture 8 - Matrix Operations
Lecture 9 - Univariate Data - Central Tendency and Variability
Lecture 10 - Bivariate Data
Lecture 11 - Missing Data Handling
Lecture 12 - Measuring Central Tendency with Missing Data
Lecture 13 - Measuring Variation with Missing Data
Lecture 14 - Coefficient of Variation and Summary
Lecture 15 - Boxplots and Grouped Boxplots
Lecture 16 - Bar Diagram, Subdivided and Multiple Bar Diagrams
Lecture 17 - Pie Diagram, Histogram and Multiple Histogram
Lecture 18 - Scatter Plots, Smooth Scatter Plots and Matrix Plots
Lecture 19 - Three Dimensional Plots, Star Plots and Chernoff Faces
Lecture 20 - Continuous and Discrete
Lecture 21 - Probability Functions
Lecture 22 - Probability Functions for Continuous Bivariate and Multivariate Random Variables
Lecture 23 - Theoretical Properties
Lecture 24 - Application in R Software
Lecture 25 - Bivariate Normal and Multivariate Normal Distributions in R
Lecture 26 - Chi square (ð•• ^ð• •), t and F Distribution
Lecture 27 - Point and Interval Estimation
Lecture 28 - Maximum Likelihood Estimation

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Lecture 29 - Basics of Tests of Hypothesis
Lecture 30 - Test and Confidence Interval for Mean in One Sample with Known Variance in Univariate Data
Lecture 31 - Test and Confidence Interval for Mean in One Sample with Unknown Variance in Univariate Data
Lecture 32 - Tests for Mean in Two Samples with Univariate Data
Lecture 33 - Analysis of Variance and Homogeneity of Variances with Univariate Data
Lecture 34 - Tests for Mean Vector with Multivariate Data in One Sample
Lecture 35 - Tests for Mean Vector with Multivariate Data in Two Samples
Lecture 36 - Centering, Scaling and Z-Scores
Lecture 37 - Introduction and Basic Concepts
Lecture 38 - Estimation of Parameters
Lecture 39 - Model Fitting With R Software
Lecture 40 - Test of Hypothesis and Confidence Interval Estimation on Individual Regression Coefficients
Lecture 41 - Analysis of Variance and Implementation in R Software
Lecture 42 - Goodness of Fit and Testing of Normality
Lecture 43 - Logistic Regression Model
Lecture 44 - Introduction to Classification
Lecture 45 - Bayes Procedure for Classification
Lecture 46 - Classification Procedure for Multivariate Normal Distributions
Lecture 47 - Classification Procedure and Analysis in R
Lecture 48 - Basic Concepts and Definitions
Lecture 49 - Hierarchical Classification
Lecture 50 - Hierarchical Classification and Analysis with R
Lecture 51 - Hierarchical Classification with Example in R
Lecture 52 - Concepts and Theoretical Setup
Lecture 53 - Principle Component and Its Graphical Analysis in R
Lecture 54 - Canonical Variables and Concepts
Lecture 55 - Statistical Analysis of Canonical Variables
Lecture 56 - Canonical Variables Analysis in R

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NPTEL Video Course - Mathematics - NOC:Optimization Algorithms: Theory and Software Implementation

Subject Co-ordinator - Prof. Thirumulanathan D

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization
Lecture 2 - Introduction to Optimization (Continued...)
Lecture 3 - Introduction to Optimization (Continued...)
Lecture 4 - Introduction to Optimization (Continued...)
Lecture 5 - Introduction to Optimization (Continued...)
Lecture 6 - Introduction to Python
Lecture 7 - Introduction to Python (Continued...)
Lecture 8 - Introduction to Python (Continued...)
Lecture 9 - Introduction to Python (Continued...)
Lecture 10 - Introduction to Python (Continued...)
Lecture 11 - Optimization Algorithms
Lecture 12 - Optimization Algorithms (Continued...)
Lecture 13 - Optimization Algorithms (Continued...)
Lecture 14 - Optimization Algorithms (Continued...)
Lecture 15 - Optimization Algorithms (Continued...)
Lecture 16 - Gradient Descent/Conjugate Gradient Algorithms
Lecture 17 - Gradient Descent/Conjugate Gradient Algorithms (Continued...)
Lecture 18 - Gradient Descent/Conjugate Gradient Algorithms (Continued...)
Lecture 19 - Gradient Descent/Conjugate Gradient Algorithms (Continued...)
Lecture 20 - Gradient Descent/Conjugate Gradient Algorithms (Continued...)
Lecture 21 - Newton's Method
Lecture 22 - Newton's Method (Continued...)
Lecture 23 - Newton's Method (Continued...)
Lecture 24 - Newton's Method (Continued...)
Lecture 25 - Newton's Method (Continued...)
Lecture 26 - Quasi-Newton Methods
Lecture 27 - Quasi-Newton Methods (Continued...)
Lecture 28 - Quasi-Newton Methods (Continued...)
Lecture 29 - Quasi-Newton Methods (Continued...)

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Lecture 30 - Quasi-Newton Methods (Continued...)
Lecture 31 - Quadratic Penalty Method
Lecture 32 - Quadratic Penalty Method (Continued...)
Lecture 33 - Quadratic Penalty Method (Continued...)
Lecture 34 - Quadratic Penalty Method (Continued...)
Lecture 35 - Quadratic Penalty Method (Continued...)
Lecture 36 - Augmented Lagrangian Method
Lecture 37 - Augmented Lagrangian Method (Continued...)
Lecture 38 - Augmented Lagrangian Method (Continued...)
Lecture 39 - Augmented Lagrangian Method (Continued...)
Lecture 40 - Augmented Lagrangian Method (Continued...)
Lecture 41 - Simplex Method
Lecture 42 - Simplex Method (Continued...)
Lecture 43 - Simplex Method (Continued...)
Lecture 44 - Simplex Method (Continued...)
Lecture 45 - Simplex Method (Continued...)
Lecture 46 - Affine Scaling Method
Lecture 47 - Affine Scaling Method (Continued...)
Lecture 48 - Affine Scaling Method (Continued...)
Lecture 49 - Affine Scaling Method (Continued...)
Lecture 50 - Affine Scaling Method (Continued...)
Lecture 51 - Affine Scaling Method (Continued...)
Lecture 52 - Affine Scaling Method (Continued...)
Lecture 53 - Affine Scaling Method (Continued...)
Lecture 54 - Affine Scaling Method (Continued...)
Lecture 55 - Affine Scaling Method (Continued...)
Lecture 56 - An application from machine learning
Lecture 57 - An application from machine learning (Continued...)
Lecture 58 - An application from machine learning (Continued...)
Lecture 59 - An application from machine learning (Continued...)
Lecture 60 - An application from machine learning (Continued...)

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NPTEL Video Course - Mathematics - NOC:Geometry of Curves and Surfaces

Subject Co-ordinator - Prof. Abhijit Pal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Parametrized Curves and Differentiable Curves
Lecture 2 - Length of a Curve
Lecture 3 - Regular Curve, Arc-length, Re-parametrization of a Curve
Lecture 4 - Unit Speed Re-parametrization, Curvature of a Curve
Lecture 5 - Curvature of a regular curve and Curvature formulas
Lecture 6 - Level curves, Implicit function theorem
Lecture 7 - Orientation of a curve, Signed curvature, Tangent and Normal vectors
Lecture 8 - Turning Angle
Lecture 9 - Curve determined by curvature, Total Curvature
Lecture 10 - Hopf's Rotation Index Theorem
Lecture 11 - Four Vertex Theorem
Lecture 12 - Isoperimetric Inequality
Lecture 13 - Space Curves and Principal Vectors
Lecture 14 - Frenet-Serret Equations
Lecture 15 - Curve determined by curvature and torsion
Lecture 16 - Several variable calculus
Lecture 17 - Regular surfaces in real three dimensional space
Lecture 18 - Examples of regular surfaces
Lecture 19 - Regular Value, Critical Value of a differentiable map
Lecture 20 - Regular surface locally graph of a differentiable function
Lecture 21 - Change of parametrizations in regular surfaces
Lecture 22 - Differentiable function on surfaces
Lecture 23 - Surface of Revolution, Torus, Higher genus surfaces
Lecture 24 - Tangent Plane and Tangent Vectors
Lecture 25 - Examples of Tangent Planes
Lecture 26 - Differential Map between Tangent Spaces
Lecture 27 - Orientation of Surfaces and Normal Vector Field
Lecture 28 - First Fundamental Form on Surfaces
Lecture 29 - Change of Parametrization in First Fundamental Form and Area

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Lecture 30 - Area of Some Surfaces and Gradient on Surfaces
Lecture 31 - Isometries, local isometries, conformal maps
Lecture 32 - Gauss Map and its Fundamental Properties
Lecture 33 - Self Adjoint Operator
Lecture 34 - Second Fundamental Form and normal Curvature
Lecture 35 - Examples for second fundamental form
Lecture 36 - Principal curvatures and Principal Directions
Lecture 37 - Examples for principal curvatures and principal directions
Lecture 38 - Gaussian Curvature and Mean Curvature
Lecture 39 - Christoffel Symbols and The Gauss's Remarkable Theorem
Lecture 40 - Invariance of Gaussian Curvature and Examples of Christoffel Symbols
Lecture 41 - Vector Field and Covariant Derivative
Lecture 42 - Vector Field along a curve, parallel vector field and geodesics
Lecture 43 - Geodesics and its equations
Lecture 44 - Simplicial Complex, Triangulation and Euler Characteristics
Lecture 45 - Gauss Bonnet Theorem

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NPTEL Video Course - Mathematics - NOC:Partial Differential Equations (2025)

Subject Co-ordinator - Prof. Kaushik Bal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Periodic Functions - Part A
Lecture 2 - Fourier Series: Idea - Part B
Lecture 3 - Convergence of Fourier Series - Part C
Lecture 4 - Fourier Series of Arbitrary Period - Part A
Lecture 5 - Half Range Fourier Extension - Part B
Lecture 6 - Addendum 'Double Fourier Series' - Part C
Lecture 7 - Sturm Liouville Problem: An Introduction
Lecture 8 - Behavior of Regular Sturm-Liouville System - Part I
Lecture 9 - Behavior of Regular Sturm-Liouville System - Part II
Lecture 10 - Behavior of Regular Sturm-Liouville Problem - Part III
Lecture 11 - Basics of Calculus - Part 1
Lecture 12 - Basics of Calculus - Part 2
Lecture 13 - Introduction to PDEâ s
Lecture 14 - First order PDE: Classification and Construction
Lecture 15 - Geometry of First order PDE and Method of Characteristics
Lecture 16 - Canonical form for First order PDE
Lecture 17 - Separation of Variable for First order PDE
Lecture 18 - Method of Characteristics: Existence and Uniqueness
Lecture 19 - Classification of Second order Linear PDE
Lecture 20 - Canonical Form
Lecture 21 - Canonical Form Examples
Lecture 22 - Elliptic Equations: Boundary Conditions
Lecture 23 - Laplace Equation: Fundamental Solution
Lecture 24 - Maximum Principle for Laplacian
Lecture 25 - Separation of Variable Formula for Laplace Equation
Lecture 26 - Poisson Equation with Dirichlet and Neumann Boundary
Lecture 27 - Wave Equation: Separation of Variable
Lecture 28 - Wave Equation: D'Alembert Formula
Lecture 29 - Nonhomogeneous Wave Equation

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Lecture 30 - Heat Equation: Fundamental Solution and Maximum Principle
Lecture 31 - Heat Equation: Separation of Variable and Uniqueness
Lecture 32 - Nonhomogeneous Equations

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NPTEL Video Course - Mathematics - NOC:An Introduction to Number Theory

Subject Co-ordinator - Prof. Somnath Jha

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Abelian Groups - I
Lecture 2 - Abelian Groups - II
Lecture 3 - Abelian Groups - III
Lecture 4 - Abelian Groups - IV
Lecture 5 - Abelian Groups - V
Lecture 6 - Abelian Groups - VI
Lecture 7 - Commutative Rings - I
Lecture 8 - Commutative Rings - II
Lecture 9 - Commutative Rings - III
Lecture 10 - Chinese Reminder Theorem
Lecture 11 - Fermat's Little Theorem and Wilson's Theorem
Lecture 12 - Prime ideals and maximal ideals
Lecture 13 - Ideals in a PID
Lecture 14 - Ideals in a UFD
Lecture 15 - Gauss Lemma
Lecture 16 - Field Extensions
Lecture 17 - Finite Fields
Lecture 18 - Multiplicative groups of finite fields
Lecture 19 - Legendre Symbol
Lecture 20 - Quadratic Reciprocity
Lecture 21 - Zero sets of polynomials
Lecture 22 - Ring of quadratic integers - I
Lecture 23 - Ring of quadratic integers - II
Lecture 24 - Gaussian integers
Lecture 25 - Ring of quadratic integers - III
Lecture 26 - Ring of quadratic integers - IV
Lecture 27 - Ideal class group of quadratic fields
Lecture 28 - Binary quadratic forms
Lecture 29 - Binary quadratic forms and ideal class group of imaginary quadratic fields - I

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Lecture 30 - Binary quadratic forms and ideal class group of imaginary quadratic fields - II
Lecture 31 - Binary quadratic forms and ideal class group of imaginary quadratic fields - III
Lecture 32 - Binary quadratic forms and ideal class group of imaginary quadratic fields - IV
Lecture 33 - Units in the rings of quadratic integers
Lecture 34 - Integral solutions of the equation ð• ¥ 2 - 2ð• ¦ 2 = 1
Lecture 35 - Dirichlet's approximation theorem
Lecture 36 - Brahmagupta - Pell's equation
Lecture 37 - Congruent Numbers - I
Lecture 38 - Congruent Numbers - II
Lecture 39 - The n = 4 case of the Fermat's Last Theorem
Lecture 40 - Congruent Numbers and Elliptic Curves
Lecture 41 - Sum of two squares theorem
Lecture 42 - Sum of four squares theorem
Lecture 43 - Sum of integer cubes
Lecture 44 - Rational cube sum problem
Lecture 45 - Affine and Projective Spaces - I
Lecture 46 - Affine and Projective Spaces - II
Lecture 47 - Elliptic Curves - I
Lecture 48 - Elliptic Curves - II

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NPTEL Video Course - Mathematics - Advanced Engineering Mathematics

Subject Co-ordinator - Dr. P. Panigrahi, Prof. J. Kumar, Prof. P.D. Srivastava, Prof. Somesh Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review Groups, Fields and Matrices
Lecture 2 - Vector Spaces, Subspaces, Linearly Dependent/Independent of Vectors
Lecture 3 - Basis, Dimension, Rank and Matrix Inverse
Lecture 4 - Linear Transformation, Isomorphism and Matrix Representation
Lecture 5 - System of Linear Equations, Eigenvalues and Eigenvectors
Lecture 6 - Method to Find Eigenvalues and Eigenvectors, Diagonalization of Matrices
Lecture 7 - Jordan Canonical Form, Cayley Hamilton Theorem
Lecture 8 - Inner Product Spaces, Cauchy-Schwarz Inequality
Lecture 9 - Orthogonality, Gram-Schmidt Orthogonalization Process
Lecture 10 - Spectrum of special matrices,positive/negative definite matrices
Lecture 11 - Concept of Domain, Limit, Continuity and Differentiability
Lecture 12 - Analytic Functions, C-R Equations
Lecture 13 - Harmonic Functions
Lecture 14 - Line Integral in the Complex
Lecture 15 - Cauchy Integral Theorem
Lecture 16 - Cauchy Integral Theorem (Continued.)
Lecture 17 - Cauchy Integral Formula
Lecture 18 - Power and Taylor's Series of Complex Numbers
Lecture 19 - Power and Taylor's Series of Complex Numbers (Continued.)
Lecture 20 - Taylor's, Laurent Series of f(z) and Singularities
Lecture 21 - Classification of Singularities, Residue and Residue Theorem
Lecture 22 - Laplace Transform and its Existence
Lecture 23 - Properties of Laplace Transform
Lecture 24 - Evaluation of Laplace and Inverse Laplace Transform
Lecture 25 - Applications of Laplace Transform to Integral Equations and ODEs
Lecture 26 - Applications of Laplace Transform to PDEs
Lecture 27 - Fourier Series
Lecture 28 - Fourier Series (Continued.)
Lecture 29 - Fourier Integral Representation of a Function

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Lecture 30 - Introduction to Fourier Transform
Lecture 31 - Applications of Fourier Transform to PDEs
Lecture 32 - Laws of Probability - I
Lecture 33 - Laws of Probability - II
Lecture 34 - Problems in Probability
Lecture 35 - Random Variables
Lecture 36 - Special Discrete Distributions
Lecture 37 - Special Continuous Distributions
Lecture 38 - Joint Distributions and Sampling Distributions
Lecture 39 - Point Estimation
Lecture 40 - Interval Estimation
Lecture 41 - Basic Concepts of Testing of Hypothesis
Lecture 42 - Tests for Normal Populations

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NPTEL Video Course - Mathematics - Functional Analysis

Subject Co-ordinator - Prof. P.D. Srivastava

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Metric Spaces with Examples
Lecture 2 - Holder Inequality and Minkowski Inequality
Lecture 3 - Various Concepts in a Metric Space
Lecture 4 - Separable Metrics Spaces with Examples
Lecture 5 - Convergence, Cauchy Sequence, Completeness
Lecture 6 - Examples of Complete and Incomplete Metric Spaces
Lecture 7 - Completion of Metric Spaces + Tutorial
Lecture 8 - Vector Spaces with Examples
Lecture 9 - Normed Spaces with Examples
Lecture 10 - Banach Spaces and Schauder Basic
Lecture 11 - Finite Dimensional Normed Spaces and Subspaces
Lecture 12 - Compactness of Metric/Normed Spaces
Lecture 13 - Linear Operators-definition and Examples
Lecture 14 - Bounded Linear Operators in a Normed Space
Lecture 15 - Bounded Linear Functionals in a Normed Space
Lecture 16 - Concept of Algebraic Dual and Reflexive Space
Lecture 17 - Dual Basis & Algebraic Reflexive Space
Lecture 18 - Dual Spaces with Examples
Lecture 19 - Tutorial - I
Lecture 20 - Tutorial - II
Lecture 21 - Inner Product & Hilbert Space
Lecture 22 - Further Properties of Inner Product Spaces
Lecture 23 - Projection Theorem, Orthonormal Sets and Sequences
Lecture 24 - Representation of Functionals on a Hilbert Spaces
Lecture 25 - Hilbert Adjoint Operator
Lecture 26 - Self Adjoint, Unitary & Normal Operators
Lecture 27 - Tutorial - III
Lecture 28 - Annihilator in an IPS
Lecture 29 - Total Orthonormal Sets And Sequences

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Lecture 30 - Partially Ordered Set and Zorns Lemma
Lecture 31 - Hahn Banach Theorem for Real Vector Spaces
Lecture 32 - Hahn Banach Theorem for Complex V.S. & Normed Spaces
Lecture 33 - Baires Category & Uniform Boundedness Theorems
Lecture 34 - Open Mapping Theorem
Lecture 35 - Closed Graph Theorem
Lecture 36 - Adjoint Operator
Lecture 37 - Strong and Weak Convergence
Lecture 38 - Convergence of Sequence of Operators and Functionals
Lecture 39 - LP - Space
Lecture 40 - LP - Space (Continued.)

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NPTEL Video Course - Mathematics - Numerical methods of Ordinary and Partial Differential Equations

Subject Co-ordinator - Dr. G.P. Raja Sekhar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation with few Examples
Lecture 2 - Single - Step Methods for IVPs
Lecture 3 - Analysis of Single Step Methods
Lecture 4 - Runge - Kutta Methods for IVPs
Lecture 5 - Higher Order Methods/Equations
Lecture 6 - Error - Stability - Convergence of Single Step Methods
Lecture 7 - Tutorial - I
Lecture 8 - Tutorial - II
Lecture 9 - Multi-Step Methods (Explicit)
Lecture 10 - Multi-Step Methods (Implicit)
Lecture 11 - Convergence and Stability of multi step methods
Lecture 12 - General methods for absolute stability
Lecture 13 - Stability Analysis of Multi Step Methods
Lecture 14 - Predictor - Corrector Methods
Lecture 15 - Some Comments on Multi - Step Methods
Lecture 16 - Finite Difference Methods - Linear BVPs
Lecture 17 - Linear/Non - Linear Second Order BVPs
Lecture 18 - BVPS - Derivative Boundary Conditions
Lecture 19 - Higher Order BVPs
Lecture 20 - Shooting Method BVPs
Lecture 21 - Tutorial - III
Lecture 22 - Introduction to First Order PDE
Lecture 23 - Introduction to Second Order PDE
Lecture 24 - Finite Difference Approximations to Parabolic PDEs
Lecture 25 - Implicit Methods for Parabolic PDEs
Lecture 26 - Consistency, Stability and Convergence
Lecture 27 - Other Numerical Methods for Parabolic PDEs
Lecture 28 - Tutorial - IV
Lecture 29 - Matrix Stability Analysis of Finite Difference Scheme

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Lecture 30 - Fourier Series Stability Analysis of Finite Difference Scheme
Lecture 31 - Finite Difference Approximations to Elliptic PDEs - I
Lecture 32 - Finite Difference Approximations to Elliptic PDEs - II
Lecture 33 - Finite Difference Approximations to Elliptic PDEs - III
Lecture 34 - Finite Difference Approximations to Elliptic PDEs - IV
Lecture 35 - Finite Difference Approximations to Hyperbolic PDEs - I
Lecture 36 - Finite Difference Approximations to Hyperbolic PDEs - II
Lecture 37 - Method of characteristics for Hyperbolic PDEs - I
Lecture 38 - Method of characterisitcs for Hyperbolic PDEs - II
Lecture 39 - Finite Difference Approximations to 1st order Hyperbolic PDEs
Lecture 40 - Summary, Appendices, Remarks

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NPTEL Video Course - Mathematics - Optimization

Subject Co-ordinator - Prof. A. Goswami, Dr. Debjani Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Optimization - Introduction
Lecture 2 - Formulation of LPP
Lecture 3 - Geometry of LPP and Graphical Solution of LPP
Lecture 4 - Solution of LPP
Lecture 5 - Big - M Method
Lecture 6 - Two - Phase Method
Lecture 7 - Special Cases in Simple Applications
Lecture 8 - Introduction to Duality Theory
Lecture 9 - Dual Simplex Method
Lecture 10 - Post Optimaility Analysis
Lecture 11 - Integer Programming - I
Lecture 12 - Integer Programming - II
Lecture 13 - Introduction to Transportation Problems
Lecture 14 - Solving Various types of Transportation Problems
Lecture 15 - Assignment Problems
Lecture 16 - Project Management
Lecture 17 - Critical Path Analysis
Lecture 18 - PERT
Lecture 19 - Shortest Path Algorithm
Lecture 20 - Travelling Salesman Problem
Lecture 21 - Classical optimization techniques
Lecture 22 - Unconstarined multivariable optimization
Lecture 23 - Nonlinear programming with equality constraint
Lecture 24 - Nonlinear programming KKT conditions
Lecture 25 - Numerical optimization
Lecture 26 - Numerical optimization
Lecture 27 - Fibonacci Method
Lecture 28 - Golden Section Methods
Lecture 29 - Interpolation Methods

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Lecture 30 - Unconstarined optimization techniques
Lecture 31 - Unconstarined optimization techniques
Lecture 32 - Nonlinear programming
Lecture 33 - Interior and Exterior penulty Function Method
Lecture 34 - Separable Programming Problem
Lecture 35 - Introduction to Geometric Programming
Lecture 36 - Constrained Geometric Programming Problem
Lecture 37 - Dynamic Programming Problem
Lecture 38 - Dynamic Programming Problem (Continued.)
Lecture 39 - Multi Objective Decision Making
Lecture 40 - Multi attribute decision making

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NPTEL Video Course - Mathematics - Probability and Statistics

Subject Co-ordinator - Prof. Somesh Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Algebra of Sets - I
Lecture 2 - Algebra of Sets - II
Lecture 3 - Introduction to Probability
Lecture 4 - Laws of Probability - I
Lecture 5 - Laws of Probability - II
Lecture 6 - Problems in Probability
Lecture 7 - Random Variables
Lecture 8 - Probability Distributions
Lecture 9 - Characteristics of Distribution
Lecture 10 - Special Distributions - I
Lecture 11 - Special Distributions - II
Lecture 12 - Special Distributions - III
Lecture 13 - Special Distributions - IV
Lecture 14 - Special Distributions - V
Lecture 15 - Special Distributions - VI
Lecture 16 - Special Distributions - VII
Lecture 17 - Functions of a Random Variable
Lecture 18 - Joint Distributions - I
Lecture 19 - Joint Distributions - II
Lecture 20 - Joint Distributions - III
Lecture 21 - Joint Distributions - IV
Lecture 22 - Transformations of Random Vectors
Lecture 23 - Sampling Distributions - I
Lecture 24 - Sampling Distributions - II
Lecture 25 - Descriptive Statistics - I
Lecture 26 - Descriptive Statistics - II
Lecture 27 - Estimation - I
Lecture 28 - Estimation - II
Lecture 29 - Estimation - III

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Lecture 30 - Estimation - IV
Lecture 31 - Estimation - V
Lecture 32 - Estimation - VI
Lecture 33 - Testing of Hypothesis - I
Lecture 34 - Testing of Hypothesis - II
Lecture 35 - Testing of Hypothesis - III
Lecture 36 - Testing of Hypothesis - IV
Lecture 37 - Testing of Hypothesis - V
Lecture 38 - Testing of Hypothesis - VI
Lecture 39 - Testing of Hypothesis - VII
Lecture 40 - Testing of Hypothesis - VIII

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NPTEL Video Course - Mathematics - Regression Analysis

Subject Co-ordinator - Dr. Soumen Maity

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Simple Linear Regression
Lecture 2 - Simple Linear Regression (Continued...1)
Lecture 3 - Simple Linear Regression (Continued...2)
Lecture 4 - Simple Linear Regression (Continued...3)
Lecture 5 - Simple Linear Regression (Continued...4)
Lecture 6 - Multiple Linear Regression
Lecture 7 - Multiple Linear Regression (Continued...1)
Lecture 8 - Multiple Linear Regression (Continued...2)
Lecture 9 - Multiple Linear Regression (Continued...3)
Lecture 10 - Selecting the BEST Regression model
Lecture 11 - Selecting the BEST Regression model (Continued...1)
Lecture 12 - Selecting the BEST Regression model (Continued...2)
Lecture 13 - Selecting the BEST Regression model (Continued...3)
Lecture 14 - Multicollinearity
Lecture 15 - Multicollinearity (Continued...1)
Lecture 16 - Multicollinearity (Continued...2)
Lecture 17 - Model Adequacy Checking
Lecture 18 - Model Adequacy Checking (Continued...1)
Lecture 19 - Model Adequacy Checking (Continued...2)
Lecture 20 - Test for Influential Observations
Lecture 21 - Transformations and Weighting to correct model inadequacies
Lecture 22 - Transformations and Weighting to correct model inadequacies (Continued...1)
Lecture 23 - Transformations and Weighting to correct model inadequacies (Continued...2)
Lecture 24 - Dummy Variables
Lecture 25 - Dummy Variables (Continued...1)
Lecture 26 - Dummy Variables (Continued...2)
Lecture 27 - Polynomial Regression Models
Lecture 28 - Polynomial Regression Models (Continued...1)
Lecture 29 - Polynomial Regression Models (Continued...2)

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Lecture 30 - Generalized Linear Models
Lecture 31 - Generalized Linear Models (Continued.)
Lecture 32 - Non-Linear Estimation
Lecture 33 - Regression Models with Autocorrelated Errors
Lecture 34 - Regression Models with Autocorrelated Errors (Continued.)
Lecture 35 - Measurement Errors & Calibration Problem
Lecture 36 - Tutorial - I
Lecture 37 - Tutorial - II
Lecture 38 - Tutorial - III
Lecture 39 - Tutorial - IV
Lecture 40 - Tutorial - V

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NPTEL Video Course - Mathematics - Statistical Inference

Subject Co-ordinator - Prof. Somesh Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation
Lecture 2 - Basic Concepts of Point Estimations - I
Lecture 3 - Basic Concepts of Point Estimations - II
Lecture 4 - Finding Estimators - I
Lecture 5 - Finding Estimators - II
Lecture 6 - Finding Estimators - III
Lecture 7 - Properties of MLEs
Lecture 8 - Lower Bounds for Variance - I
Lecture 9 - Lower Bounds for Variance - II
Lecture 10 - Lower Bounds for Variance - III
Lecture 11 - Lower Bounds for Variance - IV
Lecture 12 - Sufficiency
Lecture 13 - Sufficiency and Information
Lecture 14 - Minimal Sufficiency, Completeness
Lecture 15 - UMVU Estimation, Ancillarity
Lecture 16 - Invariance - I
Lecture 17 - Invariance - II
Lecture 18 - Bayes and Minimax Estimation - I
Lecture 19 - Bayes and Minimax Estimation - II
Lecture 20 - Bayes and Minimax Estimation - III
Lecture 21 - Testing of Hypotheses
Lecture 22 - Neyman Pearson Fundamental Lemma
Lecture 23 - Applications of NP lemma
Lecture 24 - UMP Tests
Lecture 25 - UMP Tests (Continued.)
Lecture 26 - UMP Unbiased Tests
Lecture 27 - UMP Unbiased Tests (Continued.)
Lecture 28 - UMP Unbiased Tests
Lecture 29 - Unbiased Tests for Normal Populations

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Lecture 30 - Unbiased Tests for Normal Populations (Continued.)
Lecture 31 - Likelihood Ratio Tests - I
Lecture 32 - Likelihood Ratio Tests - II
Lecture 33 - Likelihood Ratio Tests - III
Lecture 34 - Likelihood Ratio Tests - IV
Lecture 35 - Invariant Tests
Lecture 36 - Test for Goodness of Fit
Lecture 37 - Sequential Procedure
Lecture 38 - Sequential Procedure (Continued.)
Lecture 39 - Confidence Intervals
Lecture 40 - Confidence Intervals (Continued.)

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NPTEL Video Course - Mathematics - A Basic Course in Real Analysis

Subject Co-ordinator - Prof. P.D. Srivastava

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rational Numbers and Rational Cuts
Lecture 2 - Irrational numbers, Dedekind's Theorem
Lecture 3 - Continuum and Exercises
Lecture 4 - Continuum and Exercises (Continued.)
Lecture 5 - Cantor's Theory of Irrational Numbers
Lecture 6 - Cantor's Theory of Irrational Numbers (Continued.)
Lecture 7 - Equivalence of Dedekind and Cantor's Theory
Lecture 8 - Finite, Infinite, Countable and Uncountable Sets of Real Numbers
Lecture 9 - Types of Sets with Examples, Metric Space
Lecture 10 - Various properties of open set, closure of a set
Lecture 11 - Ordered set, Least upper bound, greatest lower bound of a set
Lecture 12 - Compact Sets and its properties
Lecture 13 - Weiersstrass Theorem, Heine Borel Theorem, Connected set
Lecture 14 - Tutorial - II
Lecture 15 - Concept of limit of a sequence
Lecture 16 - Some Important limits, Ratio tests for sequences of Real Numbers
Lecture 17 - Cauchy theorems on limit of sequences with examples
Lecture 18 - Fundamental theorems on limits, Bolzano-Weiersstrass Theorem
Lecture 19 - Theorems on Convergent and divergent sequences
Lecture 20 - Cauchy sequence and its properties
Lecture 21 - Infinite series of real numbers
Lecture 22 - Comparison tests for series, Absolutely convergent and Conditional convergent series
Lecture 23 - Tests for absolutely convergent series
Lecture 24 - Raabe's test, limit of functions, Cluster point
Lecture 25 - Some results on limit of functions
Lecture 26 - Limit Theorems for functions
Lecture 27 - Extension of limit concept (one sided limits)
Lecture 28 - Continuity of Functions
Lecture 29 - Properties of Continuous Functions

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Lecture 30 - Boundedness Theorem, Max-Min Theorem and Bolzano's theorem
Lecture 31 - Uniform Continuity and Absolute Continuity
Lecture 32 - Types of Discontinuities, Continuity and Compactness
Lecture 33 - Continuity and Compactness (Continued.), Connectedness
Lecture 34 - Differentiability of real valued function, Mean Value Theorem
Lecture 35 - Mean Value Theorem (Continued.)
Lecture 36 - Application of MVT , Darboux Theorem, L Hospital Rule
Lecture 37 - L'Hospital Rule and Taylor's Theorem
Lecture 38 - Tutorial - III
Lecture 39 - Riemann/Riemann Stieltjes Integral
Lecture 40 - Existence of Reimann Stieltjes Integral
Lecture 41 - Properties of Reimann Stieltjes Integral
Lecture 42 - Properties of Reimann Stieltjes Integral (Continued.)
Lecture 43 - Definite and Indefinite Integral
Lecture 44 - Fundamental Theorems of Integral Calculus
Lecture 45 - Improper Integrals
Lecture 46 - Convergence Test for Improper Integrals

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NPTEL Video Course - Mathematics - Statistical Methods for Scientists and Engineers

Subject Co-ordinator - Prof. Somesh Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Foundations of Probability
Lecture 2 - Laws of Probability
Lecture 3 - Random Variables
Lecture 4 - Moments and Special Distributions
Lecture 5 - Moments and Special Distributions (Continued...)
Lecture 6 - Special Distributions (Continued...)
Lecture 7 - Special Distributions (Continued...)
Lecture 8 - Sampling Distributions
Lecture 9 - Parametric Methods - I
Lecture 10 - Parametric Methods - II
Lecture 11 - Parametric Methods - III
Lecture 12 - Parametric Methods - IV
Lecture 13 - Parametric Methods - V
Lecture 14 - Parametric Methods - VI
Lecture 15 - Parametric Methods - VII
Lecture 16 - Multivariate Analysis - I
Lecture 17 - Multivariate Analysis - II
Lecture 18 - Multivariate Analysis - III
Lecture 19 - Multivariate Analysis - IV
Lecture 20 - Multivariate Analysis - V
Lecture 21 - Multivariate Analysis - VI
Lecture 22 - Multivariate Analysis - VII
Lecture 23 - Multivariate Analysis - VIII
Lecture 24 - Multivariate Analysis - IX
Lecture 25 - Multivariate Analysis - X
Lecture 26 - Multivariate Analysis - XI
Lecture 27 - Multivariate Analysis - XII
Lecture 28 - Non parametric Methods - I
Lecture 29 - Non parametric Methods - II

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Lecture 30 - Non parametric Methods - III
Lecture 31 - Non parametric Methods - IV
Lecture 32 - Nonparametric Methods - V
Lecture 33 - Nonparametric Methods - VI
Lecture 34 - Nonparametric Methods - VII
Lecture 35 - Nonparametric Methods - VIII
Lecture 36 - Nonparametric Methods - IX
Lecture 37 - Nonparametric Methods - X
Lecture 38 - Nonparametric Methods - XI
Lecture 39 - Nonparametric Methods - XII
Lecture 40 - Nonparametric Methods - XIII

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NPTEL Video Course - Mathematics - NOC:Probability and Statistics

Subject Co-ordinator - Prof. Somesh Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sets, Classes, Collection
Lecture 2 - Sequence of Sets
Lecture 3 - Ring, Field (Algebra)
Lecture 4 - Sigma-Ring, Sigma-Field, Monotone Class
Lecture 5 - Random Experiment, Events
Lecture 6 - Definitions of Probability
Lecture 7 - Properties of Probability Function - I
Lecture 8 - Properties of Probability Function - II
Lecture 9 - Conditional Probability
Lecture 10 - Independence of Events
Lecture 11 - Problems in Probability - I
Lecture 12 - Problems in Probability - II
Lecture 13 - Random Variables
Lecture 14 - Probability Distribution of a Random Variable - I
Lecture 15 - Probability Distribution of a Random Variable - II
Lecture 16 - Moments
Lecture 17 - Characteristics of Distributions - I
Lecture 18 - Characteristics of Distributions - II
Lecture 19 - Special Discrete Distributions - I
Lecture 20 - Special Discrete Distributions - II
Lecture 21 - Special Discrete Distributions - III
Lecture 22 - Poisson Process - I
Lecture 23 - Poisson Process - II
Lecture 24 - Special Continuous Distributions - I
Lecture 25 - Special Continuous Distributions - II
Lecture 26 - Special Continuous Distributions - III
Lecture 27 - Special Continuous Distributions - IV
Lecture 28 - Special Continuous Distributions - V
Lecture 29 - Normal Distribution

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Lecture 30 - Problems on Normal Distribution
Lecture 31 - Problems on Special Distributions - I
Lecture 32 - Problems on Special Distributions - II
Lecture 33 - Function of a random variable - I
Lecture 34 - Function of a random variable - II
Lecture 35 - Joint Distributions - I
Lecture 36 - Joint Distributions - II
Lecture 37 - Independence, Product Moments
Lecture 38 - Linearity Property of Correlation and Examples
Lecture 39 - Bivariate Normal Distribution - I
Lecture 40 - Bivariate Normal Distribution - II
Lecture 41 - Additive Properties of Distributions - I
Lecture 42 - Additive Properties of Distributions - II
Lecture 43 - Transformation of Random Variables
Lecture 44 - Distribution of Order Statistics
Lecture 45 - Basic Concepts
Lecture 46 - Chi-Square Distribution
Lecture 47 - Chi-Square Distribution (Continued...), t-Distribution
Lecture 48 - F-Distribution
Lecture 49 - Descriptive Statistics - I
Lecture 50 - Descriptive Statistics - II
Lecture 51 - Descriptive Statistics - III
Lecture 52 - Descriptive Statistics - IV
Lecture 53 - Introduction to Estimation
Lecture 54 - Unbiased and Consistent Estimators
Lecture 55 - LSE, MME
Lecture 56 - Examples on MME, MLE
Lecture 57 - Examples on MLE - I
Lecture 58 - Examples on MLE - II, MSE
Lecture 59 - UMVUE, Sufficiency, Completeness
Lecture 60 - Rao - Blackwell Theorem and Its Applications
Lecture 61 - Confidence Intervals - I
Lecture 62 - Confidence Intervals - II
Lecture 63 - Confidence Intervals - III
Lecture 64 - Confidence Intervals - IV
Lecture 65 - Basic Definitions
Lecture 66 - Two Types of Errors
Lecture 67 - Neyman-Pearson Fundamental Lemma
Lecture 68 - Applications of N-P Lemma - I

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Lecture 69 - Applications of N-P Lemma - II
Lecture 70 - Testing for Normal Mean
Lecture 71 - Testing for Normal Variance
Lecture 72 - Large Sample Test for Variance and Two Sample Problem
Lecture 73 - Paired t-Test
Lecture 74 - Examples
Lecture 75 - Testing Equality of Proportions
Lecture 76 - Chi-Square Test for Goodness Fit - I
Lecture 77 - Chi-Square Test for Goodness Fit - II
Lecture 78 - Testing for Independence in rxc Contingency Table - I
Lecture 79 - Testing for Independence in rxc Contingency Table - II

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NPTEL Video Course - Mathematics - NOC:Applied Multivariate Statistical Modeling

Subject Co-ordinator - Dr J Maiti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Multivariate Statistical Modeling
Lecture 2 - Introduction to Multivariate Statistical Modeling: Data types, models, and modeling
Lecture 3 - Statistical approaches to model building
Lecture 4 - Statistical approaches to model building (Continued...)
Lecture 5 - Univariate Descriptive Statistics
Lecture 6 - Univariate Descriptive Statistics (Continued...)
Lecture 7 - Normal Distribution and Chi-squared Distribution
Lecture 8 - t-distribution, F-distribution, and Central Limit Theorem
Lecture 9 - Univariate Inferential Statistics: Estimation
Lecture 10 - Univariate Inferential Statistics: Estimation (Continued...)
Lecture 11 - Univariate Inferential Statistics: Hypothesis Testing
Lecture 12 - Hypothesis Testing (Continued...): Decision Making Scenarios
Lecture 13 - Multivariate Descriptive Statistics: Mean Vector
Lecture 14 - Multivariate Descriptive Statistics: Covariance Matrix
Lecture 15 - Multivariate Descriptive Statistics: Correlation Matrix
Lecture 16 - Multivariate Descriptive Statistics: Relationship between correlation and covariance matrices
Lecture 17 - Multivariate Normal Distribution
Lecture 18 - Multivariate Normal Distribution (Continued...)
Lecture 19 - Multivariate Normal Distribution (Continued...): Geometrical Interpretation
Lecture 20 - Multivariate Normal Distribution (Continued...): Examining data for multivariate normal distribu
Lecture 21 - Multivariate Inferential Statistics: Basics and Hotelling T-square statistic
Lecture 22 - Multivariate Inferential Statistics: Confidence Region
Lecture 23 - Multivariate Inferential Statistics: Simultaneous confidence interval and Hypothesis testing
Lecture 24 - Multivariate Inferential Statistics: Hypothesis testing for equality of two population mean vect
Lecture 25 - Analysis of Variance (ANOVA)
Lecture 26 - Analysis of Variance (ANOVA): Decomposition of Total sum of squares
Lecture 27 - Analysis of Variance (ANOVA): Estimation of Parameters and Model Adequacy tests
Lecture 28 - Two-way and Three-way Analysis of Variance (ANOVA)
Lecture 29 - Tutorial ANOVA

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Lecture 30 - Tutorial ANOVA (Continued...)
Lecture 31 - Multivariate Analysis of Variance (MANOVA): Conceptual Model
Lecture 32 - Multivariate Analysis of Variance (MANOVA): Assumptions and Decomposition of total sum square ar
Lecture 33 - Multivariate Analysis of Variance (MANOVA): Decomposition of total sum square and cross products
Lecture 34 - Multivariate Analysis of Variance (MANOVA): Estimation and Hypothesis testing
Lecture 35 - MANOVA Case Study
Lecture 36 - Multiple Linear Regression: Introduction
Lecture 37 - Multiple Linear Regression: Assumptions and Estimation of model parameters
Lecture 38 - Multiple Linear Regression: Sampling Distribution of parameter estimates
Lecture 39 - Multiple Linear Regression: Sampling Distribution of parameter estimates (Continued...)
Lecture 40 - Multiple Linear Regression: Model Adequacy Tests
Lecture 41 - Multiple Linear Regression: Model Adequacy Tests (Continued...)
Lecture 42 - Multiple Linear Regression: Test of Assumptions
Lecture 43 - MLR-Model diagnostics
Lecture 44 - MLR-case study
Lecture 45 - Multivariate Linear Regression: Conceptual model and assumptions
Lecture 46 - Multivariate Linear Regression: Estimation of parameters
Lecture 47 - Multivariate Linear Regression: Estimation of parameters (Continued...)
Lecture 48 - Multiple Linear Regression: Sampling Distribution of parameter estimates
Lecture 49 - Multivariate Linear Regression: Model Adequacy Tests
Lecture 50 - Multiple Linear Regression: Model Adequacy Tests (Continued...)
Lecture 51 - Regression modeling using SPSS
Lecture 52 - Principal Component Analysis (PCA): Conceptual Model
Lecture 53 - Principal Component Analysis (PCA): Extraction of Principal components (PCs)
Lecture 54 - Principal Component Analysis (PCA): Model Adequacy and Interpretation
Lecture 55 - Principal Component Analysis (PCA): Model Adequacy and Interpretation (Continued...)
Lecture 56 - Factor Analysis: Basics and Orthogonal factor models
Lecture 57 - Factor Analysis: Types of models and key questions
Lecture 58 - Factor Analysis: Parameter Estimation
Lecture 59 - Factor Analysis: Parameter Estimation (Continued...)
Lecture 60 - Factor Analysis: Model Adequacy tests and factor rotation
Lecture 61 - Factor Analysis: Factor scores and case study

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NPTEL Video Course - Mathematics - NOC:Partial Differential Equations (PDE) for Engineers: Solution by Separa

Subject Co-ordinator - Prof. S. De

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to PDE
Lecture 2 - Classification of PDE
Lecture 3 - Principle of Linear Superposition
Lecture 4 - Standard Eigen Value Problem and Special ODEs
Lecture 5 - Adjoint Operator
Lecture 6 - Generalized Sturm - Louiville Problem
Lecture 7 - Properties of Adjoint Operator
Lecture 8 - Separation of Variables
Lecture 9 - Solution of 3 Dimensional Parabolic Problem
Lecture 10 - Solution of 4 Dimensional Parabolic problem
Lecture 11 - Solution of 4 Dimensional Parabolic Problem (Continued...)
Lecture 12 - Solution of Elliptical PDE
Lecture 13 - Solution of Hyperbolic PDE
Lecture 14 - Orthogonality of Bessel Function and 2 Dimensional Cylindrical Coordinate System
Lecture 15 - Cylindrical Co-ordinate System - 3 Dimensional Problem
Lecture 16 - Spherical Polar Coordinate System
Lecture 17 - Spherical Polar Coordinate System (Continued...)
Lecture 18 - Example of Generalized 3 Dimensional Problem
Lecture 19 - Example of Application Oriented Problems
Lecture 20 - Examples of Application Oriented Problems (Continued...)

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NPTEL Video Course - Mathematics - NOC:Introductory Course in Real Analysis

Subject Co-ordinator - Prof. P.D. Srivastava

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Countable and Uncountable sets
Lecture 2 - Properties of Countable and Uncountable sets
Lecture 3 - Examples of Countable and Uncountable sets
Lecture 4 - Concepts of Metric Space
Lecture 5 - Open ball, Closed ball, Limit point of a set
Lecture 6 - Tutorial-I
Lecture 7 - Some theorems on Open and Closed sets
Lecture 8 - Ordered set, Least upper bound, Greatest lower bound of a set
Lecture 9 - Ordered set, Least upper bound, Greatest lower bound of a set (Continued...)
Lecture 10 - Compact Set
Lecture 11 - Properties of Compact sets
Lecture 12 - Tutorial-II
Lecture 13 - Heine Borel Theorem
Lecture 14 - Weierstrass Theorem
Lecture 15 - Cantor set and its properties
Lecture 16 - Derived set and Dense set
Lecture 17 - Limit of a sequence and monotone sequence
Lecture 18 - Tutorial-III
Lecture 19 - Some Important limits of sequences
Lecture 20 - Ratio Test CauchyÂ s theorems on limits of sequences of real numbers
Lecture 21 - Fundamental theorems on limits
Lecture 22 - Some results on limits and Bolzano-Weierstrass Theorem
Lecture 23 - Criteria for convergent sequence
Lecture 24 - Tutorial-IV
Lecture 25 - Criteria for Divergent Sequence
Lecture 26 - Cauchy Sequence
Lecture 27 - Cauchy Convergence Criteria for Sequences
Lecture 28 - Infinite Series of Real Numbers
Lecture 29 - Convergence Criteria for Series of Positive Real Numbers

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Lecture 30 - Tutorial-V
Lecture 31 - Comparison Test for Series
Lecture 32 - Absolutely and Conditionally Convergent Series
Lecture 33 - Rearrangement Theorem and Test for Convergence of Series
Lecture 34 - Ratio and Integral Test for Convergence of Series
Lecture 35 - Raabe's Test for Convergence of Series
Lecture 36 - Tutorial-VI
Lecture 37 - Limit of Functions and Cluster Point
Lecture 38 - Limit of Functions (Continued...)
Lecture 39 - Divergence Criteria for Limit
Lecture 40 - Various Properties of Limit of Functions
Lecture 41 - Left and Right Hand Limits for Functions
Lecture 42 - Tutorial-VII
Lecture 43 - Limit of Functions at Infinity
Lecture 44 - Continuous Functions (Cauchy's Definition)
Lecture 45 - Continuous Functions (Heine's Definition)
Lecture 46 - Properties of Continuous Functions
Lecture 47 - Properties of Continuous Functions (Continued...)
Lecture 48 - Tutorial-VIII
Lecture 49 - Boundness Theorem and Max-Min Theorem
Lecture 50 - Location of Root and Bolzano's Theorem
Lecture 51 - Uniform Continuity and Related Theorems
Lecture 52 - Absolute Continuity and Related Theorems
Lecture 53 - Types of Discontinuities
Lecture 54 - Tutorial-IX
Lecture 55 - Types of Discontinuities (Continued...)
Lecture 56 - Relation between Continuity and Compact Sets
Lecture 57 - Differentiability of Real Valued Functions
Lecture 58 - Local Max. - Min. Cauchy's and Lagrange's Mean Value Theorem
Lecture 59 - Rolle's Mean Value Theorems and Its Applications
Lecture 60 - Tutorial-X
Lecture 61
Lecture 62
Lecture 63
Lecture 64
Lecture 65
Lecture 66
Lecture 67
Lecture 68

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Lecture 69
Lecture 70
Lecture 71
Lecture 72
Lecture 73

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NPTEL Video Course - Mathematics - NOC:Modeling Transport Phenomena of Microparticles

Subject Co-ordinator - Dr. G.P. Raja Sekhar, Prof. Somnath Bhattacharyya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preliminary concepts
Lecture 2 - CauchyÂ s equation of motion and Navier-Stokes equations
Lecture 3 - Reduced forms of Navier-Stokes equations and Boundary conditions
Lecture 4 - Exact solutions of Navier-Stokes equations in particular cases
Lecture 5 - Dimensional Analysis Â Non-dimensionalization of Navier-StokesÂ s equations
Lecture 6 - Stream function formulation of Navier-Stokes equations
Lecture 7 - Stokes flow past a cylinder
Lecture 8 - Stokes flow past a sphere
Lecture 9 - Elementary Lubrication Theory
Lecture 10 - Hydrodynamics of Squeeze flow
Lecture 11 - Solution of arbitrary Stokes flows
Lecture 12 - Mechanics of Swimming Microorganisms
Lecture 13 - Viscous flow past a spherical drop
Lecture 14 - Migration of a viscous drop under Marangoni effects
Lecture 15 - Singularities of Stokes flows
Lecture 16 - Introduction to porous media
Lecture 17 - Flow through porous media Â elementary geometries
Lecture 18 - Flow through composite porous channels
Lecture 19 - Modeling transport of particles inside capillaries
Lecture 20 - Modeling transport of microparticles Â some applications
Lecture 21 - Introduction to Elctrokietics
Lecture 22 - Basics on Electrostatics
Lecture 23 - Transport Equations for Electrokinetics, Part-I
Lecture 24 - Transport Equations for Electrokinetics, Part-II
Lecture 25 - Electric Double Layer
Lecture 26 - Electroosmotic flow (EOF) of ionized fluid
Lecture 27 - EOF in micro-channel
Lecture 28 - Non-linear EOF, Overlapping Debye Layer
Lecture 29 - Two-dimensional EOF

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Lecture 30 - EOF near heterogeneous surface potential
Lecture 31 - Electroosmosis in hydrophobic surface
Lecture 32 - Numerical Methods for Boundary Value Problems (BVP)
Lecture 33 - Numerical Methods for nonlinear BVP
Lecture 34 - Numerical Methods for coupled set of BVP
Lecture 35 - Numerical Methods for PDEs
Lecture 36 - Numerical Methods for transport equations, Part-I
Lecture 37 - Numerical Methods for transport equations, Part-II
Lecture 38 - Electrophoresis of charged colloids, Part-I
Lecture 39 - Electrophoresis of charged colloids, Part-II
Lecture 40 - Gel Electrophoresis

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NPTEL Video Course - Mathematics - NOC:Constrained and Unconstrained Optimization

Subject Co-ordinator - Dr. Debjani Chakraborty, Prof. A. Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization
Lecture 2 - Assumptions and Mathematical Modeling of LPP
Lecture 3 - Geometrey of LPP
Lecture 4 - Graphical Solution of LPP - I
Lecture 5 - Graphical Solution of LPP - II
Lecture 6 - Solution of LPP
Lecture 7 - Simplex Method
Lecture 8 - Introduction to BIG-M Method
Lecture 9 - Algorithm of BIG-M Method
Lecture 10 - Problems on BIG-M Method
Lecture 11 - Two Phase Method
Lecture 12 - Two Phase Method
Lecture 13 - Special Cases of LPP
Lecture 14 - Degeneracy in LPP
Lecture 15 - Sensitivity Analysis - I
Lecture 16 - Sensitivity Analysis - II
Lecture 17 - Problems on Sensitivity Analysis
Lecture 18 - Introduction to Duality Theory - I
Lecture 19 - Introduction to Duality Theory - II
Lecture 20 - Dual Simplex Method
Lecture 21 - Examples on Dual Simplex Method
Lecture 22 - Interger Linear Programming
Lecture 23 - Interger Linear Programming
Lecture 24 - IPP
Lecture 25 - Mixed Integer Programming Problem
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31 - Introduction to Nonlinear programming
Lecture 32 - Graphical Solution of NLP
Lecture 33 - Types of NLP
Lecture 34 - One dimentional unconstrained optimization
Lecture 35 - Unconstrained Optimization
Lecture 36 - Region Elimination Technique - 1
Lecture 37 - Region Elimination Technique - 2
Lecture 38 - Region Elimination Technique - 3
Lecture 39 - Unconstrained Optimization
Lecture 40 - Unconstrained Optimization
Lecture 41 - Multivariate Unconstrained Optimization - 1
Lecture 42 - Multivariate Unconstrained Optimization - 2
Lecture 43 - Unconstrained Optimization
Lecture 44 - NLP with Equality Constrained - 1
Lecture 45 - NLP with Equality Constrained - 2
Lecture 46 - Constrained NLP - 1
Lecture 47 - Constrained NLP - 2
Lecture 48 - Constrained Optimization
Lecture 49 - Constrained Optimization
Lecture 50 - KKT
Lecture 51 - Constrained Optimization
Lecture 52 - Constrained Optimization
Lecture 53 - Feasible Direction
Lecture 54 - Penalty and barrier method
Lecture 55 - Penalty method
Lecture 56 - Penalty and barrier method
Lecture 57 - Penalty and barrier method
Lecture 58 - Dynamic programming
Lecture 59 - Multi-Objective decision making
Lecture 60 - Multi-Attribute decision making

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NPTEL Video Course - Mathematics - NOC:Matrix Solver

Subject Co-ordinator - Prof. Somnath Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Matrix Algebra - I
Lecture 2 - Introduction to Matrix Algebra - II
Lecture 3 - System of Linear Equations
Lecture 4 - Determinant of a Matrix
Lecture 5 - Determinant of a Matrix (Continued...)
Lecture 6 - Gauss Elimination
Lecture 7 - Gauss Elimination (Continued...)
Lecture 8 - LU Decomposition
Lecture 9 - Gauss-Jordon Method
Lecture 10 - Representation of Physical Systems as Matrix Equations
Lecture 11 - Tridiagonal Matrix Algorithm
Lecture 12 - Equations with Singular Matrices
Lecture 13 - Introduction to Vector Space
Lecture 14 - Vector Subspace
Lecture 15 - Column Space and Nullspace of a Matrix
Lecture 16 - Finding Null Space of a Matrix
Lecture 17 - Solving Ax=b when A is Singular
Lecture 18 - Linear Independence and Spanning of a Subspace
Lecture 19 - Basis and Dimension of a Vector Space
Lecture 20 - Four Fundamental Subspaces of a Matrix
Lecture 21 - Left and right inverse of a matrix
Lecture 22 - Orthogonality between the subspaces
Lecture 23 - Best estimate
Lecture 24 - Projection operation and linear transformation
Lecture 25 - Creating orthogonal basis vectors
Lecture 26 - Gram-Schmidt and modified Gram-Schmidt algorithms
Lecture 27 - Comparing GS and modified GS
Lecture 28 - Introduction to eigenvalues and eigenvectors
Lecture 29 - Eigenvlues and eigenvectors for real symmetric matrix

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Lecture 30 - Positive definiteness of a matrix
Lecture 31 - Positive definiteness of a matrix (Continued...)
Lecture 32 - Basic Iterative Methods
Lecture 33 - Basic Iterative Methods
Lecture 34 - Convergence Rate and Convergence Factor for Iterative Methods
Lecture 35 - Numerical Experiments on Convergence
Lecture 36 - Steepest Descent Method
Lecture 37 - Steepest Descent Method
Lecture 38 - Steepest Descent Method
Lecture 39 - Introduction to General Projection Methods
Lecture 40 - Residue Norm and Minimum Residual Algorithm
Lecture 41 - Developing computer programs for basic iterative methods
Lecture 42 - Developing computer programs for projection based methods
Lecture 43 - Introduction to Krylov subspace methods
Lecture 44 - Krylov subspace methods for linear systems
Lecture 45 - Iterative methods for solving linear systems using Krylov subspace methods
Lecture 46 - Conjugate gradient methods
Lecture 47 - Conjugate gradient methods (Continued...)
Lecture 48 - Conjugate gradient methods (Continued...) and Introduction to GMRES
Lecture 49 - GMRES (Continued...)
Lecture 50 - Lanczos Biorthogonalization and BCG Algorithm
Lecture 51 - Numerical issues in BICG and polynomial based formulation
Lecture 52 - Conjugate gradient squared and Biconjugate gradient stabilized
Lecture 53 - Line relaxation method
Lecture 54 - Block relaxation method
Lecture 55 - Domain Decomposition and Parallel Computing
Lecture 56 - Preconditioners
Lecture 57 - Preconditioned conjugate gradient
Lecture 58 - Preconditioned GMRES
Lecture 59 - Multigrid methods - I
Lecture 60 - Multigrid methods - II

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NPTEL Video Course - Mathematics - NOC:Introduction to Abstract and Linear Algebra

Subject Co-ordinator - Prof.Sourav Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Set Theory
Lecture 2 - Set Operations
Lecture 3 - Set Operations (Continued...)
Lecture 4 - Set of sets
Lecture 5 - Binary relation
Lecture 6 - Equivalence relation
Lecture 7 - Mapping
Lecture 8 - Permutation
Lecture 9 - Binary Composition
Lecture 10 - Groupoid
Lecture 11 - Group
Lecture 12 - Order of an element
Lecture 13 - Subgroup
Lecture 14 - Cyclic Group
Lecture 15 - Subgroup Operations
Lecture 16 - Left Cosets
Lecture 17 - Right Cosets
Lecture 18 - Normal Subgroup
Lecture 19 - Rings
Lecture 20 - Field
Lecture 21 - Vector Spaces
Lecture 22 - Sub-Spaces
Lecture 23 - Linear Span
Lecture 24 - Basis of a Vector Space
Lecture 25 - Dimension of a Vector space
Lecture 26 - Complement of subspace
Lecture 27 - Linear Transformation
Lecture 28 - Linear Transformation (Continued...)
Lecture 29 - More on linear mapping

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Lecture 30 - Linear Space
Lecture 31 - Rank of a matrix
Lecture 32 - Rank of a matrix (Continued...)
Lecture 33 - System of linear equations
Lecture 34 - Row rank and Column rank
Lecture 35 - Eigen value of a matrix
Lecture 36 - Eigen Vector
Lecture 37 - Geometric multiplicity
Lecture 38 - More on eigen value
Lecture 39 - Similar matrices
Lecture 40 - Diagonalisable

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NPTEL Video Course - Mathematics - NOC:Engineering Mathematics-I

Subject Co-ordinator - Prof. Jitendra Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - RolleÃ¢â ¬â ¢s Theorem
Lecture 2 - Mean Value Theorems
Lecture 3 - Indeterminate Forms - Part 1
Lecture 4 - Indeterminate Forms - Part 2
Lecture 5 - Taylor Polynomial and Taylor Series
Lecture 6 - Limit of Functions of Two Variables
Lecture 7 - Evaluation of Limit of Functions of Two Variables
Lecture 8 - Continuity of Functions of Two Variables
Lecture 9 - Partial Derivatives of Functions of Two Variables
Lecture 10 - Partial Derivatives of Higher Order
Lecture 11 - Derivative and Differentiability
Lecture 12 - Differentiability of Functions of Two Variables
Lecture 13 - Differentiability of Functions of Two Variables (Continued...)
Lecture 14 - Differentiability of Functions of Two Variables (Continued...)
Lecture 15 - Composite and Homogeneous Functions
Lecture 16 - TaylorÃ¢â ¬â ¢s Theorem for Functions of Two Variables
Lecture 17 - Maxima and Minima of Functions of Two Variables
Lecture 18 - Maxima and Minima of Functions of Two Variables (Continued...)
Lecture 19 - Maxima and Minima of Functions of Two Variables (Continued...)
Lecture 20 - Constrained Maxima and Minima
Lecture 21 - Improper Integrals
Lecture 22 - Improper Integrals (Continued...)
Lecture 23 - Improper Integrals (Continued...)
Lecture 24 - Improper Integrals (Continued...)
Lecture 25 - Beta and Gamma Function
Lecture 26 - Beta and Gamma Function (Continued...)
Lecture 27 - Differentiation Under Integral Sign
Lecture 28 - Double Integrals
Lecture 29 - Double Integrals (Continued...)

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Lecture 30 - Double Integrals (Continued...)
Lecture 31 - Integral Calculus Double Integrals in Polar Form
Lecture 32 - Integral Calculus Double Integrals
Lecture 33 - Integral Calculus Double Integrals
Lecture 34 - Integral Calculus Triple Integrals
Lecture 35 - Integral Calculus Triple Integrals (Continued...)
Lecture 36 - System of Linear Equations
Lecture 37 - System of Linear Equations Gauss Elimination
Lecture 38 - System of Linear Equations Gauss Elimination (Continued...)
Lecture 39 - Linear Algebra - Vector Spaces
Lecture 40 - Linear Independence of Vectors
Lecture 41 - Vector Spaces Spanning Set
Lecture 42 - Vector Spaces Basis and Dimension
Lecture 43 - Rank of a Matrix
Lecture 44 - Linear Transformations
Lecture 45 - Linear Transformations (Continued....)
Lecture 46 - Eigenvalues and Eigenvectors
Lecture 47 - Eigenvalues and Eigenvectors (Continued...)
Lecture 48 - Eigenvalues and Eigenvectors (Continued...)
Lecture 49 - Eigenvalues and Eigenvectors (Continued...)
Lecture 50 - Eigenvalues and Eigenvectors
Lecture 51 - Differential Equations - Introduction
Lecture 52 - First Order Differential Equations
Lecture 53 - Exact Differential Equations
Lecture 54 - Exact Differential Equations (Continued...)
Lecture 55 - First Order Linear Differential Equations
Lecture 56 - Higher Order Linear Differential Equations
Lecture 57 - Solution of Higher Order Homogeneous Linear Equations
Lecture 58 - Solution of Higher Order Non-Homogeneous Linear Equations
Lecture 59 - Solution of Higher Order Non-Homogeneous Linear Equations (Continued...)
Lecture 60 - Cauchy-Euler Equations

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NPTEL Video Course - Mathematics - NOC:Integral and Vector Calculus

Subject Co-ordinator - Prof. Hari Shankar Mahato

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Partition, Riemann intergrability and One example
Lecture 2 - Partition, Riemann intergrability and One example (Continued...)
Lecture 3 - Condition of integrability
Lecture 4 - Theorems on Riemann integrations
Lecture 5 - Examples
Lecture 6 - Examples (Continued...)
Lecture 7 - Reduction formula
Lecture 8 - Reduction formula (Continued...)
Lecture 9 - Improper Integral
Lecture 10 - Improper Integral (Continued...)
Lecture 11 - Improper Integral (Continued...)
Lecture 12 - Improper Integral (Continued...)
Lecture 13 - Introduction to Beta and Gamma Function
Lecture 14 - Beta and Gamma Function
Lecture 15 - Differentiation under Integral Sign
Lecture 16 - Differentiation under Integral Sign (Continued...)
Lecture 17 - Double Integral
Lecture 18 - Double Integral over a Region E
Lecture 19 - Examples of Integral over a Region E
Lecture 20 - Change of variables in a Double Integral
Lecture 21 - Change of order of Integration
Lecture 22 - Triple Integral
Lecture 23 - Triple Integral (Continued...)
Lecture 24 - Area of Plane Region
Lecture 25 - Area of Plane Region (Continued...)
Lecture 26 - Rectification
Lecture 27 - Rectification (Continued...)
Lecture 28 - Surface Integral
Lecture 29 - Surface Integral (Continued...)

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Lecture 30 - Surface Integral (Continued...)
Lecture 31 - Volume Integral, Gauss Divergence Theorem
Lecture 32 - Vector Calculus
Lecture 33 - Limit, Continuity, Differentiability
Lecture 34 - Successive Differentiation
Lecture 35 - Integration of Vector Function
Lecture 36 - Gradient of a Function
Lecture 37 - Divergence and Curl
Lecture 38 - Divergence and Curl Examples
Lecture 39 - Divergence and Curl important Identities
Lecture 40 - Level Surface Relevant Theorems
Lecture 41 - Directional Derivative (Concept and Few Results)
Lecture 42 - Directional Derivative (Concept and Few Results) (Continued...)
Lecture 43 - Directional Derivatives, Level Surfaces
Lecture 44 - Application to Mechanics
Lecture 45 - Equation of Tangent, Unit Tangent Vector
Lecture 46 - Unit Normal, Unit binormal, Equation of Normal Plane
Lecture 47 - Introduction and Derivation of Serret-Frenet Formula, few results
Lecture 48 - Example on binormal, normal tangent, Serret-Frenet Formula
Lecture 49 - Osculating Plane, Rectifying plane, Normal plane
Lecture 50 - Application to Mechanics, Velocity, speed, acceleration
Lecture 51 - Angular Momentum, Newton's Law
Lecture 52 - Example on derivation of equation of motion of particle
Lecture 53 - Line Integral
Lecture 54 - Surface integral
Lecture 55 - Surface integral (Continued...)
Lecture 56 - Green's Theorem and Example
Lecture 57 - Volume integral, Gauss theorem
Lecture 58 - Gauss divergence theorem
Lecture 59 - Stoke's Theorem
Lecture 60 - Overview of Course

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NPTEL Video Course - Mathematics - NOC:Transform Calculus and its applications in Differential Equations

Subject Co-ordinator - Prof. A. Goswami

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Integral Transform and Laplace Transform
Lecture 2 - Existence of Laplace Transform
Lecture 3 - Shifting Properties of Laplace Transform
Lecture 4 - Laplace Transform of Derivatives and Integration of a Function - I
Lecture 5 - Laplace Transform of Derivatives and Integration of a Function - II
Lecture 6 - Explanation of properties of Laplace Transform using Examples
Lecture 7 - Laplace Transform of Periodic Function
Lecture 8 - Laplace Transform of some special Functions
Lecture 9 - Error Function, Dirac Delta Function and their Laplace Transform
Lecture 10 - Bessel Function and its Laplace Transform
Lecture 11 - Introduction to Inverse Laplace Transform
Lecture 12 - Properties of Inverse Laplace Transform
Lecture 13 - Convolution and its Applications
Lecture 14 - Evaluation of Integrals using Laplace Transform
Lecture 15 - Solution of Ordinary Differential Equations with constant coefficients using Laplace Transform
Lecture 16 - Solution of Ordinary Differential Equations with variable coefficients using Laplace Transform
Lecture 17 - Solution of Simultaneous Ordinary Differential Equations using Laplace Transform
Lecture 18 - Introduction to Integral Equation and its Solution Process
Lecture 19 - Introduction to Fourier Series
Lecture 20 - Fourier Series for Even and Odd Functions
Lecture 21 - Fourier Series of Functions having arbitrary period - I
Lecture 22 - Fourier Series of Functions having arbitrary period - II
Lecture 23 - Half Range Fourier Series
Lecture 24 - Parseval's Theorem and its Applications
Lecture 25 - Complex form of Fourier Series
Lecture 26 - Fourier Integral Representation
Lecture 27 - Introduction to Fourier Transform
Lecture 28 - Derivation of Fourier Cosine Transform and Fourier Sine Transform of Functions
Lecture 29 - Evaluation of Fourier Transform of various functions

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Lecture 30 - Linearity Property and Shifting Properties of Fourier Transform
Lecture 31 - Change of Scale and Modulation Properties of Fourier Transform
Lecture 32 - Fourier Transform of Derivative and Integral of a Function
Lecture 33 - Applications of Properties of Fourier Transform - I
Lecture 34 - Applications of Properties of Fourier Transform - II
Lecture 35 - Fourier Transform of Convolution of two functions
Lecture 36 - Parseval's Identity and its Application
Lecture 37 - Evaluation of Definite Integrals using Properties of Fourier Transform
Lecture 38 - Fourier Transform of Dirac Delta Function
Lecture 39 - Representation of a function as Fourier Integral
Lecture 40 - Applications of Fourier Transform to Ordinary Differential Equations - I
Lecture 41 - Applications of Fourier Transform to Ordinary Differential Equations - II
Lecture 42 - Solution of Integral Equations using Fourier Transform
Lecture 43 - Introduction to Partial Differential Equations
Lecture 44 - Solution of Partial Differential Equations using Laplace Transform
Lecture 45 - Solution of Heat Equation and Wave Equation using Laplace Transform
Lecture 46 - Criteria for choosing Fourier Transform, Fourier Sine Transform, Fourier Cosine Transform in sol
Lecture 47 - Solution of Partial Differential Equations using Fourier Cosine Transform and Fourier Sine Trans
Lecture 48 - Solution of Partial Differential Equations using Fourier Transform - I
Lecture 49 - Solution of Partial Differential Equations using Fourier Transform - II
Lecture 50 - Solving problems on Partial Differential Equations using Transform Techniques
Lecture 51 - Introduction to Finite Fourier Transform
Lecture 52 - Solution of Boundary Value Problems using Finite Fourier Transform - I
Lecture 53 - Solution of Boundary Value Problems using Finite Fourier Transform - II
Lecture 54 - Introduction to Mellin Transform
Lecture 55 - Properties of Mellin Transform
Lecture 56 - Examples of Mellin Transform - I
Lecture 57 - Examples of Mellin Transform - II
Lecture 58 - Introduction to Z-Transform
Lecture 59 - Properties of Z-Transform
Lecture 60 - Evaluation of Z-Transform of some functions

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NPTEL Video Course - Mathematics - NOC:Statistical Inference (2019)

Subject Co-ordinator - Prof. Somesh Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation - I
Lecture 2 - Introduction and Motivation - II
Lecture 3 - Basic Concepts of Point Estimations - I
Lecture 4 - Basic Concepts of Point Estimations - II
Lecture 5 - Basic Concepts of Point Estimations - III
Lecture 6 - Basic Concepts of Point Estimations - IV
Lecture 7 - Finding Estimators - I
Lecture 8 - Finding Estimators - II
Lecture 9 - Finding Estimators - III
Lecture 10 - Finding Estimators - IV
Lecture 11 - Finding Estimators - V
Lecture 12 - Finding Estimators - VI
Lecture 13 - Properties of MLEs - I
Lecture 14 - Properties of MLEs - II
Lecture 15 - Lower Bounds for Variance - I
Lecture 16 - Lower Bounds for Variance - II
Lecture 17 - Lower Bounds for Variance - III
Lecture 18 - Lower Bounds for Variance - IV
Lecture 19 - Lower Bounds for Variance - V
Lecture 20 - Lower Bounds for Variance - VI
Lecture 21 - Lower Bounds for Variance - VII
Lecture 22 - Lower Bounds for Variance - VIII
Lecture 23 - Sufficiency - I
Lecture 24 - Sufficiency - II
Lecture 25 - Sufficiency and Information - I
Lecture 26 - Sufficiency and Information - II
Lecture 27 - Minimal Sufficiency, Completeness - I
Lecture 28 - Minimal Sufficiency, Completeness - II
Lecture 29 - UMVU Estimation, Ancillarity - I

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Lecture 30 - UMVU Estimation, Ancillarity - II
Lecture 31 - Testing of Hypotheses
Lecture 32 - Testing of Hypotheses
Lecture 33 - Neyman Pearson Fundamental Lemma - I
Lecture 34 - Neyman Pearson Fundamental Lemma - II
Lecture 35 - Application of NP-Lemma - I
Lecture 36 - Application of NP-Lemma - II
Lecture 37 - UMP Tests - I
Lecture 38 - UMP Tests - II
Lecture 39 - UMP Tests - III
Lecture 40 - UMP Tests - IV
Lecture 41 - UMP Unbiased Tests - I
Lecture 42 - UMP Unbiased Tests - II
Lecture 43 - UMP Unbiased Tests - III
Lecture 44 - UMP Unbiased Tests - IV
Lecture 45 - Applications of UMP Unbiased Tests - I
Lecture 46 - Applications of UMP Unbiased Tests - II
Lecture 47 - Unbiased Test for Normal Populations - I
Lecture 48 - Unbiased Test for Normal Populations - II
Lecture 49 - Unbiased Test for Normal Populations - III
Lecture 50 - Unbiased Test for Normal Populations - IV
Lecture 51 - Likelihood Ratio Tests - I
Lecture 52 - Likelihood Ratio Tests - II
Lecture 53 - Likelihood Ratio Tests - III
Lecture 54 - Likelihood Ratio Tests - IV
Lecture 55 - Likelihood Ratio Tests - V
Lecture 56 - Likelihood Ratio Tests - VI
Lecture 57 - Likelihood Ratio Tests - VII
Lecture 58 - Likelihood Ratio Tests - VIII
Lecture 59 - Test for Goodness of Fit - I
Lecture 60 - Test for Goodness of Fit - II
Lecture 61 - Interval Estimation - I
Lecture 62 - Interval Estimation - II
Lecture 63 - Interval Estimation - III
Lecture 64 - Interval Estimation - IV

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NPTEL Video Course - Mathematics - NOC:Mathematical Methods for Boundary Value Problems

Subject Co-ordinator - Prof. Somnath Bhattacharyya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Strum-Liouville Problems, Linear BVP
Lecture 2 - Strum-Liouville Problems, Linear BVP (Continued...)
Lecture 3 - Solution of BVPs by Eigen function expansion
Lecture 4 - Solution of BVPs by Eigen function expansion (Continued...)
Lecture 5 - Solutions of linear parabolic, hyperbolic and elliptic PDEs with finite domain by Eigen function
Lecture 6 - Solutions of linear parabolic, hyperbolic and elliptic PDEs with finite domain by Eigen function
Lecture 7 - Green's Function for BVP and Dirichlet Problem
Lecture 8 - Green's Function for BVP and Dirichlet Problem (Continued...)
Lecture 9 - Numerical Techniques for IVP; Shooting Method for BVP
Lecture 10 - Numerical Techniques for IVP; Shooting Method for BVP (Continued...)
Lecture 11 - Finite difference methods for linear BVP; Thomas Algorithm
Lecture 12 - Finite difference methods for linear BVP; Thomas Algorithm (Continued...)
Lecture 13 - Finite difference method for Higher-order BVP; Block tri-diagonal System
Lecture 14 - Finite difference method for Higher-order BVP; Block tri-diagonal System (Continued...)
Lecture 15 - Iterative methods for nonlinear BVP; Control volume formulation
Lecture 16 - Iterative methods for nonlinear BVP; Control volume formulation (Continued...)
Lecture 17 - Implicit scheme; Truncation error; Crank-Nicolson scheme
Lecture 18 - Implicit scheme; Truncation error; Crank-Nicolson scheme (Continued...)
Lecture 19 - Stability analysis of numerical schemes
Lecture 20 - Alternating-Direction-Implicit Scheme; Successive-Over-Relaxation technique for Poisson equation

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NPTEL Video Course - Mathematics - NOC:Engineering Mathematics-II

Subject Co-ordinator - Prof. Jitendra Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vector Functions
Lecture 2 - Vector and Scalar Fields
Lecture 3 - Divergence and Curl of a Vector Field
Lecture 4 - Line Integrals
Lecture 5 - Conservative Vector Field
Lecture 6 - Greenâ s Theorem
Lecture 7 - Surface Integral - I
Lecture 8 - Surface Integral - II
Lecture 9 - Stokesâ Theorem
Lecture 10 - Divergence Theorem
Lecture 11 - Complex Numbers and Functions
Lecture 12 - Differentiability of Complex Functions
Lecture 13 - Analytic Functions
Lecture 14 - Line Integral
Lecture 15 - Cauchy Integral Theorem
Lecture 16 - Cauchy Integral Formula
Lecture 17 - Taylorâ s Series
Lecture 18 - Laurentâ s Series
Lecture 19 - Singularities
Lecture 20 - Residue
Lecture 21 - Iterative Methods for Solving System of Linear Equations
Lecture 22 - Iterative Methods for Solving System of Linear Equations (Continued...)
Lecture 23 - Iterative Methods for Solving System of Linear Equations (Continued...)
Lecture 24 - Roots of Algebraic and Transcendental Equations
Lecture 25 - Roots of Algebraic and Transcendental Equations (Continued...)
Lecture 26 - Polynomial Interpolation
Lecture 27 - Polynomial Interpolation (Continued...)
Lecture 28 - Polynomial Interpolation (Continued...)
Lecture 29 - Polynomial Interpolation (Continued...)

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Lecture 30 - Numerical Integration
Lecture 31 - Trigonometric Polynomials and Series
Lecture 32 - Derivation of Fourier Series
Lecture 33 - Fourier Series -Evaluation
Lecture 34 - Convergence of Fourier Series - I
Lecture 35 - Convergence of Fourier Series - II
Lecture 36 - Fourier Series for Even and Odd Functions
Lecture 37 - Half Range Fourier Expansions
Lecture 38 - Differentiation and Integration of Fourier Series
Lecture 39 - Besselâ s Inequality and Parsevalâ s Identity
Lecture 40 - Complex Form of Fourier Series
Lecture 41 - Fourier Integral Representation of a Function
Lecture 42 - Fourier Sine and Cosine Integrals
Lecture 43 - Fourier Cosine and Sine Transform
Lecture 44 - Fourier Transform
Lecture 45 - Properties of Fourier Transform
Lecture 46 - Evaluation of Fourier Transform - Part 1
Lecture 47 - Evaluation of Fourier Transform - Part 2
Lecture 48 - Introduction to Partial Differential Equations
Lecture 49 - Applications of Fourier Transform to PDEs - Part 1
Lecture 50 - Applications of Fourier Transform to PDEs - Part 2
Lecture 51 - Laplace Transform of Some Elementary Functions
Lecture 52 - Existence of Laplace Transform
Lecture 53 - Inverse Laplace Transform
Lecture 54 - Properties of Laplace Transform
Lecture 55 - Properties of Laplace Transform (Continued...)
Lecture 56 - Properties of Laplace Transform (Continued...)
Lecture 57 - Laplace Transform of Special Functions
Lecture 58 - Laplace Transform of Special Functions (Continued...)
Lecture 59 - Applications of Laplace Transform
Lecture 60 - Applications of Laplace Transform (Continued...)

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NPTEL Video Course - Mathematics - NOC:Advanced Calculus For Engineers

Subject Co-ordinator - Prof. Somesh Kumar, Prof. Jitendra Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rolle's Theorem
Lecture 2 - Mean Value Theorem
Lecture 3 - Taylor's Formula (Single Variable)
Lecture 4 - Indeterminate Forms - Part 1
Lecture 5 - Indeterminate Forms - Part 2
Lecture 6 - Introduction to Limit
Lecture 7 - Evaluation of Limit
Lecture 8 - Continuity
Lecture 9 - First Order Partial Derivatives
Lecture 10 - Higher Order Partial Derivatives
Lecture 11 - Differentiability - Part 1
Lecture 12 - Differentiability - Part 2
Lecture 13 - Differentiability - Part 3
Lecture 14 - Differentiability - Part 4
Lecture 15 - Composite and Homogeneous Functions
Lecture 16 - Taylor's Theorem (Multivariable)
Lecture 17 - Maxima and Minima - Part 1
Lecture 18 - Maxima and Minima - Part 2
Lecture 19 - Maxima and Minima - Part 3
Lecture 20 - Maxima and Minima - Part 4
Lecture 21 - Formation of Differential Equations
Lecture 22 - First Order and First Degree DE
Lecture 23 - Exact Differential Equations
Lecture 24 - Integrating Factor
Lecture 25 - Linear Differential Equations
Lecture 26 - Introduction to Higher Order DEs
Lecture 27 - Complementary Function
Lecture 28 - Particular Integral
Lecture 29 - Cauchy-Euler Equations

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Lecture 30 - Method of Variation of Parameters
Lecture 31 - Improper Integral - Part 1
Lecture 32 - Improper Integral - Part 2
Lecture 33 - Improper Integral - Part 3
Lecture 34 - Improper Integral - Part 4
Lecture 35 - Beta and Gamma Function - Part 1
Lecture 36 - Beta and Gamma Function - Part 2
Lecture 37 - Differentiation under the Integral Sign
Lecture 38 - Double Integrals - Part 1
Lecture 39 - Double Integrals - Part 2
Lecture 40 - Double Integrals - Part 3
Lecture 41 - Double Integrals - Part 4
Lecture 42 - Double Integrals - Part 5
Lecture 43 - Double Integrals - Part 6
Lecture 44 - Triple Integrals - Part 1
Lecture 45 - Triple Integrals - Part 2
Lecture 46 - Vector Functions
Lecture 47 - Vector and Scalar Fields
Lecture 48 - Divergence and Curl of a Vector Field
Lecture 49 - Line Integrals
Lecture 50 - Conservative Vector Fields
Lecture 51 - Green's Theorem
Lecture 52 - Surface Integrals - Part 1
Lecture 53 - Surface Integrals - Part 2
Lecture 54 - Stokes' Theorem
Lecture 55 - Divergence Theorem
Lecture 56 - Application of Derivatives
Lecture 57 - Application of Derivatives (Continued...)
Lecture 58 - Properties of Gradient, Divergence and Curl
Lecture 59 - Properties of Gradient, Divergence and Curl (Continued...)
Lecture 60 - Curl and Integrals

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NPTEL Video Course - Mathematics - NOC:Rings and Modules

Subject Co-ordinator - Prof. Ramakrishna Nanduri, Prof. Mousumi Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Rings
Lecture 2 - Rings, Subrings
Lecture 3 - Ring Homomorphism, Ideals
Lecture 4 - Properties of Ideals
Lecture 5 - Properties of Ideals (Continued...)
Lecture 6 - Quotient Ring, Isomorphism Theorem
Lecture 7 - Isomorphism Theorem, Homomorphism Theorem
Lecture 8 - Homomorphism Theorem
Lecture 9 - Integral Domain, Quotient Ring
Lecture 10 - Quotient Ring
Lecture 11 - Prime ideals, Maximal ideals
Lecture 12 - Maximal ideals
Lecture 13 - Hillbertâ s Nullstellensatz
Lecture 14 - Hillbertâ s Nullstellensatz (Continued...)
Lecture 15 - Application of Hillbertâ s Nullstellensatz
Lecture 16 - Unique Factorization domian
Lecture 17 - Properties of Unique Factorization domain
Lecture 18 - Principal ideal domain
Lecture 19 - Properties of PID and ED
Lecture 20 - Properties of PID and ED (Continued...)
Lecture 21 - Prime elements of Z[i]
Lecture 22 - Prime elements of Z[i] (Continued...)
Lecture 23 - Application in Z[i]
Lecture 24 - Polynomial Rings over UFD
Lecture 25 - Gauss's Lemma
Lecture 26 - Polynomial Ring over UFD and Irreducibility Criterion
Lecture 27 - Irreducibility Criterion
Lecture 28 - Chinese Remainder Theorem
Lecture 29 - Nilradical and Jacobson radical

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Lecture 30 - Examples and Problems
Lecture 31 - Definition of Modules and Examples
Lecture 32 - Definition of Modules and Examples (Continued...)
Lecture 33 - Submodules,direct sum and direct product of modules
Lecture 34 - Direct sum and direct product of modules, free modules
Lecture 35 - Finitely generated modules, free modules vs Vector spaces
Lecture 36 - Free modules vs Vector spaces
Lecture 37 - Vector spaces vs free modules and Examples
Lecture 38 - Quotient modules and module homomorphisms
Lecture 39 - Module homomorphism, Epimorphism theorem
Lecture 40 - Epimorphism theorem
Lecture 41 - Maximal submodules, minimal submodules
Lecture 42 - Freeness of submodules of a free module over a PID
Lecture 43 - Torsion modules, freeness of torsion-free modules over a PID
Lecture 44 - Rank of a module, p-submodules over a PID
Lecture 45 - Structure of a torsion module over a PID
Lecture 46 - Structure theorem, chain conditions
Lecture 47 - Artinian modules, Artinian rings
Lecture 48 - Noetherian modules, Noetherian rings
Lecture 49 - Ascending chain condition, Noetherian modules
Lecture 50 - Examples of Noetherian and Artinian modules and rings
Lecture 51 - Composition series, Modules of finite length
Lecture 52 - Jordan-HolderÃ¢'s theorem
Lecture 53 - Artinian rings
Lecture 54 - Noetherian rings
Lecture 55 - Hilbert basis theorem
Lecture 56 - CohenÃ¢'s theorem on Noetherianness
Lecture 57 - Nakayama lemma
Lecture 58 - Nil and Jacobson radicals in Artinian rings
Lecture 59 - Structure theorem
Lecture 60 - Comparison between Artinian and Noetherian rings

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NPTEL Video Course - Mathematics - NOC:Advanced Computational Techniques

Subject Co-ordinator - Prof. Somnath Bhattacharyya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Polynomial Interpolation
Lecture 2 - Polynomial Interpolation
Lecture 3 - Polynomial Interpolation
Lecture 4 - Spline Interpolation
Lecture 5 - Spline Interpolation
Lecture 6 - Numerical Quadrature
Lecture 7 - Numerical Quadrature (Continued...)
Lecture 8 - Least Squares Approximation
Lecture 9 - Linear System of Equations
Lecture 10 - Linear System of Equations (Continued...)
Lecture 11 - Initial Value Problems (IVP)
Lecture 12 - Initial Value Problems (Continued...)
Lecture 13 - Initial Value Problems (Continued...)
Lecture 14 - Initial Value Problems (Continued...)
Lecture 15 - Linear Boundary Value Problem (BVP)
Lecture 16 - Linear Boundary Value Problem (BVP) (Continued...)
Lecture 17 - Non-linear BVP, Iterative Method
Lecture 18 - Linear Parabolic PDE
Lecture 19 - Hyperbolic PDE
Lecture 20 - Non-linear advection-diffusion equation

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NPTEL Video Course - Mathematics - NOC:Applied Linear Algebra in AI and ML

Subject Co-ordinator - Prof. Swanand Khare

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vector Spaces
Lecture 2 - Vector Subspaces
Lecture 3 - Linear Span and Linear Dependence
Lecture 4 - Linear Independence
Lecture 5 - Basis and Dimension
Lecture 6 - Linear Functionals
Lecture 7 - Norm of Vector - Part I
Lecture 8 - Norm of Vector - Part II
Lecture 9 - Linear Functions
Lecture 10 - Affine Functions and Examples
Lecture 11 - Examples of Linear and Affine Functions
Lecture 12 - Function Composition
Lecture 13 - System of Linear Equations
Lecture 14 - Left Invertibility
Lecture 15 - Invertibility of Matrices
Lecture 16 - Triangular Systems
Lecture 17 - LU Decomposition - Part I
Lecture 18 - LU Decomposition - Part II
Lecture 19 - QR Decomposition (Rotators) - Part I
Lecture 20 - QR Decomposition (Rotators) - Part II
Lecture 21 - QR Decomposition (Reflectors) - Part I
Lecture 22 - QR Decomposition (Reflectors) - Part II
Lecture 23 - Matrix Norms
Lecture 24 - Sensitivity Analysis
Lecture 25 - Condition Number of a Matrix
Lecture 26 - Sensitivity Analysis - II
Lecture 27 - Sensitivity Analysis - III
Lecture 28 - Least Squares - Part I
Lecture 29 - Least Squares - Part II

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Lecture 30 - Least Squares - Part III
Lecture 31 - Least Squares Data Fitting
Lecture 32 - Examples of LS data fitting
Lecture 33 - Classification using Least Squares
Lecture 34 - Examples of LS classification
Lecture 35 - Constrained Least Squares
Lecture 36 - Multiobjective Least Squares
Lecture 37 - Eigenvalues and Eigenvectors - Part I
Lecture 38 - Eigenvalues and Eigenvectors - Part II
Lecture 39 - Spectral Decomposition Theorem
Lecture 40 - Positive Definite Matrices
Lecture 41 - Singular Value Decomposition (SVD)
Lecture 42 - Proof of SVD
Lecture 43 - Properties of SVD
Lecture 44 - Another Proof of SVD
Lecture 45 - Low Rank Approximations
Lecture 46 - Principal Component Analysis
Lecture 47 - SVD and Pseudo - Inverse
Lecture 48 - SVD and the Least Squares Problem
Lecture 49 - Sensitivity Analysis of the Least Squares Problem
Lecture 50 - Power Method
Lecture 51 - Directed Graphs and Properties
Lecture 52 - Page Ranking Algorithm
Lecture 53 - Inverse Eigen Value Problem
Lecture 54 - Fastest Mixing Markov Chains on Graphs - Part I
Lecture 55 - Fastest Mixing Markov Chains on Graphs - Part II
Lecture 56 - Sparse Solution and Underdetermined Systems
Lecture 57 - Structured Low Rank Approximations - Part I
Lecture 58 - Structured Low Rank Approximations - Part II
Lecture 59 - Structured Low Rank Approximations - Part III
Lecture 60 - Recap

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NPTEL Video Course - Mathematics - NOC:Advanced Engineering Mathematics (2023)

Subject Co-ordinator - Prof. H S Mahato

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction on functions of a single variable
Lecture 2 - Basic definitions
Lecture 3 - Mean value Theorems
Lecture 4 - Extremum of function of single variable
Lecture 5 - Examples
Lecture 6 - Introduction on functions of two variable
Lecture 7 - Basic definitions
Lecture 8 - Partial differentiation
Lecture 9 - Extremum of function of two variable
Lecture 10 - Examples
Lecture 11 - Convergence and divergence test
Lecture 12 - Beta function, Gamma function
Lecture 13 - Differentiation under integral sign
Lecture 14 - Line integral, integration in R^2 (Double integral)
Lecture 15 - Examples
Lecture 16 - Double integral
Lecture 17 - Integration in R3
Lecture 18 - Triple integral
Lecture 19 - Examples
Lecture 20 - Introduction to Differential equation
Lecture 21 - Exact form
Lecture 22 - Second order differential equation
Lecture 23 - Iterative method (bisection and fixed point)
Lecture 24 - Newton-Raphson, Jacobi and Gauss-Seidel method
Lecture 25 - Finite difference method
Lecture 26 - Newton's forward and backward interpolation
Lecture 27 - Numerical integration
Lecture 28 - Vector space and Subspace
Lecture 29 - Basis and dimension

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Lecture 30 - Rank of a matrix
Lecture 31 - Gauss-Elimination Method
Lecture 32 - Linear Transformation
Lecture 33 - Examples
Lecture 34 - Matrix Representation
Lecture 35 - Eigenvalues and Eigenvectors
Lecture 36 - Cayley-Hamilton Theorem
Lecture 37 - Diagonalisation of a Matrix
Lecture 38 - Examples and applications
Lecture 39 - Types of matrices
Lecture 40 - Equivalent Matrices and Elementary Matrices
Lecture 41 - Introduction to the vector function
Lecture 42 - Differentiation and integration of the vector function
Lecture 43 - Partial differentiation of vector function
Lecture 44 - Directional derivative of a vector function
Lecture 45 - Examples on directional derivative, tangent plane and normal
Lecture 46 - Divergence and curl of a vector function
Lecture 47 - Application to mechanics of vector calculus
Lecture 48 - Serret-Frenet formula and more applications to mechanics
Lecture 49 - Examples on finding unit vectors, curvature and torsion
Lecture 50 - Application of vector calculus to the particle dynamics
Lecture 51 - Line integral of vector function
Lecture 52 - Surface integral of vector function
Lecture 53 - Volume integral of vector function and Gauss Divergence Theorem
Lecture 54 - Green's theorem and Stoke's theorem
Lecture 55 - Verification and application of Divergencen theorem, Green's theorem and Stoke's theorem
Lecture 56 - Basic properties of a complex valued function
Lecture 57 - Analytic Complex valued function
Lecture 58 - Complex Integration and theorems
Lecture 59 - Application of Cauchy's integral formula
Lecture 60 - Regular and Singular point of a complex valued function

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NPTEL Video Course - Mathematics - NOC:Essentials of Topology

Subject Co-ordinator - Prof. S. P. Tiwari

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sets and Functions - I
Lecture 3 - Sets and Functions - II
Lecture 4 - Sets and Functions - III
Lecture 5 - Sets and Functions - IV
Lecture 6 - Metric Spaces
Lecture 7 - Topological Spaces
Lecture 8 - Topological Spaces (Examples)
Lecture 9 - Typologies on R - I
Lecture 10 - Typologies on R - II
Lecture 11 - Comparison of topologies
Lecture 12 - Closed sets
Lecture 13 - Basis for a topology - I
Lecture 14 - Basis for a topology - II
Lecture 15 - A topology on R^2
Lecture 16 - Subbasis and Neighborhood
Lecture 17 - Limit points of sets
Lecture 18 - Closure of sets
Lecture 19 - Interior and boundary of sets
Lecture 20 - Subspaces
Lecture 21 - Product topology
Lecture 22 - Product and Box topologies
Lecture 23 - The Quotient topology
Lecture 24 - Krakowski closure/interior operator
Lecture 25 - Countability axioms - I
Lecture 26 - Countability axioms - II
Lecture 27 - Countability axioms - III
Lecture 28 - Continuous functions - I
Lecture 29 - Continuous functions - II

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Lecture 30 - Continuous functions - III
Lecture 31 - Continuous functions - IV
Lecture 32 - Homeomorphisms - I
Lecture 33 - Homeomorphisms - II
Lecture 34 - Homeomorphisms - III
Lecture 35 - Connectedness - I
Lecture 36 - Connectedness - II
Lecture 37 - Connectedness - III
Lecture 38 - Connectedness - IV
Lecture 39 - Connectedness - V
Lecture 40 - Connectedness - VI
Lecture 41 - Connectedness - VII
Lecture 42 - Connectedness - VIII
Lecture 43 - Path connectedness - I
Lecture 44 - Path connectedness - II
Lecture 45 - Path connectedness - III
Lecture 46 - Path components and Local connectedness
Lecture 47 - Local connectedness
Lecture 48 - Local path connectedness
Lecture 49 - Compactness - I
Lecture 50 - Compactness - II
Lecture 51 - Compactness - III
Lecture 52 - Compactness - IV
Lecture 53 - Compactness - V
Lecture 54 - Compactness - VI
Lecture 55 - Compactness - VII
Lecture 56 - Compactness - VIII
Lecture 57 - Compactness - IX
Lecture 58 - Compactness - X
Lecture 59 - One-point compactifications - I
Lecture 60 - One-point compactifications - II
Lecture 61 - Separation axioms - I
Lecture 62 - Separation axioms - II
Lecture 63 - Separation axioms - III
Lecture 64 - Separation axioms - IV
Lecture 65 - Separation axioms - V
Lecture 66 - Separation axioms - VI
Lecture 67 - Separation axioms - VII
Lecture 68 - Separation axioms - VIII

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Lecture 69 - Tychonoff theorem - I
Lecture 70 - Tychonoff theorem - II
Lecture 71 - Stone-Cech compactification - I
Lecture 72 - Stone-Cech compactification - II

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NPTEL Video Course - Mathematics - NOC:Numerical Linear Algebra and Application

Subject Co-ordinator - Prof. Srinivasa Rao Pentyala

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Linear Algebra and Introduction
Lecture 2 - Computational Difficulties
Lecture 3 - Computational Error
Lecture 4 - Stability
Lecture 5 - Gaussian Elimination
Lecture 6 - LU Factorization
Lecture 7 - Iterative refinement
Lecture 8 - QR Factorization
Lecture 9 - Gram-Schmidt Orthogonalization
Lecture 10 - Cholesky Decomposition
Lecture 11 - Projections
Lecture 12 - House-Holder Reflectors
Lecture 13 - Image Compression
Lecture 14 - Singular Value Decomposition
Lecture 15 - Least Square Solutions
Lecture 16 - Pseudo-Inverse
Lecture 17 - Normal Equations
Lecture 18 - Eigenvalue problems
Lecture 19 - Gershgorin Theorem
Lecture 20 - Similarity Transforms
Lecture 21 - Eigenvalues
Lecture 22 - Sensitivity Vectors
Lecture 23 - Power method
Lecture 24 - Schur Decomposition
Lecture 25 - Jordan Canonical form
Lecture 26 - QR Iteration
Lecture 27 - Heisenberg transformation
Lecture 28 - Rayleigh Quotient
Lecture 29 - Symmetric eigenvalue problem

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Lecture 30 - Jacobi Method
Lecture 31 - Divide and Conquer
Lecture 32 - Computing the Singular Value Decomposition
Lecture 33 - Golub-Kahan-Reinsch Algorithm
Lecture 34 - Chan SVD Algorithm
Lecture 35 - Generalized SVD
Lecture 36 - Generalized and Quadratic Eigenvalue Problems
Lecture 37 - Generalized Schur Decomposition (QZ Decomposition)
Lecture 38 - Iterative Methods for Large Linear Systems: Jacobi
Lecture 39 - Iterative methods for large linear systems: Gauss-Seidel Method
Lecture 40 - Iterative methods for large linear systems: SOR method
Lecture 41 - Convergence of iterative algorithms
Lecture 42 - Krylov subspace methods
Lecture 43 - Lanczos
Lecture 44 - Arnoldi
Lecture 45 - Stability of the Cholesky QR Algorithm
Lecture 46 - Conditioning of the eigenvalues
Lecture 47 - Symmetric definite pencil
Lecture 48 - AI applications
Lecture 49 - Sensitive systems
Lecture 50 - Real Life Systems
Lecture 51 - Transient thermal systems
Lecture 52 - Left Inverse
Lecture 53 - Right Inverse
Lecture 54 - Generalized Inverse
Lecture 55 - Applications
Lecture 56 - Applications (Continued...)
Lecture 57 - Applications (Continued...)
Lecture 58 - Applications (Continued...)
Lecture 59 - Applications (Continued...)
Lecture 60 - Applications of the Matrices in Real Life Systems
Lecture 61 - Matrices and Its Fundamentals: Recalling Examples
Lecture 62 - Properties of Matrices: Recalling and Revision, Examples
Lecture 63 - Matrices: Finite Digit Arithmetic: recalling and Examples

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NPTEL Video Course - Mathematics - NOC:Mathematics for Machine Learning

Subject Co-ordinator - Prof. Debjani Chakraborty, Prof. Debashree Guha Adhya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Machine Learning
Lecture 2 - Few Instances of Learning
Lecture 3 - Loss Function Optimization
Lecture 4 - Phases of Machine Learning Systems
Lecture 5 - Single-layer and multi-layer neurons
Lecture 6 - Introduction to Convexity
Lecture 7 - Study on Convex Function
Lecture 8 - Formation of Convex Hull
Lecture 9 - Optimization of Functions
Lecture 10 - Convex Optimization Problem
Lecture 11 - Directional derivative, Gradient, Jacobian, Firest Order Taylor Formula
Lecture 12 - Gradient, Jacobian, First order Taylor formula
Lecture 13 - Gradient Descent Optimization Technique
Lecture 14 - Gradient Descent, Interpretation from Taylor approximation
Lecture 15 - Sub-Gradient Descent Optimization Technique
Lecture 16 - Introduction to Underfitting and Overfitting
Lecture 17 - Relation of Bias and Variance to Underfitting and Overfitting
Lecture 18 - Bias-Variance Trade-off
Lecture 19 - Ridge Regression
Lecture 20 - LASSO Regression
Lecture 21 - Stochastic Gradient descent
Lecture 22 - Stochastic Gradient descent (Continued...)
Lecture 23 - Variants of Gradient descent
Lecture 24 - Momentum based Gradient descent
Lecture 25 - Accelerated Gradient descent
Lecture 26 - Linear Predictors (Logistic Regression)
Lecture 27 - Linear Predictors (Logistic Regression) (Continued....)
Lecture 28 - Linear Predictors (Logistic Regression) (Continued....)
Lecture 29 - Linear Predictors (Logistic Regression) (Continued....)

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Lecture 30 - Linear Predictors (Support Vector Machines)
Lecture 31 - Introduction to Theory of Estimation
Lecture 32 - Probability Theory
Lecture 33 - Discrete Probability Distribution
Lecture 34 - Continuous Probability Distribution
Lecture 35 - Maximum likelihood Estimation
Lecture 36 - MLE for Discrete Probability Distribution
Lecture 37 - MLE for Continuous Probability Distribution
Lecture 38 - Properties of Estimators
Lecture 39 - MLE for Linear and Logistic Regression
Lecture 40 - MLE for NaÃ¯ve Bayes Model
Lecture 41 - Eigen value and eigen vector, Linearly independent vectors
Lecture 42 - Orthogonal Basis, Eigen value decomposition
Lecture 43 - Orthogonal Basis, Eigen value decomposition (Continued...)
Lecture 44 - Principal Component Analysis
Lecture 45 - Principal Component Analysis (Continued...)
Lecture 46 - Introduction to Dynamical System
Lecture 47 - Dynamical System and Control
Lecture 48 - Discrete Fourier Transform
Lecture 49 - Inverse Fourier Transform
Lecture 50 - Applications: Discrete Fourier Transform
Lecture 51 - Introduction to Mixture models
Lecture 52 - Introduction to Gaussian Mixture Models
Lecture 53 - EM Algorithm
Lecture 54 - EM Algorithm (Continued...)
Lecture 55 - A brief application to predict HMM parameters
Lecture 56 - Conditional probability, Bayes theorem
Lecture 57 - Bayes Decision Rule
Lecture 58 - Bayes Decision Rule (Continued...)
Lecture 59 - Bayes Decision Rule (Bayesian minimum risk classifier)
Lecture 60 - Bayes Decision Rule (Linear Discriminant Analysis)

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NPTEL Video Course - Mathematics - NOC:Advanced Theory of Ordinary Differential Equations

Subject Co-ordinator - Prof. Hari Sankar Mahato

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to ODEs
Lecture 2 - Introduction to ODEs (Continued...)
Lecture 3 - Existence of local solution. Theorems and Examples
Lecture 4 - Continuation of solutions upto the boundary. Global existence of Solution
Lecture 5 - Continuation of solution and dependence on initital data
Lecture 6 - Dependence on Initial data : Examples
Lecture 7 - Regular Perturbations and linearisation
Lecture 8 - Linear System of equations and their stability
Lecture 9 - Linear System of equations and their stability (Continued...)
Lecture 10 - Stability Analysis
Lecture 11 - Stability Analysis (Continued...)
Lecture 12 - Stability of linear systems with constant and periodic co-efficient Matrix
Lecture 13 - Stability of linear systems with constant and periodic co-efficient Matrix (Continued...)
Lecture 14 - Stability of nonlinear system, linearization and Lyapunov functions
Lecture 15 - Stability and Lyapunov functions
Lecture 16 - Stability and Lyapunov functions (Continued...)
Lecture 17 - Chaotic Theory - Introduction
Lecture 18 - Chaotic Theory - Introduction (Continued...)
Lecture 19 - Lorenz equation, attractor, Lyapunov exponent
Lecture 20 - Lorenz equation, attractor, Lyapunov exponent (Continued...)
Lecture 21 - Local divergence, Lyapunov exponents and related topics
Lecture 22 - Local divergence, Lyapunov exponents and related topics (Continued...)
Lecture 23 - Strange and Chaotic attractors
Lecture 24 - Strange and Chaotic attractors
Lecture 25 - Fractal Dimension and Reconstruction
Lecture 26 - Fractal Dimension and Reconstruction (Continued...)
Lecture 27 - Stiff Differential Equations: Introduction
Lecture 28 - Stiff Differential Equations: Slow and fast time scales
Lecture 29 - Stiff differential equations: Introduction

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Lecture 30 - Increment function, A-stable
Lecture 31 - BDF methods and their implementation, Bifurcation Theory: Introduction
Lecture 32 - Bifurcation Theory
Lecture 33 - One dimensional bifurcation for scalar equations
Lecture 34 - One dimensional bifurcations for planar systems
Lecture 35 - Few definitions related to Hopf bifurcation
Lecture 36 - Few definitions related to Hopf bifurcation (Continued...)
Lecture 37 - Mathematical models with second order equations - Undamped free oscillations
Lecture 38 - Damped free oscillations
Lecture 39 - Undamped and Damped Forced Oscillations
Lecture 40 - Undamped and Damped Forced Oscillations (Continued...)
Lecture 41 - Higher order linear ODEs
Lecture 42 - Higher order linear ODEs (Continued...)
Lecture 43 - Linear Differential Equations of Higher Order with Constant Coefficients
Lecture 44 - Linear Differential Equations of Higher Order with Constant Coefficients (Continued...)
Lecture 45 - Higher order linear ODEs - Particular Integrals
Lecture 46 - Higher order linear ODEs - Particular Integrals (Continued...)
Lecture 47 - Higher order linear ODEs - Variable Coefficients
Lecture 48 - Higher order linear ODEs - Variation of Parameters
Lecture 49 - Series Solution
Lecture 50 - Series Solution (Continued...)
Lecture 51 - Series Solution - Frobenius Method
Lecture 52 - Series Solution - Frobenius method (Continued...)
Lecture 53 - Special functions
Lecture 54 - Special functions (Continued...)
Lecture 55 - Sturm-Liouville Problem - Eigenvalues and Eigenfunctions
Lecture 56 - Sturm-Liouville Problem - Eigenvalues and Eigenfunctions (Continued...)
Lecture 57 - Laplace Transform and Its Applications (Continued...)
Lecture 58 - Laplace Transform
Lecture 59 - Laplace Transform and Its Applications
Lecture 60 - Laplace Transform and Its Applications (Continued...)

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NPTEL Video Course - Mathematics - NOC:Functional Analysis and its Applications

Subject Co-ordinator - Prof. Akhilesh Prasad

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview and Metric Spaces with Examples
Lecture 2 - Basic Inequalities and their Applications
Lecture 3 - Complete Metric Spaces with Examples
Lecture 4 - Vector Spaces and Subspaces with Examples
Lecture 5 - Linear Transformation with Examples
Lecture 6 - Normed Linear Space and Pseudo-Normed Linear Space with Examples
Lecture 7 - Convergence, Cauchy Sequence in Normed Linear Spaces and Banach Spaces with Examples
Lecture 8 - Further examples of Banach Spaces
Lecture 9 - The Linear Space C[a, b] as Normed Linear Space but not Banachspace
Lecture 10 - The Linear Spaces ?p and ?? as Banach Spaces
Lecture 11 - The Quotient Space as Banach Space
Lecture 12 - The Lp spaces as Banach Spaces
Lecture 13 - Bounded Linear Transformations and Equivalent Norms with Examples
Lecture 14 - Norm of Bounded (Continuous) LinearTransformations and Some Related Theorems
Lecture 15 - Continuity of Functions in Normed Linear Spaces and some related Theorems
Lecture 16 - The set of all Bounded Linear Transformations of Normed Linear Space N into N? as a
Lecture 17 - Further Theorems on Bounded Linear Transformations
Lecture 18 - Linear Functionals, Dual Vector Space and Dual Basis
Lecture 19 - Continuous (Bounded) Linear Functionals on Normed linear spaces
Lecture 20 - Consequences of Equivalent Norms with Examples and on a Finite-Dimensional space
Lecture 21 - Further Theorems on Finite-Dimensional Normed Linear Spaces
Lecture 22 - Dual Space of ?p^n, ?1^n and ??^n
Lecture 23 - Dual Space of ?p is ?q
Lecture 24 - Dual Space of ?1 is ??
Lecture 25 - Dual Space of ????0 is ?1
Lecture 26 - Dual Space of c is ?1
Lecture 27 - Inner Product Space with Examples
Lecture 28 - Further Example of Inner Product Space and Schwartzâ s Inequality
Lecture 29 - Continuity of Inner Product, Parallelogram Law and Polarization Identity

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Lecture 30 - Hilbert Space with Examples
Lecture 31 - Application of Polarization Identity
Lecture 32 - Applications of the Parallelogram Law
Lecture 33 - Weak Convergence and Strong Convergence
Lecture 34 - Orthogonality of Vectors
Lecture 35 - Orthogonal Complement of an Orthogonal Complement
Lecture 36 - The Orthogonal Decomposition (Projection) Theorem
Lecture 37 - Orthonormal Sets in Hilbert Spaces and Besselâ s Inequality
Lecture 38 - Complete Orthonormal Sets
Lecture 39 - Further Theorems on Complete Orthonormal Sets and Riesz-Fischer Theorem
Lecture 40 - Gram-Schmidt Orthogonalization Process
Lecture 41 - The Conjugate Space H* and The Riesz Representation Theorem
Lecture 42 - Further Theorems on Conjugate Space H*
Lecture 43 - The Conjugate of an Operator
Lecture 44 - The Adjoint of an Operator on a Hilbert Space
Lecture 45 - Properties of Adjoint Operators on Hilbert Spaces
Lecture 46 - Self Adjoint Operators
Lecture 47 - Partially Ordered Set and Positive Operators
Lecture 48 - Normal Operators
Lecture 49 - Further Theorems of Normal Operators
Lecture 50 - Unitary Operators
Lecture 51 - Partial Order Relations, Total Order, Maximaland Minimal Elements, Zornâ s Lemma
Lecture 52 - Hahn-Banach Theorem - Part I
Lecture 53 - Hahn-Banach Theorem - Part II and Proofof the Main Theorem
Lecture 54 - Sublinear Functional and Generalized Hahn-Banach Theorem
Lecture 55 - Uniform Boundedness Principle
Lecture 56 - Application of the Uniform Boundedness Principle and Uniform Boundedness Principle
Lecture 57 - Applications of Uniform Boundedness Principle for Continuous Linear Functionals
Lecture 58 - Open Mapping Theorem
Lecture 59 - Applications of Open Mapping Theorem
Lecture 60 - The Closed Graph Theorem

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NPTEL Video Course - Mathematics - NOC:Soft Computing Techniques

Subject Co-ordinator - Prof. Santimoy Kundu

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fuzzy Sets Fuzzy Membership Function Support Core Crossover points and Bandwidth of a Fuzzy set
Lecture 2 - Fuzzy Sets and Membership Function Alpha-Cut of a Fuzzy Set Fuzzy subset and Scalar cardinality
Lecture 3 - Fuzzy Sets and Membership Function Fuzzy subset and Scalar cardinality Basic operations and Prope
Lecture 4 - Fuzzy Sets and Membership functions, intersection etc
Lecture 5 - Fuzzy Sets Membership functions Basic operations
Lecture 6 - Crisp Relation and Example Fuzzy Relation and operations
Lecture 7 - Crisp relation and fuzzy relation Extension principle Fuzzy arithmetic numbers and operations
Lecture 8 - Fuzzy relation and operations Fuzzy multi-valued logic Fuzzy implications
Lecture 9 - Fuzzy relation and fuzzy implications Fuzzy multi-valued logic Defuzzification
Lecture 10 - Defuzzification
Lecture 11 - Fuzzy rules Generalised Modus Ponens Generalised Modus Tollens
Lecture 12 - Fuzzy rules Fuzzy inference system
Lecture 13 - Fuzzy inference system Mamdanis, Sugenos and Tsukamoto type inferences
Lecture 14 - Fuzzy inference systems with examples
Lecture 15 - Numerical examples
Lecture 16 - Introduction of Genetic Algorithm Darwinâ s Principle
Lecture 17 - Working principle and flow chart of Genetic Algorithm Important terms of Genetic Algorithm
Lecture 18 - Working procedure of Genetic Algorithm Initial population of Genetic Algorithm
Lecture 19 - Basic Concepts of Genetic Algorithm Some encoding technique of Genetic Algorithm
Lecture 20 - Working principle of Genetic Algorithm Population Set Encoding Techniques
Lecture 21 - Selection operator Population diversity and Selection Pressure Exploration and Exploitation
Lecture 22 - Population diversity and Selection Pressure Exploration and Exploitation Selection Methods
Lecture 23 - Selection Methods and Crossover Techniques
Lecture 24 - Selection Methods Crossover techniques Crossover Probability and Mutation Probability
Lecture 25 - Crossover techniques
Lecture 26 - Numerical Examples by using Genetic Algorithm
Lecture 27 - Numerical Examples
Lecture 28 - Numerical Examples (Continued...)
Lecture 29 - Numerical Examples (Continued...)

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Lecture 30 - Numerical Examples (Continued...)
Lecture 31 - Introduction of Multi-objective optimization
Lecture 32 - Weighted Sum Method Epsilon-Constraint Method
Lecture 33 - Weighted Distance Metric Method Lexicographic Ordering Method Reference point method
Lecture 34 - Few Methods to solve problems of Multi-objective optimization
Lecture 35 - Introduction of Multi objective GAsVEGA Method
Lecture 36 - Vector Optimized Evolution Strategy (VOES) Weight-Based Genetic Algorithm (WBGA)
Lecture 37 - NSGA and NSGA - II
Lecture 38 - Numerical examples by using NSGA - II
Lecture 39 - Concepts on non-domination Ranking Crowding distance operator NSGA - II
Lecture 40 - Introduction of SPEA and SPEA 2
Lecture 41 - Introduction Rough Set theory
Lecture 42 - Introduction Rough Set theory Indiscernibility Relation
Lecture 43 - Indiscernibility Relation Lower Approximations Upper Approximations
Lecture 44 - Lower Approximations Upper Approximations Boundary Regions
Lecture 45 - Properties of Approximations and Basic classes of Rough Set theory with Numerical examples
Lecture 46 - Rough membership function Dependency of Attributes
Lecture 47 - Dependency of Attributes Reduct and Core
Lecture 48 - Indispensable and Dispensable Attributes Reduct and Core
Lecture 49 - Reduct and Core Discernibility Matrix and Function
Lecture 50 - Numerical examples of Discernibility Matrix and Function
Lecture 51 - Some concepts on Rough set theory Introduction to Rule Generation
Lecture 52 - Rule Generation based on Reduct and Core
Lecture 53 - Some Problems of Rule Generations
Lecture 54 - Fuzzy-Rough Sets
Lecture 55 - Some problems of Fuzzy-Rough sets
Lecture 56 - Introduction to Artificial Neural Networks
Lecture 57 - Numerical example of Backpropagation Algorithm
Lecture 58 - Intelligent Systems Introduction to Neuro-Fuzzy system
Lecture 59 - Adaptive Neuro-Fuzzy Systems
Lecture 60 - Ant colony optimization techniques

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NPTEL Video Course - Mathematics - NOC:Basics of Nonparametric Tests with Applications by R

Subject Co-ordinator - Prof. Saran Ishika Maiti

Co-ordinating Institute - Visva Bharati University, Santiniketan

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Need of Nonparametric Inference
Lecture 2 - Rank and Permutation
Lecture 3 - Spearman Rank Correlation
Lecture 4 - Kendallâ s Rank Correlation
Lecture 5 - Linear Rank Statistics (Part B)
Lecture 6 - Sign Test
Lecture 7 - Problem Solving on Wilcoxon signed rank test
Lecture 8 - Kendallâ s Rank Correlation
Lecture 9 - Paired Sample Wicoxon signed rank test
Lecture 10 - McNemarâ s Test
Lecture 11 - General discussion on two sample test and Mann Whitney Test
Lecture 12 - Tie cases, (Wilcoxon) Mann Whitney Statistic and Problem Solving by R
Lecture 13 - Median Test and Moodâ s Tests for dispersion
Lecture 14 - Wald Wolfowitz Run Test
Lecture 15 - Extension to two sample proble
Lecture 16 - Friedman Test (Two-way Nonparametric ANOVA)
Lecture 17 - Few Forewords and Pearson Goodness of fit Test
Lecture 18 - One Sample Kolmogorov Smirnov Test
Lecture 19 - Two sample Kolmogorov Smirnov Test
Lecture 20 - Few Other Goodness of Fit Tests

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NPTEL Video Course - Mathematics - NOC:Applied Stochastic Processes

Subject Co-ordinator - Prof. Swanand Ravindra Khare, Prof. Amitalok Jayant Budkuley

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Probability
Lecture 2 - Conditional Probability
Lecture 3 - Total Probability and Bayesâ Rule
Lecture 4 - Random Variables (Discrete)
Lecture 5 - Discrete Random Variables and Special Distributions
Lecture 6 - Continuous Random Variables
Lecture 7 - Expectation, Variance and Joint Distributions
Lecture 8 - Conditional pmfs and pdfs, Independence
Lecture 9 - Conditional Expectation and Conditional Variance
Lecture 10 - Functions of random variable, sampling, limit theorems
Lecture 11 - Introduction to Stochastic Processes, Hitting Time
Lecture 12 - Markov Chains
Lecture 13 - Chapman-Kolmogorov Equations
Lecture 14 - Classification of States
Lecture 15 - Limiting and Stationary Distributions
Lecture 16 - Existence and Uniqueness of Stationary Distributions
Lecture 17 - Positive and Null Recurrence
Lecture 18 - Computation of Stationary Distribution and Gambler's Ruin
Lecture 19 - Mean Time in Transient States and Branching Processes
Lecture 20 - Hidden Markov Models
Lecture 21 - Introduction to counting processes and Bernoulli random processes
Lecture 22 - Foundations of discrete-time Bernoulli random processes
Lecture 23 - Bernoulli random processes: Alternate synthesis approaches
Lecture 24 - Counting function of Bernoulli random processes
Lecture 25 - Operations on Bernoulli random processes, and summary
Lecture 26 - Foundations of continuous-time Poisson random processes
Lecture 27 - Poisson counting processes: Dynamical system approach, counting function
Lecture 28 - Bernoulli approximation of Poisson processes, Key properties and illustrations via counting func
Lecture 29 - Operations on Poisson counting processes, Illustrative examples

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Lecture 30 - Illustrative examples involving Poisson counting processes, summary, and comparison of Bernoulli
Lecture 31 - Continuous-time Markov Chains (CTMCs): Introduction
Lecture 32 - CTMCs Foundations 1: Formal definitions of important quantities associated with CTMCs
Lecture 33 - CTMCs Foundations 2: Transition rates, Generator, Embedded chains
Lecture 34 - CTMCs via a sequence of DTMCs
Lecture 35 - Birth-Death CTMCs: Foundations
Lecture 36 - Birth-Death CTMCs: Illustrations
Lecture 37 - CTMCs: A re-look using first principles approach - I
Lecture 38 - CTMCs: A re-look using first principles approach - II
Lecture 39 - Transient analysis of CTMCs
Lecture 40 - Steady state analysis of CTMCs, Reversibility, birth-death chains and reversibility
Lecture 41 - Renewal process: Foundations, examples, applications
Lecture 42 - Counting function of Renewal processes
Lecture 43 - Renewal function and Elementary renewal theorem
Lecture 44 - CLT for Renewal processes, Renewal reward theorem, Illustration via age of renewal
Lecture 45 - Renewal process: Illustrations and extensions
Lecture 46 - Queuing theory: Foundations, applications, Illustrative example via timing diagram
Lecture 47 - Discrete-time Queues: Geo/Geo/1 queues
Lecture 48 - Continuous-time Queues: M/M/* queues
Lecture 49 - Delay models and delay analysis in Queueing theory
Lecture 50 - Queueing Theory: General queues, Burke's theorem, Tandem queues, examples
Lecture 51 - Introduction to Brownian Motion and Random Walks
Lecture 52 - Properties and Joint Distributions of Brownian Motion
Lecture 53 - White Noise and Stochastic Integrals
Lecture 54 - Gaussian Processes and Brownian Bridge
Lecture 55 - Stationary Processes and Random Telegraph Signal
Lecture 56 - Second-Order Stationarity and Auto-Regressive Processes
Lecture 57 - Linear Systems and Spectral Density
Lecture 58 - Pricing Stock Options and Arbitrage Theorem
Lecture 59 - Martingales and Geometric Brownian Motion
Lecture 60 - Black-Scholes Formula and Jump Processes

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NPTEL Video Course - Mathematics - NOC:Software Reliability

Subject Co-ordinator - Prof. Subhashis Chatterjee

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Probability
Lecture 2 - Probability Distributions
Lecture 3 - Probability Distributions and Stochastic Process
Lecture 4 - Parameter Estimation and Software Engineering
Lecture 5 - Software life cycle Model and Concepts of Software Engineering
Lecture 6 - Moduler Design
Lecture 7 - Reliability Theory and its Measures
Lecture 8 - Reliability measures and System Configuration
Lecture 9 - Redundancy in Reliabity
Lecture 10 - Introduction to Software Reliability
Lecture 11 - Software Reliability Measures and Reliability Model Classifications
Lecture 12 - Time between Failure Model
Lecture 13 - Fault Seeding Model and Input Domain Based Model
Lecture 14 - Fault Count Models
Lecture 15 - Markov Models
Lecture 16 - Different Parameters of Musa Execution Time Model and Their Uses
Lecture 17 - Learning Parameter-based Models
Lecture 18 - Models with Fault Dependency and Debugging Time-lag
Lecture 19 - Models with Testing Effort Function
Lecture 20 - Models with Fault Detection, Correction, and Imperfect Debugging Process
Lecture 21 - Important Imperfect Debugging Models
Lecture 22 - Test Coverage Model
Lecture 23 - Discrete Software Reliability Growth Models
Lecture 24 - Change Point-Based Reliability Models
Lecture 25 - Stochastic Software Reliability Models
Lecture 26 - Random Environmental Effect Model
Lecture 27 - Multi Release Software System
Lecture 28 - Software Scheduling
Lecture 29 - Software Release Time Analysis

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Lecture 30 - Software Reliability in N Version Programming
Lecture 31 - Time Series based Software Reliability Modesl
Lecture 32 - Important Time Series Based SRGMs
Lecture 33 - Introduction to Fuzzy Set Theory
Lecture 34 - Fuzzy Inference Theorem
Lecture 35 - Soft Computing-Based Optimization Techniques
Lecture 36 - Introduction to Machine Learning Techniques
Lecture 37 - Some Supervised Machine Learning Models
Lecture 38 - Deep Learning Techniques
Lecture 39 - Some Classification Techniques
Lecture 40 - Unsupervised Machine Learning Models
Lecture 41 - Neural Network and Deep Learning-based Reliability Models
Lecture 42 - Early Phase Software Metrics
Lecture 43 - Early Phase Fault Prediction
Lecture 44 - Fault Prone Module Classification Models
Lecture 45 - Deep Learning Models for Module Classification
Lecture 46 - Hybrid Software Classification Models
Lecture 47 - Imbalance Learning Models
Lecture 48 - Transfer Learning-Based Models
Lecture 49 - Unsupervised and Semi-Supervised Fault Prone Module Classification Models
Lecture 50 - Software Dependability Analysis
Lecture 51 - Reqirement Phase Dependability Model
Lecture 52 - Design Phase Dependability Model
Lecture 53 - Tyupe-2 Fuzzy-based Dependability Model
Lecture 54 - Hands-On to Minitab
Lecture 55 - Dependability Model and MATLAB Introduction
Lecture 56 - Software Aging and Rejuvenation
Lecture 57 - Some Aging Models and Software Re-engineering
Lecture 58 - Hands On Python Programming with Libraries
Lecture 59 - Regression and Classification Models (Hands On)
Lecture 60 - Hands-On With Some Machine Learning Models

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NPTEL Video Course - Mathematics - An Introduction to Riemann Surfaces and Algebraic Curves: Complex 1-Tori and Elliptic Curves

Subject Co-ordinator - Dr. T.E. Venkata Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Idea of a Riemann Surface
Lecture 2 - Simple Examples of Riemann Surfaces
Lecture 3 - Maximal Atlases and Holomorphic Maps of Riemann Surfaces
Lecture 4 - A Riemann Surface Structure on a Cylinder
Lecture 5 - A Riemann Surface Structure on a Torus
Lecture 6 - Riemann Surface Structures on Cylinders and Tori via Covering Spaces
Lecture 7 - Moebius Transformations Make up Fundamental Groups of Riemann Surfaces
Lecture 8 - Homotopy and the First Fundamental Group
Lecture 9 - A First Classification of Riemann Surfaces
Lecture 10 - The Importance of the Path-lifting Property
Lecture 11 - Fundamental groups as Fibres of the Universal covering Space
Lecture 12 - The Monodromy Action
Lecture 13 - The Universal covering as a Hausdorff Topological Space
Lecture 14 - The Construction of the Universal Covering Map
Lecture 15 - Completion of the Construction of the Universal Covering
Lecture 16 - Completion of the Construction of the Universal Covering
Lecture 17 - The Riemann Surface Structure on the Topological Covering of a Riemann Surface
Lecture 18 - Riemann Surfaces with Universal Covering the Plane or the Sphere
Lecture 19 - Classifying Complex Cylinders
Lecture 20 - Characterizing Moebius Transformations with a Single Fixed Point
Lecture 21 - Characterizing Moebius Transformations with Two Fixed Points
Lecture 22 - Torsion-freeness of the Fundamental Group of a Riemann Surface
Lecture 23 - Characterizing Riemann Surface Structures on Quotients of the Upper Half-Plane with Abelian Fundamental Groups
Lecture 24 - Classifying Annuli up to Holomorphic Isomorphism
Lecture 25 - Orbits of the Integral Unimodular Group in the Upper Half-Plane
Lecture 26 - Galois Coverings are precisely Quotients by Properly Discontinuous Free Actions
Lecture 27 - Local Actions at the Region of Discontinuity of a Kleinian Subgroup of Moebius Transformations

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Lecture 28 - Quotients by Kleinian Subgroups give rise to Riemann Surfaces
Lecture 29 - The Unimodular Group is Kleinian
Lecture 30 - The Necessity of Elliptic Functions for the Classification of Complex Tori
Lecture 31 - The Uniqueness Property of the Weierstrass Phe-function associated to a Lattice in the Plane
Lecture 32 - The First Order Degree Two Cubic Ordinary Differential Equation satisfied by the Weierstrass Phe-function
Lecture 33 - The Values of the Weierstrass Phe-function at the Zeros of its Derivative are nonvanishing Analytic Functions on the Upper Half-Plane
Lecture 34 - The Construction of a Modular Form of Weight Two on the Upper Half-Plane
Lecture 35 - The Fundamental Functional Equations satisfied by the Modular Form of Weight Two on the Upper Half-Plane
Lecture 36 - The Weight Two Modular Form assumes Real Values on the Imaginary Axis in the Upper Half-plane
Lecture 37 - The Weight Two Modular Form Vanishes at Infinity
Lecture 38 - The Weight Two Modular Form Decays Exponentially in a Neighbourhood of Infinity
Lecture 39 - A Suitable Restriction of the Weight Two Modular Form is a Holomorphic Conformal Isomorphism onto the Upper Half-Plane
Lecture 40 - The J-Invariant of a Complex Torus (or) of an Algebraic Elliptic Curve
Lecture 41 - A Fundamental Region in the Upper Half-Plane for the Elliptic Modular J-Invariant
Lecture 42 - The Fundamental Region in the Upper Half-Plane for the Unimodular Group
Lecture 43 - A Region in the Upper Half-Plane Meeting Each Unimodular Orbit Exactly Once
Lecture 44 - Moduli of Elliptic Curves
Lecture 45 - Punctured Complex Tori are Elliptic Algebraic Affine Plane Cubic Curves in Complex 2-Space
Lecture 46 - The Natural Riemann Surface Structure on an Algebraic Affine Nonsingular Plane Curve
Lecture 47 - Complex Projective 2-Space as a Compact Complex Manifold of Dimension Two
Lecture 48 - Complex Tori are the same as Elliptic Algebraic Projective Curves

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NPTEL Video Course - Mathematics - Linear Algebra

Subject Co-ordinator - Dr. K.C. Sivakumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course Contents
Lecture 2 - Linear Equations
Lecture 3a - Equivalent Systems of Linear Equations I
Lecture 3b - Equivalent Systems of Linear Equations II
Lecture 4 - Row-reduced Echelon Matrices
Lecture 5 - Row-reduced Echelon Matrices and Non-homogeneous Equations
Lecture 6 - Elementary Matrices, Homogeneous Equations and Non-homogeneous Equations
Lecture 7 - Invertible matrices, Homogeneous Equations Non-homogeneous Equations
Lecture 8 - Vector spaces
Lecture 9 - Elementary Properties in Vector Spaces. Subspaces
Lecture 10 - Subspaces (Continued...), Spanning Sets, Linear Independence, Dependence
Lecture 11 - Basis for a vector space
Lecture 12 - Dimension of a vector space
Lecture 13 - Dimensions of Sums of Subspaces
Lecture 14 - Linear Transformations
Lecture 15 - The Null Space and the Range Space of a Linear Transformation
Lecture 16 - The Rank-Nullity-Dimension Theorem. Isomorphisms Between Vector Spaces
Lecture 17 - Isomorphic Vector Spaces, Equality of the Row-rank and the Column-rank - I
Lecture 18 - Equality of the Row-rank and the Column-rank - II
Lecture 19 - The Matrix of a Linear Transformation
Lecture 20 - Matrix for the Composition and the Inverse. Similarity Transformation
Lecture 21 - Linear Functionals. The Dual Space. Dual Basis - I
Lecture 22 - Dual Basis II. Subspace Annihilators - I
Lecture 23 - Subspace Annihilators - II
Lecture 24 - The Double Dual. The Double Annihilator
Lecture 25 - The Transpose of a Linear Transformation. Matrices of a Linear Transformation and its Transpose
Lecture 26 - Eigenvalues and Eigenvectors of Linear Operators
Lecture 27 - Diagonalization of Linear Operators. A Characterization
Lecture 28 - The Minimal Polynomial

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Lecture 29 - The Cayley-Hamilton Theorem
Lecture 30 - Invariant Subspaces
Lecture 31 - Triangulability, Diagonalization in Terms of the Minimal Polynomial
Lecture 32 - Independent Subspaces and Projection Operators
Lecture 33 - Direct Sum Decompositions and Projection Operators - I
Lecture 34 - Direct Sum Decompositions and Projection Operators - II
Lecture 35 - The Primary Decomposition Theorem and Jordan Decomposition
Lecture 36 - Cyclic Subspaces and Annihilators
Lecture 37 - The Cyclic Decomposition Theorem - I
Lecture 38 - The Cyclic Decomposition Theorem - II. The Rational Form
Lecture 39 - Inner Product Spaces
Lecture 40 - Norms on Vector spaces. The Gram-Schmidt Procedure I
Lecture 41 - The Gram-Schmidt Procedure II. The QR Decomposition
Lecture 42 - Bessel's Inequality, Parseval's Indentity, Best Approximation
Lecture 43 - Best Approximation
Lecture 44 - Orthogonal Complementary Subspaces, Orthogonal Projections
Lecture 45 - Projection Theorem. Linear Functionals
Lecture 46 - The Adjoint Operator
Lecture 47 - Properties of the Adjoint Operation. Inner Product Space Isomorphism
Lecture 48 - Unitary Operators
Lecture 49 - Unitary operators - II. Self-Adjoint Operators - I.
Lecture 50 - Self-Adjoint Operators - II - Spectral Theorem
Lecture 51 - Normal Operators - Spectral Theorem

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NPTEL Video Course - Mathematics - Mathematical Logic

Subject Co-ordinator - Prof. Arindama Singh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sets and Strings
Lecture 2 - Syntax of Propositional Logic
Lecture 3 - Unique Parsing
Lecture 4 - Semantics of PL
Lecture 5 - Consequences and Equivalences
Lecture 6 - Five results about PL
Lecture 7 - Calculations and Informal Proofs
Lecture 8 - More Informal Proofs
Lecture 9 - Normal forms
Lecture 10 - SAT and 3SAT
Lecture 11 - Horn-SAT and Resolution
Lecture 12 - Resolution
Lecture 13 - Adequacy of Resolution
Lecture 14 - Adequacy and Resolution Strategies
Lecture 15 - Propositional Calculus (PC)
Lecture 16 - Some Results about PC
Lecture 17 - Arguing with Proofs
Lecture 18 - Adequacy of PC
Lecture 19 - Compactness & Analytic Tableau
Lecture 20 - Examples of Tableau Proofs
Lecture 21 - Adequacy of Tableaux
Lecture 22 - Syntax of First order Logic (FL)
Lecture 23 - Symbolization & Scope of Quantifiers
Lecture 24 - Hurdles in giving Meaning
Lecture 25 - Semantics of FL
Lecture 26 - Relevance Lemma
Lecture 27 - Validity, Satisfiability & Equivalence
Lecture 28 - Six Results about FL
Lecture 29 - Laws, Calculation & Informal Proof

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Lecture 30 - Quantifier Laws and Consequences
Lecture 31 - More Proofs and Prenex Form
Lecture 32 - Prenex Form Conversion
Lecture 33 - Skolem Form
Lecture 34 - Syntatic Interpretation
Lecture 35 - Herbrand's Theorem
Lecture 36 - Most General Unifiers
Lecture 37 - Resolution Rules
Lecture 38 - Resolution Examples
Lecture 39 - Ariomatic System FC
Lecture 40 - FC and Semidecidability of FL
Lecture 41 - Analytic Tableau for FL
Lecture 42 - Godels Incompleteness Theorems

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NPTEL Video Course - Mathematics - Real Analysis

Subject Co-ordinator - Prof. S.H. Kulkarni

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Functions and Relations
Lecture 3 - Finite and Infinite Sets
Lecture 4 - Countable Sets
Lecture 5 - Uncountable Sets, Cardinal Number
Lecture 6 - Real Number System
Lecture 7 - LUB Axiom
Lecture 8 - Sequences of Real Numbers
Lecture 9 - Sequences of Real Numbers - (Continued.)
Lecture 10 - Sequences of Real Numbers - (Continued.)
Lecture 11 - Infinite Series of Real Numbers
Lecture 12 - Series of nonnegative Real Numbers
Lecture 13 - Conditional Convergence
Lecture 14 - Metric Spaces
Lecture 15 - Metric Spaces
Lecture 16 - Balls and Spheres
Lecture 17 - Open Sets
Lecture 18 - Closure Points, Limit Points and isolated Points
Lecture 19 - Closed sets
Lecture 20 - Sequences in Metric Spaces
Lecture 21 - Completeness
Lecture 22 - Baire Category Theorem
Lecture 23 - Limit and Continuity of a Function defined on a Metric space
Lecture 24 - Continuous Functions on a Metric Space
Lecture 25 - Uniform Continuity
Lecture 26 - Connectedness
Lecture 27 - Connected Sets
Lecture 28 - Compactness
Lecture 29 - Compactness (Continued.)

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Lecture 30 - Characterizations of Compact Sets
Lecture 31 - Continuous Functions on Compact Sets
Lecture 32 - Types of Discontinuity
Lecture 33 - Differentiation
Lecture 34 - Mean Value Theorems
Lecture 35 - Mean Value Theorems (Continued.)
Lecture 36 - Taylor's Theorem
Lecture 37 - Differentiation of Vector Valued Functions
Lecture 38 - Integration
Lecture 39 - Integrability
Lecture 40 - Integrable Functions
Lecture 41 - Integrable Functions (Continued.)
Lecture 42 - Integration as a Limit of Sum
Lecture 43 - Integration and Differentiation
Lecture 44 - Integration of Vector Valued Functions
Lecture 45 - More Theorems on Integrals
Lecture 46 - Sequences and Series of Functions
Lecture 47 - Uniform Convergence
Lecture 48 - Uniform Convergence and Integration
Lecture 49 - Uniform Convergence and Differentiation
Lecture 50 - Construction of Everywhere Continuous Nowhere Differentiable Function
Lecture 51 - Approximation of a Continuous Function by Polynomials
Lecture 52 - Equicontinuous family of Functions

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NPTEL Video Course - Mathematics - Dynamic Data Assimilation: An Introduction

Subject Co-ordinator - Prof. S. Lakshmivarahan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Overview
Lecture 2 - Data Mining, Data assimilation and prediction
Lecture 3 - A classification of forecast errors
Lecture 4 - Finite Dimensional Vector Space
Lecture 5 - Matrices
Lecture 6 - Matrices (Continued...)
Lecture 7 - Multi-variate Calculus
Lecture 8 - Optimization in Finite Dimensional Vector spaces
Lecture 9 - Deterministic, Static, linear Inverse (well-posed) Problems
Lecture 10 - Deterministic, Static, Linear Inverse (Ill-posed) Problems
Lecture 11 - A Geometric View Â Projections
Lecture 12 - Deterministic, Static, nonlinear Inverse Problems
Lecture 13 - On-line Least Squares
Lecture 14 - Examples of static inverse problems
Lecture 15 - Interlude and a Way Forward
Lecture 16 - Matrix Decomposition Algorithms
Lecture 17 - Matrix Decomposition Algorithms (Continued...)
Lecture 18 - Minimization algorithms
Lecture 19 - Minimization algorithms (Continued...)
Lecture 20 - Inverse problems in deterministic
Lecture 21 - Inverse problems in deterministic (Continued...)
Lecture 22 - Forward sensitivity method
Lecture 23 - Relation between FSM and 4DVAR
Lecture 24 - Statistical Estimation
Lecture 25 - Statistical Least Squares
Lecture 26 - Maximum Likelihood Method
Lecture 27 - Bayesian Estimation
Lecture 28 - From Gauss to Kalman-Linear Minimum Variance Estimation
Lecture 29 - Initialization Classical Method

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Lecture 30 - Optimal interpolations
Lecture 31 - A Bayesian Formation-3D-VAR methods
Lecture 32 - Linear Stochastic Dynamics - Kalman Filter
Lecture 33 - Linear Stochastic Dynamics - Kalman Filter (Continued...)
Lecture 34 - Linear Stochastic Dynamics - Kalman Filter (Continued...)
Lecture 35 - Covariance Square Root Filter
Lecture 36 - Nonlinear Filtering
Lecture 37 - Ensemble Reduced Rank Filter
Lecture 38 - Basic nudging methods
Lecture 39 - Deterministic predictability
Lecture 40 - Predictability A stochastic view and Summary

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NPTEL Video Course - Mathematics - NOC:An Invitation to Mathematics

Subject Co-ordinator - Prof. Sankaran Vishwanath

Co-ordinating Institute - Institute of Mathematical Sciences

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Long division
Lecture 3 - Applications of Long division
Lecture 4 - Lagrange interpolation
Lecture 5 - The 0-1 idea in other contexts - dot and cross product
Lecture 6 - Taylors formula
Lecture 7 - The Chebyshev polynomials
Lecture 8 - Counting number of monomials - several variables
Lecture 9 - Permutations, combinations and the binomial theorem
Lecture 10 - Combinations with repetition, and counting monomials
Lecture 11 - Combinations with restrictions, recurrence relations
Lecture 12 - Fibonacci numbers; an identity and a bijective proof
Lecture 13 - Permutations and cycle type
Lecture 14 - The sign of a permutation, composition of permutations
Lecture 15 - Rules for drawing tangle diagrams
Lecture 16 - Signs and cycle decompositions
Lecture 17 - Sorting lists of numbers, and crossings in tangle diagrams
Lecture 18 - Real and integer valued polynomials
Lecture 19 - Integer valued polynomials revisited
Lecture 20 - Functions on the real line, continuity
Lecture 21 - The intermediate value property
Lecture 22 - Visualizing functions
Lecture 23 - Functions on the plane, Rigid motions
Lecture 24 - More examples of functions on the plane, dilations
Lecture 25 - Composition of functions
Lecture 26 - Affine and Linear transformations
Lecture 27 - Length and Area dilation, the derivative
Lecture 28 - Examples-I
Lecture 29 - Examples-II

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Lecture 30 - Linear equations, Lagrange interpolation revisited
Lecture 31 - Completed Matrices in combinatorics
Lecture 32 - Polynomials acting on matrices
Lecture 33 - Divisibility, prime numbers
Lecture 34 - Congruences, Modular arithmetic
Lecture 35 - The Chinese remainder theorem
Lecture 36 - The Euclidean algorithm, the 0-1 idea and the Chinese remainder theorem

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NPTEL Video Course - Mathematics - Advanced Complex Analysis

Subject Co-ordinator - Dr. T.E. Venkata Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamental Theorems Connected with Zeros of Analytic Functions
Lecture 2 - The Argument (Counting) Principle, Rouche's Theorem and The Fundamental Theorem of Algebra
Lecture 3 - Morera's Theorem and Normal Limits of Analytic Functions
Lecture 4 - Hurwitz's Theorem and Normal Limits of Univalent Functions
Lecture 5 - Local Constancy of Multiplicities of Assumed Values
Lecture 6 - The Open Mapping Theorem
Lecture 7 - Introduction to the Inverse Function Theorem
Lecture 8 - Completion of the Proof of the Inverse Function Theorem
Lecture 9 - Univalent Analytic Functions have never-zero Derivatives and are Analytic Isomorphisms
Lecture 10 - Introduction to the Implicit Function Theorem
Lecture 11 - Proof of the Implicit Function Theorem
Lecture 12 - Proof of the Implicit Function Theorem
Lecture 13 - Doing Complex Analysis on a Real Surface
Lecture 14 - F(z,w)=0 is naturally a Riemann Surface
Lecture 15 - Constructing the Riemann Surface for the Complex Logarithm
Lecture 16 - Constructing the Riemann Surface for the m-th root function
Lecture 17 - The Riemann Surface for the functional inverse of an analytic mapping at a critical point
Lecture 18 - The Algebraic nature of the functional inverses of an analytic mapping at a critical point
Lecture 19 - The Idea of a Direct Analytic Continuation or an Analytic Extension
Lecture 20 - General or Indirect Analytic Continuation and the Lipschitz Nature of the Radius of Convergence
Lecture 21 - Analytic Continuation Along Paths via Power Series Part A
Lecture 22 - Analytic Continuation Along Paths via Power Series Part B
Lecture 23 - Continuity of Coefficients occurring in Families of Power Series defining Analytic Continuations
Lecture 24 - Analytic Continuability along Paths
Lecture 25 - Maximal Domains of Direct and Indirect Analytic Continuation
Lecture 26 - Deducing the Second (Simply Connected) Version of the Monodromy Theorem from the First (Homotopy
Lecture 27 - Existence and Uniqueness of Analytic Continuations on Nearby Paths
Lecture 28 - Proof of the First (Homotopy) Version of the Monodromy Theorem
Lecture 29 - Proof of the Algebraic Nature of Analytic Branches of the Functional Inverse of an Analytic Func

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Lecture 30 - The Mean-Value Property, Harmonic Functions and the Maximum Principle
Lecture 31 - Proofs of Maximum Principles and Introduction to Schwarz Lemma
Lecture 32 - Proof of Schwarz Lemma and Uniqueness of Riemann Mappings
Lecture 33 - Reducing Existence of Riemann Mappings to Hyperbolic Geometry of Sub-domains of the Unit Disc
Lecture 34 - Differential or Infinitesimal Schwarzs Lemma, Picks Lemma, Hyperbolic Arclengths, Metric and Geo
Lecture 35 - Differential or Infinitesimal Schwarzs Lemma, Picks Lemma, Hyperbolic Arclengths, Metric and Geo
Lecture 36 - Hyperbolic Geodesics for the Hyperbolic Metric on the Unit Disc
Lecture 37 - Schwarz-Pick Lemma for the Hyperbolic Metric on the Unit Disc
Lecture 38 - Arzela-Ascoli Theorem
Lecture 39 - Completion of the Proof of the Arzela-Ascoli Theorem and Introduction to Montels Theorem
Lecture 40 - The Proof of Montels Theorem
Lecture 41 - The Candidate for a Riemann Mapping
Lecture 42 - Completion of Proof of The Riemann Mapping Theorem
Lecture 43 - Completion of Proof of The Riemann Mapping Theorem

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NPTEL Video Course - Mathematics - NOC:Discrete Mathematics

Subject Co-ordinator - Prof. Sourav Chakraborty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Sets, Relations and Functions
Lecture 3 - Propositional Logic and Predicate Logic
Lecture 4 - Propositional Logic and Predicate Logic (Part 2)
Lecture 5 - Elementary Number Theory
Lecture 6 - Formal Proofs
Lecture 7 - Direct Proofs
Lecture 8 - Case Study
Lecture 9 - Case Study (Part 2)
Lecture 10 - Sets, Relations, Function and Logic
Lecture 11 - Proof by Contradiction (Part 1)
Lecture 12 - Proof by Contradiction (Part 2)
Lecture 13 - Proof by Contraposition
Lecture 14 - Proof by Counter Example
Lecture 15 - Mathematical Induction (Part 1)
Lecture 16 - Mathematical Induction (Part 2)
Lecture 17 - Mathematical Induction (Part 3)
Lecture 18 - Mathematical Induction (Part 4)
Lecture 19 - Mathematical Induction (Part 5)
Lecture 20 - Mathematical Induction (Part 6)
Lecture 21 - Mathematical Induction (Part 7)
Lecture 22 - Mathematical Induction (Part 8)
Lecture 23 - Introduction to Graph Theory
Lecture 24 - Handshake Problem
Lecture 25 - Tournament Problem
Lecture 26 - Tournament Problem (Part 2)
Lecture 27 - Ramsey Problem
Lecture 28 - Ramsey Problem (Part 2)
Lecture 29 - Properties of Graphs

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Lecture 30 - Problem 1
Lecture 31 - Problem 2
Lecture 32 - Problem 3 & 4
Lecture 33 - Counting for Selection
Lecture 34 - Counting for Distribution
Lecture 35 - Counting for Distribution (Part 2)
Lecture 36 - Some Counting Problems
Lecture 37 - Counting using Recurrence Relations
Lecture 38 - Counting using Recurrence Relations (Part 2)
Lecture 39 - Solving Recurrence Relations (Part 1)
Lecture 40 - Solving Recurrence Relations (Part 2)
Lecture 41 - Asymptotic Relations (Part 1)
Lecture 42 - Asymptotic Relations (Part 2)
Lecture 43 - Asymptotic Relations (Part 3)
Lecture 44 - Asymptotic Relations (Part 4)
Lecture 45 - Generating Functions (Part 1)
Lecture 46 - Generating Functions (Part 2)
Lecture 47 - Generating Functions (Part 3)
Lecture 48 - Generating Functions (Part 4)
Lecture 49 - Proof Techniques
Lecture 50 - Modeling
Lecture 51 - Combinatorics

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NPTEL Video Course - Mathematics - Advanced Complex Analysis - Part 2

Subject Co-ordinator - Dr. T.E. Venkata Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Properties of the Image of an Analytic Function - Introduction to the Picard Theorems
Lecture 2 - Recalling Singularities of Analytic Functions - Non-isolated and Isolated Removable, Pole and Es
Lecture 3 - Recalling Riemann's Theorem on Removable Singularities
Lecture 4 - Casorati-Weierstrass Theorem; Dealing with the Point at Infinity -- Riemann Sphere and Riemann S
Lecture 5 - Neighborhood of Infinity, Limit at Infinity and Infinity as an Isolated Singularity
Lecture 6 - Studying Infinity - Formulating Epsilon-Delta Definitions for Infinite Limits and Limits at Inf
Lecture 7 - When is a function analytic at infinity ?
Lecture 8 - Laurent Expansion at Infinity and Riemann\'s Removable Singularities Theorem for the Point at Inf
Lecture 9 - The Generalized Liouville Theorem - Little Brother of Little Picard and Analogue of Casorati-Weie
Lecture 10 - Morera\'s Theorem at Infinity, Infinity as a Pole and Behaviour at Infinity of Rational and Merc
Lecture 11 - Residue at Infinity and Introduction to the Residue Theorem for the Extended Complex Plane - Res
Lecture 12 - Proofs of Two Avatars of the Residue Theorem for the Extended Complex Plane and Applications of
Lecture 13 - Infinity as an Essential Singularity and Transcendental Entire Functions
Lecture 14 - Meromorphic Functions on the Extended Complex Plane are Precisely Quotients of Polynomials
Lecture 15 - The Ubiquity of Meromorphic Functions - The Nerves of the Geometric Network Bridging Algebra, A
Lecture 16 - Continuity of Meromorphic Functions at Poles and Topologies of Spaces of Functions
Lecture 17 - Why Normal Convergence, but Not Globally Uniform Convergence, is the Inevitable in Complex Analy
Lecture 18 - Measuring Distances to Infinity, the Function Infinity and Normal Convergence of Holomorphic Fun
Lecture 19 - The Invariance Under Inversion of the Spherical Metric on the Extended Complex Plane
Lecture 20 - Introduction to Hurwitz\'s Theorem for Normal Convergence of Holomorphic Functions in the Spheri
Lecture 21 - Completion of Proof of Hurwitz\'s Theorem for Normal Limits of Analytic Functions in the Spheric
Lecture 22 - Hurwitz\'s Theorem for Normal Limits of Meromorphic Functions in the Spherical Metric
Lecture 23 - What could the Derivative of a Meromorphic Function Relative to the Spherical Metric Possibly Be
Lecture 24 - Defining the Spherical Derivative of a Meromorphic Function
Lecture 25 - Well-definedness of the Spherical Derivative of a Meromorphic Function at a Pole and Inversion-i
Lecture 26 - Topological Preliminaries - Translating Compactness into Boundedness
Lecture 27 - Introduction to the Arzela-Ascoli Theorem - Passing from abstract Compactness to verifiable Equi
Lecture 28 - Proof of the Arzela-Ascoli Theorem for Functions - Abstract Compactness Implies Equicontinuity
Lecture 29 - Proof of the Arzela-Ascoli Theorem for Functions - Equicontinuity Implies Compactness

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Lecture 30 - Introduction to the Montel Theorem - the Holomorphic Avatar of the Arzela-Ascoli Theorem & Why
Lecture 31 - Completion of Proof of the Montel Theorem - the Holomorphic Avatar of the Arzela-Ascoli Theorem
Lecture 32 - Introduction to Marty\'s Theorem - the Meromorphic Avatar of the Montel & Arzela-Ascoli Theorems
Lecture 33 - Proof of one direction of Marty\'s Theorem - the Meromorphic Avatar of the Montel & Arzela-Ascol
Lecture 34 - Proof of the other direction of Marty\'s Theorem - the Meromorphic Avatar of the Montel & Arzela
Lecture 35 - Normal Convergence at Infinity and Hurwitz\'s Theorems for Normal Limits of Analytic and Meromo
Lecture 36 - Normal Sequential Compactness, Normal Uniform Boundedness and Montel\'s & Marty\'s Theorems at I
Lecture 37 - Local Analysis of Normality and the Zooming Process - Motivation for Zalcman\'s Lemma
Lecture 38 - Characterizing Normality at a Point by the Zooming Process and the Motivation for Zalcman\'s Lem
Lecture 39 - Local Analysis of Normality and the Zooming Process - Motivation for Zalcman\'s Lemma
Lecture 40 - Montel\'s Deep Theorem - The Fundamental Criterion for Normality or Fundamental Normality Test b
Lecture 41 - Proofs of the Great and Little Picard Theorems
Lecture 42 - Royden\'s Theorem on Normality Based On Growth Of Derivatives
Lecture 43 - Schottky\'s Theorem - Uniform Boundedness from a Point to a Neighbourhood & Problem Solving Sess

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NPTEL Video Course - Mathematics - Basic Algebraic Geometry : Varieties, Morphisms, Local Rings, Function Fie

Subject Co-ordinator - Dr. T.E. Venkata Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Algebraic Geometry?
Lecture 2 - The Zariski Topology and Affine Space
Lecture 3 - Going back and forth between subsets and ideals
Lecture 4 - Irreducibility in the Zariski Topology
Lecture 5 - Irreducible Closed Subsets Correspond to Ideals Whose Radicals are Prime
Lecture 6 - Understanding the Zariski Topology on the Affine Line; The Noetherian property in Topology and ir
Lecture 7 - Basic Algebraic Geometry
Lecture 8 - Topological Dimension, Krull Dimension and Heights of Prime Ideals
Lecture 9 - The Ring of Polynomial Functions on an Affine Variety
Lecture 10 - Geometric Hypersurfaces are Precisely Algebraic Hypersurfaces
Lecture 11 - Why Should We Study Affine Coordinate Rings of Functions on Affine Varieties ?
Lecture 12 - Capturing an Affine Variety Topologically From the Maximal Spectrum of its Ring of Functions
Lecture 13 - Analyzing Open Sets and Basic Open Sets for the Zariski Topology
Lecture 14 - The Ring of Functions on a Basic Open Set in the Zariski Topology
Lecture 15 - Quasi-Compactness in the Zariski Topology; Regularity of a Function at a point of an Affine Vari
Lecture 16 - What is a Global Regular Function on a Quasi-Affine Variety?
Lecture 17 - Characterizing Affine Varieties; Defining Morphisms between Affine or Quasi-Affine Varieties
Lecture 18 - Translating Morphisms into Affines as k-Algebra maps and the Grand Hilbert Nullstellensatz
Lecture 19 - Morphisms into an Affine Correspond to k-Algebra Homomorphisms from its Coordinate Ring of Funct
Lecture 20 - The Coordinate Ring of an Affine Variety Determines the Affine Variety and is Intrinsic to it
Lecture 21 - Automorphisms of Affine Spaces and of Polynomial Rings - The Jacobian Conjecture; The Punctured
Lecture 22 - The Various Avatars of Projective n-space
Lecture 23 - Gluing (n+1) copies of Affine n-Space to Produce Projective n-space in Topology, Manifold Theor
Lecture 24 - Translating Projective Geometry into Graded Rings and Homogeneous Ideals
Lecture 25 - Expanding the Category of Varieties to Include Projective and Quasi-Projective Varieties
Lecture 26 - Translating Homogeneous Localisation into Geometry and Back
Lecture 27 - Adding a Variable is Undone by Homogenous Localization - What is the Geometric Significance of t
Lecture 28 - Doing Calculus Without Limits in Geometry ?
Lecture 29 - The Birth of Local Rings in Geometry and in Algebra

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Lecture 30 - The Formula for the Local Ring at a Point of a Projective Variety Or Playing with Localisations
Lecture 31 - The Field of Rational Functions or Function Field of a Variety - The Local Ring at the Generic P
Lecture 32 - Fields of Rational Functions or Function Fields of Affine and Projective Varieties and their Rel
Lecture 33 - Global Regular Functions on Projective Varieties are Simply the Constants
Lecture 34 - The d-Uple Embedding and the Non-Intrinsic Nature of the Homogeneous Coordinate Ring of a Projec
Lecture 35 - The Importance of Local Rings - A Morphism is an Isomorphism if it is a Homeomorphism and Induce
Lecture 36 - The Importance of Local Rings - A Rational Function in Every Local Ring is Globally Regular
Lecture 37 - Geometric Meaning of Isomorphism of Local Rings - Local Rings are Almost Global
Lecture 38 - Local Ring Isomorphism,Equals Function Field Isomorphism, Equals Birationality
Lecture 39 - Why Local Rings Provide Calculus Without Limits for Algebraic Geometry Pun Intended!
Lecture 40 - How Local Rings Detect Smoothness or Nonsingularity in Algebraic Geometry
Lecture 41 - Any Variety is a Smooth Manifold with or without Non-Smooth Boundary
Lecture 42 - Any Variety is a Smooth Hypersurface On an Open Dense Subset

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NPTEL Video Course - Mathematics - NOC:Introduction to Commutative Algebra

Subject Co-ordinator - Prof. A.V.Jayanthan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Ring Theory
Lecture 2 - Review of Ring Theory (Continued...)
Lecture 3 - Ideals in commutative rings
Lecture 4 - Operations on ideals
Lecture 5 - Properties of prime ideals
Lecture 6 - Colon and Radical of ideals
Lecture 7 - Radicals, extension and contraction of ideals
Lecture 8 - Modules and homomorphisms
Lecture 9 - Isomorphism theorems and Operations on modules
Lecture 10 - Operations on modules (Continued...)
Lecture 11 - Module homomorphism and determinant trick
Lecture 12 - NakayamaÂ s lemma and exact sequences
Lecture 13 - Exact sequences (Continued...)
Lecture 14 - Homomorphisms and Tensor products
Lecture 15 - Properties of tensor products
Lecture 16 - Properties of tensor products (Continued...)
Lecture 17 - Tensor product of Algebras
Lecture 18 - Localization
Lecture 19 - Localization (Continued...)
Lecture 20 - Local properties
Lecture 21 - Further properties of localization
Lecture 22 - Intergral dependence
Lecture 23 - Integral extensions
Lecture 24 - Lying over and Going-up theorems
Lecture 25 - Going-down theorem
Lecture 26 - Going-down theorem (Continued...)
Lecture 27 - Chain conditions
Lecture 28 - Noetherian and Artinian modules
Lecture 29 - Properties of Noetherian and Artinian modules, Composition Series

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Lecture 30 - Further properties of Noetherian and Artinian modules and rings
Lecture 31 - Hilbert basis theorem and Primary decomposition
Lecture 32 - Primary decomposition (Continued...)
Lecture 33 - Uniqueness of primary decomposition
Lecture 34 - 2nd Uniqueness theorem, Artinian rings
Lecture 35 - Properties of Artinian rings
Lecture 36 - Structure Theorem of Artinian rings
Lecture 37 - Noether Normalization
Lecture 38 - Hilberts Nullstellensatz

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NPTEL Video Course - Mathematics - NOC:Differential Equations

Subject Co-ordinator - Prof. Srinivasa Manam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ordinary Differential Equations (ODE)
Lecture 2 - Methods for First Order ODE's - Homogeneous Equations
Lecture 3 - Methods for First order ODE's - Exact Equations
Lecture 4 - Methods for First Order ODE's - Exact Equations (Continued...)
Lecture 5 - Methods for First order ODE's - Reducible to Exact Equations
Lecture 6 - Methods for First order ODE's - Reducible to Exact Equations (Continued...)
Lecture 7 - Non-Exact Equations - Finding Integrating Factors
Lecture 8 - Linear First Order ODE and Bernoulli's Equation
Lecture 9 - Introduction to Second order ODE's
Lecture 10 - Properties of solutions of second order homogeneous ODE's
Lecture 11 - Abel's formula to find the other solution
Lecture 12 - Abel's formula - Demonstration
Lecture 13 - Second Order ODE's with constant coefficients
Lecture 14 - Euler - Cauchy equation
Lecture 15 - Non homogeneous ODEs Variation of Parameters
Lecture 16 - Method of undetermined coefficients
Lecture 17 - Demonstration of Method of undetermined coefficients
Lecture 18 - Power Series and its properties
Lecture 19 - Power Series Solutions to Second Order ODE's
Lecture 20 - Power Series Solutions (Continued...)
Lecture 21 - Legendre Differential Equation
Lecture 22 - Legendre Polynomials
Lecture 23 - Properties of Legendre Polynomials
Lecture 24 - Power series solutions around a regular singular point
Lecture 25 - Frobenius method of solutions
Lecture 26 - Frobenius method of solutions (Continued...)
Lecture 27 - Examples on Frobenius method
Lecture 28 - Bessel differential equation
Lecture 29 - Frobenius solutions for Bessel Equation

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Lecture 30 - Properties of Bessel functions
Lecture 31 - Properties of Bessel functions (Continued...)
Lecture 32 - Introduction to Sturm-Liouville theory
Lecture 33 - Sturm-Liouville Problems
Lecture 34 - Regular Sturm-Liouville problem
Lecture 35 - Periodic and singular Sturm-Liouville Problems
Lecture 36 - Generalized Fourier series
Lecture 37 - Examples of Sturm-Liouville systems
Lecture 38 - Examples of Sturm-Liouville systems (Continued...)
Lecture 39 - Examples of regular Sturm-Liouville systems
Lecture 40 - Second order linear PDEs
Lecture 41 - Classification of second order linear PDEs
Lecture 42 - Reduction to canonical form for equations with constant coefficients
Lecture 43 - Reduction to canonical form for equations with variable coefficients
Lecture 44 - Reduction to Normal form-More examples
Lecture 45 - D'Alembert solution for wave equation
Lecture 46 - Uniqueness of solutions for wave equation
Lecture 47 - Vibration of a semi-infinite string
Lecture 48 - Vibration of a finite string
Lecture 49 - Finite length string vibrations
Lecture 50 - Finite length string vibrations (Continued...)
Lecture 51 - Non-homogeneous wave equation
Lecture 52 - Vibration of a circular drum
Lecture 53 - Solutions of heat equation-Properties
Lecture 54 - Temperature in an infinite rod
Lecture 55 - Temperature in a semi-infinite rod
Lecture 56 - Non-homogeneous heat equation
Lecture 57 - Temperature in a finite rod
Lecture 58 - Temperature in a finite rod with insulated ends
Lecture 59 - Laplace equation over a rectangle
Lecture 60 - Laplace equation over a rectangle with flux boundary conditions
Lecture 61 - Laplace equation over circular domains
Lecture 62 - Laplace equation over circular Sectors
Lecture 63 - Uniqueness of the boundary value problems for Laplace equation
Lecture 64 - Conclusions

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NPTEL Video Course - Mathematics - NOC:Numerical Analysis

Subject Co-ordinator - Prof. R. Usha

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lesson 1 - Introduction, Motivation
Lecture 2 - Lesson 2 - Part 1 - Mathematical Preliminaries, Polynomial Interpolation - 1
Lecture 3 - Lesson 2 - Part 2 - Mathematical Preliminaries, Polynomial Interpolation - 1
Lecture 4 - Lesson 3 - Part 1 - Polynomial Interpolation - 2
Lecture 5 - Lesson 3 - Part 2 - Polynomial Interpolation - 2
Lecture 6 - Lesson 4 - Polynomial Interpolation - 3
Lecture 7 - Lagrange Interpolation Polynomial, Error In Interpolation - 1
Lecture 8 - Lagrange Interpolation Polynomial, Error In Interpolation - 1
Lecture 9 - Error In Interpolation - 2
Lecture 10 - Error In Interpolation - 2
Lecture 11 - Divide Difference Interpolation Polynomial
Lecture 12 - Properties Of Divided Difference, Introduction To Inverse Interpolation
Lecture 13 - Properties Of Divided Difference, Introduction To Inverse Interpolation
Lecture 14 - Inverse Interpolation, Remarks on Polynomial Interpolation
Lecture 15 - Numerical Differentiation - 1 Taylor Series Method
Lecture 16 - Numerical Differentiation - 2 Method Of Undetermined Coefficients
Lecture 17 - Numerical Differentiation - 2 Polynomial Interpolation Method
Lecture 18 - Numerical Differentiation - 3 Operator Method Numerical Integration - 1
Lecture 19 - Numerical Integration - 2 Error in Trapezoidal Rule Simpson's Rule
Lecture 20 - Numerical Integration - 3 Error in Simpson's Rule Composite in Trapezoidal Rule, Error
Lecture 21 - Numerical Integration - 4 Composite Simpsons Rule , Error Method of Undetermined Coefficients
Lecture 22 - Numerical Integration - 5 Gaussian Quadrature (Two-Point Method)
Lecture 23 - Numerical Integrature - 5 Gaussian Quadrature (Three-Point Method) Adaptive Quadrature
Lecture 24 - Numerical Solution of Ordinary Differential Equation (ODE) - 1
Lecture 25 - Numerical Solution Of ODE-2 Stability , Single-Step Methods - 1 Taylor Series Method
Lecture 26 - Numerical Solution Of ODE-3 Examples of Taylor Series Method Euler's Method
Lecture 27 - Numerical Solution Of ODE-4 Runge-Kutta Methods
Lecture 28 - Numerical Solution Of ODE-5 Example For RK-Method Of Order 2 Modified Euler's Method
Lecture 29 - Numerical Solution Of Ordinary Differential Equations - 6 Predictor-Corrector Methods (Adam-Moul

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Lecture 30 - Numerical Solution Of Ordinary Differential Equations - 7
Lecture 31 - Numerical Solution Of Ordinary Differential Equations - 8
Lecture 32 - Numerical Solution of Ordinary Differential Equations - 9
Lecture 33 - Numerical Solution of Ordinary Differential Equations - 10
Lecture 34 - Numerical Solution of Ordinary Differential Equations - 11
Lecture 35 - Root Finding Methods - 1 The Bisection Method - 1
Lecture 36 - Root Finding Methods - 2 The Bisection Method - 2
Lecture 37 - Root Finding Methods - 3 Newton-Raphson Method - 1
Lecture 38 - Root Finding Methods - 4 Newton-Raphson Method - 2
Lecture 39 - Root Finding Methods - 5 Secant Method, Method Of false Position
Lecture 40 - Root Finding Methods - 6 Fixed Point Methods - 1
Lecture 41 - Root Finding Methods - 7 Fixed Point Methods - 2
Lecture 42 - Root Finding Methods - 8 Fixed Point Iteration Methods - 3
Lecture 43 - Root Finding Methods - 9 Practice Problems
Lecture 44 - Solution Of Linear Systems Of Equations - 1
Lecture 45 - Solution Of Linear Systems Of Equations - 2
Lecture 46 - Solution Of Linear Systems Of Equations - 3
Lecture 47 - Solution Of Linear Systems Of Equations - 4
Lecture 48 - Solution Of Linear Systems Of Equations - 5
Lecture 49 - Solution Of Linear Systems Of Equations - 6
Lecture 50 - Solution Of Linear Systems Of Equations - 7
Lecture 51 - Solution Of Linear Systems Of Equations - 8 Iterative Method - 1
Lecture 52 - Solution Of Linear Systems Of Equations - 8 Iterative Method - 2
Lecture 53 - Matrix Eigenvalue Problems - 2 Power Method - 2
Lecture 54 - Practice Problems

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NPTEL Video Course - Mathematics - NOC:Graph Theory

Subject Co-ordinator - Dr. Soumen Maity

Co-ordinating Institute - IISER - Pune

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Lecture 1 - Basic Concepts
Lecture 2 - Basic Concepts - 1
Lecture 3 - Eulerian and Hamiltonian Graph
Lecture 4 - Eulerian and Hamiltonian Graph - 1
Lecture 5 - Bipartite Graph
Lecture 6 - Bipartite Graph
Lecture 7 - Diameter of a graph; Isomorphic graphs
Lecture 8 - Diameter of a graph; Isomorphic graphs
Lecture 9 - Minimum Spanning Tree
Lecture 10 - Minimum Spanning Trees (Continued...)
Lecture 11 - Minimum Spanning Trees (Continued...)
Lecture 12 - Minimum Spanning Trees (Continued...)
Lecture 13 - Maximum Matching in Bipartite Graph
Lecture 14 - Maximum Matching in Bipartite Graph - 1
Lecture 15 - Hall's Theorem and Konig's Theorem
Lecture 16 - Hall's Theorem and Konig's Theorem - 1
Lecture 17 - Independent Set and Edge Cover
Lecture 18 - Independent Set and Edge Cover - 1
Lecture 19 - Matching in General Graphs
Lecture 20 - Proof of Halls Theorem
Lecture 21 - Stable Matching
Lecture 22 - Gale-Shapley Algorithm
Lecture 23 - Graph Connectivity
Lecture 24 - Graph Connectivity - 1
Lecture 25 - 2-Connected Graphs
Lecture 26 - 2-Connected Graphs - 1
Lecture 27 - Subdivision of an edge; 2-edge-connected graphs
Lecture 28 - Problems Related to Graphs Connectivity
Lecture 29 - Flow Network

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Lecture 30 - Residual Network and Augmenting Path
Lecture 31 - Augmenting Path Algorithm
Lecture 32 - Max-Flow and Min-Cut
Lecture 33 - Max-Flow and Min-Cut Theorem
Lecture 34 - Vertex Colouring
Lecture 35 - Chromatic Number and Max. Degree
Lecture 36 - Edge Colouring
Lecture 37 - Planar Graphs and Euler's Formula
Lecture 38 - Characterization Of Planar Graphs
Lecture 39 - Colouring of Planar Graphs

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NPTEL Video Course - Mathematics - NOC:Transform Techniques for Engineers

Subject Co-ordinator - Prof. Srinivasa Manam

Co-ordinating Institute - IIT - Madras

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Lecture 1 - Introduction to Fourier series
Lecture 2 - Fourier seriesÂ - ExamplesÂ
Lecture 3 - Complex Fourier seriesÂ
Lecture 4 - Conditions for the Convergence of Fourier SeriesÂ
Lecture 5 - Conditions for the Convergence of Fourier Series (Continued...)
Lecture 6 - Use of Delta function in the Fourier series convergence
Lecture 7 - More Examples on Fourier Series of a Periodic Signal
Lecture 8 - Gibb's Phenomenon in the Computation of Fourier Series
Lecture 9 - Properties of Fourier Transform of a Periodic Signal
Lecture 10 - Properties of Fourier transform (Continued...)
Lecture 11 - Parseval's Identity and Recap of Fourier series
Lecture 12 - Fourier integral theorem-an informal proof
Lecture 13 - Definition of Fourier transforms
Lecture 14 - Fourier transform of a Heavyside function
Lecture 15 - Use of Fourier transforms to evaluate some integrals
Lecture 16 - Evaluation of an integral- Recall of complex function theory
Lecture 17 - Properties of Fourier transforms of non-periodic signals
Lecture 18 - More properties of Fourier transforms
Lecture 19 - Fourier integral theorem - proof
Lecture 20 - Application of Fourier transform to ODE's
Lecture 21 - Application of Fourier transforms to differential and integral equations
Lecture 22 - Evaluation of integrals by Fourier transforms
Lecture 23 - D'Alembert's solution by Fourier transform
Lecture 24 - Solution of Heat equation by Fourier transform
Lecture 25 - Solution of Heat and Laplace equations by Fourier transform
Lecture 26 - Introduction to Laplace transform
Lecture 27 - Laplace transform of elementary functions
Lecture 28 - Properties of Laplace transforms
Lecture 29 - Properties of Laplace transforms (Continued...)

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Lecture 30 - Methods of finding inverse Laplace transform
Lecture 31 - Heavyside expansion theorem
Lecture 32 - Review of complex function theory
Lecture 33 - Inverse Laplace transform by contour integration
Lecture 34 - Application of Laplace transforms - ODEs'
Lecture 35 - Solutions of initial or boundary value problems for ODEs'
Lecture 36 - Solving first order PDE's by Laplace transform
Lecture 37 - Solution of wave equation by Laplace transform
Lecture 38 - Solving hyperbolic equations by Laplace transform
Lecture 39 - Solving heat equation by Laplace transform
Lecture 40 - Initial boundary value problems for heat equations
Lecture 41 - Solution of Integral Equations by Laplace Transform
Lecture 42 - Evaluation of Integrals by Laplace Transform
Lecture 43 - Introduction to Z-Transforms
Lecture 44 - Properties of Z-Transforms
Lecture 45 - Inverse Z-transforms
Lecture 46 - Solution of difference equations by Z-transforms
Lecture 47 - Evaluation of infinite sums by Z-transforms
Lecture 48 - conclusions

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NPTEL Video Course - Mathematics - NOC:Introduction to Probability and Statistics

Subject Co-ordinator - Prof. G. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to probability and Statistics
Lecture 2 - Types of data
Lecture 3 - Categorical data
Lecture 4 - Describing Categorical data
Lecture 5 - Describing Categorical data (Continued...)
Lecture 6 - Describing numerical data
Lecture 7 - Describing numerical data (Continued...)
Lecture 8 - Exercises, Association between categorical variables
Lecture 9 - Association between categorical variables (Continued...)
Lecture 10 - Association between numerical variables
Lecture 11 - Association between numerical variables (Continued...)
Lecture 12 - Probability
Lecture 13 - Rules of Probability
Lecture 14 - Rules of Probability (Continued...)
Lecture 15 - Conditional Probability
Lecture 16 - Random variables
Lecture 17 - Random variables - concepts and exercises
Lecture 18 - Association between Random variables
Lecture 19 - Binomial Distribution
Lecture 20 - Normal distribution
Lecture 21 - Additional Examples

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NPTEL Video Course - Mathematics - NOC:Introduction to Abstract Group Theory

Subject Co-ordinator - Prof. Krishna Hanumanthu

Co-ordinating Institute - IIT - Madras

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Lecture 1 - Motivational examples of groups
Lecture 2 - Definition of a group and examples
Lecture 3 - More examples of groups
Lecture 4 - Basic properties of groups and multiplication tables
Lecture 5 - Problems - 1
Lecture 6 - Problems - 2
Lecture 7 - Problems - 3
Lecture 8 - Subgroups
Lecture 9 - Types of groups
Lecture 10 - Group homomorphisms and examples
Lecture 11 - Properties of homomorphisms
Lecture 12 - Group isomorphisms
Lecture 13 - Normal subgroups
Lecture 14 - Equivalence relations
Lecture 15 - Problems - 4
Lecture 16 - Cosets and Lagrange's theorem
Lecture 17 - S_3 revisited
Lecture 18 - Problems - 5
Lecture 19 - Quotient groups
Lecture 20 - Examples of quotient groups
Lecture 21 - First isomorphism theorem
Lecture 22 - Examples and Second isomorphism theorem
Lecture 23 - Third isomorphism theorem
Lecture 24 - Cauchy's theorem
Lecture 25 - Problems - 6
Lecture 26 - Symmetric groups - I
Lecture 27 - Symmetric Groups - II
Lecture 28 - Symmetric groups - III
Lecture 29 - Symmetric groups - IV

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Lecture 30 - Odd and even permutations - I
Lecture 31 - Odd and even permutations - II
Lecture 32 - Alternating groups
Lecture 33 - Group actions
Lecture 34 - Examples of group actions
Lecture 35 - Orbits and stabilizers
Lecture 36 - Counting formula
Lecture 37 - Cayley's theorem
Lecture 38 - Problems - 7
Lecture 39 - Problems - 8 and Class equation
Lecture 40 - Group actions on subsets
Lecture 41 - Sylow Theorem - I
Lecture 42 - Sylow Theorem - II
Lecture 43 - Sylow Theorem - III
Lecture 44 - Problems - 9
Lecture 45 - Problems - 10

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NPTEL Video Course - Mathematics - NOC:Groups: Motion, Symmetry and Puzzles

Subject Co-ordinator - Prof. Amit Kulshrestha

Co-ordinating Institute - IIT - Madras

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Lecture 1 - Permutation, symmetry and groups
Lecture 2 - Groups acting on a set/an object
Lecture 3 - More on group actions
Lecture 4 - Groups and parity
Lecture 5 - Parity and puzzles
Lecture 6 - Generators and relations
Lecture 7 - Cosets, quotients and homomorphisms
Lecture 8 - Cayley graphs of groups
Lecture 9 - Platonic solids
Lecture 10 - Symmetries of plane and wallpapers
Lecture 11 - Introduction to GAP
Lecture 12 - GAP through Rubik's cube
Lecture 13 - Representing abstract groups
Lecture 14 - A quick introduction to group representations
Lecture 15 - Rotations and quaternions
Lecture 16 - Rotational symmetries of platonic solids
Lecture 17 - Finite subgroups of SO(3)

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NPTEL Video Course - Mathematics - NOC:Introduction to Rings and Fields

Subject Co-ordinator - Prof. Krishna Hanumanthu

Co-ordinating Institute - IIT - Madras

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Lecture 1 - Introduction, main definitions
Lecture 2 - Examples of rings
Lecture 3 - More examples
Lecture 4 - Polynomial Rings - 1
Lecture 5 - Polynomial Rings - 2
Lecture 6 - Homomorphisms
Lecture 7 - Kernels, ideals
Lecture 8 - Problems - 1
Lecture 9 - Problems - 2
Lecture 10 - Problems - 3
Lecture 11 - Quotient Rings
Lecture 12 - First isomorphism and correspondence theorems
Lecture 13 - Examples of correspondence theorem
Lecture 14 - Prime ideals
Lecture 15 - Maximal ideals, integral domains
Lecture 16 - Existence of maximal ideals
Lecture 17 - Problems - 4
Lecture 18 - Problems - 5
Lecture 19 - Problems - 6
Lecture 20 - Field of fractions, Noetherian rings - 1
Lecture 21 - Noetherian rings - 2
Lecture 22 - Hilbert Basis Theorem
Lecture 23 - Irreducible, prime elements
Lecture 24 - Irreducible, prime elements, GCD
Lecture 25 - Principal Ideal Domains
Lecture 26 - Unique Factorization Domains - 1
Lecture 27 - Unique Factorization Domains - 2
Lecture 28 - Gauss Lemma
Lecture 29 - Z[X] is a UFD

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Lecture 30 - Eisenstein criterion and Problems - 7
Lecture 31 - Problems - 8
Lecture 32 - Problems - 9
Lecture 33 - Field extensions - 1
Lecture 34 - Field extensions - 2
Lecture 35 - Degree of a field extension - 1
Lecture 36 - Degree of a field extension - 2
Lecture 37 - Algebraic elements form a field
Lecture 38 - Field homomorphisms
Lecture 39 - Splitting fields
Lecture 40 - Finite fields - 1
Lecture 41 - Finite fields - 2
Lecture 42 - Finite fields - 3
Lecture 43 - Problems - 10
Lecture 44 - Problems - 11

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NPTEL Video Course - Mathematics - NOC:Probabilistic Methods in PDE

Subject Co-ordinator - Prof. Anindya Goswami

Co-ordinating Institute - IIT - Madras

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Lecture 1 - Prerequisite Measure Theory - Part 1
Lecture 2 - Prerequisite Measure Theory - Part 2
Lecture 3 - Prerequisite Measure Theory - Part 3
Lecture 4 - Random variable
Lecture 5 - Stochastic Process
Lecture 6 - Conditional Expectation
Lecture 7 - Preliminary for Stochastic Integration - Part 1
Lecture 8 - Preliminary for Stochastic Integration - Part 2
Lecture 9 - Definition and properties of Stochastic Integration - Part 1
Lecture 10 - Definition and properties of Stochastic Integration - Part 2
Lecture 11 - Further properties of Stochastic Integration
Lecture 12 - Extension of stochastic integral
Lecture 13 - change of variable formula and proof - Part 1
Lecture 14 - change of variable formula and proof - Part 2
Lecture 15 - Brownian motion as the building block
Lecture 16 - Brownian motion and its martingale property - Part 1
Lecture 17 - Brownian motion and its martingale property - Part 2
Lecture 18 - Application of Itoâ s rule on Ito process
Lecture 19 - Harmonic function and its properties
Lecture 20 - Maximum principle of harmonic function
Lecture 21 - Dirichlet Problem and bounded solution
Lecture 22 - Example of a Dirichlet problem
Lecture 23 - Regular points at the boundary
Lecture 24 - Zarembas cone condition for regularity
Lecture 25 - Summary of the Zaremba's cone condition
Lecture 26 - Continuity of candidate solution at regular points - Part 1
Lecture 27 - Continuity of candidate solution at regular points - Part 2
Lecture 28 - Summary of bounded solution to the Dirichlet Problem
Lecture 29 - Stochastic representation of bounded solution to a heat equation - Part 1

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Lecture 30 - Stochastic representation of bounded solution to a heat equation - Part 2
Lecture 31 - Uniqueness of solution to the heat equationÂ
Lecture 32 - Remark on Tychonoff's Theorem
Lecture 33 - Widderâ s result and its extension on heat equation
Lecture 34 - Solution to the mixed initial boundary value problemÂ
Lecture 35 - The Feynman-Kac formulaÂ
Lecture 36 - Kacâ s theorem on the stochastic representation of solution to a second-order linear ODE - Part
Lecture 37 - Kacâ s theorem on the stochastic representation of solution to a second-order linear ODE - Part
Lecture 38 - Geometric Brownian motion
Lecture 39 - A system of stochastic differential equations in application
Lecture 40 - Brownian bridge
Lecture 41 - Simulation of stochastic differential equations
Lecture 42 - Stochastic differential equations
Lecture 43 - Stochastic differential equations
Lecture 44 - Stochastic differential equations
Lecture 45 - Stochastic differential equations
Lecture 46 - Stochastic differential equations
Lecture 47 - Functional Stochastic Differential Equations
Lecture 48 - Statement of Dirichlet and Cauchy problems with variable coefficients elliptic operators
Lecture 49 - Cauchy Problem with variable coefficients
Lecture 50 - Cauchy Problem with variable coefficients
Lecture 51 - Semigroup of bounded linear operators on Banach space - Part 1
Lecture 52 - Semigroup of bounded linear operators on Banach space - Part 2
Lecture 53 - Growth property of C0 semigroup
Lecture 54 - Unique semigroup generated by a bounded linear operator
Lecture 55 - Homogeneous initial value problem
Lecture 56 - Mild solution to homogeneous initial value problem
Lecture 57 - Mild solution to inhomogeneous initial value problem
Lecture 58 - Sufficient condition for existence of classical solution of IVP
Lecture 59 - Tutorial on Resolvant operator
Lecture 60 - Feynman-Kac formula and the formula of variations of constants
Lecture 61 - Non-autonomous evolution problem and mild/generalized solution
Lecture 62 - Sufficient condition for existence of an evolution system
Lecture 63 - Y-valued solution
Lecture 64 - mild/generalized solution to Semi-linear Evolution Problem
Lecture 65 - Existence of classical solution - Part 1
Lecture 66 - Existence of classical solution - Part 2
Lecture 67 - Conclusion video

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NPTEL Video Course - Mathematics - NOC:Linear Algebra (Prof. Pranav Haridas)

Subject Co-ordinator - Prof. Pranav Haridas

Co-ordinating Institute - IIT - Madras

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Lecture 1 - Vector Spaces
Lecture 2 - Examples of Vector Spaces
Lecture 3 - Vector Subspaces
Lecture 4 - Linear Combinations and Span
Lecture 5 - Linear Independence
Lecture 6 - Basis
Lecture 7 - Dimension
Lecture 8 - Replacement theorem consequences
Lecture 9 - Rank Nullity
Lecture 10 - Linear Transformations
Lecture 11 - Linear Transformation Basis
Lecture 12 - Linear Transformation and Matrices
Lecture 13 - Problem session
Lecture 14 - Linear Transformation and Matrices (Continued...)
Lecture 15 - Invertible Linear Transformations
Lecture 16 - Invertible Linear Transformations and Matrices
Lecture 17 - Change of Basis
Lecture 18 - Product of Vector Spaces
Lecture 19 - Quotient Spaces
Lecture 20 - Dual Spaces
Lecture 21 - Row operations
Lecture 22 - Rank of a Matrix
Lecture 23 - Inverting matrices
Lecture 24 - Determinants
Lecture 25 - Problem Session
Lecture 26 - Diagonal Matrices
Lecture 27 - Eigenvectors and eigenvalues
Lecture 28 - Computing eigenvalues
Lecture 29 - Characteristic ploynomia

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Lecture 30 - Diagonalizibility
Lecture 31 - Multiplicity of eigenvalues
Lecture 32 - Invariant subspaces
Lecture 33 - Complex Vector Spaces
Lecture 34 - Inner Product Spaces
Lecture 35 - Inner Product and Length
Lecture 36 - Orthogonality
Lecture 37 - Problem Session
Lecture 38 - Problem Session
Lecture 39 - Orthonormal Basis
Lecture 40 - Gram Schmidt Orthogonalization
Lecture 41 - Orthogonal Complements
Lecture 42 - Problem Session
Lecture 43 - Riesz Representation Theorem
Lecture 44 - Adjoint of a linear transformation
Lecture 45 - Problem Session
Lecture 46 - Normal Operators
Lecture 47 - Self Adjoint Operators
Lecture 48 - Spectral Theorem

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NPTEL Video Course - Mathematics - NOC:Algebra - I

Subject Co-ordinator - Prof. Amritanshu Prasad, Prof. S. Viswanath

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Permutations
Lecture 2 - Group Axioms
Lecture 3 - Order and Conjugacy
Lecture 4 - Subgroups
Lecture 5 - Problem solving
Lecture 6 - Group Actions
Lecture 7 - Cosets
Lecture 8 - Group Homomorphisms
Lecture 9 - Normal subgroups
Lecture 10 - Qutient Groups
Lecture 11 - Product and Chinese Remainder Theorem
Lecture 12 - Dihedral Groups
Lecture 13 - Semidirect products
Lecture 14 - Problem solving
Lecture 15 - The Orbit Counting Theorem
Lecture 16 - Fixed points of group actions
Lecture 17 - Second application
Lecture 18 - Sylow Theorem - a preliminary proposition
Lecture 19 - Sylow Theorem - I
Lecture 20 - Problem solving - I
Lecture 21 - Problem solving - II
Lecture 22 - Sylow Theorem - II
Lecture 23 - Sylow Theorem - III
Lecture 24 - Problem solving - I
Lecture 25 - Problem solving - II
Lecture 26 - Free Groups - I
Lecture 27 - Free Groups - IIa
Lecture 28 - Free Groups - IIb
Lecture 29 - Free Groups - III

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Lecture 30 - Free Groups - IV
Lecture 31 - Problem Solving/Examples
Lecture 32 - Generators and relations for symmetric groups â I
Lecture 33 - Generators and relations for symmetric groups â II
Lecture 34 - Definition of a Ring
Lecture 35 - Euclidean Domains
Lecture 36 - Gaussian Integers
Lecture 37 - The Fundamental Theorem of Arithmetic
Lecture 38 - Divisibility and Ideals
Lecture 39 - Factorization and the Noetherian Condition
Lecture 40 - Examples of Ideals in Commutative Rings
Lecture 41 - Problem Solving/Examples
Lecture 42 - The Ring of Formal Power Series
Lecture 43 - Fraction Fields
Lecture 44 - Path Algebra of a Quiver
Lecture 45 - Ideals In Non-Commutative Rings
Lecture 46 - Product of Rings
Lecture 47 - Ring Homomorphisms
Lecture 48 - Quotient Rings
Lecture 49 - Problem solving
Lecture 50 - Tensor and Exterior Algebras
Lecture 51 - Modules
Lecture 52 - Modules over polynomial rings $K[x]$
Lecture 53 - Modules
Lecture 54 - Modules
Lecture 55 - Submodules
Lecture 56 - General constructions of submodules
Lecture 57 - Problem Solving
Lecture 58 - Quotient modules
Lecture 59 - Homomorphisms
Lecture 60 - More examples of homomorphisms
Lecture 61 - First isomorphism theorem
Lecture 62 - Direct sums of modules
Lecture 63 - Complementary submodules
Lecture 64 - Change of ring
Lecture 65 - Problem solving
Lecture 66 - Free Modules (finitely generated)
Lecture 67 - Determinants
Lecture 68 - Primary Decomposition

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Lecture 69 - Problem solving
Lecture 70 - Finitely generated modules and the Noetherian condition
Lecture 71 - Counterexamples to the Noetherian condition
Lecture 72 - Generators and relations for Finitely Generated Modules
Lecture 73 - General Linear Group over a Commutative Ring
Lecture 74 - Equivalence of Matrices
Lecture 75 - Smith Canonical Form for a Euclidean domain
Lecture 76 - solved_problems1
Lecture 77 - Smith Canonical Form for PID
Lecture 78 - Structure of finitely generated modules over a PID
Lecture 79 - Structure of a finitely generated abelian group
Lecture 80 - Similarity of Matrices
Lecture 81 - Deciding Similarity
Lecture 82 - Rational Canonical Form
Lecture 83 - Jordan Canonical Form

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NPTEL Video Course - Mathematics - NOC:Computational Commutative Algebra

Subject Co-ordinator - Prof. Manoj Kummini

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definitions
Lecture 2 - Homomorphisms
Lecture 3 - Quotient rings
Lecture 4 - Noetherian rings
Lecture 5 - Monomials
Lecture 6 - Initial ideals
Lecture 7 - Division algorithm
Lecture 8 - Grobner basis
Lecture 9 - Solving Polynomial Equations
Lecture 10 - Nullstellensatz - Part 1
Lecture 11 - Nullstellensatz - Part 2
Lecture 12 - Buchberger criterion
Lecture 13 - Monomial basis
Lecture 14 - Elimination
Lecture 15 - Modules - Part 1
Lecture 16 - Modules - Part 2
Lecture 17 - Localisation
Lecture 18 - Nakayama Lemma
Lecture 19 - Spectrum - Part 1
Lecture 20 - Spectrum - Part 2
Lecture 21 - Associated primes
Lecture 22 - Primary Decomposition
Lecture 23 - Support of a module
Lecture 24 - Associated primes
Lecture 25 - Prime avoidance
Lecture 26 - Saturation - Part 1
Lecture 27 - Saturation - Part 2
Lecture 28 - Saturation - Part 3
Lecture 29 - Morphisms - Part 1

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Lecture 30 - Morphisms - Part 2
Lecture 31 - Integral extensions
Lecture 32 - Noether normalisation lemma
Lecture 33 - Noether normalisation lemma
Lecture 34 - Polynomial rings
Lecture 35 - Going up theorem
Lecture 36 - Artinian rings
Lecture 37 - Graded modules
Lecture 38 - Hilbert polynomial
Lecture 39 - Hilbert-Samuel polynomial
Lecture 40 - Artin Rees Lemma
Lecture 41 - Degree of Hilbert-Samuel polynomial
Lecture 42 - Dimension of noetherian local rings - Part 1
Lecture 43 - Dimension of noetherian local rings - Part 2
Lecture 44 - Dimension of polynomial rings
Lecture 45 - Algebras over a field
Lecture 46 - Graded rings - Part 1
Lecture 47 - Graded rings - Part 2
Lecture 48 - Polynomial rings over fields
Lecture 49 - Hilbert series - Part 1
Lecture 50 - Hilbert series - Part 2
Lecture 51 - Proj of a graded ring
Lecture 52 - Homogenization - Part 1
Lecture 53 - Homogenization - Part 2
Lecture 54 - More on graded rings
Lecture 55 - Free resolutions
Lecture 56 - Computing syzygies
Lecture 57 - Koszul complex
Lecture 58 - More on Koszul complexes
Lecture 59 - Castelnuovo Mumford regularity
Lecture 60 - Castelnuovo Mumford regularity

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NPTEL Video Course - Mathematics - NOC:Laplace Transform

Subject Co-ordinator - Prof. Indrava Roy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation for Laplace transforms - Part 1
Lecture 2 - Introduction and Motivation for Laplace transforms - Part 2
Lecture 3 - Improper Riemann integrals
Lecture 4 - Improper Riemann integrals
Lecture 5 - Existence of Laplace transforms and Examples
Lecture 6 - Properties of Laplace transforms-I - Part 1
Lecture 7 - Properties of Laplace transforms-I - Part 2
Lecture 8 - Existence of Laplace transforms for functions with vertical asymptote at the Y-axis - Part 1
Lecture 9 - Existence of Laplace transforms for functions with vertical asymptote at the Y-axis - Part 2
Lecture 10 - Properties of Laplace transforms-II - Part 1
Lecture 11 - Properties of Laplace transforms-II - Part 2
Lecture 12 - Laplace transform of Derivatives - Part 1
Lecture 13 - Laplace transform of Derivatives - Part 2
Lecture 14 - Laplace transform of Periodic functions and Integrals - I
Lecture 15 - Laplace transform of Integrals-II - Part 1
Lecture 16 - Laplace transform of Integrals-II - Part 2
Lecture 17 - Inverse Laplace transform and asymptotic behaviour - Part 1
Lecture 18 - Inverse Laplace transform and asymptotic behaviour - Part 2
Lecture 19 - Methods of finding Inverse Laplace transform-I- Partial Fractions
Lecture 20 - Methods of finding Inverse Laplace transform-II- Convolution theorem
Lecture 21 - Convolution theorem for Laplace transforms
Lecture 22 - Applications of Laplace transforms
Lecture 23 - Applications of Laplace Transform to physical systems
Lecture 24 - Solving Linear ODE's with polynomial coefficients
Lecture 25 - Integral and Integro-differential equation
Lecture 26 - Further application of Laplace transforms - Part 1
Lecture 27 - Further application of Laplace transforms - Part 2

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NPTEL Video Course - Mathematics - NOC:Measure Theory (Prof. Indrava Roy)

Subject Co-ordinator - Prof. Indrava Roy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Finite Sets and Cardinality
Lecture 2 - Infinite Sets and the Banach-Tarski Paradox - Part 1
Lecture 3 - Infinite Sets and the Banach-Tarski Paradox - Part 2
Lecture 4 - Elementary Sets and Elementary measure - Part 1
Lecture 5 - Elementary Sets and Elementary measure - Part 2
Lecture 6 - Properties of elementary measure - Part 1
Lecture 7 - Properties of elementary measure - Part 2
Lecture 8 - Uniqueness of elementary measure and Jordan measurability - Part 1
Lecture 9 - Uniqueness of elementary measure and Jordan measurability - Part 2
Lecture 10 - Characterization of Jordan measurable sets and basic properties of Jordan measure - Part 1
Lecture 11 - Characterization of Jordan measurable sets and basic properties of Jordan measure - Part 2
Lecture 12 - Examples of Jordan measurable sets-I
Lecture 13 - Examples of Jordan measurable sets-II - Part 1
Lecture 14 - Examples of Jordan measurable sets-II - Part 2
Lecture 15 - Jordan measure under Linear transformations - Part 1
Lecture 16 - Jordan measure under Linear transformations - Part 2
Lecture 17 - Connecting the Jordan measure with the Riemann integral - Part 1
Lecture 18 - Connecting the Jordan measure with the Riemann integral - Part 2
Lecture 19 - Outer measure - Motivation and Axioms of outer measure
Lecture 20 - Comparing Inner Jordan measure, Lebesgue outer measure and Jordan Outer measure
Lecture 21 - Finite additivity of outer measure on Separated sets, Outer regularity - Part 1
Lecture 22 - Finite additivity of outer measure on Separated sets, Outer regularity - Part 2
Lecture 23 - Lebesgue measurable class of sets and their Properties - Part 1
Lecture 24 - Lebesgue measurable class of sets and their Properties - Part 2
Lecture 25 - Equivalent criteria for lebesgue measurability of a subset - Part 1
Lecture 26 - Equivalent criteria for lebesgue measurability of a subset - Part 2
Lecture 27 - The measure axioms and the Borel-Cantelli Lemma
Lecture 28 - Properties of the Lebesgue measure
Lecture 29 - Properties of the Lebesgue measure

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Lecture 30 - Lebesgue measurability under Linear transformation, Construction of Vitali Set - Part 1
Lecture 31 - Lebesgue measurability under Linear transformation, Construction of Vitali Set - Part 2
Lecture 32 - Abstract measure spaces
Lecture 33 - Abstract measure and Caratheodory Measurability - Part 1
Lecture 34 - Abstract measure and Caratheodory Measurability - Part 2
Lecture 35 - Abstrsct measure and Hahn-Kolmogorov Extension
Lecture 36 - Lebesgue measurable class vs Caratheodory extension of usual outer measure on R^d
Lecture 37 - Examples of Measures defined on R^d via Hahn Kolmogorov extension - Part 1
Lecture 38 - Examples of Measures defined on R^d via Hahn Kolmogorov extension - Part 2
Lecture 39 - Measurable functions
Lecture 40 - Measurable functions
Lecture 41 - Egorov's theorem
Lecture 42 - Lebesgue integral of unsigned simple measurable functions
Lecture 43 - Lebesgue integral of unsigned measurable functions
Lecture 44 - Fundamental convergence theorems in Lebesgue integration
Lecture 45 - Lebesgue integral for complex and real measurable functions
Lecture 46 - Basic properties of L^1-functions and Lebesgue's Dominated convergence theorem
Lecture 47 - L^1 functions on R^d
Lecture 48 - L^1 functions on R^d
Lecture 49 - L^1 functions on R^d
Lecture 50 - L^1 functions on R^d
Lecture 51 - Various modes of convergence of measurable functions
Lecture 52 - Easy implications from one mode of convergence to another
Lecture 53 - Implication map for modes of convergence with various examples
Lecture 54 - Uniqueness of limits across various modes of convergence
Lecture 55 - Some criteria for reverse implications for modes of convergence
Lecture 56 - Riesz Representation theorem- Motivation
Lecture 57 - Basics on Locally compact Hausdorff spaces
Lecture 58 - Borel and Radon measures on LCH spaces
Lecture 59 - Properties of Radon measures and Lusin's theorem on LCH spaces
Lecture 60 - Riesz Representation theorem - Complete statement and proof - Part 1
Lecture 61 - Riesz Representation theorem - Complete statement and proof - Part 2
Lecture 62 - Examples of measures constructed using RRT
Lecture 63 - Theorems of Tonelli and Fubini- interchanging the order of integration for repeated integrals
Lecture 64 - Product measures
Lecture 65 - Tonelli's theorem for sets - Part 1
Lecture 66 - Tonelli's theorem for sets - Part 2
Lecture 67 - Fubini-Tonelli theorem
Lecture 68 - Lebesgue's differentiation theorem

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Lecture 69 - Lebesgue's differentiation theorem
Lecture 70 - Lebesgue's differentiation theorem
Lecture 71 - DIfferentiation theorems
Lecture 72 - DIfferentiation theorems
Lecture 73 - Riesz's Rising Sun Lemma
Lecture 74 - Differentiation theorem for monone continuous functions
Lecture 75 - Differentation theorem for general monotone functions and Second fundamental theorem of calculus

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NPTEL Video Course - Mathematics - NOC:Complex Analysis

Subject Co-ordinator - Prof. Pranav Haridas

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Field of Complex Numbers
Lecture 2 - Conjugation and Absolute value
Lecture 3 - Topology on Complex plane
Lecture 4 - Topology on Complex Plane (Continued...)
Lecture 5 - Problem Session
Lecture 6 - Isometries on the Complex Plane
Lecture 7 - Functions on the Complex Plane
Lecture 8 - Complex differentiability
Lecture 9 - Power Series
Lecture 10 - Differentiation of power series
Lecture 11 - Problem Session
Lecture 12 - Cauchy-Riemann equations
Lecture 13 - Harmonic functions
Lecture 14 - MÃ¶bius transformations
Lecture 15 - Problem session
Lecture 16 - Curves in the complex plane
Lecture 17 - Complex Integration over curves
Lecture 18 - First Fundamental theorem of Calculus
Lecture 19 - Second Fundamental theorem of Calculus
Lecture 20 - Problem session
Lecture 21 - Homotopy of curves
Lecture 22 - Cauchy-Goursat theorem
Lecture 23 - Cauchy's theorem
Lecture 24 - Problem Session
Lecture 25 - Cauchy Integral Formula
Lecture 26 - Principle of analytic continuation and Cauchy estimates
Lecture 27 - Further consequences of Cauchy Integral Formula
Lecture 28 - Problem session
Lecture 29 - Winding number

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Lecture 30 - Open mapping theorem
Lecture 31 - Schwarz reflection principle
Lecture 32 - Problem session
Lecture 33 - Singularities of a holomorphic function
Lecture 34 - Pole of a function
Lecture 35 - Laurent Series
Lecture 36 - Casorati Weierstrass theorem
Lecture 37 - Problem Session
Lecture 38 - Residue theorem
Lecture 39 - Argument principle
Lecture 40 - Problem Session
Lecture 41 - Branch of the Complex logarithm
Lecture 42 - Automorphisms of the Unit disk
Lecture 43 - Phragmen Lindelof method
Lecture 44 - Problem Session
Lecture 45 - Lifting of maps
Lecture 46 - Covering spaces
Lecture 47 - Bloch's theorem
Lecture 48 - Little Picard's theorem

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NPTEL Video Course - Mathematics - NOC:Real Analysis - I

Subject Co-ordinator - Prof. Jaikrishnan J

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - WEEK 1 - INTRODUCTION
Lecture 2 - Why study Real Analysis
Lecture 3 - Square root of 2
Lecture 4 - Wason's selection task
Lecture 5 - Zeno's Paradox
Lecture 6 - Basic set theory
Lecture 7 - Basic logic
Lecture 8 - Quantifiers
Lecture 9 - Proofs
Lecture 10 - Functions and relations
Lecture 11 - Axioms of Set Theory
Lecture 12 - Equivalence relations
Lecture 13 - What are the rationals
Lecture 14 - Cardinality
Lecture 15 - WEEK 2 - INTRODUCTION
Lecture 16 - Field axioms
Lecture 17 - Order axioms
Lecture 18 - Absolute value
Lecture 19 - The completeness axiom
Lecture 20 - Nested intervals property
Lecture 21 - NIP+APâ Completeness
Lecture 22 - Existence of square roots
Lecture 23 - Uncountability of the real numbers
Lecture 24 - Density of rationals and irrationals
Lecture 25 - WEEK 3 - INTRODUCTION
Lecture 26 - Motivation for infinite sums
Lecture 27 - Definition of sequence and examples
Lecture 28 - Definition of convergence
Lecture 29 - Uniqueness of limits

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Lecture 30 - Achilles and the tortoise
Lecture 31 - Deep dive into the definition of convergence
Lecture 32 - A descriptive language for convergence
Lecture 33 - Limit laws
Lecture 34 - Subsequences
Lecture 35 - Examples of convergent and divergent sequences
Lecture 36 - Some special sequences-CORRECT
Lecture 37 - Monotone sequences
Lecture 38 - Bolzano-Weierstrass theorem
Lecture 39 - The Cauchy Criterion
Lecture 40 - MCT implies completeness
Lecture 41 - Definition and examples of infinite series
Lecture 42 - Cauchy tests-Corrected
Lecture 43 - Tests for convergence
Lecture 44 - Erdos_s proof on divergence of reciprocals of primes
Lecture 45 - Resolving Zeno_s paradox
Lecture 46 - Absolute and conditional convergence
Lecture 47 - Absolute convergence continued
Lecture 48 - The number e
Lecture 49 - Grouping terms of an infinite series
Lecture 50 - The Cauchy product
Lecture 51 - WEEK 5 - INTRODUCTION
Lecture 52 - The role of topology in real analysis
Lecture 53 - Open and closed sets
Lecture 54 - Basic properties of adherent and limit points
Lecture 55 - Basic properties of open and closed sets
Lecture 56 - Definition of continuity
Lecture 57 - Deep dive into epsilon-delta
Lecture 58 - Negating continuity
Lecture 59 - The functions x and x2
Lecture 60 - Limit laws
Lecture 61 - Limit of sin x_x
Lecture 62 - Relationship between limits and continuity
Lecture 63 - Global continuity and open sets
Lecture 64 - Continuity of square root
Lecture 65 - Operations on continuous functions
Lecture 66 - Language for limits
Lecture 67 - Infinite limits
Lecture 68 - One sided limits

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Lecture 69 - Limits of polynomials
Lecture 70 - Compactness
Lecture 71 - The Heine-Borel theorem
Lecture 72 - Open covers and compactness
Lecture 73 - Equivalent notions of compactness
Lecture 74 - The extreme value theorem
Lecture 75 - Uniform continuity
Lecture 76 - Connectedness
Lecture 77 - Intermediate Value Theorem
Lecture 78 - Darboux continuity and monotone functions
Lecture 79 - Perfect sets and the Cantor set
Lecture 80 - The structure of open sets
Lecture 81 - The Baire Category theorem
Lecture 82 - Discontinuities
Lecture 83 - Classification of discontinuities and monotone functions
Lecture 84 - Structure of set of discontinuities
Lecture 85 - WEEK 8 and 9 - INTRODUCTION
Lecture 86 - Definition and interpretation of the derivative
Lecture 87 - Basic properties of the derivative
Lecture 88 - Examples of differentiation
Lecture 89 - Darboux_s theorem
Lecture 90 - The mean value theorem
Lecture 91 - Applications of the mean value theorem
Lecture 92 - Taylor's theorem NEW
Lecture 93 - The ratio mean value theorem and L_Hospital_s rule
Lecture 94 - Axiomatic characterisation of area and the Riemann integral
Lecture 95 - Proof of axiomatic characterization
Lecture 96 - The definition of the Riemann integral
Lecture 97 - Criteria for Riemann integrability
Lecture 98 - Linearity of integral
Lecture 99 - Sets of measure zero
Lecture 100 - The Riemann-Lebesgue theorem
Lecture 101 - Consequences of the Riemann-Lebesgue theorem
Lecture 102 - WEEK 10 and 11 - INTRODUCTION
Lecture 103 - The fundamental theorem of calculus
Lecture 104 - Taylor's theorem-Integral form of remainder
Lecture 105 - Notation for Taylor polynomials
Lecture 106 - Smooth functions and Taylor series
Lecture 107 - Power series

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Lecture 108 - Definition of uniform convergence
Lecture 109 - The exponential function
Lecture 110 - The inverse function theorem
Lecture 111 - The Logarithm
Lecture 112 - Trigonometric functions
Lecture 113 - The number Pi
Lecture 114 - The graphs of sin and cos
Lecture 115 - The Basel problem
Lecture 116 - Improper integrals
Lecture 117 - The Integral test
Lecture 118 - Weierstrass approximation theorem
Lecture 119 - Bernstein Polynomials
Lecture 120 - Properties of Bernstein polynomials
Lecture 121 - Proof of Weierstrass approximation theorem

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NPTEL Video Course - Mathematics - NOC:Variational Calculus and its applications in Control Theory and Nanome

Subject Co-ordinator - Prof. Sarthok Sircar

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction / Euler Lagrange Equations - Part 1
Lecture 2 - Introduction / Euler Lagrange Equations - Part 2
Lecture 3 - Introduction / Euler Lagrange Equations - Part 3
Lecture 4 - Introduction / Euler Lagrange Equations - Part 4
Lecture 5 - Introduction / Euler Lagrange Equations - Part 5
Lecture 6 - Introduction / Euler Lagrange Equations - Part 6
Lecture 7 - Special cases / Invariance, Existence and Uniqueness of solutions - Part 1
Lecture 8 - Special cases / Invariance, Existence and Uniqueness of solutions - Part 2
Lecture 9 - Special cases / Invariance, Existence and Uniqueness of solutions - Part 3
Lecture 10 - Special cases / Invariance, Existence and Uniqueness of solutions - Part 4
Lecture 11 - Special cases / Invariance, Existence and Uniqueness of solutions - Part 5
Lecture 12 - Special cases / Invariance, Existence and Uniqueness of solutions - Part 6
Lecture 13 - Generalization / Numerical solution of Euler Lagrange Equations - Part 1
Lecture 14 - Generalization / Numerical solution of Euler Lagrange Equations - Part 2
Lecture 15 - Generalization / Numerical solution of Euler Lagrange Equations - Part 3
Lecture 16 - Generalization / Numerical solution of Euler Lagrange Equations - Part 4
Lecture 17 - Generalization / Numerical solution of Euler Lagrange Equations - Part 5
Lecture 18 - Generalization / Numerical solution of Euler Lagrange Equations - Part 6
Lecture 19 - Isoperimetric Problems - Part 1
Lecture 20 - Isoperimetric Problems - Part 2
Lecture 21 - Isoperimetric Problems - Part 3
Lecture 22 - Isoperimetric Problems - Part 4
Lecture 23 - Isoperimetric Problems - Part 5
Lecture 24 - Isoperimetric Problems - Part 6
Lecture 25 - Problems with Holononomic and non- Holononomic Constraints, Variable Endpts - Part 1
Lecture 26 - Problems with Holononomic and non- Holononomic Constraints, Variable Endpts - Part 2
Lecture 27 - Problems with Holononomic and non- Holononomic Constraints, Variable Endpts - Part 3
Lecture 28 - Problems with Holononomic and non- Holononomic Constraints, Variable Endpts - Part 4
Lecture 29 - Problems with Holononomic and non- Holononomic Constraints, Variable Endpts - Part 5

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Lecture 30 - Problems with Holononomic and non- Holononomic Constraints, Variable Endpts - Part 6
Lecture 31 - Broken extremals / Hamiltonian Formulation - Part 1
Lecture 32 - Broken extremals / Hamiltonian Formulation - Part 2
Lecture 33 - Broken extremals / Hamiltonian Formulation - Part 3
Lecture 34 - Broken extremals / Hamiltonian Formulation - Part 4
Lecture 35 - Broken extremals / Hamiltonian Formulation - Part 5
Lecture 36 - Broken extremals / Hamiltonian Formulation - Part 6
Lecture 37 - Hamilton-Jacobi Equations - Part 1
Lecture 38 - Hamilton-Jacobi Equations - Part 2
Lecture 39 - Hamilton-Jacobi Equations - Part 3
Lecture 40 - Hamilton-Jacobi Equations - Part 4
Lecture 41 - Hamilton-Jacobi Equations - Part 5
Lecture 42 - Hamilton-Jacobi Equations - Part 6
Lecture 43 - Noether's Theorem / Introduction to Second Variation - Part 1
Lecture 44 - Noether's Theorem / Introduction to Second Variation - Part 2
Lecture 45 - Noether's Theorem / Introduction to Second Variation - Part 3
Lecture 46 - Noether's Theorem / Introduction to Second Variation - Part 4
Lecture 47 - Noether's Theorem / Introduction to Second Variation - Part 5
Lecture 48 - Noether's Theorem / Introduction to Second Variation - Part 6
Lecture 49 - Conjugate points / Jacobi Accessory Equations / Introduction to Optimal Control Theory - Part 1
Lecture 50 - Conjugate points / Jacobi Accessory Equations / Introduction to Optimal Control Theory - Part 2
Lecture 51 - Conjugate points / Jacobi Accessory Equations / Introduction to Optimal Control Theory - Part 3
Lecture 52 - Conjugate points / Jacobi Accessory Equations / Introduction to Optimal Control Theory - Part 4
Lecture 53 - Conjugate points / Jacobi Accessory Equations / Introduction to Optimal Control Theory - Part 5
Lecture 54 - Conjugate points / Jacobi Accessory Equations / Introduction to Optimal Control Theory - Part 6
Lecture 55 - Constrained Optimization in Optimal Control Theory - Part 1
Lecture 56 - Constrained Optimization in Optimal Control Theory - Part 2
Lecture 57 - Constrained Optimization in Optimal Control Theory - Part 3
Lecture 58 - Constrained Optimization in Optimal Control Theory - Part 4
Lecture 59 - Constrained Optimization in Optimal Control Theory - Part 5
Lecture 60 - Constrained Optimization in Optimal Control Theory - Part 6
Lecture 61 - Introduction to Nanomechanics - Part 1
Lecture 62 - Introduction to Nanomechanics - Part 2
Lecture 63 - Introduction to Nanomechanics - Part 3
Lecture 64 - Introduction to Nanomechanics - Part 4
Lecture 65 - Introduction to Nanomechanics - Part 5
Lecture 66 - Introduction to Nanomechanics - Part 6

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NPTEL Video Course - Mathematics - NOC:Introduction to Galois Theory

Subject Co-ordinator - Prof. Krishna Hanumanthu

Co-ordinating Institute - Chennai Mathematical Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation and overview of the course
Lecture 2 - Review of group theory
Lecture 3 - Review of ring theory - I
Lecture 4 - Review of ring theory - II
Lecture 5 - Review of field theory - I
Lecture 6 - Review of field theory - II
Lecture 7 - Review of field theory - III
Lecture 8 - Problem Session - Part 1
Lecture 9 - Problem Session - Part 2
Lecture 10 - Beginning of Galois theory
Lecture 11 - Fixed fields
Lecture 12 - Theorem I on fixed fields
Lecture 13 - Theorem II on fixed fields
Lecture 14 - Galois extensions, Galois groups
Lecture 15 - Normal extensions
Lecture 16 - Problem Session - Part 3
Lecture 17 - Problem Session - Part 4
Lecture 18 - Separable extension - Part 1
Lecture 19 - Separable extension - Part 2
Lecture 20 - Characterization of Galois extensions - Part 1
Lecture 21 - Characterization of Galois extensions - Part 2
Lecture 22 - Examples of Galois extensions
Lecture 23 - Motivating the main theorem of Galois theory
Lecture 24 - Main theorem of Galois theory - Part 1
Lecture 25 - Main theorem of Galois theory - Part 2
Lecture 26 - Fundamental theorem of algebra
Lecture 27 - Problem Session - Part 5
Lecture 28 - Problem Session - Part 6
Lecture 29 - Problem Session - Part 7

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Lecture 30 - Problem Session - Part 8
Lecture 31 - Problem Session - Part 9
Lecture 32 - Kummer extensions - Part 1
Lecture 33 - Kummer extensions - Part 2
Lecture 34 - Kummer extensions - Part 3
Lecture 35 - Cyclotomic extensions - Part 1
Lecture 36 - Cyclotomic extensions - Part 2
Lecture 37 - Solvability by radicals
Lecture 38 - Characterizations of solvability - Part 1
Lecture 39 - Characterizations of solvability - Part 2
Lecture 40 - Discriminants, Galois groups of polynomials
Lecture 41 - Quartics are solvable
Lecture 42 - Solvable groups - Part 1
Lecture 43 - Solvable groups - Part 2
Lecture 44 - Solvable groups - Part 3
Lecture 45 - Insolvability of quintics
Lecture 46 - Problem Session - Part 10
Lecture 47 - Problem Session - Part 11
Lecture 48 - Problem Session - Part 12
Lecture 49 - Problem Session - Part 13

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NPTEL Video Course - Mathematics - NOC:Basic Calculus 1

Subject Co-ordinator - Prof. Arindama Singh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Real line - Part 1
Lecture 2 - The Real line - Part 2
Lecture 3 - Absolute value - Part 1
Lecture 4 - Absolute value - Part 2
Lecture 5 - Functions - Part 1
Lecture 6 - Functions - Part 2
Lecture 7 - Transcendental and trigonometric Functions - Part 1
Lecture 8 - Transcendental and trigonometric Functions - Part 2
Lecture 9 - Limits of functions - Part 1
Lecture 10 - Limits of functions - Part 2
Lecture 11 - Algebra of limits - Part 1
Lecture 12 - Algebra of limits - Part 2
Lecture 13 - One-sided limits - Part 1
Lecture 14 - One-sided limits - Part 2
Lecture 15 - Limits at infinity - Part 1
Lecture 16 - Limits at infinity - Part 2
Lecture 17 - Infinite limits - Part 1
Lecture 18 - Infinite limits - Part 2
Lecture 19 - Continuity - Part 1
Lecture 20 - Continuity - Part 2
Lecture 21 - Algebra of continuous functions - Part 1
Lecture 22 - Algebra of continuous functions - Part 2
Lecture 23 - Results on continuity - Part 1
Lecture 24 - Results on continuity - Part 2
Lecture 25 - Differentiability - Part 1
Lecture 26 - Differentiability - Part 2
Lecture 27 - Derivative and tangent - Part 1
Lecture 28 - Derivative and tangent - Part 2
Lecture 29 - Rules of differentiation - Part 1

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Lecture 30 - Rules of differentiation - Part 2
Lecture 31 - Differentiation exercises - Part 1
Lecture 32 - Differentiation exercises - Part 2
Lecture 33 - Maxima and minima - Part 1
Lecture 34 - Maxima and minima - Part 2
Lecture 35 - Rolleâ s theorem and mean value theorem - Part 1
Lecture 36 - Rolleâ s theorem and mean value theorem - Part 2
Lecture 37 - Using Rolleâ s theorem and Mean value theorem - Part 1
Lecture 38 - Using Rolleâ s theorem and Mean value theorem - Part 2
Lecture 39 - First derivative test - Part 1
Lecture 40 - First derivative test - Part 2
Lecture 41 - Second derivative test - Part 1
Lecture 42 - Second derivative test - Part 2
Lecture 43 - Concavity - Part 1
Lecture 44 - Concavity - Part 2
Lecture 45 - Linearization and differential - Part 1
Lecture 46 - Linearization and differential - Part 2
Lecture 47 - Lâ Hospitalâ s rules - Part 1
Lecture 48 - Lâ Hospitalâ s rules - Part 2
Lecture 49 - Definite integral - Part 1
Lecture 50 - Definite integral - Part 2
Lecture 51 - Properties of integral - Part 1
Lecture 52 - Properties of integral - Part 2
Lecture 53 - Fundamental theorem of calculus - Part 1
Lecture 54 - Fundamental theorem of calculus - Part 2
Lecture 55 - Applications of Funda - mental theorem of calculus - Part 1
Lecture 56 - Applications of Funda - mental theorem of calculus - Part 2
Lecture 57 - Rule of substitution - Part 1
Lecture 58 - Rule of substitution - Part 2
Lecture 59 - Area between curves - Part 1
Lecture 60 - Area between curves - Part 2
Lecture 61 - Volumes by slicing - Part 1
Lecture 62 - Volumes by slicing - Part 2
Lecture 63 - The disk method - Part 1
Lecture 64 - The disk method - Part 2
Lecture 65 - The washer method - Part 1
Lecture 66 - The washer method - Part 2
Lecture 67 - Volumes by cylindrical shells - Part 1
Lecture 68 - Volumes by cylindrical shells - Part 2

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Lecture 69 - Lengths oc curves - Part 1
Lecture 70 - Lengths oc curves - Part 2
Lecture 71 - Areas of surface of revolution - Part 1
Lecture 72 - Areas of surface of revolution - Part 2

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NPTEL Video Course - Mathematics - NOC:Functional Analysis

Subject Co-ordinator - Prof. Kesavan

Co-ordinating Institute - Institute of Mathematical Sciences

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Normed Linear Spaces
Lecture 2 - Examples of Normed Linear Spaces
Lecture 3 - Examples (Continued...)
Lecture 4 - Continuous linear maps - Part 1
Lecture 5 - Continuous linear maps - Part 2
Lecture 6 - Isomorphisms
Lecture 7 - Exercises
Lecture 8 - Exercises (Continued...)
Lecture 9 - Hahn-Banach Theorems
Lecture 10 - Reflexivity
Lecture 11 - Geometric version
Lecture 12 - Geometric version (Continued...)
Lecture 13 - Vector valued integration
Lecture 14 - Exercises - Part 1
Lecture 15 - Exercises - Part 2
Lecture 16 - Baire's Theorem and Applications
Lecture 17 - Application to Fourier series
Lecture 18 - Open mapping and closed graph theorems
Lecture 19 - Annihilators
Lecture 20 - Complemented subspaces
Lecture 21 - Unbounded Operators, Adjoints - Part 1
Lecture 22 - Unbounded Operators, Adjoints - Part 2
Lecture 23 - Orthogonality relations
Lecture 24 - Exercises
Lecture 25 - Exercises (Continued...)
Lecture 26 - Weak topology - Part 1
Lecture 27 - Weak topology - Part 2
Lecture 28 - Weak topology - Part 3
Lecture 29 - Weak* topology - Part 1

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Lecture 30 - Weak* topology - Part 2
Lecture 31 - Reflexive Spaces
Lecture 32 - Separable Spaces - Part 1
Lecture 33 - Separable Spaces - Part 2
Lecture 34 - Uniformly Convex Spaces
Lecture 35 - Applications
Lecture 36 - Exercises
Lecture 37 - L-p Spaces - Part 1
Lecture 38 - L-p Spaces - Part 2
Lecture 39 - Completeness
Lecture 40 - Duality
Lecture 41 - L-p Spaces in Euclidean spaces - Part 1
Lecture 42 - L-p Spaces in Euclidean spaces - Part 2
Lecture 43 - Dual of L-1
Lecture 44 - The space L-1 (Continued...)
Lecture 45 - Exercises - Part 1
Lecture 46 - Exercises - Part 2
Lecture 47 - Exercises - Part 3
Lecture 48 - Exercises - Part 4
Lecture 49 - Hilbert spaces - Part 1
Lecture 50 - Hilbert spaces - Part 2
Lecture 51 - Duality
Lecture 52 - Adjoints
Lecture 53 - Applications
Lecture 54 - Orthonormal sets
Lecture 55 - Orthonormal bases - Part 1
Lecture 56 - Orthonormal bases - Part 2
Lecture 57 - Fourier series
Lecture 58 - Spectrum of an operator - Part 1
Lecture 59 - Spectrum of an operator - Part 2
Lecture 60 - Exercises - Part 1
Lecture 61 - Exercises - Part 2
Lecture 62 - Exercises - Part 3
Lecture 63 - Compact operators - Part 1
Lecture 64 - Compact operators - Part 2
Lecture 65 - Riesz-Fredholm theory - Part 1
Lecture 66 - Riesz-Fredholm theory - Part 2
Lecture 67 - Riesz-Fredholm theory
Lecture 68 - Spectrum of a compact operator

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Lecture 69 - Spectrum of a compact self-adjoint operator
Lecture 70 - Eigenvalues of a compact self-adjoint operator
Lecture 71 - Exercises - Part 1
Lecture 72 - Exercises - Part 2
Lecture 73 - Exercises - Part 3
Lecture 74 - Exercises - Part 4

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NPTEL Video Course - Mathematics - NOC:Mathematical Methods in Physics 1

Subject Co-ordinator - Prof. Auditya Sharma

Co-ordinating Institute - IISER - Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vectors
Lecture 2 - Linear vector spaces
Lecture 3 - Linear vector spaces: immediate consequences
Lecture 4 - Dot product of Euclidean vectors
Lecture 5 - Inner product on a Linear vector space
Lecture 6 - Cauchy-Schwartz inequality for Euclidean vectors
Lecture 7 - Cauchy-Schwartz inequality for vectors from LVS
Lecture 8 - Applications of the Cauchy-Schwartz inequality
Lecture 9 - Triangle inequality
Lecture 10 - Linear dependence and independence of vectors
Lecture 11 - Row reduction of matrices
Lecture 12 - Rank of a matrix
Lecture 13 - Rank of a matrix: consequences
Lecture 14 - Determinants and their properties
Lecture 15 - The rank of a matrix using determinants
Lecture 16 - Cramer's rule
Lecture 17 - Square system of equations
Lecture 18 - Homogeneous equations
Lecture 19 - The rank of a matrix and linear dependence
Lecture 20 - Span, basis, and dimension of a LVS
Lecture 21 - Gram-Schmidt orthogonalization
Lecture 22 - Vector subspaces
Lecture 23 - Linear operators
Lecture 24 - Inverse of an operator
Lecture 25 - Adjoint of an operator
Lecture 26 - Projection operators
Lecture 27 - Eigenvalues and Eigenvectors
Lecture 28 - Hermitian operators
Lecture 29 - Unitary operators

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Lecture 30 - Normal operators
Lecture 31 - Similarity and Unitary transformations
Lecture 32 - Matrix representations
Lecture 33 - Eigenvalues and Eigenvectors of matrices
Lecture 34 - Defective matrices
Lecture 35 - Eigenvalues and eigenvectors: useful results
Lecture 36 - Transformation of Basis
Lecture 37 - A class of invertible matrices
Lecture 38 - Diagonalization of matrices
Lecture 39 - Diagonalizability of matrices
Lecture 40 - Functions of matrices
Lecture 41 - SHM and waves
Lecture 42 - Periodic functions
Lecture 43 - Average value of a function
Lecture 44 - Piecewise continuous functions
Lecture 45 - Orthogonal basis: Fourier series
Lecture 46 - Fourier coefficients
Lecture 47 - Dirichlet Conditions
Lecture 48 - Complex Form of Fourier Series
Lecture 49 - Other intervals: arbitrary period
Lecture 50 - Even and Odd Functions
Lecture 51 - Differentiating Fourier series
Lecture 52 - Parseval's theorem
Lecture 53 - Fourier series to Fourier transforms
Lecture 54 - Fourier Sine and Cosine transforms
Lecture 55 - Parseval's theorem for Fourier series
Lecture 56 - Ordinary Differential equations
Lecture 57 - First order ODEs
Lecture 58 - Linear first order ODEs
Lecture 59 - Orthogonal Trajectories
Lecture 60 - Exact differential equations
Lecture 61 - Special first order ODEs
Lecture 62 - Solutions of linear first-order ODEs
Lecture 63 - Revisit linear first-order ODEs
Lecture 64 - ODEs in disguise
Lecture 65 - 2nd order Homogeneous linear equations with constant coefficients
Lecture 66 - The use of a known solution to find another
Lecture 67 - An alternate approach to auxiliary equation
Lecture 68 - Inhomogeneous second order equations

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Lecture 69 - Methods to find a Particular solution
Lecture 70 - Successive Integration of two first order equations
Lecture 71 - Illustrative examples
Lecture 72 - Variation of Parameters
Lecture 73 - Vibrations in mechanical systems
Lecture 74 - Forced Vibrations
Lecture 75 - Resonance
Lecture 76 - Linear Superposition
Lecture 77 - Laplace Transform (LT)
Lecture 78 - Basic Properties of Laplace Transforms
Lecture 79 - Step functions, Translations, and Periodic functions
Lecture 80 - The Inverse Laplace Transform
Lecture 81 - Convolution of functions
Lecture 82 - Solving ODEs using Laplace transforms
Lecture 83 - The Dirac Delta function
Lecture 84 - Properties of the Dirac Delta function
Lecture 85 - Green's function method
Lecture 86 - Green's function method: Boundary value problem
Lecture 87 - Power series method
Lecture 88 - Power series solutions about an ordinary point
Lecture 89 - Initial value problem: power series solution
Lecture 90 - Frobenius method for regular singular points

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NPTEL Video Course - Mathematics - NOC:Computational Mathematics with SageMath

Subject Co-ordinator - Prof. Ajit Kumar

Co-ordinating Institute - Institute of Chemical Technology - Mumbai

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Installation of Python
Lecture 2 - Getting Started with Python
Lecture 3 - Python as an advanced calculator
Lecture 4 - Lists in Python
Lecture 5 - Tuple, Sets and Dictionaries in Python
Lecture 6 - Functions and Branching
Lecture 7 - For loop in Python
Lecture 8 - While loop in Python
Lecture 9 - Creating Modules and Introduction to NumPy
Lecture 10 - Use of NumPy module
Lecture 11 - Python Graphics using MatplotLib
Lecture 12 - Use of SciPy and SymPy in Python
Lecture 13 - Classes in Python - Part 1
Lecture 14 - Classes in Python - Part 2
Lecture 15 - Introduction and Installation of SageMath
Lecture 16 - Exploring integers in SageMath
Lecture 17 - Solving Equations in SageMath
Lecture 18 - 2d Plotting with SageMath
Lecture 19 - 3d Plotting with SageMath
Lecture 20 - Calculus of one variable with SageMath - Part 1
Lecture 21 - Calculus of one variable with SageMath - Part 2
Lecture 22 - Applications of derivatives
Lecture 23 - Integration with SageMath
Lecture 24 - Improper Integral using SageMath
Lecture 25 - Application of integration using SageMath
Lecture 26 - Limit and Continuity of real valued functions
Lecture 27 - Partial Derivative with SageMath
Lecture 28 - Local Maximum and Minimum
Lecture 29 - Application of local maximum and local minimum

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Lecture 30 - Constrained optimization using Lagrange multipliers
Lecture 31 - Working with vectors in SageMath
Lecture 32 - Solving system of linear Equations in SageMath
Lecture 33 - Vector Spaces in SageMath
Lecture 34 - Basis and dimensions of vector spaces in SageMath
Lecture 35 - Matrix Spaces with SageMath
Lecture 36 - Linear Transformations - Part 1 with SageMath
Lecture 37 - Linear Transformations - Part 2 with SageMath
Lecture 38 - Eigenvalues and Eigenvectors - Part 1 with SageMath
Lecture 39 - Eigenvalues and Eigenvectors - Part 2 with SageMath
Lecture 40 - Inner Product - Part 1 with SageMath
Lecture 41 - Inner Product - Part 2 with SageMath
Lecture 42 - Orthogonal Decomposition with SageMath
Lecture 43 - Least Square Solution with SageMath
Lecture 44 - Singular Value Decomposition (SVD) with SageMath
Lecture 45 - Application of SVD to image processing
Lecture 46 - Solving System of linear ODE using Eigenvalues and Eigenvectors
Lecture 47 - Google Page Rank Algorithm using SageMath
Lecture 48 - Finding Roots of algebraic and transcendental equations in SageMath
Lecture 49 - Numerical Solutions of System of linear equations in SageMath
Lecture 50 - Interpolations in SageMath
Lecture 51 - Numerical Integration in SageMath
Lecture 52 - Numerical Eigenvalues
Lecture 53 - Solving 1st and 2nd order ODE with SageMath
Lecture 54 - Euler's Method to solve 1st order ODE with SageMath
Lecture 55 - Fourth Order Runge-Kutta Method
Lecture 56 - RK4 method for System of ODE and Applications
Lecture 57 - Solving ODE using Laplace Transforms in SageMath
Lecture 58 - Introduction to Linear Programming Problems (LPP)
Lecture 59 - Solving Linear Programming Problmes using Graphical Methods
Lecture 60 - Basics Definitions and Results in LPP
Lecture 61 - Theory of Simplex Method
Lecture 62 - Simplex Methods in SageMath - Part 1
Lecture 63 - Simplex Methods in SageMath - Part 2
Lecture 64 - Simplex Methods in Matrix Form
Lecture 65 - Revised Simplex Method in SageMath
Lecture 66 - Two Phase Simplex Method in SageMath
Lecture 67 - Big-M Method in SageMath
Lecture 68 - Duality of Linear Program

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Lecture 69 - Dual Simplex Method in SageMath
Lecture 70 - Review and What next in SageMath?

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NPTEL Video Course - Mathematics - NOC:Introduction to Probability (with examples using R)

Subject Co-ordinator - Prof. Siva Athreya

Co-ordinating Institute - ISI - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sample Space, Events and Probability
Lecture 2 - Properties of Probability
Lecture 3 - Equally likely Outcomes
Lecture 4 - Conditional Probability
Lecture 5 - Bayes Theorem
Lecture 6 - Independence - Part 1
Lecture 7 - Independence - Part 2
Lecture 8 - Sampling and Repeated Trials
Lecture 9 - Sampling and Repeated Trials - Part 1
Lecture 10 - Sampling and Repeated Trials - Part 2
Lecture 11 - Sampling with and Without Replacement
Lecture 12 - Sampling without Replacement
Lecture 13 - Hypergeometric Distribution and Discrete Random Variables
Lecture 14 - Discrete Random Variables - Part 1
Lecture 15 - Discrete Random Variables - Part 2
Lecture 16 - Conditional, Joint and Marginal Distributions
Lecture 17 - Memoryless property of Geometric Distribution
Lecture 18 - Functions of Random Variables
Lecture 19 - Sums of Independent Random Variables
Lecture 20 - Functions and Independence
Lecture 21 - Expectation of Random Variables
Lecture 22 - Properties of Expectation
Lecture 23 - Expectation: Independence and Functions
Lecture 24 - Variance of Discrete Random Variables
Lecture 25 - Markov and Chebyshev Inequalities
Lecture 26 - Conditional Expectation and Covariance
Lecture 27 - Continuous Random Variables - Part 1
Lecture 28 - Continuous Random Variables - Part 2
Lecture 29 - Distribution Function

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Lecture 30 - Exponential and Normal Random Variable
Lecture 31 - Normal Random Variable
Lecture 32 - Change of Variable
Lecture 33 - Joint Distribution of Continuous Random Variables
Lecture 34 - Marginal Density and Independence
Lecture 35 - Conditional Density
Lecture 36 - Sums of Independent Random Variables
Lecture 37 - Quotient of Independent Random Variables
Lecture 38 - Expectation and Variance of Continuous Random Variables
Lecture 39 - Sampling Distribution and Sample Mean
Lecture 40 - Weak Law of Large Numbers
Lecture 41 - Revisit of Variance and Expectation
Lecture 42 - Revisit of Properties of Variance
Lecture 43 - Revisit Weak Law of Large Numbers
Lecture 44 - Demoivre-Laplace Central Limit Theorem and Normal Random Variables
Lecture 45 - Revisit Normal Random Variables
Lecture 46 - Normal Tables, Mean and Variance

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NPTEL Video Course - Mathematics - NOC:Algebra-II

Subject Co-ordinator - Prof. Amritanshu Prasad, Prof. S. Viswanath

Co-ordinating Institute - Institute of Mathematical Sciences

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Algebraic and Transcendental Numbers
Lecture 2 - Extensions Generated by Elements
Lecture 3 - Isomorphic Extensions
Lecture 4 - Degree of an Extension
Lecture 5 - Constructible Numbers
Lecture 6 - The Field of Constructible Numbers
Lecture 7 - Characterization of Constructible Numbers
Lecture 8 - Solved Problems (Week 1)
Lecture 9 - Some Things can't be Constructed
Lecture 10 - Symbolic Adjunction
Lecture 11 - Repeated Roots
Lecture 12 - Gauss Lemma
Lecture 13 - Eisensteinâ s criterion
Lecture 14 - Existence Theorem for Finite Fields
Lecture 15 - Subfields of a Finite Field
Lecture 16 - Multiplicative Group of a Finite Field
Lecture 17 - Uniqueness Theorem for Finite Fields
Lecture 18 - Solved Problems (Week 2)
Lecture 19 - Algebraic Extensions and Algebraic Closures
Lecture 20 - Existence of Algebraic Closures
Lecture 21 - Uniqueness of Algebraic Closure
Lecture 22 - Solved Problems - Part 1 (Week 3)
Lecture 23 - Existence of splitting fields, bound on degree
Lecture 24 - Uniqueness of splitting fields
Lecture 25 - Solved problems - Part 2 (Week 3)
Lecture 26 - Normal Extensions
Lecture 27 - Separable polynomials
Lecture 28 - Perfect fields, separable extensions
Lecture 29 - Definition and examples, fixed fields

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Lecture 30 - Characterization of Galois extensions
Lecture 31 - Linear Independence of Characters
Lecture 32 - Solved problems (Week 4)
Lecture 33 - Artinâ s Theorem - Part 1
Lecture 34 - Artinâ s Theorem - Part 2
Lecture 35 - Finite Galois Extensions
Lecture 36 - The fundamental theorem of Galois Theory - 1
Lecture 37 - The fundamental theorem of Galois Theory - 2
Lecture 38 - Solved problems (Week 5)
Lecture 39 - Cyclotomic extensions
Lecture 40 - Irreducibility of the cyclotomic polynomial
Lecture 41 - Application: Constructibility of regular n-gons.
Lecture 42 - Insolvability of the general quintic - Part 1
Lecture 43 - Insolvability of the general quintic - Part 2
Lecture 44 - Insolvability of the general quintic - Part 3
Lecture 45 - What is category theory (and why is it important)?
Lecture 46 - Definition of a category
Lecture 47 - Monomorphisms, epimorphisms, and isomorphisms
Lecture 48 - Categories: First Problem Session
Lecture 49 - Initial and Terminal Objects
Lecture 50 - Products and Coproducts
Lecture 51 - Categories: Second Problem Session
Lecture 52 - Functors
Lecture 53 - The Category of Categories
Lecture 54 - Natural Transformations
Lecture 55 - Functor Categories
Lecture 56 - Categories: Third Problem Session
Lecture 57 - Adjunction
Lecture 58 - Categories: Fourth Problem Session
Lecture 59 - Tensor products of Z-modules
Lecture 60 - Free abelian groups and quotient groups
Lecture 61 - Construction of the tensor product
Lecture 62 - Problem session
Lecture 63 - Tensor product of R-modules
Lecture 64 - Functoriality of the tensor product
Lecture 65 - Bimodules
Lecture 66 - Tensor products of bimodules
Lecture 67 - Tensor products of modules over commutative rings
Lecture 68 - Extension of scalars

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Lecture 69 - Problem session - tensor products of vector spaces
Lecture 70 - Some Properties of the tensor product
Lecture 71 - F-algebras
Lecture 72 - Composition Series
Lecture 73 - Schreierâ s Theorem
Lecture 74 - Ascending and Descending Chain Conditions
Lecture 75 - Existence of Jordan-Holder Series
Lecture 76 - The Jordan-Holder Theorem
Lecture 77 - Examples related to the Jordan-Holder Theorem
Lecture 78 - The Jordan-Holder Theorem for Groups
Lecture 79 - Indecomposable Modules
Lecture 80 - Direct Sum Decompositions
Lecture 81 - Decomposition as a sum of Indecomposables
Lecture 82 - The Endomorphism Ring of an Indecomposable Module
Lecture 83 - Krull-Schmidt Theorem
Lecture 84 - Krull-Schmidt Examples

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NPTEL Video Course - Mathematics - NOC:Mathematical Methods in Physics 2

Subject Co-ordinator - Prof. Auditya Sharma

Co-ordinating Institute - IISER - Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to complex numbers
Lecture 2 - The triangle inequality
Lecture 3 - The de Moivre formula
Lecture 4 - Roots of unity
Lecture 5 - Functions of a complex variable and the notion of continuity
Lecture 6 - Derivative of a complex function
Lecture 7 - Differentiation rules for a complex function
Lecture 8 - Cauchy-Riemann Equations
Lecture 9 - Sufficient conditions for differentiability
Lecture 10 - Cauchy-Riemann conditions in polar coordinates
Lecture 11 - More persepective on differentiability
Lecture 12 - The value of the derivative
Lecture 13 - Analytic functions
Lecture 14 - Harmonic functions
Lecture 15 - The exponential function
Lecture 16 - Complex logarithm
Lecture 17 - Complex exponents
Lecture 18 - Trigonometric functions of complex variables
Lecture 19 - Hyperbolic functions of complex variables
Lecture 20 - Inverse Trigonometric and Hyperbolic functions
Lecture 21 - Branch of a multivalued function
Lecture 22 - Contour Integrals
Lecture 23 - Green's Theorem
Lecture 24 - Path dependence of the contour intergal
Lecture 25 - Antiderivatives
Lecture 26 - The Cauchy theorem
Lecture 27 - Crossing contours and multiply connected domains
Lecture 28 - Cauchy Integral formula
Lecture 29 - Derivatives of an analytic function

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Lecture 30 - Liouville's theorem and the Fundamental theorem of algebra
Lecture 31 - Taylor Series
Lecture 32 - Laurent Series
Lecture 33 - Convergence
Lecture 34 - Differentiation and integration of power series
Lecture 35 - Isolated Singularities
Lecture 36 - Residues
Lecture 37 - Residue Theorem
Lecture 38 - Evaluation of integrals - I
Lecture 39 - Evaluation of integrals - II
Lecture 40 - Analytic Continuation
Lecture 41 - Introduction of orthogonal polynomials
Lecture 42 - How to construct orthogonal polynomials
Lecture 43 - The weight function
Lecture 44 - Recursion relations
Lecture 45 - Differential equation satisfied by the orthogonal polynomials
Lecture 46 - Hermite polynomials
Lecture 47 - Properties of Hemite polynomials
Lecture 48 - Legendre polynomials
Lecture 49 - Legendre polynomials: recurrence relation
Lecture 50 - Differential equation corresponding to Legendre polynomials
Lecture 51 - The generating function corresponding to Legendre polynomials
Lecture 52 - Laguerre Polynomials
Lecture 53 - Laguerre Polynomials: recurrence relation
Lecture 54 - Laguerre polynomials: differential equation
Lecture 55 - Laguerre polynomials: generating function
Lecture 56 - Bessel functions: series defination
Lecture 57 - Bessel functions: recurrence relations
Lecture 58 - Bessel functions: differential equation
Lecture 59 - Bessel functions of integral order: generating function
Lecture 60 - Bessel functions: orthogonality
Lecture 61 - Classification of Second Order PDEs
Lecture 62 - Canonical Forms for Hyperbolic PDEs
Lecture 63 - Canonical Forms for Parabolic PDEs
Lecture 64 - Canonical Forms for Elliptic PDEs
Lecture 65 - Tha Laplace Equation
Lecture 66 - The Laplace Equation: Separation of Variables
Lecture 67 - The Laplace Equation: Dirichlet and Neumann boundary conditions
Lecture 68 - The Laplace Equation in Cartesian coordinates

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Lecture 69 - The Laplace Equation for a 3-D rectangular box
Lecture 70 - The Laplace Equation in spherical coordinates
Lecture 71 - The Laplace Equation in Spherical Coordinates: Solution
Lecture 72 - The Laplace Equation in Spherical Coordinates: illustrative examples
Lecture 73 - The Poisson's Equation: Green's function solution
Lecture 74 - The heat equation: a heuristic discussion
Lecture 75 - From the random walk to the diffusion equation
Lecture 76 - Solution of the Diffusion equation
Lecture 77 - The Diffusion equation with Dirichlet and Neumann boundary conditions
Lecture 78 - The Heat equation: illustrative examples
Lecture 79 - The Wave equation: Method of characteristics
Lecture 80 - The Wave equation: Separation of variables

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NPTEL Video Course - Mathematics - NOC:Real Analysis - II

Subject Co-ordinator - Prof. Jaikrishnan J

Co-ordinating Institute - IIT - Palakkad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Metric Spaces
Lecture 2 - Examples of metric spaces
Lecture 3 - Loads of definitions
Lecture 4 - Normed vector spaces
Lecture 5 - Examples of normed vector spaces
Lecture 6 - Basic properties open closed sets metric
Lecture 7 - Continuity in metric spaces
Lecture 8 - Equivalent metrics and product spaces
Lecture 9 - Completeness
Lecture 10 - Completeness (Continued...)
Lecture 11 - Completeness of B(x,y)
Lecture 12 - Completion
Lecture 13 - Compactness
Lecture 14 - The Bolzano-Weierstrass Property
Lecture 15 - Open covers and Compactness
Lecture 16 - The Heine-Borel Theorem for Metric Spaces
Lecture 17 - Connectedness
Lecture 18 - Path-Connectedness
Lecture 19 - Connected Components
Lecture 20 - The Arzela-Ascolli theorem
Lecture 21 - Upper and lower limits
Lecture 22 - The Stone-Weierstrass theorem
Lecture 23 - All norms are equivalent
Lecture 24 - Vector-valued functions
Lecture 25 - Scalar-valued functions of a vector variable
Lecture 26 - Directional derivatives and the gradient
Lecture 27 - Interpretation and properties of the gradient
Lecture 28 - Higher-order partial derivatives
Lecture 29 - The derivative as a linear map

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Lecture 30 - Examples of differentiation
Lecture 31 - Properties of the derivative map
Lecture 32 - The mean-value theorem
Lecture 33 - Differentiating under the integral sign
Lecture 34 - Higher-order derivatives
Lecture 35 - Symmetry of the second derivative
Lecture 36 - Taylor's theorem
Lecture 37 - Taylor's theorem with remainder
Lecture 38 - The Banach fixed point theorem
Lecture 39 - Newton's method
Lecture 40 - The inverse function theorem
Lecture 41 - Diffeomorphismsm and local diffeomorphisms
Lecture 42 - The implicit function theorem
Lecture 43 - Tangent space to a hypersurface
Lecture 44 - The definition of a manifold
Lecture 45 - Examples and non examples of manifolds
Lecture 46 - The tangent space to a manifold
Lecture 47 - Maxima and minima in several variables
Lecture 48 - The Hessian and extrema
Lecture 49 - Completing the squares
Lecture 50 - Constrained extrema and lagrange multipliers
Lecture 51 - Curves
Lecture 52 - Rectifiability and arc-length
Lecture 53 - The Riemann integral revisited
Lecture 54 - Monotone sequences of functions
Lecture 55 - Upper functions and their integrals
Lecture 56 - Riemann integrable functions as upper functions
Lecture 57 - Lebesgue integrable functions
Lecture 58 - Approximation of Lebesgure integrable functions
Lecture 59 - Levi monotone convergence theorem for step functions
Lecture 60 - Monotone convergence theorem for upper functions
Lecture 61 - Monotone convergence theorem for Lebesgue integrable functions
Lecture 62 - The Lebesgue dominated convergence theorem
Lecture 63 - Applications of the convergence theorems
Lecture 64 - The problem of measure
Lecture 65 - The Lebesgue integral on unbounded intervals
Lecture 66 - Measurable functions
Lecture 67 - Solution to the problem of measure
Lecture 68 - The Lebesgue integral on arbitrary subsets

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Lecture 69 - Square integrable functions
Lecture 70 - Norms and inner-products on complex vector spaces
Lecture 71 - Convergence in L2
Lecture 72 - The Riesz-Fischer theorem
Lecture 73 - Multiple Riemann integration
Lecture 74 - Multiple Lebesgue integration

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NPTEL Video Course - Mathematics - NOC:Sobolev Spaces and Partial Differential Equations

Subject Co-ordinator - Prof. Kesavan

Co-ordinating Institute - IMSc

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Test Functions - Part 1
Lecture 2 - Test Functions - Part 2
Lecture 3 - Distributions
Lecture 4 - Examples - Part 1
Lecture 5 - Distribution Derivatives
Lecture 6 - More operations on distributions
Lecture 7 - Support of a distribution
Lecture 8 - Distributions with compact support; singular support - Part 1
Lecture 9 - Distributions with compact support; singular support - Part 2
Lecture 10 - Exercises - Part 1
Lecture 11 - Convolution of functions - Part 1
Lecture 12 - Convolution of functions - Part 2
Lecture 13 - Convolution of functions - Part 3
Lecture 14 - Convolution of distributions - Part 1
Lecture 15 - Convolution of distributions - Part 2
Lecture 16 - Convolution of distributions - Part 3
Lecture 17 - Exercises - Part 2
Lecture 18 - Fundamental solutions
Lecture 19 - The Fourier transform
Lecture 20 - The Schwarz space - Part 1
Lecture 21 - The Schwarz space - Part 2
Lecture 22 - Examples - Part 1
Lecture 23 - Fourier inversion formula
Lecture 24 - Tempered distributions
Lecture 25 - Exercises - Part 3
Lecture 26 - Sobolev spaces - Part 1
Lecture 27 - Sobolev spaces - Part 2
Lecture 28 - Sobolev spaces - Part 3
Lecture 29 - Approximation by smooth functions

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Lecture 30 - Chain rule and applications - Part 1
Lecture 31 - Chain rule and applications - Part 2
Lecture 32 - Extension theorems - Part 1
Lecture 33 - Extension theorems - Part 2
Lecture 34 - Poincare's inequlity
Lecture 35 - Exercises - Part 4
Lecture 36 - Exercises - Part 5
Lecture 37 - Imbedding theorems
Lecture 38 - Imbedding theorems: Case p less than N - Part 1
Lecture 39 - Imbedding theorems: Case p = N - Part 2
Lecture 40 - Imbedding theorems: Case p greater than N - Part 3
Lecture 41 - Compactness theorems - Part 1
Lecture 42 - Compactness theorems - Part 2
Lecture 43 - Compactness theorems - Part 3
Lecture 44 - The spaces W^{s,p}
Lecture 45 - spaces W^{s,p} and Trace spaces
Lecture 46 - Trace theory - Part 1
Lecture 47 - Trace theory - Part 2
Lecture 48 - Trace theory - Part 3
Lecture 49 - Trace theory - Part 4
Lecture 50 - Exercises - Part 6
Lecture 51 - Exercises - Part 7
Lecture 52 - Abstract variational problems - Part 1
Lecture 53 - Abstract variational problems - Part 2
Lecture 54 - Weak solutions of elliptic boundary value problems - Part 1
Lecture 55 - Weak solutions of elliptic boundary value problems - Part 2
Lecture 56 - Neumann problems
Lecture 57 - The Biharmonic operator
Lecture 58 - The elasticity system
Lecture 59 - Exercises - Part 8
Lecture 60 - Exercises - Part 9
Lecture 61 - Exercises - Part 9
Lecture 62 - Maximum Principles - Part 1
Lecture 63 - Maximum Principles - Part 2
Lecture 64 - Exercises - Part 10
Lecture 65 - Exercises - Part 11
Lecture 66 - Eigenvalue problems - Part 1
Lecture 67 - Eigenvalue problems - Part 2
Lecture 68 - Eigenvalue problems - Part 3

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Lecture 69 - Exercises - Part 12
Lecture 70 - Exercises - Part 13
Lecture 71 - Unbounded operators - Part 1
Lecture 72 - Unbounded operators - Part 2
Lecture 73 - The exponential map
Lecture 74 - C_0 Semigroups - Part 1
Lecture 75 - C_0 Semigroups - Part 2
Lecture 76 - Infinitesimal generators of contraction semigroups
Lecture 77 - Hille-Yosida theorem
Lecture 78 - Regularity
Lecture 79 - Contraction semigroups on Hilbert spaces
Lecture 80 - Self-adjoint case and the case of isometries
Lecture 81 - The heat equation
Lecture 82 - The wave equation
Lecture 83 - The Schrodinger equation
Lecture 84 - The inhomogeneous equation
Lecture 85 - Exercises - 14

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NPTEL Video Course - Mathematics - NOC:Combinatorics

Subject Co-ordinator - Prof. Narayanan N

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Pigeonhole Principle
Lecture 2 - Dirichlet theorem and Erdos-Szekeres Theorem
Lecture 3 - Ramey theorem as generalisation of PHP
Lecture 4 - An infinite flock of Pigeons
Lecture 5 - Basic Counting - the sum and product rules
Lecture 6 - Examples of basic counting
Lecture 7 - Examples: Product and Division rules
Lecture 8 - Binomial theorem and bijective counting
Lecture 9 - Counting lattice paths
Lecture 10 - Multinomial theorem
Lecture 11 - Applying Multinomial theorem
Lecture 12 - Integer compositions
Lecture 13 - Set partitions and Stirling numbers
Lecture 14 - Stirling and Hemachandra recursions
Lecture 15 - Integer partitions
Lecture 16 - Young's diagram and Integer partitions
Lecture 17 - Principle of Inclusion and Exclusion
Lecture 18 - Applications of PIE
Lecture 19 - The twelvefold way
Lecture 20 - Inclusion exclusion: Linear algebra view
Lecture 21 - Partial Orders
Lecture 22 - Mobius Inversion Formula
Lecture 23 - Product theorem and applications of Mobius Inversion
Lecture 24 - Formal power series, ordinary generating functions
Lecture 25 - Application of Ordinary generating functions
Lecture 26 - Product of Generating functions
Lecture 27 - Composition of generating functions
Lecture 28 - Exponential Generating Function
Lecture 29 - Composition of EGF

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Lecture 30 - Euler pentagonal number theorem
Lecture 31 - Graphs - introduction
Lecture 32 - Paths Walks, Cycles
Lecture 33 - Digraphs and functional digraphs
Lecture 34 - Componenets, Connectivity, Bipartite graphs
Lecture 35 - Acyclic graphs
Lecture 36 - Graph colouring
Lecture 37 - Mycielski graphs
Lecture 38 - Product of graphs
Lecture 39 - Menger's theorem
Lecture 40 - System of Distinct representatives
Lecture 41 - Planar graphs
Lecture 42 - Euler identity
Lecture 43 - Map colouring problem - History
Lecture 44 - The Discharging Method - Part 1
Lecture 45 - The Discharging Method - Part 2
Lecture 46 - Introduction to Group actions
Lecture 47 - Colouring and symmetries - examples
Lecture 48 - Bursides lemma
Lecture 49 - Proof of Bursides lemma
Lecture 50 - Polya's theorem
Lecture 51 - Species of structures- definitions and examples
Lecture 52 - Associated seris and Product of species
Lecture 53 - Species: Substitution and Derivative
Lecture 54 - Species: Pointing and countilg labelled trees
Lecture 55 - Review and Further directions
Lecture 56 - More on further topics
Lecture 57 - Linear Algebra method: Ultra short introduction
Lecture 58 - Probabiistic Method: Ultra short introduction

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NPTEL Video Course - Mathematics - NOC:Geometry of Vision

Subject Co-ordinator - Prof. Vijay Ravikumar

Co-ordinating Institute - Chennai Mathematical Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Geometry of Vision
Lecture 2 - Chapter One: The Power of Vanishing Points
Lecture 3 - Drawing parallel lines: a thought experiment
Lecture 4 - Why do the images of lines terminate ?
Lecture 5 - Why do some lines share a vanishing point ?
Lecture 6 - Why do some lines remain parallel ?
Lecture 7 - The vanishing point theorem
Lecture 8 - The horizon line theorem
Lecture 9 - Three views of a tiled floor
Lecture 10 - Demo: drawing the third perspective view
Lecture 11 - The second perspective view revisited
Lecture 12 - Demo: drawing railway tracks
Lecture 13 - Three views of a box
Lecture 14 - Demo: drawing in one point and two point perspective
Lecture 15 - What does a perspective drawing reveal about the viewer ?
Lecture 16 - Chapter Two: A Geometry of Coincidence
Lecture 17 - Incidence relations
Lecture 18 - Linear spaces
Lecture 19 - Extending the euclidean plane
Lecture 20 - The shape of this exended plane
Lecture 21 - Incidence relations in the extended plane
Lecture 22 - Coincidence #1 the harmonic conjugate theorem
Lecture 23 - Proof of the harmonic conjugate theorem
Lecture 24 - Coincidence #2 Pappus's theorem
Lecture 25 - Coincidence #3 Desargues's theorem
Lecture 26 - The exended euclidean space P3
Lecture 27 - Desargues's theorem in three dimensions
Lecture 28 - A Shadow drawing challenge
Lecture 29 - Solution to the Shadow drawing challenge

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Lecture 30 - Proving Desargues's in three dimensions
Lecture 31 - Lifting Desargues's theorem from the plane
Lecture 32 - How to prove the converse
Lecture 33 - Chapter Three: The Shadow of a Square
Lecture 34 - Perspectivities the maps that shift perspective
Lecture 35 - Visualizing perspectivities
Lecture 36 - Perspectivities are well defined
Lecture 37 - The harmonic conjugate theorem revisited
Lecture 38 - Projectivities sequences of perspectivities
Lecture 39 - 1D projectivities a puzzle
Lecture 40 - 1D projectivities a harder puzzle
Lecture 41 - Projectivities as functions
Lecture 42 - The three fixed points theorem
Lecture 43 - 1D fundamental theorem of projective geometry
Lecture 44 - The criss cross construction
Lecture 45 - Proving pappusâ s theorem
Lecture 46 - 2D Fundamental theorem of projective geometry
Lecture 47 - The four fixed points lemma
Lecture 48 - The shadow of a square
Lecture 49 - Chapter Four: The Analytic Framework
Lecture 50 - Introducing the cross ratio
Lecture 51 - Evenly spaced points
Lecture 52 - How many cross ratios ?
Lecture 53 - Invariance of the cross ratio
Lecture 54 - Injectivity of the cross ratio
Lecture 55 - Proving the 3 fixed points theorem
Lecture 56 - Bonus: the cross ratio as a function
Lecture 57 - The real projective plane
Lecture 58 - Homogeneous coordinates
Lecture 59 - Homogenous proof that parallel lines converge
Lecture 60 - Bonus: join and meet as cross product
Lecture 61 - Affine charts
Lecture 62 - The matrix group of transformations of RP2
Lecture 63 - The fundamental theorem of PGL(3,R)
Lecture 64 - Visualizing the action of PGL(3,R)
Lecture 65 - Proving the fundamental theorem of PGL(3,R)
Lecture 66 - Conclusion to Geometry of Vision

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NPTEL Video Course - Mathematics - NOC:Algebraic Combinatorics

Subject Co-ordinator - Prof. Amritanshu Prasad, Prof. Sankaran Viswanath

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Examples of Mobius Inversion
Lecture 2 - Partially Ordered Sets
Lecture 3 - Hasse Diagrams
Lecture 4 - Isomorphsms of Posets
Lecture 5 - Maximal, Minimal, Greatest, Least
Lecture 6 - Induced Subposets
Lecture 7 - Incidence Algebras
Lecture 8 - Inversion in Incidence Algebras
Lecture 9 - Mobius Inversion
Lecture 10 - Examples of Mobius Functions
Lecture 11 - Product Posets and their Mobius Functions
Lecture 12 - Opposite of a Poset
Lecture 13 - The Poset of Set Partitions
Lecture 14 - Connected Structures
Lecture 15 - Lattices
Lecture 16 - Weisner's Theorem
Lecture 17 - The Lattice of Non-Crossing Partitions
Lecture 18 - The Canonical Product Decoposition for Intervals of Non-Crossing Partitions
Lecture 19 - The Mobius Function for Non-Crossing Partitions
Lecture 20 - Ideals in a Poset
Lecture 21 - Mobius Function of J(P)
Lecture 22 - Young's Lattice
Lecture 23 - Distributive Lattices
Lecture 24 - Formal Power Series
Lecture 25 - The Necklace Problem
Lecture 26 - Combinatorial Classes
Lecture 27 - Sums, Products, and Sequences of Combinatorial Classes
Lecture 28 - Power Set, Multisets, and Sequences
Lecture 29 - A Little Dendrology

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Lecture 30 - Super Catalan/Little Schroeder numbers
Lecture 31 - Regular Languages
Lecture 32 - Finite Automata
Lecture 33 - The Pumping Lemma
Lecture 34 - The Dyck Language
Lecture 35 - Permutations and their cycles
Lecture 36 - Permutation Groups
Lecture 37 - Orbits, fixed points, stabilizers
Lecture 38 - The orbit counting theorem
Lecture 39 - The Polya Enumeration Theorem
Lecture 40 - The Cycle Index Polynomials
Lecture 41 - Cycle Index of the Octahedral Group
Lecture 42 - Cycle Index of the Full Permutation Group
Lecture 43 - Combinatorial Species
Lecture 44 - Generating Series of a Species
Lecture 45 - Cycle Index Series of a Species
Lecture 46 - Isomorphism of Species
Lecture 47 - Visualization of Species
Lecture 48 - Sum of Species
Lecture 49 - Product of Species
Lecture 50 - Sums and Products: More Examples
Lecture 51 - Substitution of Species
Lecture 52 - Derivative of a Species
Lecture 53 - Powers and Seqeunces of Binomial Type
Lecture 54 - Pointing and Cayley's Theorem
Lecture 55 - R-enriched Trees
Lecture 56 - R-enriched Endofunctions
Lecture 57 - Lagrange Inversion Forumla
Lecture 58 - Motivation for the LGV Lemma
Lecture 59 - Statement of the LGV Lemma
Lecture 60 - Nice Applications of the LGV Lemma
Lecture 61 - Sign-Reversing Involutions
Lecture 62 - Proof of the LGV Lemma
Lecture 63 - The Cauchy-Binet Formula
Lecture 64 - Symmetric polynomials: definition and examples
Lecture 65 - Monomial symmetric polynomials
Lecture 66 - Elementary and Complete symmetric polynomials - Part 1
Lecture 67 - Elementary and Complete symmetric polynomials - Part 2
Lecture 68 - Alternating polynomials

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Lecture 69 - Labelled abaci and alternants
Lecture 70 - Schur polynomials
Lecture 71 - Pieri Rule - Statement and Examples
Lecture 72 - Pieri Rule - Proof
Lecture 73 - The second Pieri rule
Lecture 74 - Semi-standard tableaux
Lecture 75 - Triangularity of Kostka matrix
Lecture 76 - Monomial expansion of Schur
Lecture 77 - The RSK correspondence
Lecture 78 - Jacobi Trudi identities via LGV lemma
Lecture 79 - Formal ring of symmetric functions in infinitely many variables
Lecture 80 - Monomial expansions and RSK
Lecture 81 - Generating functions for e, h
Lecture 82 - The power sum symmetric functions
Lecture 83 - The inner product and Cauchy identity
Lecture 84 - Skew Schur functions and the LR rule

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NPTEL Video Course - Mathematics - NOC:An Invitation to Topology

Subject Co-ordinator - Prof. Indrava Roy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Topology
Lecture 2 - Basic Set theory
Lecture 3 - Mathematical Logic - Part 1
Lecture 4 - Mathematical Logic - Part 2
Lecture 5 - Functions
Lecture 6 - Finite Sets - Part 1
Lecture 7 - Finite Sets - Part 2
Lecture 8 - Infinite Sets
Lecture 9 - Infinite Sets and Axiom of Choice
Lecture 10 - Definition of aTopology
Lecture 11 - Examples of different topologies
Lecture 12 - Basis for a topology
Lecture 13 - Various topologies on the real line
Lecture 14 - Comparison of topologies - Part 1: Finer and coarser topologies
Lecture 15 - Comparison of topologies - Part 2: Comparing the various topologies on R
Lecture 16 - Basis and Sub-basis for a topology
Lecture 17 - Various topologies: the subspace topology
Lecture 18 - The Product topology
Lecture 19 - Topologies on arbitrary Cartesian products
Lecture 20 - Metric topology - Part 1
Lecture 21 - Metric topology - Part 2
Lecture 22 - Metric topology - Part 3
Lecture 23 - Closed Sets
Lecture 24 - Closure and Limit points
Lecture 25 - Continuous functions
Lecture 26 - Construction of continuous functions
Lecture 27 - Continuous functions on metric spaces - Part 1
Lecture 28 - Continuous functions on metric spaces - Part 2
Lecture 29 - Connectedness

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Lecture 30 - Some conditions for Connectedness
Lecture 31 - Connectedness of the Real Line
Lecture 32 - Connectedness of a Linear Continuum
Lecture 33 - The Intermediate Value Theorem
Lecture 34 - Path-connectedness
Lecture 35 - Connectedness does not imply Path-connectedness - Part 1
Lecture 36 - Connectedness does not imply Path-connectedness - Part 2
Lecture 37 - Connected and Path-connected Components
Lecture 38 - Local connectedness and Local Path-connectedness
Lecture 39 - Compactness
Lecture 40 - Properties of compact spaces
Lecture 41 - The Heine-Borel Theorem
Lecture 42 - Tychonoff't theorem
Lecture 43 - Proof of Tychonoff's theorem - Part 1
Lecture 44 - Proof of Tychonoff's theorem - Part 2
Lecture 45 - Compactness in metric spaces
Lecture 46 - Lebesgue Number Lemma and the Uniform Continuity theorem
Lecture 47 - Different Kinds of Compactness
Lecture 48 - Equivalence of various compactness properties for Metric Spaces
Lecture 49 - Compactness and Sequential Compactness in arbitrary topological spaces
Lecture 50 - Baire Spaces
Lecture 51 - Properties and Examples of Baire Spaces
Lecture 52 - The Baire Category Theorem
Lecture 53 - Complete Metric Spaces and the Baire Category theorem - Part 1
Lecture 54 - Complete Metric Spaces and the Baire Category theorem - Part 2
Lecture 55 - Application of the Baire Category theorem
Lecture 56 - Regular and Normal spaces
Lecture 57 - Properties and examples of regular and normal spaces
Lecture 58 - Urysohn's Lemma
Lecture 59 - Proof of Urysohn's Lemma
Lecture 60 - Tietze Extension theorem - Part 1
Lecture 61 - Tietze Extension theorem - Part 2
Lecture 62 - Compactness and Completeness in Metric spaces
Lecture 63 - The space of continuous functions - Part 1
Lecture 64 - The space of continuous functions - Part 2
Lecture 65 - Equicontinuity
Lecture 66 - Total boundedness and Equicontinuity - Part 1
Lecture 67 - Total boundedness and Equicontinuity - Part 2
Lecture 68 - Topology of compact convergence - Part 1

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Lecture 69 - Topology of compact convergence - Part 2
Lecture 70 - Equicontinuity revisited - Part 1
Lecture 71 - Equicontinuity revisited - Part 2
Lecture 72 - Locally compact Hausdorff spaces
Lecture 73 - The ArzelÃ - Ascoli theorem

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NPTEL Video Course - Mathematics - NOC:Operator Theory

Subject Co-ordinator - Prof. G. Ramesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Semi Inner product spaces
Lecture 2 - Inner Product Spaces
Lecture 3 - Parallelogram law
Lecture 4 - Hilbert Spaces
Lecture 5 - Orthogonality
Lecture 6 - Projection Theorem
Lecture 7 - Linear Operator
Lecture 8 - Bounded Operators
Lecture 9 - Norm of a linear operator
Lecture 10 - Examples of bounded operators
Lecture 11 - The Adjoint Operator
Lecture 12 - The Adjoint: Properties
Lecture 13 - Closed range operators - 1
Lecture 14 - Closed range operators - 2
Lecture 15 - Self-adjoint Operators
Lecture 16 - Normal operators
Lecture 17 - Isometris and Unitaries
Lecture 18 - Isometris and Unitaries
Lecture 19 - Mutually Orthogonal Projections
Lecture 20 - Invariant Subspaces
Lecture 21 - Monotone Convergence Theorem
Lecture 22 - Square root
Lecture 23 - Polar decomposition
Lecture 24 - Invertibility
Lecture 25 - Spectrum
Lecture 26 - Spectral Mapping Theorem
Lecture 27 - The spectral radius formula
Lecture 28 - multiplicative linear functionals
Lecture 29 - The GKZ-theorem

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Lecture 30 - Maximal Ideal Space
Lecture 31 - Commutative C*-algebras
Lecture 32 - Decomposition of spectrum
Lecture 33 - Computing spectrum: Examples
Lecture 34 - Approximate spectrum
Lecture 35 - Approximate spectrum: Properties
Lecture 36 - Numerical bounds
Lecture 37 - Compact Operators
Lecture 38 - Compact Operators; Properties
Lecture 39 - Spectral Theorem: Compact Self-Adjoint Operators
Lecture 40 - Spectral Theorem: Consequences
Lecture 41 - Compact Normal Operators
Lecture 42 - Compact Operators Singular value Decomposition
Lecture 43 - Fredholm Alternative Theorem
Lecture 44 - Orthogonal decomposition of self-adjoint operators
Lecture 45 - Spectral family; Properties - I
Lecture 46 - Spectral family; Properties - II
Lecture 47 - Spectral theorem Self adjoint Operators
Lecture 48 - Spectral theorem Examples
Lecture 49 - Spectral theorem: Consequences
Lecture 50 - Continuous functional Calculus
Lecture 51 - Spectral mapping theorem

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NPTEL Video Course - Mathematics - NOC:Measure and Integration

Subject Co-ordinator - Prof. S. Kesavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preamble
Lecture 2 - Algebras of sets
Lecture 3 - Measures on rings
Lecture 4 - Outer-measure
Lecture 5 - Measurable sets
Lecture 6 - Caratheodory's method
Lecture 7 - Exercises
Lecture 8 - Exercises
Lecture 9 - Lebesgue measure: the ring
Lecture 10 - Construction of the Lebesgue measure
Lecture 11 - Errata
Lecture 12 - The Cantor set
Lecture 13 - Approximation
Lecture 14 - Approximation
Lecture 15 - Approximation
Lecture 16 - Translation Invariance
Lecture 17 - Non-measurable sets
Lecture 18 - Exercises
Lecture 19 - Measurable functions
Lecture 20 - Measurable functions
Lecture 21 - The Cantor function
Lecture 22 - Exercises
Lecture 23 - Egorov's theorem
Lecture 24 - Convergence in measure
Lecture 25 - Convergence in measure
Lecture 26 - Convergence in measure
Lecture 27 - Exercises
Lecture 28 - Integration: Simple functions
Lecture 29 - Non-negative functions

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Lecture 30 - Monotone convergence theorem
Lecture 31 - Examples
Lecture 32 - Fatou's lemma
Lecture 33 - Integrable functions
Lecture 34 - Dominated convergence theorem
Lecture 35 - Dominated convergence theorem: Applications
Lecture 36 - Absolute continuity
Lecture 37 - Integration on the real line
Lecture 38 - Examples
Lecture 39 - Weierstrass' theorem
Lecture 40 - Exercises
Lecture 41 - Exercises
Lecture 42 - Vitali covering lemma
Lecture 43 - Monotonic functions
Lecture 44 - Functions of bounded variation
Lecture 45 - Functions of bounded variation
Lecture 46 - Functions of bounded variation
Lecture 47 - Differentiation of an indefinite integral
Lecture 48 - Absolute continuity
Lecture 49 - Exercises
Lecture 50 - Product spaces
Lecture 51 - Product spaces: measurable functions
Lecture 52 - Product measure
Lecture 53 - Fubini's theorem
Lecture 54 - Examples
Lecture 55 - Examples
Lecture 56 - Integration of radial functions
Lecture 57 - Measure of the unit ball in N dimensions
Lecture 58 - Exercises
Lecture 59 - Signed measures
Lecture 60 - Hahn and Jordan decompositions
Lecture 61 - Upper,lower and totaal variations of a signed measure; Absolute continuity
Lecture 62 - Absolute continuity
Lecture 63 - Radon-Nikodym theorem
Lecture 64 - Radon-Nikodym theorem
Lecture 65 - Exercises
Lecture 66 - Lebesgue spaces
Lecture 67 - Examples. Inclusion questions
Lecture 68 - Convergence in L^p

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Lecture 69 - Approximation
Lecture 70 - Applications
Lecture 71 - Duality
Lecture 72 - Duality
Lecture 73 - Convolutions
Lecture 74 - Convolutions
Lecture 75 - Convolutions
Lecture 76 - Exercises
Lecture 77 - Exercises
Lecture 78 - Change of variable
Lecture 79 - Change of variable

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NPTEL Video Course - Mathematics - NOC:Approximate Reasoning using Fuzzy Set Theory

Subject Co-ordinator - Prof. Balasubramaniam Jayaram

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Flow of the Course: A not-so-sneak peek
Lecture 2 - Fuzzy Sets - The Necessity
Lecture 3 - Fuzzy Sets - Representations
Lecture 4 - Fuzziness vs Probability
Lecture 5 - Fuzzy Sets - Some Important Notions
Lecture 6 - Operations on Fuzzy Sets
Lecture 7 - Posets on Fuzzy Sets
Lecture 8 - Lattice of Fuzzy Sets
Lecture 9 - Boolean Algebra of Sets
Lecture 10 - Algebras on Fuzzy Sets
Lecture 11 - Triangular Norms
Lecture 12 - Triangular Norms: Analytical Aspects
Lecture 13 - Triangular Norms: Algebraic Aspects
Lecture 14 - T-Norms: Construction and Representations
Lecture 15 - T-Norms:Complementation and Duality
Lecture 16 - Fuzzy Implications
Lecture 17 - Fuzzy Implications - Desirable Properties
Lecture 18 - Construction of Fuzzy Implication - I
Lecture 19 - Construction of Fuzzy Implication - II
Lecture 20 - Construction of Fuzzy Implication - II
Lecture 21 - Construction of Fuzzy Implication - III
Lecture 22 - Construction of Fuzzy Implication - IV
Lecture 23 - (N, T, I)- An Organic Relationship
Lecture 24 - Fuzzy Relations
Lecture 25 - Composition of Fuzzy Relations
Lecture 26 - Similarity and Compatibility Classes
Lecture 27 - On the Transitivity of Fuzzy Relations - I
Lecture 28 - On the Transitivity of Fuzzy Relations - II
Lecture 29 - Fuzzy Propositions: Some Interpretations

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Lecture 30 - Fuzzy If-Then Rules
Lecture 31 - Fuzzy Relational Inference
Lecture 32 - Fuzzy Relational Inference - MISO Case
Lecture 33 - Fuzzy Relational Inference - Multiple Rules
Lecture 34 - Fuzzy Inferencing Schemes - A Visual Illustration
Lecture 35 - Similarity Based Reasoning
Lecture 36 - SBR : Mamdani Fuzzy Systems
Lecture 37 - Introduction to Building a Mamdani FIS
Lecture 38 - Contrast Enhancement in Images: An FIS Approach
Lecture 39 - Takagi-Sugeno-Kang Fuzzy Systems
Lecture 40 - Fuzzy Inference Systems - Interpolativity
Lecture 41 - Interpolativity of FRI - Single SISO Rule
Lecture 42 - Fuzzy Relational Equations
Lecture 43 - Interpolativity of FRI - Multiple SISO Rules
Lecture 44 - Similarity Based Reasoning- Interpolativity
Lecture 45 - FRI~SBR : FITA~FATI : Some Connections
Lecture 46 - Continuous Models of FRI
Lecture 47 - Continuous Models of CRI and BKS
Lecture 48 - Continuous Models of SBR
Lecture 49 - Extensionality of a Fuzzy Set
Lecture 50 - Robustness of CRI
Lecture 51 - Robustness of BKS
Lecture 52 - Robustness of SBR
Lecture 53 - Monotonicity of an FIS
Lecture 54 - Monotonicity of an FRI
Lecture 55 - Monotonicity of an SBR
Lecture 56 - Functional (In)Equalities involving FLCs
Lecture 57 - Suitability of BKS with Yager's Implications
Lecture 58 - Law of Importation and Hierarchical CRI

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NPTEL Video Course - Mathematics - NOC:Probability-II with Examples Using R

Subject Co-ordinator - Prof. Siva Athreya

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Continuous Random Variables - Part 1
Lecture 2 - Continuous Random Variables - Part 2
Lecture 3 - R Set Up
Lecture 4 - Exponential and Normal Random Variable
Lecture 5 - Normal Random Variable
Lecture 6 - Distribution Function
Lecture 7 - Normal Distribution
Lecture 8 - Problem Solving for Week 12 - Part 2
Lecture 9 - Joint Distribution of Continuous Random Variables
Lecture 10 - Marginal Density and Independence
Lecture 11 - Uniform Distribution in R2
Lecture 12 - Problem Solving
Lecture 13 - Bivariate Normal - Part 1
Lecture 14 - Problem Solving 1 - Calculating Probabilities
Lecture 15 - Problem Solving 2 - Quadratic Equation, Random Coefficients
Lecture 16 - Conditional Density
Lecture 17 - Sums of Independent Random Variables
Lecture 18 - Quotient of Independent Random Variables
Lecture 19 - Simulating Bivariate Normal Random Variables
Lecture 20 - Problem Solving Conditional Density
Lecture 21 - Expectation and Variance of Continuous Random Variables
Lecture 22 - Revisit of Variance and Expectation
Lecture 23 - Revisit of Properties of Variance
Lecture 24 - Covariance and Correlation
Lecture 25 - Conditional Expectation and Conditional Variance
Lecture 26 - Analysis of Variance Formula
Lecture 27 - Problem Solving Expectations
Lecture 28 - Moment Generating Function
Lecture 29 - Moments and Moment Generating Function

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Lecture 30 - Bivariate Normal - Part 2
Lecture 31 - Problem Solving Conditional Expectation and Conditional Variance
Lecture 32 - Sampling Distribution and Sample Mean
Lecture 33 - Weak Law of Large Numbers
Lecture 34 - Revisit Weak Law of Large Numbers
Lecture 35 - Problem Solving
Lecture 36 - Demoivre-Laplace Central Limit Theorem and Normal Random Variables
Lecture 37 - Revisit Normal Random Variables
Lecture 38 - Normal Tables, Mean and Variance
Lecture 39 - Problem Solving
Lecture 40 - Bivariate Normal Random Variables_Characterisation
Lecture 41 - Bivariate Normal Random Variables_Independence
Lecture 42 - Problem Solving
Lecture 43 - Bivariate Normal Random Variables Joint Density Calculation - Part 1
Lecture 44 - Bivariate Normal Random Variables Joint Density Calculation - Part 2
Lecture 45 - Problem Solving - Review of Transformation of Random Variables

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NPTEL Video Course - Mathematics - NOC:Predictive Analytics - Regression and Classification

Subject Co-ordinator - Prof. Sourish Das

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Least Squares method
Lecture 3 - Hands-on with Python - Part 1
Lecture 4 - Hands-on with R - Part 1
Lecture 5 - Categorical Variable as Predictor - Part 1
Lecture 6 - Categorical Variable as Predictor - Part 2
Lecture 7 - Hands-on with R - Part 2
Lecture 8 - Understanding the joint probability from data perspective
Lecture 9 - Hands-on with R - Part 3
Lecture 10 - Regression Line as Conditional Expectation
Lecture 11 - Normal Equations
Lecture 12 - Gauss Markov Theorem
Lecture 13 - Hands-on with Python - Part 2
Lecture 14 - Geometry of Regression Model and Feature Engineering
Lecture 15 - Sampling Distribution and Statistical Inference of Regression Coefficient
Lecture 16 - Hands-on with R - Part 4
Lecture 17 - Checking Model Assumptions
Lecture 18 - Comparing Models with Predictive Accuracy
Lecture 19 - Hands-on with Julia
Lecture 20 - Model Complexity, Bias and Variance Tradeoff
Lecture 21 - Feature Selection, Variable Selection
Lecture 22 - Hands on with R - Part 5
Lecture 23 - Understanding Multicollinearity
Lecture 24 - Ill-Posed Problem and Regularisation, LASSO and Risdge
Lecture 25 - Hands-on with Python - Part 3
Lecture 26 - Time Series Forecasting with Regression Model
Lecture 27 - Hands on with R - Part 6
Lecture 28 - Granger Causal model
Lecture 29 - Hands on with R - Part 7

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Lecture 30 - Capital Asset Pricing Model
Lecture 31 - Hands on with R for CAPM
Lecture 32 - Bootstrap Regression
Lecture 33 - Hands on with R for Bootstrap Regression
Lecture 34 - Hands on with Python: Handle multicollinearity with Ridge correction
Lecture 35 - Hands on with Julia: Implemente Chennai Temperature Analysis with Julia and CRRao
Lecture 36 - Introduction to logistic Regression
Lecture 37 - Maximum Likelihood Estimate for Logistic Regression
Lecture 38 - Hands on with R for Logistic Regression
Lecture 39 - Hands on with R: Measure Time performance of R code
Lecture 40 - Statistical Inference of Logistic Regression
Lecture 41 - Hands on with R with Iris Dataset
Lecture 42 - Multi-Class Classification with Discriminant Analysis
Lecture 43 - Hands on with R: Implement LDA
Lecture 44 - Effect of Feature Engineer in Logistic Regression
Lecture 45 - Logistic Regression to Deep Learning Neural Network
Lecture 46 - Hands on with R: Feature Engineer in Logistic Regression
Lecture 47 - Generalised Linear Model
Lecture 48 - Hands on with R: Poisson Regression with Football Data
Lecture 49 - Gaussian Process Regression
Lecture 50 - Hands on with R: Implement GP Regression from scratch
Lecture 51 - Tree Structured Regression
Lecture 52 - Hands on with R: Implement Tree Regression and Random Forest with Simulated Data
Lecture 53 - Hands on with R: Implement Tree Regression and Random Forest with EPL football Data
Lecture 54 - Hands on with Python : Analysis of Bangalore House Price Data
Lecture 55 - Hands on with R: Prediction of Bangalore House Price
Lecture 56 - Hands on with R: More Prediction of Bangalore House Price
Lecture 57 - Hands on with R: Some Correction with Bangalore House Price Data Prediction
Lecture 58 - Hands on with R: Classify fake bank note with GLM
Lecture 59 - Hands on with R: Dynamic Pricing with Cheese Data
Lecture 60 - Hands on with Julia - Bayesian Logistic Regression with Horse Shoe Prior - Genetic Data Analysis
Lecture 61 - Hands on with Julia - Bayesian Poisson Regression with Horse Shoe Prior English Premier League D
Lecture 62 - Why Julia is Future for Data Science Projects ?
Lecture 63 - Concluding Remarks
Lecture 64 - Course Review

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NPTEL Video Course - Mathematics - NOC:Introduction to Algebraic Geometry

Subject Co-ordinator - Prof. Arijit Dey

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Commutative Algebra - Part 1
Lecture 2 - Commutative Algebra - Part 2
Lecture 3 - Commutative Algebra - Part 3
Lecture 4 - Commutative Algebra - Part 4
Lecture 5 - Commutative Algebra - Part 5
Lecture 6 - Tutorial 1 : Cayley-Hamilton Theorem, Nakayama's Lemma
Lecture 7 - Commutative Algebra - Part 6
Lecture 8 - Commutative Algebra - Part 7
Lecture 9 - Commutative Algebra - Part 8
Lecture 10 - Affine Algebraic Sets - Part 1
Lecture 11 - Affine Algebraic Sets - Part 2
Lecture 12 - Tutorial 2 : Noether Normalization Lemma,Some Important Results in Dimension Theory
Lecture 13 - Regular Morphisms
Lecture 14 - Abstract Algebraic Sets
Lecture 15 - Zariski Topology on Affine Space
Lecture 16 - Irreducible Affine Algebraic Sets
Lecture 17 - Ring of Regular Functions
Lecture 18 - Projective Space
Lecture 19 - Tutorial 3 : Some Applications of Dimension Theory
Lecture 20 - Zariski Topology on Projective Space
Lecture 21 - Affine Open Cover of Projective Space
Lecture 22 - Projective and Quasi-Projective Varieties
Lecture 23 - Regular Functions on Quasi-Projective Varieties
Lecture 24 - Presheaves and Sheaves
Lecture 25 - Morphism of Presheaves/Sheaves
Lecture 26 - Tutorial 4 : More Applications of Dimension Theory
Lecture 27 - A Brief Overview of Sheaf Theory - Part 1
Lecture 28 - A Brief Overview of Sheaf Theory - Part 2
Lecture 29 - A Brief Overview of Sheaf Theory - Part 3

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Lecture 30 - Prevarieties
Lecture 31 - Sheaf of Regular Functions
Lecture 32 - Ring of Germs of Regular Functions at a point, Field of Rational Functions
Lecture 33 - Tutorial 5 : Sheafification
Lecture 34 - Ring of Regular Functions, Local Ring at a Point,and Field of Rational Functions of an AffineVar
Lecture 35 - Equivalence of Categories of the Category of Affine Varieties over a Field k and the Category
Lecture 36 - Equivalence of Categories of the Category of Affine Varieties over a Field k (Continued...)
Lecture 37 - Some Examples, Open Immersions and Closed Immersions
Lecture 38 - Product of Quasi-affine Varieties
Lecture 39 - Diagonal Morphisms, Abstract Varieties
Lecture 40 - Tutorial 6 : Normal Varieties and Normalization of a Variety
Lecture 41 - Projective Varieties Revisited - Part 1
Lecture 42 - Projective Varieties Revisited - Part 2
Lecture 43 - Global Regular Functions on ProjectiveVarieties are Constants - Part 1
Lecture 44 - Global Regular Functions on ProjectiveVarieties are Constants - Part 2
Lecture 45 - Product of Prevarieties - Part 1
Lecture 46 - Product of Prevarieties - Part 2
Lecture 47 - Tutorial 7 : A Result on Tensor Products of k-algebras
Lecture 48 - Morphisms of Prevarieties - Part 1
Lecture 49 - Morphisms of Prevarieties - Part 2
Lecture 50 - Finite Morphisms - Part 1
Lecture 51 - Finite Morphisms - Part 2
Lecture 52 - Fiber Products
Lecture 53 - Tutorial 8 : Finite Morphisms
Lecture 54 - Immersions
Lecture 55 - Fiber Products, Separatedness
Lecture 56 - Criterion of Separatedness
Lecture 57 - Proper Morphisms and Complete Varieties
Lecture 58 - Tutorial 9 : Closed Immersions and Graph of a Morphism
Lecture 59 - Projective Varieties are Complete
Lecture 60 - Zariski Tangent Space, Singular and Nonsingular Points
Lecture 61 - Smooth Points Form a Non-empty Open Subset
Lecture 62 - Blow-Ups, Rational Maps and Birational Maps
Lecture 63 - Tutorial 10 : Zariski Tangent Space at a Point of an Affine Variety
Lecture 64 - Blow-Ups (Continued...)
Lecture 65 - Smooth Morphisms
Lecture 66 - Bertini's Theorem
Lecture 67 - Sard's Theorem
Lecture 68 - Tutorial 11 : Dimension of fiber of a morphism

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Lecture 69 - Introduction to Affine Schemes - Spectrum of a Ring
Lecture 70 - Introduction to Affine Schemes - Topology on Spec A
Lecture 71 - Introduction to Affine Schemes - Topology on Spec A (Continued...)
Lecture 72 - Introduction to Affine Schemes - Sheaf Structure on Spec A
Lecture 73 - Abstract Non-singular Curves - Part 1
Lecture 74 - Abstract Non-singular Curves - Part 2
Lecture 75 - Tutorial 12 : Extension of Regular Functions

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NPTEL Video Course - Mathematics - NOC:Introduction to Statistics

Subject Co-ordinator - Prof. Sameen Naqvi

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Types of variables
Lecture 2 - Types of studies
Lecture 3 - Types of sampling strategies
Lecture 4 - Python - Session 1
Lecture 5 - Python - Session 2
Lecture 6 - Summary measures of categorical and numerical variables
Lecture 7 - Measures of Dispersion
Lecture 8 - Measures of Skewness
Lecture 9 - Python - Session 3
Lecture 10 - Python - Session 4
Lecture 11 - Visualizing categorical and numerical data
Lecture 12 - Visualizing numerical data
Lecture 13 - Python - Session 5
Lecture 14 - Python - Session 6
Lecture 15 - Python - Session 7
Lecture 16 - Sampling distribution of sample mean
Lecture 17 - Central Limit Theorem
Lecture 18 - Sampling distribution of sample variance and proportion
Lecture 19 - Python - Session 8
Lecture 20 - Python - Session 9
Lecture 21 - Sampling distribution of difference of sample means - Part 1
Lecture 22 - Sampling distribution of difference of sample means - Part 2
Lecture 23 - Sampling distribution of ratio of sample variances and difference of sample proportions
Lecture 24 - Python - Session 10
Lecture 25 - Python - Session 11
Lecture 26 - Point estimation - Part 1
Lecture 27 - Point estimation - Part 2
Lecture 28 - Point estimation - Part 3
Lecture 29 - Python - Session 12

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Lecture 30 - Python - Session 13
Lecture 31 - Unbiased estimation
Lecture 32 - EM algorithm - Part 1
Lecture 33 - EM algorithm - Part 2
Lecture 34 - Python - Session 14
Lecture 35 - Python - Session 15
Lecture 36 - Hypothesis Testing - Part 1
Lecture 37 - Hypothesis Testing - Part 2
Lecture 38 - Hypothesis Testing - Part 3
Lecture 39 - Python - Session 16
Lecture 40 - Python - Session 17
Lecture 41 - Hypothesis Testing for two sample problem - Part 1
Lecture 42 - Hypothesis Testing for two sample problem - Part 2
Lecture 43 - Hypothesis Testing for two sample problem - Part 3
Lecture 44 - Python - Session 18
Lecture 45 - Python - Session 19
Lecture 46 - Bootstrap Hypothesis Testing - Part 1
Lecture 47 - Python - Session 20
Lecture 48 - Python - Session 21
Lecture 49 - Bootstrap Hypothesis Testing - Part 2
Lecture 50 - Python - Session 22
Lecture 51 - Confidence Interval Estimation - Part 1
Lecture 52 - Confidence Interval Estimation - Part 2
Lecture 53 - Confidence Interval Estimation - Part 3
Lecture 54 - Python - Session 23
Lecture 55 - Python - Session 24
Lecture 56 - Confidence interval for two sample problem
Lecture 57 - Python - Session 25
Lecture 58 - Bootstrap Confidence Interval
Lecture 59 - Python - Session 26
Lecture 60 - Python - Session 27

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NPTEL Video Course - Mathematics - NOC:Probability Theory for Data Science

Subject Co-ordinator - Prof. Ishapathik Das

Co-ordinating Institute - IIT - Thirupathi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sample Space and Events
Lecture 3 - Special Events and Various Approaches to Defining Probability
Lecture 4 - Important Theorems
Lecture 5 - Numerical Examples and Introduction to Conditional Probability
Lecture 6 - Definition of Conditional Probability and Independence
Lecture 7 - Bayes' Theorem
Lecture 8 - Random Variable
Lecture 9 - Events Defined by a Random Variable
Lecture 10 - Cumulative Distribution Function
Lecture 11 - Properties of the Cumulative Distribution Function and Discrete Random Variable
Lecture 12 - Probability Mass Function
Lecture 13 - Continuous Random Variable and Probability Density Function
Lecture 14 - Numerical Examples
Lecture 15 - Moments
Lecture 16 - Higher Order Moments and Variance of a Random Variable
Lecture 17 - Numerical Examples of Moments and Bernoulli Distribution
Lecture 18 - Binomial Distribution
Lecture 19 - Applications of Binomial Distribution
Lecture 20 - Poisson Distribution
Lecture 21 - Applications of Poisson Distribution
Lecture 22 - Numerical Examples of Poisson Distribution and Uniform Distribution
Lecture 23 - Application of Uniform Distribution and Exponential Distribution
Lecture 24 - Applications of Exponential Distribution
Lecture 25 - Memoryless Property and Gamma Distribution
Lecture 26 - Example of Gamma Distribution and Normal Distribution
Lecture 27 - Properties of Normal Distributions
Lecture 28 - Numerical Examples of Normal Distributions
Lecture 29 - Applications of Normal Distributions and Conditional Distribution Function

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Lecture 30 - Examples of Conditional Distribution Function and Bivariate Random Variable
Lecture 31 - Example of Bivariate Random Variable
Lecture 32 - Properties of the Joint Cumulative Distribution Function of a Bivariate Random Variable
Lecture 33 - Independence Between Two Random Variables
Lecture 34 - Examples of Joint Cumulative Distribution Functions, Marginals, and Independence
Lecture 35 - Joint Probability Mass Function, Marginal Probability Mass Function, Examples
Lecture 36 - Numerical Examples on Bivariate Discrete Random Variables and the Concept of Joint Probability
Lecture 37 - Marginal Probability Density Function, Independence, and Examples
Lecture 38 - Numerical Examples on Probability Density Function
Lecture 39 - Conditional Probability Mass Function
Lecture 40 - Conditional Probability Density Function
Lecture 41 - Moments for Bivariate Random Variables
Lecture 42 - Association Between Two Random Variables
Lecture 43 - Numerical Examples on Moments for Bivariate Random Variables
Lecture 44 - Conditional Mean and Variance for Discrete Random Variables
Lecture 45 - Conditional Mean and Variance for Continuous Random Variables
Lecture 46 - Numerical Examples on Conditional Mean and Variance
Lecture 47 - Multivariate Random Variables
Lecture 48 - Multivariate Probability Density Function and Independence
Lecture 49 - Moments of a Multivariate Random Variable
Lecture 50 - Numerical Examples on Joint Probability Mass Functions
Lecture 51 - Numerical Examples on Joint Probability Density Functions
Lecture 52 - Multinomial Distribution and Multivariate Normal Distribution
Lecture 53 - Transformation of Random Variables
Lecture 54 - Theorem on Transformation of Random Variables
Lecture 55 - Transformation of Multivariate Random Variables
Lecture 56 - Examples of Transformation of Bivariate Random Variables
Lecture 57 - Convolution and Example on Transformation of n-variate Random Variables
Lecture 58 - Transformation of Discrete Random Variables
Lecture 59 - Moment Generating Functions
Lecture 60 - Example of Moment Generating Functions
Lecture 61 - Moment Generating Functions for the Transformation of Random Variables
Lecture 62 - Chebyshev's Inequality
Lecture 63 - Notions of Convergence, Law of Large Numbers, and the Central Limit Theorem

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NPTEL Video Course - Mathematics - NOC:Algebra 1: Foundations

Subject Co-ordinator - Prof. Jaikrishnan J

Co-ordinating Institute - IIT - Palakkad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The nature of pure mathematics
Lecture 2 - Basic set theory
Lecture 3 - Basic logic
Lecture 4 - Proofs
Lecture 5 - More about proofs
Lecture 6 - Set theoretic identities
Lecture 7 - Functions
Lecture 8 - Equivalence relations
Lecture 9 - Quotients
Lecture 10 - More functions
Lecture 11 - Binary operations
Lecture 12 - Groups
Lecture 13 - Rings and integral domains
Lecture 14 - Peeking under the carpet
Lecture 15 - The Integers
Lecture 16 - Induction
Lecture 17 - Applications of Induction
Lecture 18 - Uniqueness of Integers
Lecture 19 - Cardinality of sets
Lecture 20 - Division in the Integers
Lecture 21 - Congruences
Lecture 22 - Basic number theory
Lecture 23 - Fields
Lecture 24 - Real numbers
Lecture 25 - Complex numbers
Lecture 26 - Polynomials
Lecture 27 - System of Linear Equations
Lecture 28 - Gaussian elimination
Lecture 29 - Matrix Algebra

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Lecture 30 - Square systems
Lecture 31 - The set of solutions
Lecture 32 - Vector spaces
Lecture 33 - Direct sums of subspaces
Lecture 34 - Spans and linear independence
Lecture 35 - Basis
Lecture 36 - Linear Maps
Lecture 37 - The Rank--Nullity theorem
Lecture 38 - Matrices and Linear transformations
Lecture 39 - Change of basis
Lecture 40 - Eigenvalues
Lecture 41 - Minimal Polynomial
Lecture 42 - Applications of the minimal polynomial
Lecture 43 - Triangular Form
Lecture 44 - Jordan Form
Lecture 45 - Examples of Canonical Forms

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NPTEL Video Course - Mathematics - NOC:An Introduction to Matrix Lie Groups

Subject Co-ordinator - Prof. Krishnendu Gongopadhyay

Co-ordinating Institute - IISER Mohali

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Complex Numbers
Lecture 2 - The Plane Rotations
Lecture 3 - The Quaternions
Lecture 4 - Quaternionic matrices
Lecture 5 - What is a Matrix Lie Group
Lecture 6 - General Linear Group
Lecture 7 - Complex matrices as real matrices
Lecture 8 - Quaternionic matrices as real matrices
Lecture 9 - Discussions on quaternions
Lecture 10 - Topology of matrix groups
Lecture 11 - Topology of matrix groups: Closedness
Lecture 12 - Path-Connected subsets in R^m
Lecture 13 - Compactness in R^m
Lecture 14 - Inner products
Lecture 15 - Unitary transformations
Lecture 16 - Unitary matrices
Lecture 17 - Congruence
Lecture 18 - Euclidean isometries
Lecture 19 - Two dimensional Euclidean Isometries
Lecture 20 - Compactness of unitary groups
Lecture 21 - Connectedness of complex matrix groups
Lecture 22 - Connectedness of real matrix groups
Lecture 23 - Differentiability of a function - I
Lecture 24 - Differentiability of a function - II
Lecture 25 - What is a Lie Algebra
Lecture 26 - Examples of Lie algebras
Lecture 27 - Lie algebra for special linear groups
Lecture 28 - Lie algebra as vector fields
Lecture 29 - Lie algebras for orthogonal and unitary groups

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Lecture 30 - Series of Matrices
Lecture 31 - Series of Matrices
Lecture 32 - Exponential map
Lecture 33 - Properties of Exponential Map
Lecture 34 - One parameter Subgroups
Lecture 35 - Matrix logarithm
Lecture 36 - Inverse Function Theorem
Lecture 37 - Image of the Exponential map
Lecture 38 - Exponential map is a local diffeomorphism
Lecture 39 - Every matrix group is a manifold
Lecture 40 - Calculus on Manifolds
Lecture 41 - The Lie Bracket
Lecture 42 - Lie Algebra isomorphisms and Matrix Group isomorphisms
Lecture 43 - Example of isomorphic Lie algebras
Lecture 44 - The adjoint Representation
Lecture 45 - Adjoint representation for compact matrix groups
Lecture 46 - Shape of space rotations
Lecture 47 - More double covers - I
Lecture 48 - More double covers - II
Lecture 49 - Overview of Simply Connectedness
Lecture 50 - Correspondence between connected subgroups and Lie Ideals
Lecture 51 - Discrete subgroups - I
Lecture 52 - Discrete subgroups - II
Lecture 53 - Characterization of Torus
Lecture 54 - Maximal Torus
Lecture 55 - Non-compact Examples: Lorentzian groups
Lecture 56 - Symplectic groups
Lecture 57 - Introduction to Smooth Manifolds
Lecture 58 - Tangent spaces to Smooth Manifolds
Lecture 59 - Lie groups

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NPTEL Video Course - Mathematics - NOC:Introduction to Algebraic Topology

Subject Co-ordinator - Prof. Arpan Kabiraj

Co-ordinating Institute - IIT Palakkad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Topology
Lecture 2 - Some Topological Constructions and Homotopy
Lecture 3 - Retraction and Deformation Retraction
Lecture 4 - Contractible Spaces and Null Homotopy
Lecture 5 - Some Questions
Lecture 6 - Simplicial Complex 1
Lecture 7 - Simplicial Complex 2
Lecture 8 - Simplicial Complex 3
Lecture 9 - Simplicial Complex 3 Delta Complex
Lecture 10 - Path Homotopy
Lecture 11 - The Fundamental Group
Lecture 12 - Covering Spaces
Lecture 13 - Path Lifting
Lecture 14 - Homotopy Lifting
Lecture 15 - The Fundamental Group of a Circle
Lecture 16 - The Induced Homomorphism
Lecture 17 - Applications
Lecture 18 - The Fundamental Group of a Sphere
Lecture 19 - Free Product of Groups
Lecture 20 - Seifert-Van Kampen Theorem 1
Lecture 21 - Seifert-Van Kampen Theorem 2
Lecture 22 - Lifting correspondence and Lifting criterion
Lecture 23 - Classification of Covering Spaces 1
Lecture 24 - Classification of Covering Spaces 2
Lecture 25 - Classification of Covering Spaces 3
Lecture 26 - The Group of Deck transformations
Lecture 27 - Action of Deck Transformations
Lecture 28 - Graphs and Free Groups
Lecture 29 - Free modules and chain complexes

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Lecture 30 - Notation and conventions
Lecture 31 - The Simplicial Chain Complex
Lecture 32 - Simplicial Homology : Examples
Lecture 33 - Few results about Homology
Lecture 34 - Relative Homology
Lecture 35 - Induced homomorphism 1
Lecture 36 - Induced homomorphism 2 Homology of a cone
Lecture 37 - Induced homomorphism 3 Contiguous maps
Lecture 38 - Induced homomorphism 4 Simplicial approximations and barycentric subdivisions
Lecture 39 - Induced homomorphism 5 Invariance of homology under barycentric subdivision
Lecture 40 - Homotopy invariance of induced homomorphism
Lecture 41 - Finite vs Infinite simplicial complex
Lecture 42 - Applications
Lecture 43 - Exact sequences
Lecture 44 - Zigzag Lemma
Lecture 45 - Naturality
Lecture 46 - Mayer-Vietoris Sequences
Lecture 47 - Excision
Lecture 48 - Local Homology
Lecture 49 - Maps of spheres
Lecture 50 - Hopf trace theorem
Lecture 51 - Hopf trace theorem and Euler number
Lecture 52 - Lefschetz fixed-point theorem
Lecture 53 - Jordan curve theorem
Lecture 54 - A glimpse of singular homology
Lecture 55 - Axioms for homology

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NPTEL Video Course - Mathematics - NOC:Probability Theory with Actuarial Applications

Subject Co-ordinator - Prof. Neelesh S. Upadhye

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Language of Risk
Lecture 2 - The Art of Counting Combinatorics
Lecture 3 - Updating Beliefs Conditional Probability
Lecture 4 - Bayes' Theorem The Update Tool
Lecture 5 - Independence The Free Pass
Lecture 6 - From Events to Numbers (Discrete RVs and PMF)
Lecture 7 - The Continuous World (Continuous RVs and PDF)
Lecture 8 - The 'Grand Unifier' (Cumulative Distribution Function)
Lecture 9 - The 'Center of Gravity' (Expected Value)
Lecture 10 - Functions of an RV (The Actuarial Toolkit)
Lecture 11 - The 'Yes/No' World (Bernoulli and Binomial)
Lecture 12 - The 'Claim Count' Model (Poisson)
Lecture 13 - The 'Waiting Time' Model (Exponential)
Lecture 14 - The 'Flexible' Model (Gamma)
Lecture 15 - The 'Everywhere' Model (Normal Distribution)
Lecture 16 - Joint Distributions (Discrete PMF)
Lecture 17 - Joint Distributions (Continuous PDF)
Lecture 18 - Independence and Conditional Distributions
Lecture 19 - Covariance (Measuring Linear Relationship)
Lecture 20 - Correlation and Variance of Sums
Lecture 21 - The '1D' Transformation (The CDF Method)
Lecture 22 - The '1D' Shortcut (Change of Variable)
Lecture 23 - The '2D' Transformation (The Jacobian Method)
Lecture 24 - The 'Aggregate Loss' Transformation (Convolution)
Lecture 25 - The 'Extreme Loss' (Order Statistics)
Lecture 26 - Conditional Expectation
Lecture 27 - The 'Tower Property' (Law of Total Expectation)
Lecture 28 - The Law of Total Variance (Eve's Law)
Lecture 29 - Conditioning Drills (Mixed Distributions)

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Lecture 30 - Review (Compound vs Mixed Models)
Lecture 31 - The 'Magic Tool' (Moment-Generating Function)
Lecture 32 - The MGF 'Lookup Table'
Lecture 33 - The 'Payoff' (MGF of Independent Sums)
Lecture 34 - Advanced Tools (CGFs and Compound Sum MGF)
Lecture 35 - Week 7 Review and Capstone Drill)
Lecture 36 - The Problem of 'Tails' (Why We Need Bounds)
Lecture 37 - The 'Better' Bound (Chebyshev's Inequality)
Lecture 38 - The Law of Large Numbers (LLN)
Lecture 39 - Other Inequalities (One-Sided Chebyshev and Jensen's)
Lecture 40 - Week 8 Review and Drills
Lecture 41 - The Central Limit Theorem (CLT)
Lecture 42 - CLT Drills (Aggregate Loss Problems)
Lecture 43 - The Continuity Correction
Lecture 44 - Capstone Drill (CLT for Aggregate Losses)
Lecture 45 - The Approximation ``Decision Tree'
Lecture 46 - The 'Language' of Insurance Models
Lecture 47 - Policy Feature 1 (Deductibles)
Lecture 48 - Policy Feature 2 (Policy Limits)
Lecture 49 - Capstone (Pricing a 'Policy Layer')
Lecture 50 - Review and Introduction to Stop-Loss
Lecture 51 - The 'Master Formula' for Expected Aggregate Loss
Lecture 52 - The 'Master Algorithm' for Var(S)
Lecture 53 - Finding Severity Moments E[Y^2] and Var(Y)
Lecture 54 - The 'Master Algorithm' Drill
Lecture 55 - Week 11 Review and Capstone Drills
Lecture 56 - 'The Big Picture' Review - Part 1: The Toolkit
Lecture 57 - 'The Big Picture' Review - Part 2: The Models
Lecture 58 - Mock Exam Review - Part 1: (Q1-10)
Lecture 59 - Mock Exam Review - Part 2: (Q11-20)
Lecture 60 - Mock Exam Review - Part 3: (Q21-30)

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NPTEL Video Course - Mathematics - NOC:Financial Mathematics for Actuaries

Subject Co-ordinator - Prof. Neelesh S. Upadhye, Prof. Pramod Kumar Naik

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Measurement of Interest
Lecture 2 - Simple vs Compound Interest
Lecture 3 - Present Value (v) and Discount Rate (d)
Lecture 4 - Relationships Between Rates (i vs d)
Lecture 5 - Problem Solving Lab (Basic TVM)
Lecture 6 - Nominal Interest Rates (i^(m))
Lecture 7 - Nominal Discount Rates (d^(m))
Lecture 8 - The Force of Interest Î´
Lecture 9 - Variable Force of Interest Î´_t
Lecture 10 - Inflation (Real vs Nominal Rates) and Review
Lecture 11 - The Equation of Value
Lecture 12 - Solving for Unknown Time (n)
Lecture 13 - Solving for Unknown Interest Rate (i)
Lecture 14 - Dollar-Weighted vs Time-Weighted Rates
Lecture 15 - Week 3 Problem Solving Lab
Lecture 16 - Annuity - Immediate
Lecture 17 - Annuity - Due
Lecture 18 - Future Value of Annuities
Lecture 19 - Annuities Payable mothly
Lecture 20 - Problem Solving Lab - Retirement Planning
Lecture 21 - Perpetuities
Lecture 22 - Continuous Annuities
Lecture 23 - Deferred Annuities
Lecture 24 - Solving for Unknowns (n and i)
Lecture 25 - Problem Solving Lab
Lecture 26 - Arithmetically Increasing Annuities
Lecture 27 - Decreasing Annuities
Lecture 28 - Geometrically Increasing Annuities
Lecture 29 - Varying Continuous Annuities

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Lecture 30 - Module 1 Review (Theory Quiz)
Lecture 31 - Loan Repayment Method - Part 1
Lecture 32 - Loan Repayment Method - Part 2
Lecture 33 - Loan Repayment Method - Part 3
Lecture 34 - Loan amortization; problems and solution
Lecture 35 - Loan Repayment method - Part 4
Lecture 36 - Bonds and Bond Pricing
Lecture 37 - The Concept of Bond Valuation
Lecture 38 - Bond Valuation
Lecture 39 - Bond Valuation - 1
Lecture 40 - Bond Amortization Schedule
Lecture 41 - Bond Valuation
Lecture 42 - Behavior of Interest Rate - 1
Lecture 43 - Behavior of Interest Rate - 2
Lecture 44 - Risk Structure and Bond Ratings
Lecture 45 - Yield Curve and the Term Structure of Interest Rate - 1
Lecture 46 - Yield Curve and the Term Structure of Interest Rate - 2
Lecture 47 - Bond Pricing under General Term Structure - I
Lecture 48 - Bond Pricing under General Term Structure - II
Lecture 49 - Bond Pricing under General Term Structure - III
Lecture 50 - Bond Duration and Management - 1
Lecture 51 - Bond Duration and Management - 2
Lecture 52 - Bond Duration and Management - 3
Lecture 53 - Priciples of Diversification
Lecture 54 - Optimal Portfolio Theory
Lecture 55 - Integrated Review: Loan Repayment Method
Lecture 56 - Integrated Review: Bond Basics, Bond Valuation - Part 1
Lecture 57 - Integrated Review: Bond Basics, Bond Valuation - Part 2
Lecture 58 - Integrated Review: Yiled Curve, Term Structure of Interest rate; Bond Duration and Convexity

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NPTEL Video Course - Mathematics - Discrete Mathematics

Subject Co-ordinator - Dr. Aditi Gangopadhyay, Dr. Sugata Gangopadhyay, Dr. Tanuja Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the theory of sets
Lecture 2 - Set operation and laws of set operation
Lecture 3 - The principle of inclusion and exclusion
Lecture 4 - Application of the principle of inclusion and exclusion
Lecture 5 - Fundamentals of logic
Lecture 6 - Logical Inferences
Lecture 7 - Methods of proof of an implication
Lecture 8 - First order logic (1)
Lecture 9 - First order logic (2)
Lecture 10 - Rules of influence for quantified propositions
Lecture 11 - Mathematical Induction (1)
Lecture 12 - Mathematical Induction (2)
Lecture 13 - Sample space, events
Lecture 14 - Probability, conditional probability
Lecture 15 - Independent events, Bayes theorem
Lecture 16 - Information and mutual information
Lecture 17 - Basic definition
Lecture 18 - Isomorphism and sub graphs
Lecture 19 - Walks, paths and circuits operations on graphs
Lecture 20 - Euler graphs, Hamiltonian circuits
Lecture 21 - Shortest path problem
Lecture 22 - Planar graphs
Lecture 23 - Basic definition
Lecture 24 - Properties of relations
Lecture 25 - Graph of relations
Lecture 26 - Matrix of relation
Lecture 27 - Closure of relaton (1)
Lecture 28 - Closure of relaton (2)
Lecture 29 - Warshall's algorithm

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Lecture 30 - Partially ordered relation
Lecture 31 - Partially ordered sets
Lecture 32 - Lattices
Lecture 33 - Boolean algebra
Lecture 34 - Boolean function (1)
Lecture 35 - Boolean function (2)
Lecture 36 - Discrete numeric function
Lecture 37 - Generating function
Lecture 38 - Introduction to recurrence relations
Lecture 39 - Second order recurrence relation with constant coefficients (1)
Lecture 40 - Second order recurrence relation with constant coefficients (2)
Lecture 41 - Application of recurrence relation

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NPTEL Video Course - Mathematics - NOC:Mathematical Methods and its Applications

Subject Co-ordinator - Prof. P.N. Agarwal, S. K. Gupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to linear differential equations
Lecture 2 - Linear dependence, independence and Wronskian of functions
Lecture 3 - Solution of second-order homogenous linear differential equations with constant coefficients - I
Lecture 4 - Solution of second-order homogenous linear differential equations with constant coefficients - II
Lecture 5 - Method of undetermined coefficients
Lecture 6 - Methods for finding Particular Integral for second-order linear differential equations with const
Lecture 7 - Methods for finding Particular Integral for second-order linear differential equations with const
Lecture 8 - Methods for finding Particular Integral for second-order linear differential equations with const
Lecture 9 - Euler-Cauchy equations
Lecture 10 - Method of reduction for second-order linear differential equations
Lecture 11 - Method of variation of parameters
Lecture 12 - Solution of second order differential equations by changing dependent variable
Lecture 13 - Solution of second order differential equations by changing independent variable
Lecture 14 - Solution of higher-order homogenous linear differential equations with constant coefficients
Lecture 15 - Methods for finding Particular Integral for higher-order linear differential equations
Lecture 16 - Formulation of Partial differential equations
Lecture 17 - Solution of LagrangeÂ s equation - I
Lecture 18 - Solution of LagrangeÂ s equation - II
Lecture 19 - Solution of first order nonlinear equations - I
Lecture 20 - Solution of first order nonlinear equations - II
Lecture 21 - Solution of first order nonlinear equations - III
Lecture 22 - Solution of first order nonlinear equations - IV
Lecture 23 - Introduction to Laplace transforms
Lecture 24 - Laplace transforms of some standard functions
Lecture 25 - Existence theorem for Laplace transforms
Lecture 26 - Properties of Laplace transforms - I
Lecture 27 - Properties of Laplace transforms - II
Lecture 28 - Properties of Laplace transforms - III
Lecture 29 - Properties of Laplace transforms - IV

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Lecture 30 - Convolution theorem for Laplace transforms - I
Lecture 31 - Convolution theorem for Laplace transforms - II
Lecture 32 - Initial and final value theorems for Laplace transforms
Lecture 33 - Laplace transforms of periodic functions
Lecture 34 - Laplace transforms of Heaviside unit step function
Lecture 35 - Laplace transforms of Dirac delta function
Lecture 36 - Applications of Laplace transforms - I
Lecture 37 - Applications of Laplace transforms - II
Lecture 38 - Applications of Laplace transforms - III
Lecture 39 - ZÂ transform and inverse Z-transform of elementary functions
Lecture 40 - Properties of Z-transforms - I
Lecture 41 - Properties of Z-transforms - II
Lecture 42 - Initial and final value theorem for Z-transforms
Lecture 43 - Convolution theorem for Z-transforms
Lecture 44 - Applications of Z-transforms - I
Lecture 45 - Applications of Z-transforms - II
Lecture 46 - Applications of Z-transforms - III
Lecture 47 - Fourier series and its convergence - I
Lecture 48 - Fourier series and its convergence - II
Lecture 49 - Fourier series of even and odd functions
Lecture 50 - Fourier half-range series
Lecture 51 - ParsevelÂ s Identity
Lecture 52 - Complex form of Fourier series
Lecture 53 - Fourier integrals
Lecture 54 - Fourier sine and cosine integrals
Lecture 55 - Fourier transforms
Lecture 56 - Fourier sine and cosine transforms
Lecture 57 - Convolution theorem for Fourier transforms
Lecture 58 - Applications of Fourier transforms to BVP - I
Lecture 59 - Applications of Fourier transforms to BVP - II
Lecture 60 - Applications of Fourier transforms to BVP - III

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NPTEL Video Course - Mathematics - NOC:Integral Equations, Calculus of Variations and its Applications

Subject Co-ordinator - Prof.D. N Pandey, Prof. P.N. Agarwal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition and classification of linear integral equations
Lecture 2 - Conversion of IVP into integral equations
Lecture 3 - Conversion of BVP into an integral equations
Lecture 4 - Conversion of integral equations into differential equations
Lecture 5 - Integro-differential equations
Lecture 6 - Fredholm integral equation with separable kernel
Lecture 7 - Fredholm integral equation with separable kernel
Lecture 8 - Solution of integral equations by successive substitutions
Lecture 9 - Solution of integral equations by successive approximations
Lecture 10 - Solution of integral equations by successive approximations
Lecture 11 - Fredholm integral equations with symmetric kernels
Lecture 12 - Fredholm integral equations with symmetric kernels
Lecture 13 - Fredholm integral equations with symmetric kernels
Lecture 14 - Construction of Green function - I
Lecture 15 - Construction of Green function - II
Lecture 16 - Green function for self adjoint linear differential equations
Lecture 17 - Green function for non-homogeneous boundary value problem
Lecture 18 - Fredholm alternative theorem - I
Lecture 19 - Fredholm alternative theorem - II
Lecture 20 - Fredholm method of solutions
Lecture 21 - Classical Fredholm theory
Lecture 22 - Classical Fredholm theory
Lecture 23 - Classical Fredholm theory
Lecture 24 - Method of successive approximations
Lecture 25 - Neumann series and resolvent kernels - I
Lecture 26 - Neumann series and resolvent kernels - II
Lecture 27 - Equations with convolution type kernels - I
Lecture 28 - Equations with convolution type kernels - II
Lecture 29 - Singular integral equations - I

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Lecture 30 - Singular integral equations - II
Lecture 31 - Cauchy type integral equations - I
Lecture 32 - Cauchy type integral equations - II
Lecture 33 - Cauchy type integral equations - III
Lecture 34 - Cauchy type integral equations - IV
Lecture 35 - Cauchy type integral equations - V
Lecture 36 - Solution of integral equations using Fourier transform
Lecture 37 - Solution of integral equations using Hilbert transform - I
Lecture 38 - Solution of integral equations using Hilbert transform - II
Lecture 39 - Calculus of variations
Lecture 40 - Calculus of variations
Lecture 41 - Calculus of variations
Lecture 42 - Calculus of variations
Lecture 43 - Euler equation
Lecture 44 - Euler equation
Lecture 45 - Brachistochrone problem and Euler equation - I
Lecture 46 - Euler's equation - II
Lecture 47 - Functions of several independent variables
Lecture 48 - Variational problems in parametric form
Lecture 49 - Variational problems of general type
Lecture 50 - Variational derivative and invariance of Euler's equation
Lecture 51 - Invariance of Euler's equation and isoperimetric problem - I
Lecture 52 - Isoperimetric problem - II
Lecture 53 - Variational problem involving a conditional extremum - I
Lecture 54 - Variational problem involving a conditional extremum - II
Lecture 55 - Variational problems with moving boundaries - I
Lecture 56 - Variational problems with moving boundaries - II
Lecture 57 - Variational problems with moving boundaries - III
Lecture 58 - Variational problems with moving boundaries; One sided variation
Lecture 59 - Variational problem with a movable boundary for a functional dependent on two functions
Lecture 60 - Hamilton's principle

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NPTEL Video Course - Mathematics - NOC:Nonlinear Programming

Subject Co-ordinator - S. K. Gupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Convex Sets and Functions
Lecture 2 - Properties of Convex Functions - I
Lecture 3 - Properties of Convex Functions - II
Lecture 4 - Properties of Convex Functions- III
Lecture 5 - Convex Programming Problems
Lecture 6 - KKT optimality conditions
Lecture 7 - Quadratic Programming Problems - I
Lecture 8 - Quadratic Programming Problems - II
Lecture 9 - Separable Programming - I
Lecture 10 - Separable Programming - II
Lecture 11 - Geometric Programming - I
Lecture 12 - Geometric Programming - II
Lecture 13 - Geometric Programming - III
Lecture 14 - Dynamic Programming - I
Lecture 15 - Dynamic Programming - II
Lecture 16 - Dynamic programming approach to find shortest path in any network
Lecture 17 - Dynamic Programming - IV
Lecture 18 - Search Techniques - I
Lecture 19 - Search Techniques - II
Lecture 20 - Search Techniques - III

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NPTEL Video Course - Mathematics - NOC:Numerical Methods

Subject Co-ordinator - Prof. Sanjeev Kumar, Prof. Ameeya Kumar Nayak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to error analysis and linear systems
Lecture 2 - Gaussian elimination with Partial pivoting
Lecture 3 - LU decomposition
Lecture 4 - Jacobi and Gauss Seidel methods
Lecture 5 - Iterative methods-II
Lecture 6 - Introduction to Non-linear equations and Bisection method
Lecture 7 - Regula Falsi and Secant methods
Lecture 8 - Newton-Raphson method
Lecture 9 - Fixed point iteration method
Lecture 10 - System of Nonlinear equations
Lecture 11 - Introduction to Eigenvalues and Eigenvectors
Lecture 12 - Similarity Transformations and Gershgorin Theorem
Lecture 13 - Jacobi's Method for Computing Eigenvalues
Lecture 14 - Power Method
Lecture 15 - Inverse Power Method
Lecture 16 - Interpolation - Part I (Introduction to Interpolation)
Lecture 17 - Interpolation - Part II (Some basic operators and their properties)
Lecture 18 - Interpolation - Part III (Newtonâ s Forward/ Backward difference and derivation of general erro
Lecture 19 - Interpolation - Part IV (Error in approximating a function by a polynomial using Newtonâ s Forw
Lecture 20 - Interpolation - Part V (Solving problems using Newton's Forward and Backward difference formula)
Lecture 21 - Interpolation - Part VI (Central difference formula)
Lecture 22 - Interpolation - Part VII (Lagrange interpolation formula with examples)
Lecture 23 - Interpolation - Part VIII (Divided difference interpolation with examples)
Lecture 24 - Interpolation - Part IX (Hermite's interpolation with examples)
Lecture 25 - Numerical differentiation - Part I (Introduction to numerical differentiation by interpolation f
Lecture 26 - Numerical differentiation - Part II (Numerical differentiation based on Lagrangeâ s interpolati
Lecture 27 - Numerical differentiation - Part III (Numerical differentiation based on Divided difference form
Lecture 28 - Numerical differentiation - Part IV (Maxima and minima of a tabulated function and differentiati
Lecture 29 - Numerical differentiation - Part V (Differentiation based on finite difference operators)

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Lecture 30 - Numerical differentiation - Part VI (Method of undetermined coefficients and Derivatives with ur
Lecture 31 - Numerical Integration - Part I (Methodology of Numerical Integration and Rectangular rule)
Lecture 32 - Numerical Integration - Part II (Quadrature formula and Trapezoidal rule with associated errors)
Lecture 33 - Numerical Integration - Part III (Simpsons 1/3rd rule with associated errors)
Lecture 34 - Numerical Integration - Part IV (Composite Simpsons 1/3rd rule and Simpsons 3/8th rule with exam
Lecture 35 - Numerical Integration - Part V (Gauss Legendre 2-point and 3-point formula with examples)
Lecture 36 - Introduction to Ordinary Differential equations
Lecture 37 - Numerical methods for ODE-1
Lecture 38 - Numerical Methods - II
Lecture 39 - R-K Methods for solving ODEs
Lecture 40 - Multi-step Method for solving ODEs

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NPTEL Video Course - Mathematics - NOC:Numerical Linear Algebra

Subject Co-ordinator - Prof.D. N Pandey, Prof. P.N. Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Matrix Operations and Types of Matrices
Lecture 2 - Determinant of a Matrix
Lecture 3 - Rank of a Matrix
Lecture 4 - Vector Space - I
Lecture 5 - Vector Space - II
Lecture 6 - Linear dependence and independence
Lecture 7 - Bases and Dimension - I
Lecture 8 - Bases and Dimension - II
Lecture 9 - Linear Transformation - I
Lecture 10 - Linear Transformation - II
Lecture 11 - Orthogonal Subspaces
Lecture 12 - Row Space, Column Space and Null Space
Lecture 13 - Eigen Values and Eigen Vectors - I
Lecture 14 - Eigen Values and Eigen Vectors - II
Lecture 15 - Diagonalizable Matrices
Lecture 16 - Orthogonal Sets
Lecture 17 - Gram Schmidt ortthogonalization and orthogonal bases
Lecture 18 - Introduction to Matlab
Lecture 19 - Sign Integer Representation
Lecture 20 - Computer Representation of Numbers
Lecture 21 - Floating Point Representation
Lecture 22 - Round-off Error
Lecture 23 - Error Propagation in Computer Arithmetic
Lecture 24 - Addition and Multiplication of Floating Point Numbers
Lecture 25 - Conditioning and Condition Numbers - I
Lecture 26 - Conditioning and Condition Numbers - II
Lecture 27 - Stability of Numerical Algorithms - I
Lecture 28 - Stability of Numerical Algorithms - II
Lecture 29 - Vector Norms - I

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Lecture 30 - Vector Norms - II
Lecture 31 - Matrix Norms - I
Lecture 32 - Matrix Norms - II
Lecture 33 - Convergent Matrices - I
Lecture 34 - Convergent Matrices - II
Lecture 35 - Stability of non linear system
Lecture 36 - Condition number of a matrix
Lecture 37 - Sensitivity Analysis - I
Lecture 38 - Sensitivity Analysis - II
Lecture 39 - Residual Theorem
Lecture 40 - Nearness to Singularity
Lecture 41 - Estimation of the Condition Number
Lecture 42 - Singular value decomposition of a matrix - I
Lecture 43 - Singular value decomposition of a matrix - II
Lecture 44 - Orthonormal Projections
Lecture 45 - Algebraic and geometric properties of SVD
Lecture 46 - SVD and their applications
Lecture 47 - Perturbation theorem for singular values
Lecture 48 - Outer product expansion of a matrix
Lecture 49 - Least square solutions - I
Lecture 50 - Least square solutions - II
Lecture 51 - Householder matrices
Lecture 52 - Householder matrices and their applications
Lecture 53 - Householder QR factorization - I
Lecture 54 - Householder QR factorization - II
Lecture 55 - Basic theorems on eigenvalues and QR method
Lecture 56 - Power Method
Lecture 57 - Rate of Convergence of Power Method
Lecture 58 - Applications of Power Method with Shift
Lecture 59 - Jacobi Method - I
Lecture 60 - Jacobi Method - II

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NPTEL Video Course - Mathematics - NOC:Numerical Methods - Finite Difference Approach

Subject Co-ordinator - Prof. Ameeya Kumar Nayak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Numerical solutions
Lecture 2 - Numerical Solution of ODE
Lecture 3 - Numerical solution of PDE
Lecture 4 - Finite difference approximation
Lecture 5 - Polynomial fitting and one-sided approximation
Lecture 6 - Solution of parabolic equation
Lecture 7 - Implicit and C-N scheme for solving 1D parabolic equation
Lecture 8 - Stability analysis of Explicit scheme for solving parabolic equation
Lecture 9 - Stability of Crank-Nicoloson's scheme
Lecture 10 - Approximation of derivative boundary conditions
Lecture 11 - Solution of two-dimensional parabolic equation
Lecture 12 - Solution of 2D parabolic equation using ADI scheme
Lecture 13 - Solution of Elliptic Equation
Lecture 14 - Solution of Elliptic equation using SOR method
Lecture 15 - Solution of Elliptic equation using ADI scheme
Lecture 16 - Solution of Hyperbolic equation
Lecture 17 - Stability analysis for Hyperbolic equations
Lecture 18 - Characteristics of PDE
Lecture 19 - Lax-Wendroff's method
Lecture 20 - Wendroff's method

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NPTEL Video Course - Mathematics - NOC:Multivariable Calculus

Subject Co-ordinator - Dr. Sanjeev Kumar, S. K. Gupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functions of several variables
Lecture 2 - Limits for multivariable functions - I
Lecture 3 - Limits for multivariable functions - II
Lecture 4 - Continuity of multivariable functions
Lecture 5 - Partial Derivatives - I
Lecture 6 - Partial Derivatives - II
Lecture 7 - Differentiability - I
Lecture 8 - Differentiability - II
Lecture 9 - Chain rule - I
Lecture 10 - Chain rule - II
Lecture 11 - Change of variables
Lecture 12 - Eulerâ s theorem for homogeneous functions
Lecture 13 - Tangent planes and Normal lines
Lecture 14 - Extreme values - I
Lecture 15 - Extreme values - II
Lecture 16 - Lagrange multipliers
Lecture 17 - Taylorâ s theorem
Lecture 18 - Error approximation
Lecture 19 - Polar-curves
Lecture 20 - Multiple Integrals
Lecture 21 - Change Of Order Of Integration
Lecture 22 - Change of Variables in Multiple Integral
Lecture 23 - Introduction to Gamma Function
Lecture 24 - Introduction to Beta Function
Lecture 25 - Properties of Beta and Gamma Functions - I
Lecture 26 - Properties of Beta and Gamma Functions - II
Lecture 27 - Dirichlet's Integral
Lecture 28 - Applications of Multiple Integrals
Lecture 29 - Vector Differentiation

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Lecture 30 - Gradient of a Scalar Field and Directional Derivative
Lecture 31 - Normal Vector and Potential field
Lecture 32 - Gradient (Identities), Divergence and Curl (Identities)
Lecture 33 - Some Identities on Divergence and Curl
Lecture 34 - Line Integral (I)
Lecture 35 - Applications of Line Integrals
Lecture 36 - Green's Theorem
Lecture 37 - Surface Area
Lecture 38 - Surface Integral
Lecture 39 - Divergence Theorem of Gauss
Lecture 40 - Stoke's Theorem

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NPTEL Video Course - Mathematics - NOC:Ordinary and Partial Differential Equations and Applications

Subject Co-ordinator - Prof.D. N Pandey, Prof. P.N. Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to differential equations - I
Lecture 2 - Introduction to differential equations - II
Lecture 3 - Existence and uniqueness of solutions of differential equations - I
Lecture 4 - Existence and uniqueness of solutions of differential equations - II
Lecture 5 - Existence and uniqueness of solutions of differential equations - III
Lecture 6 - Existence and uniqueness of solutions of a system of differential equations
Lecture 7 - Linear System
Lecture 8 - Properties of Homogeneous Systems
Lecture 9 - Solution of Homogeneous Linear System with Constant Coefficients - I
Lecture 10 - Solution of Homogeneous Linear System with Constant Coefficients - II
Lecture 11 - Solution of Homogeneous Linear System with Constant Coefficients - III
Lecture 12 - Solution of Non-Homogeneous Linear System with Constant Coefficients
Lecture 13 - Power Series
Lecture 14 - Uniform Convergence of Power Series
Lecture 15 - Power Series Solution of Second Order Homogeneous Equations
Lecture 16 - Regular singular points - I
Lecture 17 - Regular singular points - II
Lecture 18 - Regular singular points - III
Lecture 19 - Regular singular points - IV
Lecture 20 - Regular singular points - V
Lecture 21 - Critical points
Lecture 22 - Stability of Linear Systems - I
Lecture 23 - Stability of Linear Systems - II
Lecture 24 - Stability of Linear Systems - III
Lecture 25 - Critical Points and Paths of Non-linear Systems
Lecture 26 - Boundary value problems for second order differential equations
Lecture 27 - Self - adjoint Forms
Lecture 28 - Sturm - Liouville problem and its properties
Lecture 29 - Sturm - Liouville problem and its applications

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Lecture 30 - Greenâ s function and its applications - I
Lecture 31 - Greenâ s function and its applications - II
Lecture 32 - Origins and Classification of First Order PDE
Lecture 33 - Initial Value Problem for Quasi-linear First Order Equations
Lecture 34 - Existence and Uniqueness of Solutions
Lecture 35 - Surfaces orthogonal to a given system of surfaces
Lecture 36 - Nonlinear PDE of first order
Lecture 37 - Cauchy method of characteristics - I
Lecture 38 - Cauchy method of characteristics - II
Lecture 39 - Compatible systems of first order equations
Lecture 40 - Charpitâ s method - I
Lecture 41 - Charpitâ s method - II
Lecture 42 - Second Order PDE with Variable Coefficients
Lecture 43 - Classification and Canonical Form of Second Order PDE - I
Lecture 44 - Classification and Canonical Form of Second Order PDE - II
Lecture 45 - Classification and Characteristic Curves of Second Order PDEs
Lecture 46 - Review of Integral Transforms - I
Lecture 47 - Review of Integral Transforms - II
Lecture 48 - Review of Integral Transforms - II
Lecture 49 - Review of Integral Transforms - III
Lecture 50 - Laplace Equation - I
Lecture 51 - Laplace Equation - II
Lecture 52 - Laplace and Poisson Equations
Lecture 53 - One dimensional wave equation and its solution - I
Lecture 54 - One dimensional wave equation and its solution - II
Lecture 55 - One dimensional wave equation and its solution - III
Lecture 56 - Two dimensional wave equation and its solution - I
Lecture 57 - Solution of non-homogeneous wave equation
Lecture 58 - Solution of homogeneous diffusion equation - I
Lecture 59 - Solution of homogeneous diffusion equation - II
Lecture 60 - Duhamelâ s principle

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NPTEL Video Course - Mathematics - NOC:Matrix Analysis with Applications

Subject Co-ordinator - Dr. Sanjeev Kumar, S. K. Gupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Elementary row operations
Lecture 2 - Echelon form of a matrix
Lecture 3 - Rank of a matrix
Lecture 4 - System of Linear Equations - I
Lecture 5 - System of Linear Equations - II
Lecture 6 - Introduction to Vector Spaces
Lecture 7 - Subspaces
Lecture 8 - Basis and Dimension
Lecture 9 - Linear Transformations
Lecture 10 - Rank and Nullity
Lecture 11 - Inverse of a Linear Transformation
Lecture 12 - Matrix Associated with a LT
Lecture 13 - Eigenvalues and Eigenvectors
Lecture 14 - Cayley-Hamilton Theorem and Minimal Polynomial
Lecture 15 - Diagonalization
Lecture 16 - Special Matrices
Lecture 17 - More on Special Matrices and Gerschgorin Theorem
Lecture 18 - Inner Product Spaces
Lecture 19 - Vector and Matrix Norms
Lecture 20 - Gram Schmidt Process
Lecture 21 - Normal Matrices
Lecture 22 - Positive Definite Matrices
Lecture 23 - Positive Definite and Quadratic Forms
Lecture 24 - Gram Matrix and Minimization of Quadratic Forms
Lecture 25 - Generalized Eigenvectors and Jordan Canonical Form
Lecture 26 - Evaluation of Matrix Functions
Lecture 27 - Least Square Approximation
Lecture 28 - Singular Value Decomposition
Lecture 29 - Pseudo-Inverse and SVD

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Lecture 30 - Introduction to Ill-Conditioned Systems
Lecture 31 - Regularization of Ill-Conditioned Systems
Lecture 32 - Linear Systems
Lecture 33 - Linear Systems
Lecture 34 - Non-Stationary Iterative Methods
Lecture 35 - Non-Stationary Iterative Methods
Lecture 36 - Krylov Subspace Iterative Methods (Conjugate Gradient Method)
Lecture 37 - Krylov Subspace Iterative Methods (CG and Pre-Conditioning)
Lecture 38 - Introduction to Positive Matrices
Lecture 39 - Positive Matrices, Positive Eigenpair, Perron Root and vector, Example
Lecture 40 - Polar Decomposition

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NPTEL Video Course - Mathematics - NOC:Mathematical Modelling: Analysis and Applications

Subject Co-ordinator - Prof. Ameeya Kumar Nayak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mathematical Modeling
Lecture 2 - Discrete Time Linear Models in Population Dynamics - I
Lecture 3 - Discrete Time Linear Models in Population Dynamics - II
Lecture 4 - Discrete Time Linear Age Structured Models
Lecture 5 - Numerical Methods to Compute Eigen Values
Lecture 6 - Discrete Time Non-Linear Models in Population Dynamics - II
Lecture 7 - Analysis on Logistic Difference Equation
Lecture 8 - Classifications of Bifurcation
Lecture 9 - Discrete Time Non - Linear Models in Population Dynamics - II
Lecture 10 - Discrete Time Prey - Predator Model
Lecture 11 - Introduction to Continuous Time Models
Lecture 12 - Solution of First Order First Degree Differential Equations
Lecture 13 - Continuous Time Models in Population Dynamics - I
Lecture 14 - Continuous Time Models in Population Dynamics - II
Lecture 15 - Stability and Linearization of System of Ordinary Differential Equations
Lecture 16 - Continuous Time Single Species Models
Lecture 17 - Qualitative Solution of Differential Equations - Phase Diagrams - I
Lecture 18 - Qualitative Solution of Differential Equations - Phase Diagrams - II
Lecture 19 - Continuous Time Lotka - Volterra Competition Model
Lecture 20 - Continuous Time Prey - Predator Model

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NPTEL Video Course - Mathematics - NOC:Dynamical System and Control

Subject Co-ordinator - Prof.D. N Pandey, Dr. N. Sukavanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Formulation of Dynamical Systems - I
Lecture 2 - Formulation of Dynamical Systems - II
Lecture 3 - Existence and Uniqueness Theorem - I
Lecture 4 - Existence and Uniqueness Theorem - II
Lecture 5 - Linear Systems - I
Lecture 6 - Linear Systems - II
Lecture 7 - Solutions of Linear Systems - I
Lecture 8 - Solutions of Linear Systems - II
Lecture 9 - Solutions of Linear Systems - III
Lecture 10 - Fundamental Matrix - I
Lecture 11 - Fundamental Matrix - II
Lecture 12 - Fundamental Matrix for Non-Autonomous systems
Lecture 13 - Solutions of Non-Homogeneous Systems
Lecture 14 - Stability of Systems
Lecture 15 - Stability of Linear Autonomous Systems - I
Lecture 16 - Stability of Linear Autonomous Systems - II
Lecture 17 - Stability of Linear Autonomous Systems - III
Lecture 18 - Stability of Weakly Non-Linear Systems - I
Lecture 19 - Stability of Weakly Non-Linear Systems - II
Lecture 20 - Stability of Non-Linear Systems using Linearization
Lecture 21 - Properties of Phase Portrait
Lecture 22 - Properties of Orbits
Lecture 23 - Phase Portrait
Lecture 24 - Phase Portrait of Linear Differential Equations - I
Lecture 25 - Phase Portrait of Linear Differential Equations - II
Lecture 26 - Phase Portrait of Linear Differential Equations - III
Lecture 27 - Poincare Bendixson Theorem
Lecture 28 - Limit Cycle
Lecture 29 - Lyapunov Stability - I

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Lecture 30 - Lyapunov Stability - II
Lecture 31 - Introduction to Control Systems - I
Lecture 32 - Introduction to Control Systems - II
Lecture 33 - Controllability of Autonomous Systems
Lecture 34 - Controllability of Non-autonomous Systems
Lecture 35 - Observability - I
Lecture 36 - Observability - II
Lecture 37 - Results on Controllability and Observability
Lecture 38 - Companion Form
Lecture 39 - Feedback Control - I
Lecture 40 - Feedback Control - II
Lecture 41 - Feedback Control - III
Lecture 42 - Feedback Control - IV
Lecture 43 - State Observer
Lecture 44 - Stabilizability
Lecture 45 - Introduction to Discrete Systems - I
Lecture 46 - Introduction to Discrete Systems - II
Lecture 47 - Lyapunov Stability Theory - I
Lecture 48 - Lyapunov Stability Theory - II
Lecture 49 - Lyapunov Stability Theory - III
Lecture 50 - Optimal Control - I
Lecture 51 - Optimal Control - II
Lecture 52 - Optimal Control - III
Lecture 53 - Optimal Control - IV
Lecture 54 - Optimal Control for Discrete Systems - I
Lecture 55 - Optimal Control for Discrete Systems - II
Lecture 56 - Controllability of Discrete Systems
Lecture 57 - Observability of Discrete Systems
Lecture 58 - Stability for Discrete Systems
Lecture 59 - Relation between Continuous and Discrete Systems - I
Lecture 60 - Relation between Continuous and Discrete Systems - II

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NPTEL Video Course - Mathematics - NOC:Advanced Engineering Mathematics

Subject Co-ordinator - Prof. P.N. Agarwal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Analytic Function
Lecture 2 - Cauchy-Riemann Equations
Lecture 3 - Harmonic Functions, Harmonic Conjugates and Milne's Method
Lecture 4 - Applications to the Problems of Potential Flow - I
Lecture 5 - Applications to the Problems of Potential Flow - II
Lecture 6 - Complex Integration
Lecture 7 - Cauchy's Theorem - I
Lecture 8 - Cauchy's Theorem - II
Lecture 9 - Cauchy's Integral Formula for the Derivatives of Analytic Function
Lecture 10 - Morera's Theorem, Liouville's Theorem and Fundamental Theorem of Algebra
Lecture 11 - Winding Number and Maximum Modulus Principle
Lecture 12 - Sequences and Series
Lecture 13 - Uniform Convergence of Series
Lecture 14 - Power Series
Lecture 15 - Taylor Series
Lecture 16 - Laurent Series
Lecture 17 - Zeros and Singularities of an Analytic Function
Lecture 18 - Residue at a Singularity
Lecture 19 - Residue Theorem
Lecture 20 - Meromorphic Functions
Lecture 21 - Evaluation of real integrals using residues - I
Lecture 22 - Evaluation of real integrals using residues - II
Lecture 23 - Evaluation of real integrals using residues - III
Lecture 24 - Evaluation of real integrals using residues - IV
Lecture 25 - Evaluation of real integrals using residues - V
Lecture 26 - Bilinear Transformations
Lecture 27 - Cross Ratio
Lecture 28 - Conformal Mapping - I
Lecture 29 - Conformal Mapping - II

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Lecture 30 - Conformal mapping from half plane to disk and half plane to half plane - I
Lecture 31 - Conformal mapping from disk to disk and angular region to disk
Lecture 32 - Application of Conformal Mapping to Potential Theory
Lecture 33 - Review of Z-transforms - I
Lecture 34 - Review of Z-transforms - II
Lecture 35 - Review of Z-transforms - III
Lecture 36 - Review of Bilateral Z-transforms
Lecture 37 - Finite Fourier Transforms
Lecture 38 - Fourier Integral and Fourier Transforms
Lecture 39 - Fourier Series
Lecture 40 - Discrete Fourier Transforms - I
Lecture 41 - Discrete Fourier Transforms - II
Lecture 42 - Basic Concepts of Probability
Lecture 43 - Conditional Probability
Lecture 44 - Bayes Theorem and Probability Networks
Lecture 45 - Discrete Probability Distribution
Lecture 46 - Binomial Distribution
Lecture 47 - Negative Binomial Distribution and Poisson Distribution
Lecture 48 - Continuous Probability Distribution
Lecture 49 - Poisson Process
Lecture 50 - Exponential Distribution
Lecture 51 - Normal Distribution
Lecture 52 - Joint Probability Distribution - I
Lecture 53 - Joint Probability Distribution - II
Lecture 54 - Joint Probability Distribution - III
Lecture 55 - Correlation and Regression - I
Lecture 56 - Correlation and Regression - II
Lecture 57 - Testing of Hypotheses - I
Lecture 58 - Testing of Hypotheses - II
Lecture 59 - Testing of Hypotheses - III
Lecture 60 - Application to Queuing Theory and Reliability Theory

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NPTEL Video Course - Mathematics - NOC:Higher Engineering Mathematics

Subject Co-ordinator - Prof. P.N. Agarwal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Symbolic Representation of Statements - I
Lecture 2 - Symbolic Representation of Statements - II
Lecture 3 - Tautologies and Contradictions
Lecture 4 - Predicates and Quantifires - I
Lecture 5 - Predicates and Quantifiers - II
Lecture 6 - Validity of Arguments
Lecture 7 - Language and Grammers - I
Lecture 8 - Language and Grammers - II
Lecture 9 - Language and Grammers - III
Lecture 10 - Finite- State Machines
Lecture 11 - Partially Ordered Sets - I
Lecture 12 - Partially Ordered Sets - II
Lecture 13 - Partially Ordered Sets - III
Lecture 14 - Lattices - I
Lecture 15 - Lattices - II
Lecture 16 - Lattices - III
Lecture 17 - Lattices - IV
Lecture 18 - Lattices - V
Lecture 19 - Boolean Algebra - I
Lecture 20 - Boolean Algebra - II
Lecture 21 - Boolean Algebra - III
Lecture 22 - Boolean Algebra - IV
Lecture 23 - Logic Gates
Lecture 24 - Karnaugh Map - I
Lecture 25 - Karnaugh Map - II
Lecture 26 - Various type of Graphs - I
Lecture 27 - Various types of Graphs - II
Lecture 28 - Paths and Connectivity
Lecture 29 - Subgraphs and Traversable Multigraphs

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Lecture 30 - Undirected and Directed Graphs
Lecture 31 - Eulerian and Hamiltonian Graphs
Lecture 32 - Planar Graphs
Lecture 33 - Representation of Graphs
Lecture 34 - Isomorphic and Homeomorphic Graphs
Lecture 35 - Kuratowski's Theorem
Lecture 36 - Dual of a Graph
Lecture 37 - Coloring of Graphs - I
Lecture 38 - Coloring of Graphs - II
Lecture 39 - Tree - I
Lecture 40 - Tree - II
Lecture 41 - Graphical Method - I
Lecture 42 - Graphical Method - II
Lecture 43 - General Linear Programming Problem
Lecture 44 - Simplex Method - I
Lecture 45 - Simplex Method - II
Lecture 46 - Big - M Method - I
Lecture 47 - Big - M Method - II (Special Cases)
Lecture 48 - Two Phase Method - I
Lecture 49 - Two Phase method - II
Lecture 50 - Duality - I
Lecture 51 - Duality - II
Lecture 52 - Dual Simplex Method
Lecture 53 - Transportation Problem - I
Lecture 54 - Transportation Problem - II
Lecture 55 - Assignment Problem - I
Lecture 56 - Assignment Problem - II

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NPTEL Video Course - Mathematics - NOC:Operations Research

Subject Co-ordinator - Prof. Kusumdeep

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to OR Models
Lecture 2 - More OR Models
Lecture 3 - Graphical Method for LPP
Lecture 4 - Convex sets
Lecture 5 - Simplex Method
Lecture 6 - Big M Method
Lecture 7 - Two Phase
Lecture 8 - Multiple solutions of LPP
Lecture 9 - Unbounded solution of LPP
Lecture 10 - Infeasible solution of LPP
Lecture 11 - Revised Simplex Method
Lecture 12 - Case studies and Exercises - I
Lecture 13 - Case studies and Exercises - II
Lecture 14 - Case studies and Exercises - III
Lecture 15 - Primal Dual Construction
Lecture 16 - Weak Duality Theorem
Lecture 17 - More Duality Theorems
Lecture 18 - Primal-Dual relationship of solutions
Lecture 19 - Dual Simplex Method
Lecture 20 - Sensitivity Analysis - I
Lecture 21 - Sensitivity Analysis - II
Lecture 22 - Case studies and Exercises - I
Lecture 23 - Case studies and Exercises - II
Lecture 24 - Integer Programming
Lecture 25 - Goal Programming
Lecture 26 - Multi-Objective Programming
Lecture 27 - Dynamic Programming
Lecture 28 - Transportation Problem
Lecture 29 - Assignment Problem

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Lecture 30 - Case studies and Exercises
Lecture 31 - Processing n Jobs on Two Machines
Lecture 32 - Processing n Jobs through Three Machines
Lecture 33 - Processing two jobs through m machines
Lecture 34 - Processing n jobs through m machines
Lecture 35 - Case studies and Exercises
Lecture 36 - Two Person Zero-Sum Game
Lecture 37 - Theorems of Game Theory
Lecture 38 - Solution of Mixed Strategy Games
Lecture 39 - Linear Programming method for solving games
Lecture 40 - Case studies and Exercises

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NPTEL Video Course - Mathematics - NOC:Essential Mathematics for Machine Learning

Subject Co-ordinator - Prof. S.K. Gupta, Dr. Sanjeev Kumar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vectors in Machine Learning
Lecture 2 - Basics of Matrix Algebra
Lecture 3 - Vector Space: Definition and Examples
Lecture 4 - Vector Subspace: Examples and Properties
Lecture 5 - Basis and Dimension
Lecture 6 - Linear Transformations
Lecture 7 - Norms and Spaces
Lecture 8 - Orthogonal Complement and Projection Mapping
Lecture 9 - Eigenvalues and Eigenvectors
Lecture 10 - Special matrices and Properties
Lecture 11 - Spectral Decomposition
Lecture 12 - Singular Value Decomposition
Lecture 13 - SVD: Properties and Applications
Lecture 14 - Low Rank Approximations
Lecture 15 - Python Implementation of SVD and Low - rank Approximation
Lecture 16 - Principal Component Analysis - I
Lecture 17 - PCA: Derivation and Examples
Lecture 18 - Python Implementation of PCA
Lecture 19 - Linear Discriminant Analysis
Lecture 20 - Python Implementation of LDA
Lecture 21 - Least Square Approximation and Minimum Normed Solution
Lecture 22 - Linear and Multiple Regression - I
Lecture 23 - Linear and Multiple Regression - II
Lecture 24 - Logistic Regression - I
Lecture 25 - Logistic Regression - II
Lecture 26 - Classification Metrics
Lecture 27 - Gram Schmidt Process
Lecture 28 - Polar Decomposition
Lecture 29 - Minimal Polynomial and Jordan Canonical Form - I

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Lecture 30 - Minimal Polynomial and Jordan Canonical Form - II
Lecture 31 - Basic Concepts of Calculus - I
Lecture 32 - Basic Concepts of Calculus - II
Lecture 33 - Basic Concepts of Calculus - III
Lecture 34 - Basic Concepts of Calculus - IV
Lecture 35 - Basic Concepts of Calculus - V
Lecture 36 - Calculus in Python
Lecture 37 - Convex Sets and Functions
Lecture 38 - Properties of convex functions - I
Lecture 39 - Properties of Convex functions - II
Lecture 40 - Introduction to Optimization
Lecture 41 - Unconstrained Optimization
Lecture 42 - Constrained Optimization - I
Lecture 43 - Constrained Optimization - II
Lecture 44 - Steepest Descent method
Lecture 45 - Newton's and Penalty function method
Lecture 46 - Optimization using Python
Lecture 47 - Operations on Sets
Lecture 48 - Review on Probability
Lecture 49 - Bayes' theorem and Random variables
Lecture 50 - Expectation and Variance
Lecture 51 - Discrete probability distributions
Lecture 52 - Continuous probability distributions
Lecture 53 - Joint probability distribution and covariance
Lecture 54 - Introduction to SVM
Lecture 55 - Error Minimizing LPP
Lecture 56 - Concepts of Duality
Lecture 57 - Hard Margin classifier
Lecture 58 - Soft margin classifier
Lecture 59 - SVM using Python - I
Lecture 60 - SVM using Python - II

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NPTEL Video Course - Mathematics - NOC:Advanced Linear Algebra

Subject Co-ordinator - Prof. Premananda Bera

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - System of Linear Equations
Lecture 2 - Elementary Row Operations
Lecture 3 - Row-Reduced Echelon Form and its Applications
Lecture 4 - Vector Spaces - I
Lecture 5 - Vector Spaces - II
Lecture 6 - Basis and Dimensions - I
Lecture 7 - Basis and Dimensions - II
Lecture 8 - Change of Ordered Basis in F. D. V. S.
Lecture 9 - Row Space of a Matrix
Lecture 10 - Computations concerning Subspaces
Lecture 11 - Linear Transformations
Lecture 12 - Concept of Rank
Lecture 13 - Algebra of Linear Transformations - I
Lecture 14 - Algebra of Linear Transformations - II
Lecture 15 - Algebra of Linear Transformations - III
Lecture 16 - Matrix Representation of Linear Transformations - I
Lecture 17 - Matrix Representation of Linear Transformations - II
Lecture 18 - Linear Functional - I
Lecture 19 - Linear Functional - II
Lecture 20 - Linear Functional - III
Lecture 21 - Linear Functional and Transpose of L.T. - I
Lecture 22 - Linear Functional and Transpose of L.T. - II
Lecture 23 - Eigenvalue and Eigenvector of Linear Operator - I
Lecture 24 - Eigenvalue and Eigenvector of Linear Operator - II
Lecture 25 - Eigenvalue and Eigenvector of Digonalizable L.O.
Lecture 26 - Annihilating Polynomial of Linear Operator
Lecture 27 - Cayley-Hamilton Theorem and Its Applications - I
Lecture 28 - Cayley-Hamilton Theorem and its Applications - II
Lecture 29 - Invariant Subspaces - I

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Lecture 30 - Invariant Subspaces - II
Lecture 31 - Application of Invariant Subspaces - I
Lecture 32 - Application of Invariant Subspaces - II
Lecture 33 - Direct Sum Decompositions - I
Lecture 34 - Direct Sum Decompositions - II
Lecture 35 - Invariant Direct Sums - I
Lecture 36 - Invariant Direct Sums - II
Lecture 37 - Decomposition of space and Operator - I
Lecture 38 - Decomposition of Space and Operator - II
Lecture 39 - Applications of Primary Decomposition Theorem - I
Lecture 40 - Applications of Primary Decomposition Theorem - II
Lecture 41 - Applications of Primary Decomposition Theorem - III
Lecture 42 - Inner Products - I
Lecture 43 - Inner Products - II
Lecture 44 - Inner Product Spaces - I
Lecture 45 - Inner Product Spaces - II
Lecture 46 - Best Approximation in I.P.S.
Lecture 47 - Orthogonal Projection in I.P.S.
Lecture 48 - Linear Functionals and Adjoints - I
Lecture 49 - Linear Functionals and Adjoints - II
Lecture 50 - Linear Functionals and Adjoints - III
Lecture 51 - Linear Functionals and Adjoints - IV
Lecture 52 - Isomorphism in Inner Product Spaces
Lecture 53 - Unitary Operators - I
Lecture 54 - Unitary Operators - II
Lecture 55 - Application of Unitary O. and Initiation of Normal Operator
Lecture 56 - Normal Operator - I
Lecture 57 - Normal Operator - II
Lecture 58 - Normal Operator and It's Spectral Resolution
Lecture 59 - Singular Value Decomposition of a Matrix
Lecture 60 - Forms on Inner product Spaces

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NPTEL Video Course - Mathematics - NOC:EXCELing with Mathematical Modeling

Subject Co-ordinator - Prof. Sandip Banerjee

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Importance and Limitations
Lecture 2 - Units and Dimensions
Lecture 3 - Scaling
Lecture 4 - How to build mathematical models?
Lecture 5 - Basics of Excel - 1
Lecture 6 - Basics of Excel - 2
Lecture 7 - Basics of Excel - 3
Lecture 8 - Linear, Quadratic, Cubic Models
Lecture 9 - Linear Stability Analysis - I
Lecture 10 - Linear Stability Analysis - II
Lecture 11 - Lyapunov Stability
Lecture 12 - Phase Plane Analysis - 1
Lecture 13 - Phase Plane Analysis - 2
Lecture 14 - Phase Plane Analysis - 3
Lecture 15 - Growth Models (Continuous model)
Lecture 16 - Predator-Prey models
Lecture 17 - Two species competition model
Lecture 18 - Arms Race Model
Lecture 19 - Combat Model - I
Lecture 20 - Combat Model - II
Lecture 21 - Carbon Dating
Lecture 22 - Drug Distribution
Lecture 23 - Growth and decay in L-R circuit
Lecture 24 - Rectilinear motion under variable force
Lecture 25 - Dynamice of Rowing
Lecture 26 - Horizontal oscillations
Lecture 27 - Vertical oscillations
Lecture 28 - Epidemic model - 1
Lecture 29 - Epidemic model - 2

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Lecture 30 - Rumor model
Lecture 31 - Varying Gravity model
Lecture 32 - Tumor model - I
Lecture 33 - Tumor model - II
Lecture 34 - Vegetation in a desert model
Lecture 35 - Mathematical model of love affairs
Lecture 36 - Discrete models: Difference Equation - I
Lecture 37 - Difference Equations - II
Lecture 38 - Basics of Excel - 4
Lecture 39 - Stability Analysis - I
Lecture 40 - Stability Analysis - II
Lecture 41 - Population Models
Lecture 42 - Bank Account Models
Lecture 43 - Economic Model (Harrod Model
Lecture 44 - Lake Pollutant Models
Lecture 45 - Mathematical Model of the Dynamics of Alcohol
Lecture 46 - Discrete Predator-Prey Model
Lecture 47 - Forsenic Model
Lecture 48 - Drug Delivery Models
Lecture 49 - Lanchester's Combat Model
Lecture 50 - Two-Species Competition Model (Discrete)
Lecture 51 - Infection model
Lecture 52 - Smoking Model
Lecture 53 - Price and Demand Model
Lecture 54 - Paper Towel model, Burning Calories Model
Lecture 55 - Learning model, Kidney function model
Lecture 56 - Empirical Modelling
Lecture 57 - Estimation of Parameters - I
Lecture 58 - Estimation of Parameters - II
Lecture 59 - Estimation of Parameters - III
Lecture 60 - Simulation Modeling

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NPTEL Video Course - Mathematics - Advanced Matrix Theory and Linear Algebra for Engineers

Subject Co-ordinator - Prof. Vittal Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prologue - Part 1
Lecture 2 - Prologue - Part 2
Lecture 3 - Prologue - Part 3
Lecture 4 - Linear Systems - Part 1
Lecture 5 - Linear Systems - Part 2
Lecture 6 - Linear Systems - Part 3
Lecture 7 - Linear Systems - Part 4
Lecture 8 - Vector Spaces - Part 1
Lecture 9 - Vector Spaces - Part 2
Lecture 10 - Linear Independence and Subspaces - Part 1
Lecture 11 - Linear Independence and Subspaces - Part 2
Lecture 12 - Linear Independence and Subspaces - Part 3
Lecture 13 - Linear Independence and Subspaces - Part 4
Lecture 14 - Basis - Part 1
Lecture 15 - Basis - Part 2
Lecture 16 - Basis - Part 3
Lecture 17 - Linear Transformations - Part 1
Lecture 18 - Linear Transformations - Part 2
Lecture 19 - Linear Transformations - Part 3
Lecture 20 - Linear Transformations - Part 4
Lecture 21 - Linear Transformations - Part 5
Lecture 22 - Inner Product and Orthogonality - Part 1
Lecture 23 - Inner Product and Orthogonality - Part 2
Lecture 24 - Inner Product and Orthogonality - Part 3
Lecture 25 - Inner Product and Orthogonality - Part 4
Lecture 26 - Inner Product and Orthogonality - Part 5
Lecture 27 - Inner Product and Orthogonality - Part 6
Lecture 28 - Diagonalization - Part 1
Lecture 29 - Diagonalization - Part 2

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Lecture 30 - Diagonalization - Part 3
Lecture 31 - Diagonalization - Part 4
Lecture 32 - Hermitian and Symmetric matrices - Part 1
Lecture 33 - Hermitian and Symmetric matrices - Part 2
Lecture 34 - Hermitian and Symmetric matrices - Part 3
Lecture 35 - Hermitian and Symmetric matrices - Part 4
Lecture 36 - Singular Value Decomposition (SVD) - Part 1
Lecture 37 - Singular Value Decomposition (SVD) - Part 2
Lecture 38 - Back To Linear Systems - Part 1
Lecture 39 - Back To Linear Systems - Part 2
Lecture 40 - Epilogue

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NPTEL Video Course - Mathematics - Ordinary Differential Equations and Applications

Subject Co-ordinator - Prof. A.K. Nandakumaran, Prof. Raju K. George, Prof. P.S. Datti

Co-ordinating Institute - IISc - Bangalore | IIST - Trivandrum | TIFR-CAM - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction
Lecture 2 - Examples
Lecture 3 - Examples (Continued - I)
Lecture 4 - Examples (Continued - II)
Lecture 5 - Linear Algebra
Lecture 6 - Linear Algebra (Continued - I)
Lecture 7 - Linear Algebra (Continued - II)
Lecture 8 - Analysis
Lecture 9 - Analysis (Continued...)
Lecture 10 - First Order Linear Equations
Lecture 11 - Exact Equations
Lecture 12 - Second Order Linear Equations
Lecture 13 - Second Order Linear Equations (Continued - I)
Lecture 14 - Second Order Linear Equations (Continued - II)
Lecture 15 - Well-posedness and Examples of IVP
Lecture 16 - Gronwall's Lemma
Lecture 17 - Basic Lemma and Uniqueness Theorem
Lecture 18 - Picard's Existence and Uniqueness Theorem
Lecture 19 - Picard's Existence and Uniqueness (Continued...)
Lecture 20 - Cauchy Peano Existence Theorem
Lecture 21 - Existence using Fixed Point Theorem
Lecture 22 - Continuation of Solutions
Lecture 23 - Series Solution
Lecture 24 - General System and Diagonalizability
Lecture 25 - 2 by 2 systems and Phase Plane Analysis
Lecture 26 - 2 by 2 systems and Phase Plane Analysis (Continued...)
Lecture 27 - General Systems
Lecture 28 - General Systems (Continued...) and Non-homogeneous Systems
Lecture 29 - Basic Definitions and Examples

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Lecture 30 - Stability Equilibrium Points
Lecture 31 - Stability Equilibrium Points (Continued - I)
Lecture 32 - Stability Equilibrium Points (Continued - II)
Lecture 33 - Second Order Linear Equations (Continued - III)
Lecture 34 - Lyapunov Function
Lecture 35 - Lyapunov Function (Continued...)
Lecture 36 - Periodic Orbits and Poincare Bendixon Theory
Lecture 37 - Periodic Orbits and Poincare Bendixon Theory (Continued...)
Lecture 38 - Linear Second Order Equations
Lecture 39 - General Second Order Equations
Lecture 40 - General Second Order Equations (Continued...)

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NPTEL Video Course - Mathematics - NOC:Linear Algebra

Subject Co-ordinator - Prof. Dilip P. Patil

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Algebraic Structures - Rings and Fields
Lecture 2 - Definition of Vector Spaces
Lecture 3 - Examples of Vector Spaces
Lecture 4 - Definition of subspaces
Lecture 5 - Examples of subspaces
Lecture 6 - Examples of subspaces (Continued...)
Lecture 7 - Sum of subspaces
Lecture 8 - System of linear equations
Lecture 9 - Gauss elimination
Lecture 10 - Generating system, linear independence and bases
Lecture 11 - Examples of a basis of a vector space
Lecture 12 - Review of univariate polynomials
Lecture 13 - Examples of univariate polynomials and rational functions
Lecture 14 - More examples of a basis of vector spaces
Lecture 15 - Vector spaces with finite generating system
Lecture 16 - Steinitzs exchange theorem and examples
Lecture 17 - Examples of finite dimensional vector spaces
Lecture 18 - Dimension formula and its examples
Lecture 19 - Existence of a basis
Lecture 20 - Existence of a basis (Continued...)
Lecture 21 - Existence of a basis (Continued...)
Lecture 22 - Introduction to Linear Maps
Lecture 23 - Examples of Linear Maps
Lecture 24 - Linear Maps and Bases
Lecture 25 - Pigeonhole principle in Linear Algebra
Lecture 26 - Interpolation and the rank theorem
Lecture 27 - Examples
Lecture 28 - Direct sums of vector spaces
Lecture 29 - Projections

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Lecture 30 - Direct sum decomposition of a vector space
Lecture 31 - Dimension equality and examples
Lecture 32 - Dual spaces
Lecture 33 - Dual spaces (Continued...)
Lecture 34 - Quotient spaces
Lecture 35 - Homomorphism theorem of vector spaces
Lecture 36 - Isomorphism theorem of vector spaces
Lecture 37 - Matrix of a linear map
Lecture 38 - Matrix of a linear map (Continued...)
Lecture 39 - Matrix of a linear map (Continued...)
Lecture 40 - Change of bases
Lecture 41 - Computational rules for matrices
Lecture 42 - Rank of a matrix
Lecture 43 - Computation of the rank of a matrix
Lecture 44 - Elementary matrices
Lecture 45 - Elementary operations on matrices
Lecture 46 - LR decomposition
Lecture 47 - Elementary Divisor Theorem
Lecture 48 - Permutation groups
Lecture 49 - Canonical cycle decomposition of permutations
Lecture 50 - Signature of a permutation
Lecture 51 - Introduction to multilinear maps
Lecture 52 - Multilinear maps (Continued...)
Lecture 53 - Introduction to determinants
Lecture 54 - Determinants (Continued...)
Lecture 55 - Computational rules for determinants
Lecture 56 - Properties of determinants and adjoint of a matrix
Lecture 57 - Adjoint-determinant theorem
Lecture 58 - The determinant of a linear operator
Lecture 59 - Determinants and Volumes
Lecture 60 - Determinants and Volumes (Continued...)

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NPTEL Video Course - Mathematics - NOC:An Introduction to Smooth Manifolds

Subject Co-ordinator - Prof. Harish Seshadri

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic linear algebra
Lecture 2 - Multivariable calculus - 1
Lecture 3 - Multivariable calculus - 2
Lecture 4 - The derivative map
Lecture 5 - Inverse Function Theorem
Lecture 6 - Constant Rank Theorem
Lecture 7 - Smooth functions with compact support
Lecture 8 - Smooth manifold
Lecture 9 - Examples of smooth manifolds
Lecture 10 - Higher dimensional spheres as smooth manifolds
Lecture 11 - Smooth maps
Lecture 12 - Examples of smooth maps
Lecture 13 - Tangent spaces - 1
Lecture 14 - Tangent spaces - 2
Lecture 15 - Derivatives of smooth maps
Lecture 16 - Chain rule on manifolds
Lecture 17 - Dimension of tangent space - 1
Lecture 18 - Dimension of tangent space - 2
Lecture 19 - Derivative of inclusion map
Lecture 20 - Basis of tangent space
Lecture 21 - Inverse Function Theorem for manifolds
Lecture 22 - Submanifolds
Lecture 23 - Tangent space of a submanifold
Lecture 24 - Regular Value Theorem
Lecture 25 - Special linear group as a submanifold of the set of all square matrices
Lecture 26 - Hypersurfaces
Lecture 27 - Tangent spaces to level sets
Lecture 28 - Vector fields - 1
Lecture 29 - Vector fields - 2

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Lecture 30 - Vector fields - 3
Lecture 31 - Lie groups - 1
Lecture 32 - Lie groups - 2
Lecture 33 - Integral curve and flows - 1
Lecture 34 - Integral curve and flows - 2
Lecture 35 - Integral curve and flows - 3
Lecture 36 - Complete vector fields
Lecture 37 - Vector fields and smooth maps
Lecture 38 - Lie Brackets - 1
Lecture 39 - Lie brackets - 2
Lecture 40 - Lie brackets - 3
Lecture 41 - Lie algebras of matrix groups - 1
Lecture 42 - Lie algebras of matrix groups - 2
Lecture 43 - Exponential map
Lecture 44 - Frobenius theorems
Lecture 45 - Tensors and differential forms - 1
Lecture 46 - Tensors and differential forms - 2
Lecture 47 - Pull-back form
Lecture 48 - Symmetric Tensors
Lecture 49 - Alternating Tensors - 1
Lecture 50 - Alternating Tensors - 2
Lecture 51 - Alternating Tensors - 3
Lecture 52 - Alternating Tensors - 4
Lecture 53 - Alternating Tensors - 5
Lecture 54 - Alternating Tensors - 6
Lecture 55 - Alternating Tensors - 7
Lecture 56 - Alternating Tensors - 8
Lecture 57 - Alternating Tensors - 9
Lecture 58 - Differential forms on manifolds - 1
Lecture 59 - Differential forms on manifolds - 2
Lecture 60 - The Exterior derivative - 1
Lecture 61 - The Exterior derivative - 2
Lecture 62 - The Exterior derivative - 3
Lecture 63 - The Exterior derivative - 4
Lecture 64 - The Exterior derivative - 5
Lecture 65 - Special classes of forms
Lecture 66 - Orientation on manifolds - 1
Lecture 67 - Orientation on manifolds - 2
Lecture 68 - Orientation on manifolds - 3

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NPTEL Video Course - Mathematics - NOC:Measure Theory (Prof. E. K. Narayanan)

Subject Co-ordinator - Prof. E. K. Narayanan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Riemann integration and introduction to sigma algebras
Lecture 2 - Sigma algebras and measurability
Lecture 3 - Measurable functions and approximation by simple functions
Lecture 4 - Properties of countably additive measures
Lecture 5 - Integration of positive measurable functions
Lecture 6 - Some properties of integrals of positive simple functions
Lecture 7 - Monotone convergence theorem and Fatou's lemma
Lecture 8 - Integration of complex valued measurable functions
Lecture 9 - Dominated convergence theorem
Lecture 10 - Sets of measure zero and completion
Lecture 11 - Consequences of MCT, Fatou's lemma and DCT
Lecture 12 - Rectangles in R^n and some properties
Lecture 13 - Outer measure on R^n
Lecture 14 - Properties of outer measure on R^n
Lecture 15 - Lebesgue measurable sets and Lebesgue measure on R^n
Lecture 16 - Lebesgue sigma algebra
Lecture 17 - Lebesgue measure
Lecture 18 - Fine properties of measurable sets
Lecture 19 - Invariance properties of Lebesgue measure
Lecture 20 - Non measurable set
Lecture 21 - Measurable functions
Lecture 22 - Riemann and Lebesgue integrals
Lecture 23 - Locally compact Hausdorff spaces
Lecture 24 - Riesz representation theorem
Lecture 25 - Positive Borel measures
Lecture 26 - Lebesgue measure via Riesz representation theorem
Lecture 27 - Construction of Lebesgue measure
Lecture 28 - Invariance properties of Lebesgue measure
Lecture 29 - Linear transformations and Lebesgue measure

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Lecture 30 - Cantor set
Lecture 31 - Cantor function
Lecture 32 - Lebesgue set which is not Borel
Lecture 33 - L^p spaces
Lecture 34 - L^p norm
Lecture 35 - Completeness of L^p
Lecture 36 - Properties of L^p spaces
Lecture 37 - Examples of L^p spaces
Lecture 38 - Product sigma algebra
Lecture 39 - Product measures - I
Lecture 40 - Product measures - II
Lecture 41 - Fubini's theorem - I
Lecture 42 - Fubini's theorem - II
Lecture 43 - Completeness of product measures
Lecture 44 - Polar coordinates
Lecture 45 - Applications of Fubini's theorem
Lecture 46 - Complex measures - I
Lecture 47 - Complex measures - II
Lecture 48 - Absolutely continuous measures
Lecture 49 - L^2 space
Lecture 50 - Continuous linear functionals
Lecture 51 - Radon-Nikodym theorem - I
Lecture 52 - Radon Nikodym theorem - II
Lecture 53 - Consequences of Radon-Nikodym theorem - I
Lecture 54 - Consequences of Radon-Nikodym theorem - II
Lecture 55 - Continuous linear functionals on L^p spaces - I
Lecture 56 - Continuous linear functionals on L^p spaces - II
Lecture 57 - Riesz representation theorem - I
Lecture 58 - Riesz representation theorem - II
Lecture 59 - Hardy-Littlewood maximal function
Lecture 60 - Lebesgue differentiation theorem
Lecture 61 - Absolutely continuous functions - I
Lecture 62 - Absolutely continuous functions - II

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NPTEL Video Course - Mathematics - NOC:Introduction to Algebraic Geometry and Commutative Algebra

Subject Co-ordinator - Prof. Dilip P. Patil

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation for K-algebraic sets
Lecture 2 - Definitions and examples of Affine Algebraic Set
Lecture 3 - Rings and Ideals
Lecture 4 - Operation on Ideals
Lecture 5 - Prime Ideals and Maximal Ideals
Lecture 6 - Krull's Theorem and consequences
Lecture 7 - Module, submodules and quotient modules
Lecture 8 - Algebras and polynomial algebras
Lecture 9 - Universal property of polynomial algebra and examples
Lecture 10 - Finite and Finite type algebras
Lecture 11 - K-Spectrum (K-rational points)
Lecture 12 - Identity theorem for Polynomial functions
Lecture 13 - Basic properties of K-algebraic sets
Lecture 14 - Examples of K-algebraic sets
Lecture 15 - K-Zariski Topology
Lecture 16 - The map V L
Lecture 17 - Noetherian and Artinian Ordered sets
Lecture 18 - Noetherian induction and Transfinite induction
Lecture 19 - Modules with Chain Conditions
Lecture 20 - Properties of Noetherian and Artinian Modules
Lecture 21 - Examples of Artinian and Noetherian Modules
Lecture 22 - Finite modules over Noetherian Rings
Lecture 23 - Hilbertâ s Basis Theorem (HBT)
Lecture 24 - Consequences of HBT
Lecture 25 - Free Modules and rank
Lecture 26 - More on Noetherian and Artinian modules
Lecture 27 - Ring of Fractions (Localization)
Lecture 28 - Nil radical, contraction of ideals
Lecture 29 - Universal property of S -1 A

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Lecture 30 - Ideal structure in S -1 A
Lecture 31 - Consequences of the Correspondence of Ideals
Lecture 32 - Consequences of the Correspondence of Ideals (Continued...)
Lecture 33 - Modules of Fraction and universal properties
Lecture 34 - Exactness of the functor S -1
Lecture 35 - Universal property of Modules of Fractions
Lecture 36 - Further properties of Modules and Module of Fractions
Lecture 37 - Local-Global Principle
Lecture 38 - Consequences of Local-Global Principle
Lecture 39 - Properties of Artinian Rings
Lecture 40 - Krull-Nakayama Lemma
Lecture 41 - Properties of I K and V L maps
Lecture 42 - Hilbertâ s Nullstelensatz
Lecture 43 - Hilbertâ s Nullstelensatz (Continued...)
Lecture 44 - Proof of Zariskiâ s Lemma (HNS 3)
Lecture 45 - Consequences of HNS
Lecture 46 - Consequences of HNS (Continued...)
Lecture 47 - Jacobson Ring and examples
Lecture 48 - Irreducible subsets of Zariski Topology (Finite type K-algebra)
Lecture 49 - Spec functor on Finite type K-algebras
Lecture 50 - Properties of Irreducible topological spaces
Lecture 51 - Zariski Topology on arbitrary commutative rings
Lecture 52 - Spec functor on arbitrary commutative rings
Lecture 53 - Topological properties of Spec A
Lecture 54 - Example to support the term Spectrum
Lecture 55 - Integral Extensions
Lecture 56 - Elementwise characterization of Integral extensions
Lecture 57 - Properties and examples of Integral extensions
Lecture 58 - Prime and Maximal ideals in integral extensions
Lecture 59 - Lying over Theorem
Lecture 60 - Cohen-Siedelberg Theorem

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NPTEL Video Course - Mathematics - NOC:First Course on Partial Differential Equations-I

Subject Co-ordinator - Prof. P. S. Datti, Prof. A. K. Nandakumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Introduction - 2
Lecture 3 - Priliminaries - 1
Lecture 4 - Priliminaries - 2
Lecture 5 - Priliminaries - 3
Lecture 6 - Priliminaries - 4
Lecture 7 - First order equations in two variables - 1
Lecture 8 - First order equations in two variables - 2
Lecture 9 - First order equations in two variables - 3
Lecture 10 - First order equations in two variables - 4
Lecture 11 - First order equations in two variables - 5
Lecture 12 - First order equations in more than two variables - 6
Lecture 13 - First order equations in more than two variables - 7
Lecture 14 - First order equations in more than two variables - 8
Lecture 15 - Classification - 1
Lecture 16 - Classification - 2
Lecture 17 - Classification - 3
Lecture 18 - Laplace and Poisson equations - 1
Lecture 19 - Laplace and Poisson equations - 2
Lecture 20 - Laplace and Poisson equations - 3
Lecture 21 - Laplace and Poisson equations - 4
Lecture 22 - Laplace and Poisson equations - 5
Lecture 23 - Laplace and Poisson equations - 6
Lecture 24 - Laplace and Poisson equations - 7
Lecture 25 - Laplace and Poisson equations - 8
Lecture 26 - Laplace and Poisson equations - 9
Lecture 27 - Laplace and Poisson equations - 10
Lecture 28 - One dimensional heat equation - 1
Lecture 29 - One dimensional heat equation - 2

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Lecture 30 - One dimensional heat equation - 3
Lecture 31 - One dimensional heat equation - 4
Lecture 32 - One dimensional heat equation - 5
Lecture 33 - One dimensional heat equation - 6
Lecture 34 - One dimensional wave equation - 1
Lecture 35 - One dimensional wave equation - 2
Lecture 36 - One dimensional wave equation - 3
Lecture 37 - One dimensional wave equation - 4
Lecture 38 - One dimensional wave equation - 5
Lecture 39 - One dimensional wave equation - 6
Lecture 40 - One dimensional wave equation - 7
Lecture 41 - One dimensional wave equation - 8

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NPTEL Video Course - Mathematics - NOC:First Course on Partial Differential Equations - II

Subject Co-ordinator - Prof. A. K. Nandakumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - HJE 1
Lecture 3 - HJE 2
Lecture 4 - HJE 3
Lecture 5 - HJE 4
Lecture 6 - HJE 5
Lecture 7 - HJE 6
Lecture 8 - CL1
Lecture 9 - CL2
Lecture 10 - CL3
Lecture 11 - CL4
Lecture 12 - CL5
Lecture 13 - CL6
Lecture 14 - Perron Method - 1
Lecture 15 - Perron Method - 2
Lecture 16 - Perron Method - 3
Lecture 17 - Perron Method - 4
Lecture 18 - Newtonian Potential - 1
Lecture 19 - Newtonian Potential - 2
Lecture 20 - Newtonian Potential - 3
Lecture 21 - Newtonian Potential - 4
Lecture 22 - Newtonian Potential - 5
Lecture 23 - Eigen Value Problem - 1
Lecture 24 - Eigen Value Problem - 2
Lecture 25 - Heat Equation - 1
Lecture 26 - Heat Equation - 2
Lecture 27 - Heat Equation - 3
Lecture 28 - Heat Equation - 4
Lecture 29 - Heat Equation - 5

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Lecture 30 - Wave Equation - 1
Lecture 31 - Wave Equation - 2
Lecture 32 - Wave Equation - 3
Lecture 33 - Wave Equation - 4
Lecture 34 - Wave Equation - 5
Lecture 35 - Wave Equation - 6
Lecture 36 - Wave Equation - 7
Lecture 37 - Weak Solutions - 1
Lecture 38 - Weak Solutions - 2
Lecture 39 - Weak Solutions - 3
Lecture 40 - Weak Solutions - 4
Lecture 41 - Weak Solutions - 5

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NPTEL Video Course - Mathematics - Matrix Theory

Subject Co-ordinator - Prof. Chandra Murthy

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course introduction and properties of matrices
Lecture 2 - Vector spaces
Lecture 3 - Basis, dimension
Lecture 4 - Linear transforms
Lecture 5 - Fundamental subspaces of a matrix
Lecture 6 - Fundamental theorem of linear algebra
Lecture 7 - Properties of rank
Lecture 8 - Inner product
Lecture 9 - Gram-schmidt algorithm
Lecture 10 - Orthonormal matrices definition
Lecture 11 - Determinant
Lecture 12 - Properties of determinants
Lecture 13 - Introduction to norms and inner products
Lecture 14 - Vector norms and their properties
Lecture 15 - Applications and equivalence of vector norms
Lecture 16 - Summary of equivalence of norms
Lecture 17 - Dual norms
Lecture 18 - Properties and examples of dual norms
Lecture 19 - Matrix norms
Lecture 20 - Matrix norms: Properties
Lecture 21 - Induced norms
Lecture 22 - Induced norms and examples
Lecture 23 - Spectral radius
Lecture 24 - Properties of spectral radius
Lecture 25 - Convergent matrices, Banach lemma
Lecture 26 - Recap of matrix norms and Levy-Desplanques theorem
Lecture 27 - Equivalence of matrix norms and error in inverses of linear systems
Lecture 28 - Errors in inverses of matrices
Lecture 29 - Errors in solving systems of linear equations

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Lecture 30 - Introduction to eigenvalues and eigenvectors
Lecture 31 - The characteristic polynomial
Lecture 32 - Solving characteristic polynomials, eigenvectors properties
Lecture 33 - Similarity
Lecture 34 - Diagonalization
Lecture 35 - Relationship between eigenvalues of BA and AB
Lecture 36 - Eigenvector and principle of biorthogonality
Lecture 37 - Unitary matrices
Lecture 38 - Properties of unitary matrices
Lecture 39 - Unitary equivalence
Lecture 40 - Schur's triangularization theorem
Lecture 41 - Cayley-Hamilton theorem
Lecture 42 - Uses of cayley-hamilton theorem and diagonalizability revisited
Lecture 43 - Normal matrices: Definition and fundamental properties
Lecture 44 - Fundamental properties of normal matrices
Lecture 45 - QR decomposition and canonical forms
Lecture 46 - Jordan canonical form
Lecture 47 - Determining the Jordan form of a matrix
Lecture 48 - Properties of the Jordan canonical form - Part 1
Lecture 49 - Properties of the Jordan canonical form - Part 2
Lecture 50 - Properties of convergent matrices
Lecture 51 - Polynomials and matrices
Lecture 52 - Other canonical forms and factorization of matrices: Gaussian elimination and LU factorization
Lecture 53 - LU decomposition
Lecture 54 - LU decomposition with pivoting
Lecture 55 - Solving pivoted system and LDM decomposition
Lecture 56 - Cholesky decomposition and uses
Lecture 57 - Hermitian and symmetric matrix
Lecture 58 - Properties of hermitian matrices
Lecture 59 - Variational characterization of Eigenvalues: Rayleigh-Ritz theorem
Lecture 60 - Variational characterization of eigenvalues (Continued...)
Lecture 61 - Courant-Fischer theorem
Lecture 62 - Summary of Rayliegh-Ritz and Courant-Fischer theorems
Lecture 63 - Weyl's theorem
Lecture 64 - Positive semi-definite matrix, monotonicity theorem and interlacing theorems
Lecture 65 - Interlacing theorem - I
Lecture 66 - Interlacing theorem - II (Converse)
Lecture 67 - Interlacing theorem (Continued...)
Lecture 68 - Eigenvalues: Majorization theorem and proof

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Lecture 69 - Location and perturbation of Eigenvalues - Part 1: Dominant diagonal theorem
Lecture 70 - Location and perturbation of Eigenvalues - Part 2: Gersgorin's theorem
Lecture 71 - Implications of Gersgorin disc theorem, condition of eigenvalues
Lecture 72 - Condition of eigenvalues for diagonalizable matrices
Lecture 73 - Perturbation of eigenvalues Birkhoff's theorem Hoffman-Weiland ttheorem
Lecture 74 - Singular value definition and some remarks
Lecture 75 - Proof of singular value decomposition theorem
Lecture 76 - Partitioning the SVD
Lecture 77 - Properties of SVD
Lecture 78 - Generalized inverse of matrices
Lecture 79 - Least squares
Lecture 80 - Constrained least squares

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NPTEL Video Course - Mathematics - NOC:C* Algebras and Spectral Theorem

Subject Co-ordinator - Prof. E K Narayanan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Finite dimensional Spectral theorem
Lecture 2 - Compact operators
Lecture 3 - Spectral theorem for Compact self-adjoint operators
Lecture 4 - Spectral theorem for Compact Normal operators
Lecture 5 - Banach algebras
Lecture 6 - Gelfand-Mazur theorem
Lecture 7 - Spectral radius
Lecture 8 - Multiplicative functionals
Lecture 9 - Gelfand transform - I
Lecture 10 - Gelfand transform - II
Lecture 11 - C* algebras
Lecture 12 - Examples and Wienerâ s theorem
Lecture 13 - Gelfand-Naimark theorem
Lecture 14 - Non-unital Banach algebras
Lecture 15 - Non-unital C* algebra
Lecture 16 - Gelfand transform of non-unital C*algebras
Lecture 17 - Gelfand-Naimark theorem for non-unital C* algebras
Lecture 18 - Continuous functional calculus
Lecture 19 - Bounded functional calculus - I
Lecture 20 - Bounded functional calculus - II
Lecture 21 - Projection valued measures
Lecture 22 - Bounded functional calculus with respect to a projection valued measure
Lecture 23 - Spectral Theorem - I
Lecture 24 - Spectral theorem - II
Lecture 25 - Some applications
Lecture 26 - Spectral theorem for a bounded normal operator
Lecture 27 - Resolution of identity - I
Lecture 28 - Resolution of identity - II
Lecture 29 - Resolution of identity - III

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Lecture 30 - Resolution of identity - IV
Lecture 31 - Equivalence of various forms of spectral theorems - I
Lecture 32 - Equivalence of various forms of spectral theorems - II
Lecture 33 - Spectrum of a self-adjoint operator - I
Lecture 34 - Spectrum of a self-adjoint operator - II
Lecture 35 - Commuting family of self-adjoint operators
Lecture 36 - Continuous functional calculus for commuting family of self-adjoint operators - I
Lecture 37 - Continuous functional calculus for commuting family of self-adjoint operators - II
Lecture 38 - Fugledeâ s theorem
Lecture 39 - Spectral theorem for commuting finite family of normal operators
Lecture 40 - Multiplicity theory

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NPTEL Video Course - Mathematics - NOC:Advanced Partial Differential Equations (Part I: Distributions and Sob

Subject Co-ordinator - Prof. P.S. Datti, Prof. A K Nandakumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Preliminaries - 1
Lecture 3 - Preliminaries - 2
Lecture 4 - Priliminaries - 3
Lecture 5 - Priliminaries - 4
Lecture 6 - Preliminaries - 5
Lecture 7 - Prelimunaries - 6
Lecture 8 - Preliminaries - 7
Lecture 9 - Preliminaries - 8
Lecture 10 - Preliminaries - 9
Lecture 11 - Introduction to Distributions
Lecture 12 - Properties and Examples
Lecture 13 - Convergence of distributions
Lecture 14 - Convergence of distributions
Lecture 15 - Calculus in the space of distributions
Lecture 16 - Further discussion on Distributions
Lecture 17 - Order and support of a distribution
Lecture 18 - Laplace and Poisson equations - Distributions with compact support
Lecture 19 - Validity of the definition of the support
Lecture 20 - Convolution and Fourier transform of distributions
Lecture 21 - The Schwartz space andAKN Lec 15 its dual
Lecture 22 - Fourier transform of a tempered distribution, convolution
Lecture 23 - Properties of Convolution
Lecture 24 - Further discussion on Fourier transform and convolution
Lecture 25 - Convolution of two distributions
Lecture 26 - Convolution of distributions
Lecture 27 - Introduction to Sobolev spaces
Lecture 28 - Properties of Sobloev Spaces
Lecture 29 - Extension and Density results

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Lecture 30 - General Extension result
Lecture 31 - Integration on a smooth surface
Lecture 32 - A more general extension result
Lecture 33 - Notion of the trace
Lecture 34 - A compactness theorem
Lecture 35 - Equivalent norms
Lecture 36 - Sobolev lemma
Lecture 37 - Sobolev lemma (Continued...)
Lecture 38 - Analysis near the boundary
Lecture 39 - Trace in the upper half space
Lecture 40 - Trace in the upper half space
Lecture 41 - Supplementary lecture
Lecture 42 - Supplementary lecture

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NPTEL Video Course - Mathematics - NOC:Advanced Course on Partial Differential Equations - II

Subject Co-ordinator - Prof. A K Nandakumaran, Prof. P.S. Datti

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Outline
Lecture 2 - Review of Sobolev spaces - 1
Lecture 3 - Review of Sobolev spaces - 2
Lecture 4 - Review of Sobolev spaces - 3
Lecture 5 - Review of Sobolev spaces - 4
Lecture 6 - Review of Sobolev spaces - 5
Lecture 7 - Elliptic equations and weak formulation
Lecture 8 - Abstract Formulation
Lecture 9 - Variational Inequality
Lecture 10 - Babuska-Brezzi Theorem
Lecture 11 - Strong vs Weak Form of PDE
Lecture 12 - General Second Order Equations
Lecture 13 - Non-uniqueness of Neumann problem
Lecture 14 - Biharmonic equation, Stokes system
Lecture 15 - Stokes system (Continued...)
Lecture 16 - Regularity of Ellptic Equations
Lecture 17 - Regularity (Continued...)
Lecture 18 - Maximum and Minimum Principles for weak formulation
Lecture 19 - Spectrum of the Laplace operator
Lecture 20 - First eigenvalue of the Laplace operator and a brief discussion of a Galerkin method
Lecture 21 - Introduction to semi-groups and unbounded operators
Lecture 22 - Spectrum of an operator
Lecture 23 - Examples of operators and operators in a Hilbert space
Lecture 24 - Perturbation of an operator, Kato theorems. Definition of a semi-group
Lecture 25 - Semi-group and its infinitesimal generator
Lecture 26 - Examples of semi-groups; spectrum and resolvent of the infinitesimal generator
Lecture 27 - An application. Saturation theorem
Lecture 28 - Hille-Yosida Theorem
Lecture 29 - Lumer-Philips Theorem. Stone's theorem

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Lecture 30 - Abstract Cauchy Problem
Lecture 31 - Semi-group arising from the heat equation
Lecture 32 - Geneartor of the heat semi-group
Lecture 33 - Semi-group arising from the wave equation
Lecture 34 - Semi-group arising from the wave equation in energy space
Lecture 35 - Wave equation in energy space
Lecture 36 - Wave equation in energy space (Continued...)
Lecture 37 - Semi-group arising from the wave equation in H^1 x L^2
Lecture 38 - Schroedinger equation in free space
Lecture 39 - Schroedinger equation with a potential. Application of Kato's theorem
Lecture 40 - Equations in a bounded domain. Concluding remarks

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NPTEL Video Course - Mathematics - NOC:Introduction to Group Theory

Subject Co-ordinator - Prof. R. Venkatesh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation of group theory
Lecture 2 - Definition of a group
Lecture 3 - Examples of groups
Lecture 4 - The symmetric group
Lecture 5 - Subgroups of integers
Lecture 6 - Basic properties of groups
Lecture 7 - Subgroups of a group
Lecture 8 - Subgroup generated by subsets of a group
Lecture 9 - Group of integers modulo n
Lecture 10 - Some elementary number theory - I
Lecture 11 - Some elementary number theory - II
Lecture 12 - Order of an elements in a group
Lecture 13 - Cyclic groups and its subgroups
Lecture 14 - Characterization of cyclic groups
Lecture 15 - Examples of cosets of a subgroup in a group
Lecture 16 - Cosets of a subgroup of a group
Lecture 17 - Lagrange's Theorem
Lecture 18 - Number theoretic applications of Lagrange's Theorem
Lecture 19 - Normal subgroup
Lecture 20 - Some useful definitions
Lecture 21 - Internal direct product
Lecture 22 - More on normal subgroups
Lecture 23 - Normalizer of a subgroup
Lecture 24 - First Isomorphism Theorem
Lecture 25 - Second Isomorphism Theorem
Lecture 26 - Third Isomorphism Theorem
Lecture 27 - Group acting on a set
Lecture 28 - Group action - Examples
Lecture 29 - Isometries of the plane is a group

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Lecture 30 - Orthogonal maps
Lecture 31 - Dihedral groups
Lecture 32 - Finite subgroups of the orthogonal group
Lecture 33 - Group acting on a set
Lecture 34 - Group action - Examples
Lecture 35 - Orbit-decomposition Theorem
Lecture 36 - Stabilizer of a subset
Lecture 37 - Applications of group action
Lecture 38 - Class equation
Lecture 39 - Some more applications of group action
Lecture 40 - G-sets and morphisms
Lecture 41 - More examples
Lecture 42 - Burnside's lemma
Lecture 43 - The Sylow's theorems
Lecture 44 - The Sylow's theorems (Continued...)
Lecture 45 - Application of Sylow's Theorems
Lecture 46 - Semidirect product of groups
Lecture 47 - Automorphisms of groups
Lecture 48 - Symmetric and alternating groups
Lecture 49 - Conjugacy in the symmetric group
Lecture 50 - Conjugacy in the symmetric group (Continued...)
Lecture 51 - Simplicity of the alternating groups
Lecture 52 - The sign map
Lecture 53 - The sign map (Continued...)
Lecture 54 - Structure theorem for finite abelian groups (using invariant factors)
Lecture 55 - The structure theorem for finite abelian groups
Lecture 56 - Proof of the structure theorem for finite abelian groups (Continued...)
Lecture 57 - Proof of the structure theorem for finite abelian groups
Lecture 58 - Structure theory of finite abelian p-groups

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NPTEL Video Course - Mathematics - NOC:Introduction to Lie Algebras

Subject Co-ordinator - Prof. R. Venkatesh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to Lie Algebras
Lecture 2 - Lie subalgebra and Homomorphism
Lecture 3 - Some Problems
Lecture 4 - Ideals and Quotient algebras
Lecture 5 - Isomorphism theorems
Lecture 6 - Correspondence between ideals
Lecture 7 - Low dimensional Lie algebra - 1
Lecture 8 - Low dimensional Lie algebra - 2
Lecture 9 - Some more definitions
Lecture 10 - Solvable and nilpotent Lie algebra
Lecture 11 - Nilpotent Lie algebra
Lecture 12 - The invariance Lemma
Lecture 13 - Engel's and Lie's Theorem
Lecture 14 - Engel's and Lie's Theorem (Continued...)
Lecture 15 - Lie's Theorem
Lecture 16 - Basics of Representation Theory
Lecture 17 - Basics of Representation Theory (Continued...)
Lecture 18 - Schur's lemma
Lecture 19 - Finite dimensional representations of of sl2(C)
Lecture 20 - Classification of finite dimensional representations of sl2(C)
Lecture 21 - Complete reducibility of finite dimensional representation of sl2(C) - Part 1
Lecture 22 - Complete reducibility of finite dimensional representation of sl2(C) - Part 2
Lecture 23 - Applications of Lie's and Engel's theorem
Lecture 24 - Applications of Weyl's Theorem for sl2(C)
Lecture 25 - New representations form given representations
Lecture 26 - Primary decomposition Theorem and Jordan-Chevalley decomposition
Lecture 27 - Cartan's criteria for solvability
Lecture 28 - Cartan's criteria for semisimplicity and its consequences
Lecture 29 - Abstract Jordan decomposition in semisimple Lie algebras

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Lecture 30 - Casimir element of a representation of a semisimple Lie algebra
Lecture 31 - Weyl's Theorem of complete reducibility for semisimple Lie algebras
Lecture 32 - Root space decomposition of semisimple Lie algebras
Lecture 33 - Centralizer of a maximal toral subalgebra
Lecture 34 - Properties of roots
Lecture 35 - More properties of roots
Lecture 36 - Rationality of roots
Lecture 37 - Abstract root system and Weyl groups
Lecture 38 - Isomorphism of Root systems and dual root systems
Lecture 39 - Root systems of Ranks 1 and 2
Lecture 40 - Classification of rank 2 root systems
Lecture 41 - Base of a root system
Lecture 42 - Classification of bases
Lecture 43 - Basic properties of simple roots
Lecture 44 - Characterization of length function
Lecture 45 - Decomposition of root systems
Lecture 46 - Root lengths, Cartan Matrices
Lecture 47 - Cartan matrices and Dynkin diagrams
Lecture 48 - Classification of Root systems
Lecture 49 - Classification of Root systems (Continued...)
Lecture 50 - Concrete description of root systems
Lecture 51 - Uniqueness of root systems
Lecture 52 - Isomorphism theorem
Lecture 53 - Isomorphism theorem (Continued...)
Lecture 54 - Generators and relations
Lecture 55 - Serre presentation

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NPTEL Video Course - Mathematics - NOC:Representation Theory of General Linear Lie Algebra

Subject Co-ordinator - Prof. R. Venkatesh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Theory of Lie algebras
Lecture 2 - Basic Theory of Lie algebras (Continued...)
Lecture 3 - Basic Theory of Lie algebras (Continued...)
Lecture 4 - Representation Theory of Lie algebras
Lecture 5 - Representation Theory of Lie algebras (Continued...)
Lecture 6 - Representation of Lie algebras
Lecture 7 - Classification of 2 dimensional representation of two dimensional non-abelian Lie algebra
Lecture 8 - Isomorphism Theorem
Lecture 9 - Characterization of completely reducible module
Lecture 10 - Representation theory of sl2(C)
Lecture 11 - Irreducible representation of sl2(C)
Lecture 12 - Irreducible representation of sl2(C) (Continued...)
Lecture 13 - Complete reducibility of sl2(C)
Lecture 14 - Complete reducibility of sl2(C) (Continued...)
Lecture 15 - Representation theory of sl2(C)-basic observation
Lecture 16 - Application of sl2(C) representation theory in combinatorics
Lecture 17 - Constructions of new representations
Lecture 18 - Construction of universal algebras - I
Lecture 19 - Construction of universal algebras - II
Lecture 20 - Non-degenerate and invariant bilinear forms
Lecture 21 - SchurÃ¢â ¬â ¢s lemma and Killing form
Lecture 22 - Killing form of general and special linear Lie algebras
Lecture 23 - The universal enveloping algebra
Lecture 24 - Properties of the universal enveloping algebra
Lecture 25 - The Casimir operator for representations of gln(C) and sln(C)
Lecture 26 - Weylâ s theorem of complete reducibility
Lecture 27 - The structure of sln+1(C)
Lecture 28 - Representations of sln+1(C) - I
Lecture 29 - Representations of sln+1(C) - II

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Lecture 30 - Representations of sln+1(C) - III
Lecture 31 - Casimir operator and highest weight modules - I
Lecture 32 - Casimir operator and highest weight modules - II
Lecture 33 - Irreducible representations of sln+1(C)
Lecture 34 - Verma module and its irreducible quotient
Lecture 35 - Verma modules and standard cyclic irreducible modules
Lecture 36 - Finite dimensional standard cyclic irreducible modules
Lecture 37 - Standard cyclic irreducible modules
Lecture 38 - Character Theory - I
Lecture 39 - Character Theory - II
Lecture 40 - Deniminator Identity - Prep 1
Lecture 41 - Deniminator Identity - Prep 2
Lecture 42 - Proof of the denominator identity
Lecture 43 - Freudenthal's formula
Lecture 44 - The Weyl character formula
Lecture 45 - The Laplacian operator and the Weyl Character Formula
Lecture 46 - Proof of the Weyl Character Formula
Lecture 47 - Applications of Weyl Character formula
Lecture 48 - The Weyl dimension formula, Schur polynomials
Lecture 49 - Semi-standard Young Tableaux
Lecture 50 - BGG resolution

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NPTEL Video Course - Mathematics - NOC:Algebraic Number Theory

Subject Co-ordinator - Prof. Mahesh Kakde

Co-ordinating Institute - IISc - Bangalore

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Lecture 1 - Overview and Motivation
Lecture 2 - Algebraic Numbers
Lecture 3 - The ring of integers
Lecture 4 - Lattices
Lecture 5 - Properties of ring of integers
Lecture 6 - Discriminant
Lecture 7 - Dedekind Domains (DD)
Lecture 8 - Algebraic properties of DD
Lecture 9 - Unique Factorization of Ideals - 1
Lecture 10 - Unique Factorization of Ideals - 2
Lecture 11 - Ring of Integers is a DD
Lecture 12 - Ideal Class Group
Lecture 13 - Integral Ideal in an ideal class
Lecture 14 - Finiteness of ideal class group
Lecture 15 - Geometry of numbers - 1
Lecture 16 - Geometry of numbers - 2
Lecture 17 - Dirichlet's Unit Theorem - 1
Lecture 18 - Dirichlet's Unit Theorem - 2
Lecture 19 - Relative extension - 1
Lecture 20 - Relative extension - 2
Lecture 21 - Decomposition Group
Lecture 22 - Inertia Group
Lecture 23 - The Artin map
Lecture 24 - Valuations
Lecture 25 - Archimedean valuations
Lecture 26 - Non-archimedean valuations
Lecture 27 - p-adic numbers
Lecture 28 - p-adic completion of a Number field
Lecture 29 - Product formula

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Lecture 30 - Hensel's lemma
Lecture 31 - Finite extensions of local fields
Lecture 32 - Factorisation of conorm of a prime ideal in a finite extension - I
Lecture 33 - Factorisation of conorm of a prime ideal in a finite extension - II
Lecture 34 - Different - I
Lecture 35 - Different - II
Lecture 36 - Different - III
Lecture 37 - Ramification and different ideal
Lecture 38 - Quadratic Fields
Lecture 39 - Binary quadratic forms - I
Lecture 40 - Binary quadratic forms - II
Lecture 41 - Reduced binary quadratic forms
Lecture 42 - Class group of imaginary quadratic fields and binary quadratic forms - 1
Lecture 43 - Class group of imaginary quadratic fields and binary quadratic forms - 2
Lecture 44 - Computation of Class group of imaginary quadratic fields using binary quadratic forms
Lecture 45 - Order two elements in Class group of imaginary quadratic fields
Lecture 46 - Pure cubic fields - 1
Lecture 47 - Pure cubic fields - 2
Lecture 48 - Pell's equation - 1
Lecture 49 - Pell's equation - 2
Lecture 50 - Biquadratic fields - 1
Lecture 51 - Biquadratic fields - 2
Lecture 52 - Cyclotomic fields - 1
Lecture 53 - Cyclotomic fields - 2
Lecture 54 - Compuation of class groups - 1
Lecture 55 - Compuation of class groups - 2
Lecture 56 - Compuation of class groups - 3
Lecture 57 - Compuation of class groups - 4

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NPTEL Video Course - Mathematics - NOC:Representation Theory of Finite Groups

Subject Co-ordinator - Prof. R. Venkatesh

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of vector spaces
Lecture 2 - Inner product spaces
Lecture 3 - Diagonalization
Lecture 4 - Generalized eigen spaces
Lecture 5 - Decomposition theorems
Lecture 6 - Definition of representation
Lecture 7 - Isomorphism theorems
Lecture 8 - Indecomposable representations
Lecture 9 - Schur's Lemma
Lecture 10 - Filtration of representations
Lecture 11 - Construction of new representations by extensions
Lecture 12 - Basics of representation theory of finite groups
Lecture 13 - Classification of irreducible representations of finite cyclic group and Symmteric group
Lecture 14 - Irreducibility via Cyclic Vectors
Lecture 15 - Construction of representations of group generated by a set with defining relations
Lecture 16 - Complete reducibility of unitary representations
Lecture 17 - Complete reducibility of finite dimensional representations of finite groups
Lecture 18 - Projection map from representation of G to its fixed subspace
Lecture 19 - Character Theory: Basic properties
Lecture 20 - Orthogonality relations of irreducible characters of finite group
Lecture 21 - Orthonormal subset of space of class functions and Orthogonality of irreducible characters
Lecture 22 - Schur's orthogonality relations and its applications
Lecture 23 - Applications of character theory
Lecture 24 - Regular representation, decomposition of regular representation
Lecture 25 - Orthonormal basis of space of class functions and computation of character tables
Lecture 26 - Orthogonality of the columns of the character table
Lecture 27 - Representations of finite abeilian group
Lecture 28 - Algebraic numbers and equivalent conditions for algebraic integers
Lecture 29 - Dimension theorem

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Lecture 30 - Applications of dimension theorem
Lecture 31 - Character table computation of groups: Q_8, D_8, A_4
Lecture 32 - Burnside Theorem and its proof
Lecture 33 - Proof of key result used in Burnside Theorem
Lecture 34 - Notion of Tensor product
Lecture 35 - Basic properties of Tensor product
Lecture 36 - Symmetric tensor product
Lecture 37 - Alternating tensor product
Lecture 38 - G-action on Symmetric and exterior tensor product
Lecture 39 - Graded character of Symmetric tensor algebra and exterior algebra
Lecture 40 - Alternate proof of orthogonality of irreducible characters
Lecture 41 - Density theorem
Lecture 42 - Frobenius theorem
Lecture 43 - Induced representation
Lecture 44 - Frobenius reciprocity
Lecture 45 - Mackey's restrcition formula
Lecture 46 - Mackey's irreducibility criterion
Lecture 47 - Fourier analysis on finite groups
Lecture 48 - Fourier inversion
Lecture 49 - Fourier analysis on nonabeilian groups
Lecture 50 - Applications of Fourier analysis on finite groups
Lecture 51 - Cayley graph and its eigenvalues
Lecture 52 - Notations and combinatorics in representation theory of symmetric group
Lecture 53 - Irreducible representations of symmetric group
Lecture 54 - Permutation modules
Lecture 55 - Constructing irreducibles of symmetric group
Lecture 56 - Classification of irreducible representations of symmetric group

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NPTEL Video Course - Mathematics - NOC:Riemannian Geometry

Subject Co-ordinator - Prof. Ved Vivek Datar

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Angle Sum Property for Triangles
Lecture 2 - Introduction to Curvature of Planar Curves
Lecture 3 - Curvature of Embedded Surfaces in the 3-Dimensional Space
Lecture 4 - Review of Smooth Manifolds
Lecture 5 - Review of Tangent Spaces and Vector Fields
Lecture 6 - Review of Cotangent Spaces, Smooth Forms and Tensors on Manifolds
Lecture 7 - Introduction to Riemannian Manifolds
Lecture 8 - Some More Examples of Riemannian Manifolds
Lecture 9 - Isometries on Riemannian Manifolds
Lecture 10 - The Flat Torus
Lecture 11 - Local Orthonormal Frame and the Musical Isomorphisms
Lecture 12 - Inner Products of Smooth Forms and the Riemannian Volume Element
Lecture 13 - Introduction to Connections
Lecture 14 - Continuing Further with the Discussion on Connections
Lecture 15 - Covariant Differentiation along Smooth Curves
Lecture 16 - Parallel Transport Map
Lecture 17 - Levi-Civita Connection
Lecture 18 - Covariant Differentiation of Tensors
Lecture 19 - Riemann Curvature Tensor
Lecture 20 - Properties of Curvature Tensor
Lecture 21 - Curvature of Model Spaces
Lecture 22 - Flat Riemannian Manifolds
Lecture 23 - Sectional Curvature and Curvature Like Tensors
Lecture 24 - Ricci Curvature
Lecture 25 - Further Discussion on Ricci Curvature, and Scalar Curvature
Lecture 26 - Geometry of Sub-manifolds
Lecture 27 - Further Discussion on Geometry of Sub-manifolds
Lecture 28 - Gauss-Bonnet formulae
Lecture 29 - More Discussion on local Gauss-Bonnet formula

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Lecture 30 - Continuing Further with the Discussion on local Gauss-Bonnet formula
Lecture 31 - Geodesics
Lecture 32 - Further Discussion on Geodesics
Lecture 33 - Length and Energy Functionals, and the Variation Vector Field
Lecture 34 - First Variation Formula
Lecture 35 - Discussion on Critical Points of the Energy and Length Functionals
Lecture 36 - The Exponential Map
Lecture 37 - Geodesic Normal Coordinates
Lecture 38 - The Gauss Lemma
Lecture 39 - Local Behaviour of Geodesics
Lecture 40 - The Induced Metric Space Structure on a Riemannian Manifold
Lecture 41 - The Hopf-Rinow Theorem
Lecture 42 - The Hopf-Rinow Theorem (Continued...)
Lecture 43 - The Second Variation Formula
Lecture 44 - Jacobi Fields
Lecture 45 - Jacobi Fields (Continued...)
Lecture 46 - Taylor Expansion of the Metric in Terms of Geodesic Normal Coordinates
Lecture 47 - Geometric Characterization of the Various Curvature Notions
Lecture 48 - Conjugate Points and the Null Space of a Geodesic
Lecture 49 - Obstructions for Geodesics to be Not Minimizing
Lecture 50 - The Segment Domain and the Cut-Locus
Lecture 51 - Fundamental Groups
Lecture 52 - Covering Spaces
Lecture 53 - Cartan-Hadamard Theorem
Lecture 54 - Ambrose Proposition
Lecture 55 - Uniformization of Space Forms
Lecture 56 - Jacobi Fields in Space Forms
Lecture 57 - Jacobi Fields Comparison
Lecture 58 - Proof of Uniformization Theorem for Space Forms
Lecture 59 - Myers Diameter Comparison Theorem
Lecture 60 - Schur Theorem for Sectional Curvature and Ricci Curvature

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NPTEL Video Course - Mechanical Engineering - Convective Heat and Mass Transfer

Subject Co-ordinator - Prof. A.W. Date

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Flow Classifications
Lecture 3 - Laws of Convection
Lecture 4 - Scalar Transport Equations
Lecture 5 - Laminar Boundary Layers
Lecture 6 - Similarity Method
Lecture 7 - Similaity Solns Velocity BL
Lecture 8 - Similaity Solns Temperature BL - I
Lecture 9 - Similaity Solns Temperature BL - II
Lecture 10 - Integral BL Equations
Lecture 11 - Integral Solns Laminar Velocity BL
Lecture 12 - Integral Solns Laminar Temperature BL
Lecture 13 - Superposition Theory
Lecture 14 - Laminar Internal Flows
Lecture 15 - Fully-Developed Laminar Flows - 1
Lecture 16 - Fully-Developed Laminar Flows - 2
Lecture 17 - Fully-Developed Laminar Flows Heat Transfer - 1
Lecture 18 - Fully-Developed Laminar Flows Heat Transfer - 2
Lecture 19 - Laminar Internal Developing Flows Heat Transfer
Lecture 20 - Superposition Technique
Lecture 21 - Nature of Turbulent Flows
Lecture 22A - Sustaining Mechanism of Turbulence - 1
Lecture 22B - Sustaining Mechanism of Turbulence - 1
Lecture 23 - Sustaining Mechanism of Turbulence - 2
Lecture 24 - Near-Wall Turbulent Flows - 1
Lecture 25 - Near-Wall Turbulent Flows - 2
Lecture 26 - Turbulence Models - 1
Lecture 27 - Turbulence Models - 2
Lecture 28 - Turbulence Models - 3

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Lecture 29 - Prediction of Turbulent Flows
Lecture 30 - Prediction of Turbulent Heat Transfer
Lecture 31 - Convective Mass Transfer
Lecture 32 - Stefan Flow Model
Lecture 33 - Couette Flow Model
Lecture 34 - Reynolds Flow Model
Lecture 35 - Boundary Layer Flow Model
Lecture 36 - Evaluation of g and Nw
Lecture 37 - Diffusion Mass Transfer Problems
Lecture 38 - Convective MT Couette Flow
Lecture 39 - Convective MT Reynolds Flow Model - 1
Lecture 40 - Convective MT Reynolds Flow Model - 2
Lecture 41 - Natural Convection
Lecture 42 - Diusion Jet Flames

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NPTEL Video Course - Mechanical Engineering - Cryogenic Engineering

Subject Co-ordinator - Prof. M.D. Atrey

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cryogenic Engineering
Lecture 2 - Properties of Cryogenic Fluids - I
Lecture 3 - Properties of Cryogenic Fluids - II
Lecture 4 - Properties of Cryogenic
Lecture 5 - Material Properties at Low Temperature - I
Lecture 6 - Material Properties at Low Temperature - II
Lecture 7 - Material Properties at Low Temperature - III
Lecture 8 - Gas Liquefaction and Refrigeration Systems - I
Lecture 9 - Gas Liquefaction and Refrigeration Systems - II
Lecture 10 - Gas Liquefaction and Refrigeration Systems - III
Lecture 11 - Gas Liquefaction and Refrigeration Systems - IV
Lecture 12 - Gas Liquefaction and Refrigeration Systems - V
Lecture 13 - Gas Liquefaction and Refrigeration Systems - VI
Lecture 14 - Gas Liquefaction and Refrigeration Systems - VII
Lecture 15 - Gas Liquefaction and Refrigeration Systems - VIII
Lecture 16 - Gas Liquefaction and Refrigeration Systems - IX
Lecture 17 - Gas Liquefaction and Refrigeration Systems - X
Lecture 18 - Gas Separation - I
Lecture 19 - Gas Separation - II
Lecture 20 - Gas Separation - III
Lecture 21 - Gas Separation - IV
Lecture 22 - Gas Separation - V
Lecture 23 - Gas Separation - VI
Lecture 24 - Gas Separation - VII
Lecture 25 - Gas Separation - VIII
Lecture 26 - Cryocoolers
Lecture 27 - Cryocoolers Ideal Stirling Cycle - I
Lecture 28 - Cryocoolers Ideal Stirling Cycle - II
Lecture 29 - Cryocoolers Ideal Stirling Cycle - III

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Lecture 30 - Cryocoolers Ideal Stirling Cycle - IV
Lecture 31 - Cryocoolers Ideal Stirling Cycle - V
Lecture 32 - Cryocoolers
Lecture 33 - Cryogenic Insulation - I
Lecture 34 - Cryogenic Insulation - II
Lecture 35 - Cryogenic Insulation - III
Lecture 36 - Vacuum Technology - I
Lecture 37 - Vacuum Technology - II
Lecture 38 - Vaccum Technology - III
Lecture 39 - Instrumentation in Cryogenics - I
Lecture 40 - Instrumentation in Cryogenics - II
Lecture 41 - Instrumentation in Cryogenics - III
Lecture 42 - Safety in Cryogenics

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NPTEL Video Course - Mechanical Engineering - Advanced Strength of Materials

Subject Co-ordinator - Prof. S.K. Maiti

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Stress and Strain Tensor
Lecture 2 - Stress and Strain Tensor (Continued) and Cauchy Formula for Traction
Lecture 3 - Examples on Calculation of Strains and Tractions, Principal Stresses and Directions
Lecture 4 - Example on Calculation of Principal Stresses and Directions, Orthogonality of Principal Directior
Lecture 5 - Maximum Shear Stress and Octahedral Shear Stress, Deviatoric and Hydrostatic Stresses
Lecture 6 - Transformation of Stresses and Mohr Circle in 3-D
Lecture 7 - Mohr Circle (Continued)
Lecture 8 - Deformation, Rotation and Strain Tensors, Principal Strains,Deviatoric and Hydrostatic Strains
Lecture 9 - Strain Transformations, Strains in Polar Coordinates, Equilibrium Equations in 2-D
Lecture 10 - Equilibrium Equations in 2-D Polar Coordinates Plane Stress and Plane Strain Conditions
Lecture 11 - Stress-Strain Relations for Isotropic, Orthotropic and Anisotropic Materials Stress-Strain-Tempe
Lecture 12 - Relation between Elastic Constants and Strain Energy Densities Recap of Lectures 1 to 11
Lecture 13 - Stress Distribution in Thick Cylinder
Lecture 14 - Stresses due to Shrink Fitting
Lecture 15 - Stresses in Rotating Disc
Lecture 16 - Examples on Shrink Fitting and Rotating Disc
Lecture 17 - Torsion of Non-Circular Shaft
Lecture 18 - Torsion of Non-Circular Shaft (Continued)
Lecture 19 - Membrane Analogy for Torsion
Lecture 20 - Torsion of Thin Box Sections
Lecture 21 - Torsion of Box and Open Sections
Lecture 22 - Bending of Curved Bars
Lecture 23 - Bending of Curved Bars (Continued)
Lecture 24 - Theories of Failure
Lecture 25 - Theories of Failure (Continued)
Lecture 26 - Theories of Failure (Continued) and Their Applications, Griffith Theory of Brittle Fracture
Lecture 27 - Application of Griffith Theory, Irwin-Orowan Modification of Griffith Theory, Assessment of Effe
Lecture 28 - Theorems of Elasticity
Lecture 29 - Theorems of Elasticity (Continued)

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Lecture 30 - Thermal Stress Distribution in Rectangular Sheet due to Symmetric and Asymmetric Temperature Fie
Lecture 31 - Thermal Stress Distribution in Cylinders
Lecture 32 - Unsymmetrical Bending
Lecture 33 - Shear Centre
Lecture 34 - Plate Bending
Lecture 35 - Plate Bending (Continued)
Lecture 36 - Examples on Plate Bending
Lecture 37 - Approximate Solutions for Bending of Rectangular and Circular Plates
Lecture 38 - Thin Shells of Revolution
Lecture 39 - Beam on Elastic Foundation
Lecture 40 - Application of Beam on Elastic Foundation Analysis to Pressure Vessels for Calculation of Discor

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NPTEL Video Course - Mechanical Engineering - Heat and Mass Transfer

Subject Co-ordinator - Prof. S.P. Sukhatme, Prof. U.N. Gaitonde

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Heat and Mass Transfer
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Heat Conduction - 1
Lecture 5 - Heat Conduction - 2
Lecture 6 - Heat Conduction - 3
Lecture 7 - Heat Conduction - 4
Lecture 8 - Heat Conduction - 5
Lecture 9 - Heat Conduction - 6
Lecture 10 - Thermal Radiation - 1
Lecture 11 - Thermal Radiation - 2
Lecture 12 - Thermal Radiation - 3
Lecture 13 - Thermal Radiation - 4
Lecture 14 - Thermal Radiation - 5
Lecture 15 - Thermal Radiation - 6
Lecture 16 - Review Of Fluid Mechanics - 1
Lecture 17 - Review Of Fluid Mechanics - 2
Lecture 18 - Forced Convection - 1
Lecture 19 - Forced Convection - 2
Lecture 20 - Forced Convection - 3
Lecture 21 - Forced Convection - 4
Lecture 22 - Natural Convection - 1
Lecture 23 - Natural Convection - 2
Lecture 24 - Natural Convection - 3
Lecture 25 - Heat Exchangers - 1
Lecture 26 - Heat Exchangers - 2
Lecture 27 - Heat Exchangers - 3
Lecture 28 - Heat Exchangers - 4
Lecture 29 - Boiling and Condensation - 1

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Lecture 30 - Boiling and Condensation - 2
Lecture 31 - Boiling and Condensation - 3
Lecture 32 - Boiling and Condensation - 4
Lecture 33 - Introduction to Mass Transfer - 1
Lecture 34 - Introduction to Mass Transfer - 2
Lecture 35 - Introduction to Mass Transfer - 3

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NPTEL Video Course - Mechanical Engineering - Robotics

Subject Co-ordinator - Prof. P. Seshu, Prof. P.S. Gandhi, Prof. K. Kurien Issac, Prof. B. Seth, Prof. C. Amar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Robotics
Lecture 2 - Technologies in Robots
Lecture 3 - Industrial Robots
Lecture 4 - Industrial Manipulators and its Kinematics
Lecture 5 - Parallel Manipulators
Lecture 6 - Grippers manipulators
Lecture 7 - Electric Actuators
Lecture 8 - Actuators - Electric, Hydraulic, Pneumatic
Lecture 9 - Internal State Sensors
Lecture 10 - Internal State Sensors
Lecture 11 - External State Sensors
Lecture 12 - Trajectory planning
Lecture 13 - Trajectory planning
Lecture 14 - Trajectory planning
Lecture 15 - Trajectory planning
Lecture 16 - Trajectory planning
Lecture 17 - Trajectory planning
Lecture 18 - Trajectory planning
Lecture 19 - Trajectory planning
Lecture 20 - Forward Position Control
Lecture 21 - Inverse Problem
Lecture 22 - Velocity Analysis
Lecture 23 - Velocity Analysis
Lecture 24 - Dynamic Analysis
Lecture 25 - Image Processing
Lecture 26 - Image Processing
Lecture 27 - Image Processing
Lecture 28 - Image Processing
Lecture 29 - Image Processing

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Lecture 30 - Image Processing
Lecture 31 - Robot Dynamics and Control
Lecture 32 - Robot Dynamics and Control
Lecture 33 - Robot Dynamics and Control
Lecture 34 - Robot Dynamics and Control
Lecture 35 - Robot Dynamics and Control
Lecture 36 - Robot Dynamics and Control
Lecture 37 - Futuristic Topics in Robotics
Lecture 38 - Robot Dynamic and Control-Case Studies
Lecture 39 - Robot Dynamic and Control-Case Studies
Lecture 40 - Futuristic Topics in Robotics

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NPTEL Video Course - Mechanical Engineering - NOC:Optimization from Fundamentals

Subject Co-ordinator - Prof. Ankur A. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Isoperimetric problem
Lecture 3 - Review of real analysis (sequences and convergence)
Lecture 4 - Bolzano-Weierstrass theorem and completeness axiom
Lecture 5 - Open sets, closed sets and compact sets
Lecture 6 - Continuity and Weierstrass theorem
Lecture 7 - Weierstrass theorem
Lecture 8 - Different solution concepts
Lecture 9 - Different types of constraints
Lecture 10 - Taylor's theorem
Lecture 11 - First order sufficient condition
Lecture 12 - Second order necessary condition
Lecture 13 - Least square regression
Lecture 14 - Least square regression (Continued...)
Lecture 15 - Implicit function theorem
Lecture 16 - Optimization with equality constraints and introduction to Lagrange multipliers - I
Lecture 17 - Optimization with equality constraints and introduction to Lagrange multipliers - II
Lecture 18 - Least norm solution of underdetermined linear system
Lecture 19 - Transformation of optimization problems - I
Lecture 20 - Transformation of optimization problems - II
Lecture 21 - Transformation of optimization problems - III
Lecture 22 - Convex Analysis - I
Lecture 23 - Convex Analysis - II
Lecture 24 - Convex Analysis - III
Lecture 25 - Polyhedrons
Lecture 26 - Minkowski-Weyl Theorem
Lecture 27 - Linear Programming Problems
Lecture 28 - Extreme points and optimal solution of an LP
Lecture 29 - Extreme points and optimal solution of an LP (Continued...)

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Lecture 30 - Extreme points and basic feasible solutions
Lecture 31 - Equivalence of extreme point and BFS
Lecture 32 - Equivalence of extreme point and BFS (Continued...)
Lecture 33 - Examples of Linear Programming
Lecture 34 - Weak and Strong duality
Lecture 35 - Proof of strong duality
Lecture 36 - Proof of strong duality (Continued...)
Lecture 37 - Farkas' lemma
Lecture 38 - Max-flow Min-cut problem
Lecture 39 - Shortest path problem
Lecture 40 - Complementary Slackness
Lecture 41 - Proof of complementary slackness
Lecture 42 - Tangent cones
Lecture 43 - Tangent cones (Continued...)
Lecture 44 - Constraint qualifications, Farkas' lemma and KKT
Lecture 45 - KKT conditions
Lecture 46 - Convex optimization and KKT conditions
Lecture 47 - Slater condition and Lagrangian Dual
Lecture 48 - Weak duality in convex optimization and Fenchel dual
Lecture 49 - Geometry of the Lagrangian
Lecture 50 - Strong duality in convex optimization - I
Lecture 51 - Strong duality in convex optimization - II
Lecture 52 - Strong duality in convex optimization - III
Lecture 53 - Line search methods for unconstrained optimization
Lecture 54 - Wolfe conditions
Lecture 55 - Line search algorithm and convergence
Lecture 56 - Steepest descent method and rate of convergence
Lecture 57 - Newton's method
Lecture 58 - Penalty methods
Lecture 59 - L1 and L2 Penalty methods
Lecture 60 - Augmented Lagrangian methods
Lecture 61 - Cutting plane methods
Lecture 62 - Interior point methods for linear programming
Lecture 63 - Dynamic programming: Inventory control problem
Lecture 64 - Policy and value function
Lecture 65 - Principle of optimality in dynamic programming
Lecture 66 - Principle of optimality applied to inventory control problem
Lecture 67 - Optimal control for a system with linear state dynamics and quadratic cost

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NPTEL Video Course - Mechanical Engineering - NOC:Design of Mechatronic Systems

Subject Co-ordinator - Prof. Prasanna Gandhi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Elements of Mechatronic Systems - Part I
Lecture 3 - Elements of Mechatronic Systems - Part II
Lecture 4 - Elements of Mechatronic Systems - Part III
Lecture 5 - CD-ROM - Part I
Lecture 6 - CD-ROM - Part II
Lecture 7 - CD-ROM - Part III
Lecture 8 - Scanner
Lecture 9 - Integrated Mechanical-Electronics Philosophy - Part I
Lecture 10 - Integrated Mechanical-Electronics Philosophy - Part II
Lecture 11 - Smart Sensors Concept
Lecture 12 - Compliant Mechanisms
Lecture 13 - Microprocessor Building Blocks I - Combinational Circuits
Lecture 14 - Microprocessor Building Blocks II - Sequential Circuits
Lecture 15 - Microprocessor Memory and Addressing
Lecture 16 - Timing and control unit: Primitive Microprocessor
Lecture 17 - Microcontroller Architecture - I
Lecture 18 - Microcontroller Architecture - II
Lecture 19 - Microcontroller Programming Philosophy
Lecture 20 - Hardware Interfaces
Lecture 21 - Interfacing Actuator using PWM in Tiva Microcontroller
Lecture 22 - Interfacing Encoder using QEI in Tiva Launchpad + ISR
Lecture 23 - Mathematical Modelling: Overview and Context
Lecture 24 - Modelling Friction in a System
Lecture 25 - Modelling DC Motor with loads
Lecture 26 - Lagrange formulation fundamentals
Lecture 27 - Lagrange formulation examples
Lecture 28 - Dynamics: 2-R Manipulator
Lecture 29 - Control formulation: Regulation and Tracking

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Lecture 30 - Fundamentals of Simulation of dynamics using MATLAB
Lecture 31 - Selection of Sensors and Actuators - Part I
Lecture 32 - Selection of Sensors and Actuators - Part II
Lecture 33 - Concept of feedback
Lecture 34 - Closed loop control implementation in microcontroller
Lecture 35 - Mathematical representations of systems for control
Lecture 36 - Control design for linear systems
Lecture 37 - Application of control design for linear systems
Lecture 38 - Mathematical Preliminaries- Nonlinear Control
Lecture 39 - Fundamentals of Lyapunov theory
Lecture 40 - Application of Lyapunov stability analysis
Lecture 41 - Trajectory tracking controller: Robotic system
Lecture 42 - Fundamentals of sampling
Lecture 43 - Shannon sampling theorem and signal reconstruction
Lecture 44 - Signal processing
Lecture 45 - Digital system representation and filters for mechatronics
Lecture 46 - Case study: Development of 3D microprinting system
Lecture 47 - Case study: 3D microprinting via Bulk lithography
Lecture 48 - Case study: Hele-Shaw system for novel fabrication

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NPTEL Video Course - Mechanical Engineering - NOC:Nonlinear Adaptive Control

Subject Co-ordinator - Prof. Srikant Sukumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts and Nomenclature
Lecture 2 - Preliminaries - Part 1
Lecture 3 - Preliminaries - Part 2
Lecture 4 - Preliminaries - Part 3
Lecture 5 - Preliminaries - Part 4
Lecture 6 - Preliminaries - Part 5
Lecture 7 - Barbalat's Lemma - Part 1
Lecture 8 - Barbalat's Lemma - Part 2
Lecture 9 - Convergence of Signals using Barbalat's Lemma - Part 1
Lecture 10 - Convergence of Signals using Barbalat's Lemma - Part 2
Lecture 11 - Notions of Stability - Part 1
Lecture 12 - Notions of Stability - Part 2
Lecture 13 - Stability Analysis with Examples - Part 1
Lecture 14 - Stability Analysis with Examples - Part 2
Lecture 15 - Stability Analysis with Examples - Part 3
Lecture 16 - Stability Analysis with Examples - Part 4
Lecture 17 - Stability Analysis in Linear Systems
Lecture 18 - Function Classes and Definiteness
Lecture 19 - Positive Definite Functions
Lecture 20 - Radially Unbounded Functions
Lecture 21 - Decrescent Functions
Lecture 22 - Lyapunov Stability Theorems - Part 1
Lecture 23 - Lyapunov Stability Theorems - Part 2
Lecture 24 - Lyapunov Stability Theorems - Part 3
Lecture 25 - Exponential Stability and Converse Lyapunov Theorems
Lecture 26 - Persistence of Excitation (PE): Introduction
Lecture 27 - Connection of PE to Stability, Uniform Complete Observability (UCO)
Lecture 28 - Exponential Stability of LTV systems, PE and Exponential Stability
Lecture 29 - Parameter Identifier Convergence under PE Condition

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Lecture 30 - Analysis of Parameter Varying Systems using General Integral Lemma - Part 1
Lecture 31 - Analysis of Parameter Varying Systems using General Integral Lemma - Part 2
Lecture 32 - Adaptive Control Design: First Order Scalar Systems
Lecture 33 - Barbalat's Lemma and Signal Chasing Anslysis
Lecture 34 - Parameter Convergence in Adaptive Control Design
Lecture 35 - Adaptive Control Design: Second-Order Systems
Lecture 36 - Overcoming the Detectability Obstacle: Ortega Construction
Lecture 37 - Backstepping in Adaptive Control: Introduction - Part 1
Lecture 38 - Backstepping in Adaptive Control: Introduction - Part 2
Lecture 39 - Backstepping in Adaptive Control: Parameters Unmatched with Control - Part 1
Lecture 40 - Backstepping in Adaptive Control: Parameters Unmatched with Control - Part 2
Lecture 41 - How to Deal with Unknown Gains in Control
Lecture 42 - Setup of Model Reference Adaptive Control (MRAC) Problem
Lecture 43 - Model Reference Adaptive control: For Known and Unknown Parameters
Lecture 44 - Model Reference Adaptive control: Lyapunov Stability Analysis
Lecture 45 - Generalization of Adaptive Integrator Backstepping Method - Part 1
Lecture 46 - Generalization of Adaptive Integrator Backstepping Method - Part 2
Lecture 47 - Extended Matching Design for Avoiding Overparameterization
Lecture 48 - Adaptive Integrator Backstepping Method: An Example - Part 1
Lecture 49 - Adaptive Integrator Backstepping Method: An Example - Part 2
Lecture 50 - Extended Matching Design: An Example
Lecture 51 - Control Lyapunov Function
Lecture 52 - Tuning Function Adaptive Method
Lecture 53 - Adaptive Backstepping via Control Lyapunov Function (CLF)
Lecture 54 - Adaptive Backstepping via CLF: An Example
Lecture 55 - Robustness in Adaptive Control - Part 1
Lecture 56 - Robustness in Adaptive Control - Part 2
Lecture 57 - Parameter Projection in Adaptive Control - Part 1
Lecture 58 - Parameter Projection in Adaptive Control - Part 2
Lecture 59 - Parameter Projection in Adaptive Control - Part 3
Lecture 60 - Sigma- Modification and Epsilon-Modification in Adaptive Control
Lecture 61 - Initial Excitation in Adaptive Control - Part 1
Lecture 62 - Initial Excitation in Adaptive Control - Part 2
Lecture 63 - Initial Excitation in Adaptive Control - Part 3
Lecture 64 - Initial Excitation in Adaptive Control - Part 4
Lecture 65 - Initial Excitation in Adaptive Control - Part 5
Lecture 66 - Discussion on Historical Developments in Adaptive Control and Learning
Lecture 67 - Real Time Neural Network Based Control of a Robotic Manipulator - Part 1
Lecture 68 - Real Time Neural Network Based Control of a Robotic Manipulator - Part 2

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Lecture 69 - Real Time Neural Network Based Control of a Robotic Manipulator - Part 3
Lecture 70 - Real Time Neural Network Based Control of a Robotic Manipulator - Part 4
Lecture 71 - Real Time Neural Network Based Control of a Robotic Manipulator - Part 5

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NPTEL Video Course - Mechanical Engineering - NOC:Nonlinear Control Design

Subject Co-ordinator - Prof. Srikant Sukumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction
Lecture 2 - Examples of Nonlinear systems
Lecture 3 - Existence and uniqueness of solutions
Lecture 4 - Preliminaries and notations
Lecture 5 - Preliminaries: Normed linear space
Lecture 6 - Preliminaries: Induced Matrix Norms and Signal Norms
Lecture 7 - Signal Norms and Cauchy-Schwarz Inequality
Lecture 8 - Stability - Part 1
Lecture 9 - Stability - Part 2
Lecture 10 - Stability - Part 3
Lecture 11 - Stability - Part 4
Lecture 12 - Stability - Part 5
Lecture 13 - Lyapunov stability Theorems - Part 1
Lecture 14 - Lyapunov stability Theorems - Part 2
Lecture 15 - Lyapunov stability Theorems - Part 3
Lecture 16 - Lyapunov stability Theorems - Part 4
Lecture 17 - Lyapunov stability Theorems - Part 5
Lecture 18 - Lyapunov stability Theorems - Part 6
Lecture 19 - Proofs of Lyapunov Stability Theorems - Part 1
Lecture 20 - Proofs of Lyapunov Stability Theorems - Part 2
Lecture 21 - Proofs of Lyapunov Stability Theorems - Part 3
Lecture 22 - Proofs of Lyapunov Stability Theorems - Part 4
Lecture 23 - La Salle's Invariance Principle - Part 1
Lecture 24 - La Salle's Invariance Principle - Part 2
Lecture 25 - La Salle's Invariance Principle - Part 3
Lecture 26 - La Salle's Invariance Principle - Part 4
Lecture 27 - La Salle's Invariance Principle - Part 5
Lecture 28 - La Salle's Invariance Principle - Part 6
Lecture 29 - Control Lyapunov functions - Part 1

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Lecture 30 - Control Lyapunov functions - Part 2
Lecture 31 - Control Lyapunov functions - Part 3
Lecture 32 - Control Lyapunov functions - Part 4
Lecture 33 - Control Lyapunov functions - Part 5
Lecture 34 - Backstepping method for control design - Part 1
Lecture 35 - Backstepping method for control design - Part 2
Lecture 36 - Backstepping method for control design - Part 3
Lecture 37 - Backstepping method for control design - Part 4
Lecture 38 - Passivity based control - Part 1
Lecture 39 - Passivity based control - Part 2
Lecture 40 - Passivity based control - Part 3
Lecture 41 - Passivity in control systems - Part 1 (Prof. Antonio Loria)
Lecture 42 - Passivity in control systems - Part 2 (Prof. Antonio Loria)
Lecture 43 - Passivity in control systems - Part 3 (Prof. Antonio Loria)
Lecture 44 - Passivity in control systems - Part 4 (Prof. Antonio Loria)
Lecture 45 - Passivity based control - Part 4
Lecture 46 - Passivity based control - Part 5
Lecture 47 - Passivity based control - Part 6
Lecture 48 - Passivity based control - Part 7
Lecture 49 - Feedback Linearization - Part 1
Lecture 50 - Feedback Linearization - Part 2
Lecture 51 - Feedback Linearization - Part 3
Lecture 52 - Feedback Linearization - Part 4
Lecture 53 - Feedback Linearization - Part 5
Lecture 54 - Feedback Linearization - Part 6
Lecture 55 - Feedback Linearization - Part 6
Lecture 56 - Feedback Linearization - Part 7
Lecture 57 - Feedback Linearization - Part 8
Lecture 58 - Feedback Linearization - Part 9
Lecture 59 - Feedback Linearization - Part 10
Lecture 60 - Feedback Linearization - Part 11
Lecture 61 - Barbalat's Lemma
Lecture 62 - Application of Barbalat's Lemma
Lecture 63 - Adaptive control - Part 1
Lecture 64 - Adaptive control - Part 2
Lecture 65 - State constrained control - Part 1
Lecture 66 - State constrained control - Part 2
Lecture 67 - State constrained control - Part 3
Lecture 68 - Finite time stability - Part 1

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Lecture 69 - Finite time stability - Part 2
Lecture 70 - Finite time stability - Part 3
Lecture 71 - Sliding mode control - Part 1
Lecture 72 - Sliding mode control - Part 2
Lecture 73 - Sliding mode control - Part 3

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NPTEL Video Course - Mechanical Engineering - NOC:Navigating the Latest Trends in Additive Manufacturing Lanc

Subject Co-ordinator - Prof. Alankar, Prof. Akshatha Hulmani Dayananda

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Additive Manufacturing (AM) - Part 1
Lecture 2 - Value addition due to AM - Part 2
Lecture 3 - Additive Technology Landscape - Steterolithography - Part 1
Lecture 4 - Additive Technology Landscape - Steterolithography - Part 2
Lecture 5 - Material extrusion, material jetting, binder jetting
Lecture 6 - Summary of Week 1 and Assignment
Lecture 7 - Additive Technology Landscape - Powder Bed Fusion - Part 1
Lecture 8 - Directed Energy Deposition, Sheet Lamination, Hybrid and Novel Techno - Part 2
Lecture 9 - Developments in Design, Process Monitoring and Control - Part 1
Lecture 10 - Developments in Design, Process Monitoring and Control - Part 2
Lecture 11 - Summary of Week 2 and Assignment
Lecture 12 - Metals in AM
Lecture 13 - Polymer Materials in AM
Lecture 14 - Other materials in AM
Lecture 15 - Summary of Week 3 and Assignment
Lecture 16 - Case Study - Part I
Lecture 17 - Case Study - Part II
Lecture 18 - Case Study

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NPTEL Video Course - Mechanical Engineering - NOC:Essentials of Turbulence

Subject Co-ordinator - Prof. Abhilash J. Chandy

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The 'despair' in turbulence
Lecture 2 - Why Study Turbulence?
Lecture 3 - Some descriptions of turbulence
Lecture 4 - How to define turbulence?
Lecture 5 - A brief history of turbulence
Lecture 6 - Characteristics of turbulent flow
Lecture 7 - Methods of analysis
Lecture 8 - Origin of turbulence
Lecture 9 - Diffusivity of turbulence
Lecture 10 - Length scales in turbulent flows - Part A
Lecture 11 - Length scales in turbulent flows - Part B
Lecture 12 - Length scales in turbulent flows - Part C
Lecture 13 - Length scales in turbulent flows - Part D
Lecture 14 - Nature of turbulent flows and Continuity equation
Lecture 15 - Momentum equations, Pressure and Conserved scalars
Lecture 16 - Vorticity equation, Rates of strain and rotation
Lecture 17 - Random nature of turbulence
Lecture 18 - Characterization of random variables and examples of PDF
Lecture 19 - Joint random variables, Joint PDFs and Conditional PDFs
Lecture 20 - Random processes
Lecture 21 - Frequency spectrum and Gaussian process
Lecture 22 - Random fields and Wavenumber spectra
Lecture 23 - Reynolds equations
Lecture 24 - Closure problem in turbulence
Lecture 25 - Gradient diffusion and Turbulent viscosity hypotheses
Lecture 26 - Energy cascade
Lecture 27 - Kolmogorov hypotheses - Part 1
Lecture 28 - Kolmogorov hypotheses - Part 2
Lecture 29 - Energy spectrum - Part 1

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Lecture 30 - Energy spectrum - Part 2
Lecture 31 - Fourier modes and Fourier series representation
Lecture 32 - The evolution of Fourier modes - Part 1
Lecture 33 - The evolution of Fourier modes - Part 2
Lecture 34 - The kinetic energy of Fourier modes
Lecture 35 - Velocity spectrum tensor and Energy spectrum function
Lecture 36 - One-dimensional spectra and comparison of spectra
Lecture 37 - Kolmogorov spectra
Lecture 38 - Model spectra
Lecture 39 - Dissipation spectra
Lecture 40 - Inertial subrange and Energy-containing range
Lecture 41 - Effects of Reynolds number
Lecture 42 - Energy-spectrum balance
Lecture 43 - Challenges and modeling approaches
Lecture 44 - Criteria for appraising models - Part 1
Lecture 45 - Criteria for appraising models - Part 2
Lecture 46 - Pseudo-spectral methods for DNS
Lecture 47 - Computational cost of DNS - Part 1
Lecture 48 - Computational cost of DNS - Part 2
Lecture 49 - Turbulent Viscosity Models
Lecture 50 - Four conceptual steps in LES
Lecture 51 - Filtering in one-dimension
Lecture 52 - Spectral representation of LES filter
Lecture 53 - Filtering in three-dimension
Lecture 54 - Filtered conservation equations
Lecture 55 - Smagorinsky model
Lecture 56 - LES in wavenumber space
Lecture 57 - Practice Problems - Part 1
Lecture 58 - Practice Problems - Part 2
Lecture 59 - Practice Problems - Part 3
Lecture 60 - Practice Problems - Part 4
Lecture 61 - Tutorial 1 - Practice Problem
Lecture 62 - Tutorial 2 - Practice Problem

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NPTEL Video Course - Mechanical Engineering - NOC:Convective Heat Transfer: Fundamentals and Some Applicatior

Subject Co-ordinator - Prof. Arunkumar Sridharan, Prof. Shankar Krishnan, Prof. S.V. Prabhu

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Convection - 1
Lecture 2 - Introduction to Convection - 2
Lecture 3 - Introduction to Convection - 3
Lecture 4 - Introduction to Convection - 4
Lecture 5 - Introduction to Convection - 5
Lecture 6 - Fluid Acceleration
Lecture 7 - Reynolds transport theorem
Lecture 8 - General motion of fluid
Lecture 9 - Conservation of Mass and Momentum
Lecture 10 - Conservation of Momentum
Lecture 11 - Conservation of Energy - 1
Lecture 12 - Conservation of Energy - 2
Lecture 13 - Dimensional Similarity
Lecture 14 - Scale Analysis - 1
Lecture 15 - Scale Analysis - 2
Lecture 16 - Scale Analysis - 3 and Reynolds Analogy
Lecture 17 - Relationship between Stress and Strain rate
Lecture 18 - Introduction to Similarity method
Lecture 19 - Similarity method : Momentum equation - 1
Lecture 20 - Similarity method : Momentum equation - 2
Lecture 21 - Similarity method : Blasius solution
Lecture 22 - Similarity method : Energy equation - 1
Lecture 23 - Similarity method : Energy equation - 2
Lecture 24 - Similarity method : Energy equation - 3
Lecture 25 - Definition of various thicknesses, Introduction to Integral method
Lecture 26 - Integral method - 1
Lecture 27 - Integral method - 2
Lecture 28 - Integral method - 3
Lecture 29 - Integral method : Energy equation - 1

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Lecture 30 - Integral method : Energy equation - 2
Lecture 31 - Introduction to Turbulence
Lecture 32 - Reynolds averaging of Governing equations and Universal Velocity Profile
Lecture 33 - Reynolds averaging of Energy equation, Concept of Eddy Diffusivity of Momentum and Eddy Diffusiv
Lecture 34 - Boundary layer equation, Two Layer Assumptions, Prandtl's Mixing Length Hypothesis
Lecture 35 - Universal Velocity Distribution, Friction Factor for Turbulent Flow in Hydraulically Smooth pipe
Lecture 36 - Friction Factor for Turbulent Flow in a Hydraulically Rough pipe
Lecture 37 - Emperical Power Law Velocity Distribution for Turbulent Flow
Lecture 38 - Internal Flows : Concept of Average Velocity and Bulk Mean Temperature
Lecture 39 - Thermal Entrance Length : Boundary layer growth for Pr > 1, Pr ~ 1 and Pr C 1 cases, Concept of
Lecture 40 - Analysis of Internal Flows for Constant Heat Flux Boundary Condition
Lecture 41 - Internal Flow : Constant Wall Temperature case
Lecture 42 - Velocity Distribution for Laminar flow in Circular pipe
Lecture 43 - Nusselt number for Laminar Flow in a Circular pipe with Constant Wall Heat Flux, Nusselt number
Lecture 44 - Natural Convection : Introduction, Scaling Analysis, Derivation of Governing equation
Lecture 45 - Natural Convection : Scale Analysis for Pr > 1
Lecture 46 - Natural Convection : Scale Analysis for Pr C 1
Lecture 47 - Dimensional Similarity and criterion for Forced and Natural Convection correlations for various
Lecture 48 - Vertical Channel flow with Plates maintained at Constant Wall Temperature
Lecture 49 - Optimal Cooling of a stack of Vertical Heat generating plates
Lecture 50 - Effect of Viscous Dissipation on Nusselt number - 1
Lecture 51 - Effect of Viscous Dissipation on Nusselt number - 2
Lecture 52 - Boiling Heat transfer : Introduction and Classification
Lecture 53 - Pool Boiling curve - 1
Lecture 54 - Pool Boiling curve - 2
Lecture 55 - Pool Boiling curve - 3 : Introduction to Critical Heat Flux
Lecture 56 - Critical Heat flux (Continuation), Film Boiling, Basic analysis of Flow Boiling
Lecture 57 - Condensation - 1
Lecture 58 - Condensation - 2
Lecture 59 - Introduction to Electronics cooling
Lecture 60 - Pool Boiling curve - 3 : Introduction to Electronics cooling - Resistance network
Lecture 61 - Problem Solving - Part 1
Lecture 62 - Problem Solving - Part 2
Lecture 63 - Problem Solving - Part 3
Lecture 64 - Unheated starting length (Integral method) and Duhamel's theorem
Lecture 65 - Arbitrarily varying Boundary temperature - Duhamel's theorem
Lecture 66 - Heat transfer coefficient - IcePAK Analysis
Lecture 67 - Heat Sinks - Part 1
Lecture 68 - Heat exchanger theory - An approach to modeling heat sinks

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Lecture 69 - Forced convection cooling
Lecture 70 - Honeycomb and Foam heat sink modeling - Approximation
Lecture 71 - Foam heat sink modeling - Approximation (Continuation)

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NPTEL Video Course - Mechanical Engineering - Tribology

Subject Co-ordinator - Dr. Harish Hirani

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Interdisciplinary Approach and Economic Benefits
Lecture 3 - Friction
Lecture 4 - Friction Estimation
Lecture 5 - Friction Instability
Lecture 6 - Wear
Lecture 7 - Adhesive Wear
Lecture 8 - Wear Mechanisms
Lecture 9 - Wear Mechanisms - 2
Lecture 10 - Wear Analysis
Lecture 11 - Lubrication and Lubricants
Lecture 12 - Boundary Lubrication
Lecture 13 - Lubrication Mechanisms
Lecture 14 - Hydrodynamic Lubrication
Lecture 15 - Lubricant Classifications
Lecture 16 - Solid and Semi Solid Lubricants
Lecture 17 - Liquid Lubricants
Lecture 18 - Lubricant Additives
Lecture 19 - Fluid Film Lubrication
Lecture 20 - Reynolds Equation
Lecture 21 - Solution of Reynolds Equation
Lecture 22 - Hybrid Solution Approach (to solve Reynolds Equation)
Lecture 23 - Finite Difference Method to Solve Reynolds Equation
Lecture 24 - Viscosity Variation
Lecture 25 - Estimating Elastic Deformation
Lecture 26 - Thermo Hydrodynamic Lubrication
Lecture 27 - Application of Tribology
Lecture 28 - Rolling Element Bearings
Lecture 29 - Rolling Element Bearings (Continued...)

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Lecture 30 - Rolling Element Bearings (Continued...)
Lecture 31 - Selection of Rolling Element Bearings
Lecture 32 - Friction of Rolling Element Bearing
Lecture 33 - Bearing Clearance
Lecture 34 - Bearing Lubrication
Lecture 35 - Tribology of Gears
Lecture 36 - Friction and Lubrication of Gears
Lecture 37 - Friction and Lubrication of Gears (Continued...)
Lecture 38 - Surface Fatigue of Spur Gears
Lecture 39 - Journal Bearings
Lecture 40 - Hydrostatic Bearings
Lecture 41 - Hydrodynamic Journal Bearings
Lecture 42 - Design of Hydrodynamic Journal Bearings

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NPTEL Video Course - Mechanical Engineering - Computer Aided Design and Manufacturing

Subject Co-ordinator - Prof. P.V. Madhusudan Rao, Prof. Anoop Chawla

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to CAD
Lecture 2 - Input Output Devices, Raster Graphics
Lecture 3 - Raster Graphics - I
Lecture 4 - Raster Graphics - II
Lecture 5 - Polygon Filling
Lecture 6 - Windowing and Clipping
Lecture 7 - Clipping of Polygons
Lecture 8 - 2D Transformations
Lecture 9 - 3D Transformations and Projection
Lecture 10 - Perspective Projections
Lecture 11 - Projections and Hidden Surface Removal
Lecture 12 - Hidden Surface Removal
Lecture 13 - Hidden Surface Removal
Lecture 14- Hidden Surface Removal
Lecture 15 - Finite Element Method
Lecture 16 - Galerkin's Approach
Lecture 17 - Galerkin's Method
Lecture 18 - 1D Finite Element Problems
Lecture 19 - 1D Finite Element Problems
Lecture 20 - FE Problems
Lecture 21 - 1D - FE Problems
Lecture 22 - Penalty Approach and Multi Point Boundary
Lecture 23 - Quadratic Shape Functions
Lecture 24 - 2D - FE Problems
Lecture 25 - 2D - FE Problems (Continued.)
Lecture 26 - 3D - FE Problems
Lecture 27 - 3D - Tetrahedral and 2D - Quadrilateral Element
Lecture 28 - Mesh Preparation
Lecture 29 - Modeling of Curves

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Lecture 30 - Modeling of Curves
Lecture 31 - Modeling of Curves
Lecture 32 - Modeling of B-Spline Curves
Lecture 33 - Modeling of B-spline Curves
Lecture 34 - Surface Modeling
Lecture 35 - Surface Modeling
Lecture 36 - Display of Curves and Surfaces
Lecture 37 - Solid Modeling
Lecture 38 - Solid Modeling
Lecture 39 - Solid Modeling Using Octrees
Lecture 40 - (Lecture Missing)
Lecture 41 - Computer Aided Design
Lecture 42 - Computer Aided Manufacturing
Lecture 43 - What is CAD/CAM
Lecture 44 - An Overview of Geometric Modeling
Lecture 45 - Parametric Cubic Curve
Lecture 46 - Parametric Bezier Curve
Lecture 47 - B-Spline Curve
Lecture 48 - Parametric Surfaces - Part-1
Lecture 49 - Parametric Surfaces - Part-2
Lecture 50 - Solid Modeling
Lecture 51 - Geometric & Product Data Exchange
Lecture 52 - Reverse Engineering

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NPTEL Video Course - Mechanical Engineering - Project and Production Management

Subject Co-ordinator - Prof. Arun Kanda

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Project and Production Management - An Overview
Lecture 2 - Project Management
Lecture 3 - Project Identification and Screening
Lecture 4 - Project Appraisal - Part I
Lecture 5 - Project Appraisal - Part II
Lecture 6 - Project Selection
Lecture 7 - Project Representation
Lecture 8 - Consistency and Redundancy in Project Networks
Lecture 9 - Basic scheduling with A-O-A Networks
Lecture 10 - Basic Scheduling with A-O-N Networks
Lecture 11 - Project Scheduling with Probabilistic Activity
Lecture 12 - Linear Time-Cost Tradeoffs in Projects
Lecture 13 - Project Crashing with Multiple Objectives
Lecture 14 - Resource Profiles and Leveling
Lecture 15 - Limited Resource Allocation
Lecture 16 - Project Monitoring and Control with PERT/Cost
Lecture 17 - Team Building and Leadership in Projects
Lecture 18 - Organizational and Behavioral Issues
Lecture 19 - Computers in Project Management
Lecture 20 - Project Completion and Review
Lecture 21 - Life Cycle of a Production System
Lecture 22 - Role of Models in Production Management
Lecture 23 - Financial Evaluation of capital Decisions
Lecture 24 - Decision Trees and Risk Evaluation
Lecture 25 - Introducing New Products & Services
Lecture 26 - Economic Evaluation of New Products & Services
Lecture 27 - Product Mix Decisions
Lecture 28 - Product & Process Design
Lecture 29 - Issues in Location of Facilities

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Lecture 30 - Mathematical Models for Facility Location
Lecture 31 - Layout planning
Lecture 32 - Computerised Layout Planning
Lecture 33 - Product Layouts and Assembly Line Balancing
Lecture 34 - Forecasting
Lecture 35 - The Analysis of Time Series
Lecture 36 - Aggregate Production Planning
Lecture 37 - Modelling Approaches
Lecture 38 - Basic Inventory Principles
Lecture 39 - Inventory Modelling
Lecture 40 - Material Requirements Planning
Lecture 41 - Scheduling of Job Shops

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NPTEL Video Course - Mechanical Engineering - NOC:RAC Product Design

Subject Co-ordinator - Prof. Sanjeev Jain

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Design
Lecture 2 - Design Considerations
Lecture 3 - Basic Concepts Psychrometry and Air-Conditioning
Lecture 4 - Refrigerants
Lecture 5 - Refrigerant Properties and Applications
Lecture 6 - Refrigeration Cycle and Components
Lecture 7 - Compressor Selection
Lecture 8 - Expansion Devices
Lecture 9 - Condensers and Evaporators
Lecture 10 - Types of Heat Exchangers and Air Conditioning Systems
Lecture 11 - Selection of Air Conditioning Systems for Hostels
Lecture 12 - Case Study on a Railway Air Conditioning System
Lecture 13 - Vibration and noise issues in railway AC systems
Lecture 14 - New product launch process
Lecture 15 - Case study on a telecom cooling system and Emerging technologies

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NPTEL Video Course - Mechanical Engineering - NOC:Thermodynamics

Subject Co-ordinator - Prof. S.R kale

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thermodynamic Concepts
Lecture 2 - Thermodynamic Concepts
Lecture 3 - Thermodynamic Concepts
Lecture 4 - Thermodynamic Concepts
Lecture 5 - Thermodynamic Concepts
Lecture 6 - Thermodynamic Concepts
Lecture 7 - Thermodynamic Concepts
Lecture 8 - Thermodynamic Concepts
Lecture 9 - Thermodynamic Concepts
Lecture 10 - Thermodynamic Concepts
Lecture 11 - Laws Of Thermodynamics
Lecture 12 - Laws Of Thermodynamics
Lecture 13 - Laws Of Thermodynamics
Lecture 14 - Laws Of Thermodynamics
Lecture 15 - Laws Of Thermodynamics
Lecture 16 - Laws Of Thermodynamics
Lecture 17 - Laws Of Thermodynamics
Lecture 18 - Laws Of Thermodynamics
Lecture 19 - Laws Of Thermodynamics
Lecture 20 - Properties of a Pure Substance
Lecture 21 - Properties of a Pure Substance
Lecture 22 - Properties of a Pure Substance
Lecture 23 - Properties of a Pure Substance
Lecture 24 - Properties of a Pure Substance
Lecture 25 - Properties of a Pure Substance
Lecture 26 - Properties of a Pure Substance
Lecture 27 - Properties of a Pure Substance
Lecture 28 - Properties of a Pure Substance
Lecture 29 - Properties of a Pure Substance

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Lecture 30 - Properties of a Pure Substance
Lecture 31 - Laws of Thermodynamics
Lecture 32 - Applications, Problem Solving
Lecture 33 - Applications, Problem Solving
Lecture 34 - Applications, Problem Solving
Lecture 35 - Applications, Problem Solving
Lecture 36 - Applications, Problem Solving
Lecture 37 - Applications, Problem Solving
Lecture 38 - Applications, Problem Solving
Lecture 39 - Applications, Problem Solving
Lecture 40 - Applications, Problem Solving
Lecture 41 - Applications, Problem Solving
Lecture 42 - Applications, Problem Solving
Lecture 43 - Applications, Problem Solving
Lecture 44 - Applications, Problem Solving
Lecture 45 - Properties of Ideal Gas Mixtures
Lecture 46 - Properties of Ideal Gas Mixtures
Lecture 47 - Gas-Vapour Mixtures
Lecture 48 - Gas-Vapour Mixtures
Lecture 49 - Gas-Vapour Mixtures
Lecture 50 - Thermodynamics of Reacting sytems
Lecture 51 - Thermodynamics of Reacting sytems
Lecture 52 - Thermodynamics of Reacting sytems
Lecture 53 - Phase and Chemical Equilibrium
Lecture 54 - Phase and Chemical Equilibrium

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NPTEL Video Course - Mechanical Engineering - NOC:Solid Mechanics

Subject Co-ordinator - Prof. Ajeet Kumar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mathematical Concepts
Lecture 2 - Traction Vector
Lecture 3 - Stress Tensor and its Matrix Representation
Lecture 4 - Transformation of Stress Matrix
Lecture 5 - Stress Equilibrium Equations
Lecture 6 - Balance of Angular Momentum (Continued...)
Lecture 7 - Principal Planes and Principal stress components
Lecture 8 - Maximizing the Shear Component of Traction
Lecture 9 - Mohr's Circle
Lecture 10 - Mohr's Circle (Continued...), Stress Invariants, Decomposition of the Stress Tensor
Lecture 11 - Concept of Strain Tensor
Lecture 12 - Longitudinal and Shear Strains
Lecture 13 - Local Volumetric Strain and Local Infinitesimal Rotation
Lecture 14 - Similarity in Properties of Stress and Strain Tensors
Lecture 15 - Stress-Strain Relation
Lecture 16 - Stress-Strain Relation for Isotropic Materials
Lecture 17 - Linear Momentum Balance in Cylinderical Coordinate System
Lecture 18 - Linear Momentum Balance in Cylinderical Coordinate System (Continued...)
Lecture 19 - Strain Matrix Cylinderical Coordinate System
Lecture 20 - Extension-Torsion-Inflation in a Hollow Cylinder
Lecture 21 - Extension-Torsion-Inflation in a Hollow Cylinder (Continued...)
Lecture 22 - Solving Problems Involving Torsion of Shafts
Lecture 23 - Pure Bending of Rectangular Beams
Lecture 24 - Bending of Beams (Continued...)
Lecture 25 - Bending of Unsymmetrical Beams
Lecture 26 - Concept of Shear Center
Lecture 27 - Theoy of Beams
Lecture 28 - Theoy of Beams (Continued...) and Beam Buckling
Lecture 29 - Energy Methods

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Lecture 30 - Energy Methods (Continued...)
Lecture 31 - Theories of Failure
Lecture 32 - Theories of Failure (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Uncertainty Analysis and Experimentation

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Outline, Introduction
Lecture 2 - Experimentation Processes and Applications Overview
Lecture 3 - Developments in Uncertainty Analysis, Approach
Lecture 4 - Errors, Their Causes and Classification
Lecture 5 - Errors to Uncertainty via Statistics
Lecture 6 - Sources of Errors, Uncertainty Definitions
Lecture 7 - Experimentation - I
Lecture 8 - Experimentation Stages / Phases I
Lecture 9 - Experimentation Stages / Phases II
Lecture 10 - Uncertainty Analysis Processes
Lecture 11 - Instrument ans DAS
Lecture 12 - Basic procedure - I
Lecture 13 - Basic procedure - II
Lecture 14 - Evaluating systematic uncertainties
Lecture 15 - Worksheets for uncertainty in a measurement, Examples
Lecture 16 - Examples of uncertainty in a measurement
Lecture 17 - Methodologies, Multiple tests method
Lecture 18 - Single test, Basics of taylor Series Method
Lecture 19 - Sensitivity coefficient, Result uncertainty from TSM
Lecture 20 - Result uncertainty TSM: Special cases
Lecture 21 - Method selection, Worksheets for result uncertainty
Lecture 22 - Examples for result uncertainty - 1
Lecture 23 - Examples for result uncertainty - 2
Lecture 24 - Regression Introduction
Lecture 25 - Regression analysis - Linear, single variable
Lecture 26 - Correlation, Related topics
Lecture 27 - Reporting uncertainties
Lecture 28 - Validation and verification aspects, Data archiving
Lecture 29 - Course overview

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Graphics and Design

Subject Co-ordinator - Prof. Naresh Varma Datla and Prof. S.R Kale

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Examples of visualization - 1
Lecture 3 - Examples of visualization - 2
Lecture 4 - Visualization and drawing
Lecture 5 - Sketch to engineering drawing
Lecture 6 - Types of projections
Lecture 7 - Multiview projections
Lecture 8 - 1st and 3rd angle projections
Lecture 9 - Sketching
Lecture 10 - Visualization
Lecture 11 - Drawing sheet
Lecture 12 - Lines
Lecture 13 - Dimensioning
Lecture 14 - Projection of a point line and plane
Lecture 15 - Projection of simple objects
Lecture 16 - Example Projection of a solid
Lecture 17 - Example Projection of an object
Lecture 18 - Types of Solids
Lecture 19 - Polygons Construction and Projections
Lecture 20 - Rotation of Solids
Lecture 21 - Example Rotation of Solids
Lecture 22 - Section views
Lecture 23 - Sectioning practices
Lecture 24 - Auxiliary views
Lecture 25 - Example Section View
Lecture 26 - Example Auxiliary View
Lecture 27 - Pictorial Drawings
Lecture 28 - Construction of Isometric Drawings
Lecture 29 - Example Isometric drawings

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Lecture 30 - Working Drawing
Lecture 31 - Example Sectional View of Assembly
Lecture 32 - Computer Aided Design
Lecture 33 - Autodesk Inventor Environment
Lecture 34 - Sketching for Solid Modelling
Lecture 35 - Example 1 Extrude Hole Fillet Chamfer
Lecture 36 - Example 2 Rib Mirror
Lecture 37 - Example 3
Lecture 38 - Revolve Loft Pattern
Lecture 39 - Example 4
Lecture 40 - Example 5
Lecture 41 - Spline Sweep Shell
Lecture 42 - Example 6
Lecture 43 - Example 7
Lecture 44 - Drawing from Solid Model
Lecture 45 - Assembly with constraints
Lecture 46 - Example 8
Lecture 47 - Example 9
Lecture 48 - Example 10
Lecture 49 - Example 11
Lecture 50 - Civil and architectural drawings

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NPTEL Video Course - Mechanical Engineering - NOC:Ideal Fluid Flows using Complex Analysis

Subject Co-ordinator - Prof. Amit Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Ideal fluids, Velocity potential, Potential flows
Lecture 2 - Stream function, Orthogonality of streamlines and equipotential lines
Lecture 3 - Complex variables, Analyticity, Cauchy - Riemann equations, Complex potential, Complex velocity
Lecture 4 - Elementary flows : Uniform flow, Source and Sink, Free vortex
Lecture 5 - Flow in a bend, Flow around a sharp edge
Lecture 6 - Superposition of source and sink : doublet flow
Lecture 7 - Superposition of uniform flow and doublet
Lecture 8 - Superposition of uniform flow, doublet and free vortex
Lecture 9 - Superposition of source and uniform flow
Lecture 10 - Problem solving session - 1
Lecture 11 - Problem solving session - 2
Lecture 12 - Method of images, Forces on a body, Blasius theorem
Lecture 13 - Calculation of forces using derived flow field
Lecture 14 - Introduction to conformal transformation
Lecture 15 - Singularities and their transformations

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NPTEL Video Course - Mechanical Engineering - NOC:Experimental Modal Analysis

Subject Co-ordinator - Subodh V. Modak

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanical Behavior of Polymers and Composites

Subject Co-ordinator - Dr. Naresh V Datla

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to polymers
Lecture 2 - Polymer structure
Lecture 3 - Polymer classification
Lecture 4 - Polymer length, packing and tacticity
Lecture 5 - Glass transition temperature
Lecture 6 - Temperature effects, glassy regime
Lecture 7 - Viscoelastic, rubbery, viscous, decomposition
Lecture 8 - Relaxation and creep tests
Lecture 9 - Failure of polymers
Lecture 10 - Heaviside, Dirac delta, Laplace
Lecture 11 - Introduction to linear viscoelasticity
Lecture 12 - Phenomenological models for linear viscoelasticity
Lecture 13 - Maxwell model
Lecture 14 - Kelvin model
Lecture 15 - Three and four parameter models
Lecture 16 - Generalized Maxwell and Kelvin models
Lecture 17 - Boltzman superposition principle
Lecture 18 - Alfrey's correspondence principle
Lecture 19 - Analysis of viscoelastic bars
Lecture 20 - Analysis of viscoelastic beams
Lecture 21 - Dynamic mechanical analysis (DMA)
Lecture 22 - Dynamic mechanical thermal analysis (DMTA)
Lecture 23 - Time temperature superposition principle (TTSP)
Lecture 24 - Plastic design consideration and practices
Lecture 25 - What are composites?
Lecture 26 - Composite materials and types
Lecture 27 - Composite advantages and applications
Lecture 28 - Fabrication and other aspects of composites
Lecture 29 - 3D stress and strain components

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Lecture 30 - Symmetry in stress, strain and stiffness matrix
Lecture 31 - Monoclinic, orthotropic and isotropic materials
Lecture 32 - 3D stress strain relation for orthotropic material
Lecture 33 - Plane stress: Specially orthotropic material
Lecture 34 - Plane stress: Generally orthotropic material
Lecture 35 - Lamina engineering constants
Lecture 36 - Lamina hygrothermal effects
Lecture 37 - Lamina fundamental strengths
Lecture 38 - Lamina failure criteria
Lecture 39 - Tsai-Hill and Hoffman failure criteria
Lecture 40 - Micromechanics: Assumptions, RVE
Lecture 41 - Micromechanics: Stiffness prediction
Lecture 42 - Micromechanics: Stiffness and strength
Lecture 43 - Macromechanics of laminate
Lecture 44 - Classical laminate theory
Lecture 45 - Classical laminate theory - II
Lecture 46 - Symmetric laminates, orthotropic laminates
Lecture 47 - Angle-ply, cross-ply and quasi-isotropic laminates
Lecture 48 - Hygrothermal stresses in laminates
Lecture 49 - Laminate failure
Lecture 50 - Design practices with laminates
Lecture 51 - Sandwich structures
Lecture 52 - Composites testing
Lecture 53 - Joining of composites

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NPTEL Video Course - Mechanical Engineering - NOC:Data-Enabled Tribological Engineering: From Experiments to

Subject Co-ordinator - Prof. (HAG) Harish Hirani

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Tribology
Lecture 2 - Tribological Interfaces
Lecture 3 - Fundamentals of Friction and Wear
Lecture 4 - Adhesion, Abrasion, and Surface Fatigue Mechanisms
Lecture 5 - Wear Measurement Techniques
Lecture 6 - Principles of Lubrication, types of Lubricants and their properties
Lecture 7 - Lubrication regimes and film thickness calculations
Lecture 8 - Mixed Lubrication
Lecture 9 - Hydrodynamic Lubrication Theory
Lecture 10 - Design Considerations for Hydrodynamic Lubrication Systems
Lecture 11 - Elastohydrodynamic Lubrication
Lecture 12 - Solid Lubrication
Lecture 13 - Surface modification techniques for tribological applications
Lecture 14 - Thin film coatings and their tribological properties
Lecture 15 - Nanotribology
Lecture 16 - Tribocorrosion
Lecture 17 - Wear testing techniques and standards
Lecture 18 - Measurement and analysis of wear debris
Lecture 19 - Experimental Design and Statistical Analysis
Lecture 20 - Introduction to Data-Enabled Engineering
Lecture 21 - Data Collection and Preprocessing
Lecture 22 - Feature Extraction and Selection
Lecture 23 - Introduction to Machine Learning Algorithms
Lecture 24 - Regression and Classification Algorithms for Tribological Modeling
Lecture 25 - Deep Learning for Tribological Engineering
Lecture 26 - Data-Driven Models for Friction Prediction
Lecture 27 - Data-Driven Models for Wear Prediction
Lecture 28 - Data-Driven Models for Lubricant Optimization
Lecture 29 - Data-Driven Models for Tribofilm Formation

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Lecture 30 - Data-Driven Models for Tribocorrosion Prediction
Lecture 31 - Prediction of Coating and Surface Treatment Performance
Lecture 32 - Optimization of Surface Engineering Processes using Machine Learning
Lecture 33 - Uncertainty Quantification and Sensitivity Analysis
Lecture 34 - Data Management and Ethics in Data-Enabled Engineering
Lecture 35 - Case Studies in Data-Enabled Tribological Engineering
Lecture 36 - Future Directions in Data-Enabled Tribological Engineering

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NPTEL Video Course - Mechanical Engineering - NOC:Design of Precision Machines

Subject Co-ordinator - Prof. Jitendra P. Khatait

Co-ordinating Institute - IIT Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Artifacts and Examples
Lecture 3 - Artifacts and Examples (Continued...)
Lecture 4 - Semiconductor
Lecture 5 - Design Principles
Lecture 6 - Exact Constraint Design
Lecture 7 - Nesting Force
Lecture 8 - Self-help
Lecture 9 - Controlling Degrees of Freedom
Lecture 10 - Exact-constraint Design
Lecture 11 - Elements to Constrain DOFs - 1 to 4
Lecture 12 - Elements to Constrain DOFs - 5 to 6
Lecture 13 - Examples Controlling DOFs
Lecture 14 - Design for Stiffness
Lecture 15 - Stiffness for different loading conditions
Lecture 16 - Effect of Transmission of Stiffness
Lecture 17 - Stiffness in series and parallel
Lecture 18 - Material usage for stiffness
Lecture 19 - Stiffness of open and closed profiles under torsion
Lecture 20 - Complaint Mechanisms - Introduction
Lecture 21 - Cross Flexure
Lecture 22 - Flexure Parallel Guiding
Lecture 23 - Flexures with reinforced section and Folded sheet flexures
Lecture 24 - Hole Flexure and Applications
Lecture 25 - Various Examples of Flexures
Lecture 26 - Flexures in Tube Walls
Lecture 27 - Friction and Hysteresis
Lecture 28 - Effect of Combined motion on motion transmission
Lecture 29 - Air Bearings and Guideways

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Lecture 30 - Orifice-Type Air Bearing
Lecture 31 - Air Bearing System (ABS) for Ultra-Precision
Lecture 32 - Case Study: Robotic Minimally Invasive Surgery with Flexible Instruments
Lecture 33 - Design of Experiment Setup: Actuation, force sensing and tip measurement modules
Lecture 34 - Energy Management
Lecture 35 - Gravity compensation and Dynamics
Lecture 36 - Actuators and Examples

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NPTEL Video Course - Mechanical Engineering - Nonlinear Vibration

Subject Co-ordinator - Prof. S.K. Dwivedy

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Nonlinear systems
Lecture 2 - Review of Linear vibrating systems
Lecture 3 - Phenomena associated with Nonlinear systems
Lecture 4 - Commonly observed Phenomena in Nonlinear systems
Lecture 5 - Force and Moment based Approach
Lecture 6 - Energy based approach Extended Hamiltonâ s principle and Lagrange Priciple
Lecture 7 - Derivation of Equation of motion of nonlinear discrete system (More examples)
Lecture 8 - Derivation of Equation of motion of nonlinear continuous system - 1
Lecture 9 - Derivation of Equation of motion of nonlinear continuous system - 2
Lecture 10 - Ordering of nonlinear Equation of motion
Lecture 11 - Qualitative Analysis Straight forward expansion
Lecture 12 - Numerical method Straight forward expansion
Lecture 13 - Lindstedt Poincareâ technique
Lecture 14 - Method of multiple scales
Lecture 15 - Method of Harmonic balance
Lecture 16 - Method of averaging
Lecture 17 - Generalized Method of averaging
Lecture 18 - Krylov-Bogoliubov-Mitropolski technique
Lecture 19 - Incremental harmonic balance method and Intrinsic multiple scale harmonic balance method
Lecture 20 - Modified Lindstedt Poincareâ technique
Lecture 21 - Stability and Bifurcation of Fixed-point response - 1
Lecture 22 - Stability and Bifurcation of Fixed-point response - 2
Lecture 23 - Stability and Bifurcation of Fixed-point response - 3
Lecture 24 - Stability and Bifurcation of Fixed-point response - 4
Lecture 25 - Stability Analysis of Periodic response
Lecture 26 - Bifurcation of Periodic response And Introduction to quasi-periodic and Chaotic response
Lecture 27 - Quasi-Periodic and Chaotic response
Lecture 28 - Numerical methods to obtain roots of characteristic equation and time response
Lecture 29 - Numerical methods to obtain time response

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Lecture 30 - Numerical methods to obtain frequency response
Lecture 31 - Free Vibration of Single degree of freedom Nonlinear systems with Cubic and quadratic nonlineari
Lecture 32 - Free Vibration of Single degree of freedom Nonlinear systems with Cubic and quadratic nonlineari
Lecture 33 - Free Vibration of multi- degree of freedom Nonlinear systems with Cubic and quadratic nonlineari
Lecture 34 - Forced nonlinear Vibration Single degree of freedom Nonlinear systems with Cubic nonlinearities
Lecture 35 - Forced nonlinear Vibration Single and multi- degree of freedom Nonlinear systems
Lecture 36 - Nonlinear Forced-Vibration of Single and Multi Degree-of-Freedom System
Lecture 37 - Analysis of Multi- degree of freedom system
Lecture 38 - Nonlinear Vibration of Parametrically excited system
Lecture 39 - Nonlinear Vibration of Parametrically excited system
Lecture 40 - Nonlinear Vibration of Parametrically excited system with internal resonance

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NPTEL Video Course - Mechanical Engineering - Theory and Practice of Rotor Dynamics

Subject Co-ordinator - Prof. Rajiv Tiwari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - A Brief History of Rotor Dynamics
Lecture 3 - The State of the Art of Rotor Dynamics
Lecture 4 - Simple Rotor Models with Rigid Bearings
Lecture 5 - Jeffcott Rotor Model
Lecture 6 - Variant of Jeffcott Rotor Model
Lecture 7 - Rigid Rotor Mounted on Simple Anistropic Springs as Bearings
Lecture 8 - Rigid Rotor Mounted on Complex Anisotropic Bearings
Lecture 9 - Flexible Shaft with a Rigid Disc Mounted on Anistropic Supports
Lecture 10 - Gyroscopic Effects
Lecture 11 - Gyroscopic Effects
Lecture 12 - Gyroscopic Effects
Lecture 13 - Gyroscopic Effects
Lecture 14 - Torsional Vibrations
Lecture 15 - Three Disc Rotor System
Lecture 16 - Transfer Matrix Approach - Part I
Lecture 17 - Transfer Matrix Approach - Part II
Lecture 18 - Transfer Matrix Approach - Part III
Lecture 19 - Geared and Branched Systems
Lecture 20 - Continuous System and Finite Element Method
Lecture 21 - Finite Element Method
Lecture 22 - Finite Element Analysis
Lecture 23 - Finite Element Analysis - Part III
Lecture 24 - Influence Coefficient Method
Lecture 25 - Transfer Matrix Method - Part I
Lecture 26 - Transfer Matrix Method - Part II
Lecture 27 - Transfer Matrix Method - Part III
Lecture 28 - Continuous System Approach
Lecture 29 - Finite Element Method - Part I

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Lecture 30 - Finite Element Method - Part II
Lecture 31 - Finite Element Method - Part III
Lecture 32 - Instability in Rotor Systems
Lecture 33 - Fluid-Film Bearings
Lecture 34 - Internal Damping & Asymmetrical Shaft
Lecture 35 - Steam Whirl and Seals
Lecture 36 - Subcritical Speed Whirl
Lecture 37 - Introduction to Rigid Rotor Balancing
Lecture 38 - Dynamic Balancing of Rotors
Lecture 39 - Dynamic Balancing of Rotors
Lecture 40 - Dynamic Balancing of Rotors
Lecture 41 - Common Faults & Vibration signatures
Lecture 42 - Condition Based Monitoring

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NPTEL Video Course - Mechanical Engineering - Engineering Mechanics

Subject Co-ordinator - Prof. U.S. Dixit, Dr. G. Saravana Kumar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals Of Engineering Mechanics
Lecture 2 - Equations of Equilibrium
Lecture 3 - Truss Analysis - Part 1
Lecture 4 - Truss Analysis - Part 2
Lecture 5 - Analysis of Frames Machines
Lecture 6 - Internal Forces
Lecture 7 - Internal Forces in Beams
Lecture 8 - Cables
Lecture 9 - Friction
Lecture 10 - Application of Friction - Part 1
Lecture 11 - Application of Friction - Part 2
Lecture 12 - Application of Friction - Part 3
Lecture 13 - Centroids Center of Mass
Lecture 14 - Centroids Area of Moments
Lecture 15 - Product of Inertia, Rotation of Axis and Principle Moments of Inertia
Lecture 16 - Principle Mass Moments of Inertia
Lecture 17 - Second Moment of Mass
Lecture 18 - Virtual Work of Ideal System
Lecture 19 - Principle of Virtual Work
Lecture 20 - Systems with Friction
Lecture 21 - Potential Energy
Lecture 22 - Stability of Equilibrium
Lecture 23 - Kinematics of a Particles
Lecture 24 - Kinematics of a Particle Moving on a Curve
Lecture 25 - Relative Motion
Lecture 26 - Plane Kinematics of Rigid Bodies
Lecture 27 - Kinematics of a Particle
Lecture 28 - Work and Energy
Lecture 29 - Impulse and Momentum

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Lecture 30 - Direct and Oblique Impulse
Lecture 31 - Plane Kinetics of Rigid Bodies
Lecture 32 - Kinetics of a Body
Lecture 33 - Method of Momentum and Analysis of Robot Manipulator
Lecture 34 - Kinematics in 3D
Lecture 35 - Kinetics in 3D
Lecture 36 - Free Vibration
Lecture 37 - Forced Vibration Damped Undamped
Lecture 38 - Vibration of Rigid Bodies - Part 1
Lecture 39 - Vibration of Rigid Bodies - Part 2
Lecture 40 - Some Problems of Vibration

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NPTEL Video Course - Mechanical Engineering - Mechanical Vibrations

Subject Co-ordinator - Prof. S.K. Dwivedy, Prof. Rajiv Tiwari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of the Course, Practical and Research Trends
Lecture 2 - Harmonic and Periodic Motions, Vibration Terminology
Lecture 3 - Vibration Model, Equation of Motion-Natural Frequency
Lecture 4 - Energy Method, Principle of Virtual Work
Lecture 5 - Viscously Damped Free Vibration Special Cases
Lecture 6 - Logarithmic Decrement Experimental Determination of Damping Coefficient Hystersis Loop
Lecture 7 - Coulomb Damping other Damping Models
Lecture 8 - Forced Harmonic Vibration, Magnification Factor
Lecture 9 - Laplace Transform, Superposition Theorem
Lecture 10 - Rotor Unbalance and Whirling of Shaft, Transmissibility
Lecture 11 - Support Motion, Vibration Isolation
Lecture 12 - Sharpness of Resonance, Vibration Measuring Instruments
Lecture 13 - Generalized and Principle Coordinates, Derivation of Equation of Motion
Lecture 14 - Lagranges's Equation
Lecture 15 - Coordinate Coupling
Lecture 16 - Forced Harmonic Vibration
Lecture 17 - Tuned Absorber, Determination of Mass Ratio
Lecture 18 - Tuned and Damped Absorber, Untuned Viscous Damper
Lecture 19 - Derivation of Equations of Motion, Influence Coefficient Method
Lecture 20 - Properties of Vibrating Systems
Lecture 21 - Modal Analysis
Lecture 22 - Modal Analysis
Lecture 23 - Simple Systems With One Two or Three Discs Geared System
Lecture 24 - Multi-Degree of Freedom Systems-Transfer Matrix Method Branched Systems
Lecture 25 - Derivation of Equations of Motion Part 1 - Newton
Lecture 26 - Derivation of Equations of Motion Part 2 - Newton
Lecture 27 - Vibration of Strings
Lecture 28 - Longitudinal and Torsional Vibration of Rods
Lecture 29 - Transverse Vibration of Beams, Equations of Motion and Boundary Conditions

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Lecture 30 - Transverse Vibration of Beams
Lecture 31 - Rayleigh's Energy Method
Lecture 32 - Matrix Iteration Method
Lecture 33 - Durkerley, Rayleigh-Ritz and Galerkin Method
Lecture 34 - Finite Element Formulation for Rods, Gear Train and Branched System
Lecture 35 - Finite Element Formulation for Beams
Lecture 36 - Global Finite Element Assembly and Imposition of Boundary Conditions
Lecture 37 - Vibration Testing Equipments
Lecture 38 - Vibration Testing Equipments
Lecture 39 - Field Balancing of Rotors
Lecture 40 - Condition Monitoring

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Machining Processes

Subject Co-ordinator - Prof. Manas Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to advanced machining processes
Lecture 2 - Ultrasonic machining - Part I
Lecture 3 - Ultrasonic machining - Part II
Lecture 4 - Abrasive jet machining
Lecture 5 - Water jet cutting and Abrasive water jet machining
Lecture 6 - Magnetic abrasive finishing
Lecture 7 - Abrasive Flow Finishing
Lecture 8 - Magnetorheological Finishing
Lecture 9 - Magnetorheological Abrasive Flow Finishing - Part I
Lecture 10 - Magnetorheological Abrasive Flow Finishing - Part II
Lecture 11 - Magnetorheological Abrasive Flow Finishing - Part III
Lecture 12 - Electric discharge machining (EDM)
Lecture 13 - Electric Discharge Grinding, Electric Discharge Diamond Grinding and Wire Electric Discharge Mac
Lecture 14 - Electrochemical Machining (ECM)
Lecture 15 - Electrochemical Grinding, Electrostream Drilling, Shaped Tube Electrolytic Machining
Lecture 16 - Plasma Arc Machining (PAM)
Lecture 17 - Electron Beam Machining (EBM) Edit Lesson
Lecture 18 - Laser Beam Machining (LBM)
Lecture 19 - Chemical Machining (ChM)

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Nuclear Power Generation

Subject Co-ordinator - Prof. Dipankar N. Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of nuclear energy
Lecture 2 - Binding energy and mass defect
Lecture 3 - Radioactivity and radioactive decay
Lecture 4 - Different types of nuclear transmutation
Lecture 5 - Artificial radioactivity and neutron-nucleus interactions
Lecture 6 - Energy and momentum conservation
Lecture 7 - Fission and role of neutron energy
Lecture 8 - Theory of elastic scattering
Lecture 9 - Neutron multiplication factor
Lecture 10 - Neutron diffusion theory
Lecture 11 - Solution of one-group diffusion equation
Lecture 12 - Simple reactor theory
Lecture 13 - Nuclear fuel and simple energy consideration
Lecture 14 - Axial temperature distribution and heat transfer coefficient
Lecture 15 - Prompt and delayed neutrons
Lecture 16 - Delayed neutron kinetics
Lecture 17 - Different control mechanisms and various effects
Lecture 18 - Classical reactor designs
Lecture 19 - Evolution of reactors from Gen-I to Gen-IV
Lecture 20 - The concept of breeding
Lecture 21 - Fuel cycles and FBR
Lecture 22 - Gen-IV FBR designs
Lecture 23 - Hydrogen fusion reactions
Lecture 24 - Coulomb barrier and other critical factors
Lecture 25 - Radiation dose and gross biological effects
Lecture 26 - Stochastic and deterministic effects of human cells
Lecture 27 - Lessons from TMI and Chernobyl
Lecture 28 - Defence-in-depth Philosophy
Lecture 29 - Waste classification and Disposal of Mill Tailings

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Lecture 30 - Disposal methodologies for HLW and IMW

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NPTEL Video Course - Mechanical Engineering - NOC:Advances in Welding and Joining Technologies

Subject Co-ordinator - Prof. Swarup bag

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Welding and Joining - Part I
Lecture 2 - Fundamentals of Welding and Joining - Part II
Lecture 3 - Fundamentals of Welding and Joining - Part III
Lecture 4 - Fundamentals of Welding and Joining - Part IV
Lecture 5 - Fundamentals of Welding and Joining - Part V
Lecture 6 - Laser and Electron Beam Welding - Part I
Lecture 7 - Laser and Electron Beam Welding - Part II
Lecture 8 - Solid State Welding Processes - Part I
Lecture 9 - Solid State Welding Processes - Part II
Lecture 10 - Solid State Welding Processes - Part III
Lecture 11 - Computational Welding Mechanics - Part I
Lecture 12 - Computational Welding Mechanics - Part II
Lecture 13 - Computational Welding Mechanics - Part III
Lecture 14 - Micro and Nano Joining Processes - Part I
Lecture 15 - Micro and Nano Joining Processes - Part II
Lecture 16 - Micro and Nano Joining Processes - Part III
Lecture 17 - Welding Metallurgy - Part I
Lecture 18 - Welding Metallurgy - Part II
Lecture 19 - Welding Metallurgy - Part III
Lecture 20 - Welding Metallurgy - Part IV
Lecture 21 - Welding and Joining of Non-Metals - Part I
Lecture 22 - Welding and Joining of Non-Metals - Part II
Lecture 23 - Metal Transfer in Welding and Metal Printing

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Machining and Machining Fluids

Subject Co-ordinator - Prof. Mamilla Ravi Sankar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction and Importance of Machining
Lecture 3 - Principles of Machining or Metal Cutting
Lecture 4 - Cutting Tools
Lecture 5 - Forces in Machining
Lecture 6 - Tribology in Machining
Lecture 7 - Lubrication surface roughness in Machining
Lecture 8 - Machinability and Thermal Aspects
Lecture 9 - Tool Wear and Tool life - Part 1
Lecture 10 - Tool Wear and Tool life - Part 2
Lecture 11 - Tool Wear and Tool life - Part 3
Lecture 12 - Tool Materials and Coatings
Lecture 13 - Machining Fluids / Cutting Fluids and its Additives - Part 1
Lecture 14 - Machining Fluids / Cutting Fluids and its Additives - Part 2
Lecture 15 - Machining Fluids / Cutting Fluids and its Emissions
Lecture 16 - Eco Friendly Cutting Fluids - Part 1
Lecture 17 - Eco Friendly Cutting Fluids - Part 2
Lecture 18 - Rheology and Thermal Characterization of Machining / Cutting Fluids
Lecture 19 - Bio-degradation Studies of Machining / Cutting Fluids
Lecture 20 - Cutting Fluid Application in Machining Region
Lecture 21 - Practical Machining Processes - 1
Lecture 22 - Practical Machining Processes - 2
Lecture 23 - Introduction to Abrasive Processes - Grinding
Lecture 24 - Cutting fluids in Grinding Process
Lecture 25 - Unbonded Conventional Abrasive Processes
Lecture 26 - Advances in Metal Cutting_Machining Processes
Lecture 27 - Advances in Metal Cutting_Machining Processes - 2

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanics of Machining

Subject Co-ordinator - Dr. Uday S. Dixit

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Deformation of Metals
Lecture 2 - Mechanism of Plastic Deformation
Lecture 3 - Machining Processes
Lecture 4 - Tool Geometry
Lecture 5 - Tool Specifications, Conversion Of Tool Angles, Multi-Point Cutting Tools
Lecture 6 - Mechanics of Orthogonal Cutting, Force Relationships
Lecture 7 - Determination of Stress, Strain, and Strain Rate
Lecture 8 - Measurement of Shear Angle
Lecture 9 - Other Analysis for Force Relationships
Lecture 10 - Mechanics of Oblique Cutting
Lecture 11 - Measurement of Cutting Forces
Lecture 12 - Thermal Aspects Of Machining
Lecture 13 - Tool Wear and Tool Life and Tool Life Equations
Lecture 14 - Economics in Machining
Lecture 15 - Practical Machining Operations
Lecture 16 - Practical Machining Operations
Lecture 17 - Grinding of Metals and Mechanics of Grinding Process
Lecture 18 - Abrasive Machining and Finishing Operations
Lecture 19 - CNC Machines and CNC Programming
Lecture 20 - Introduction to Advanced Machining Processes

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NPTEL Video Course - Mechanical Engineering - NOC:Principle of Hydraulic Machines and System Design

Subject Co-ordinator - Prof. Pranab K. Mondal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to hydraulic machines: classifications and operational principles
Lecture 2 - Euler equation for turbomachines: net head developed by the pump/turbines
Lecture 3 - Velocity triangles of pumps, effect of inlet swirl on pump operation
Lecture 4 - Velocity triangles of pumps, effect of inlet swirl on pump operation
Lecture 5 - Pump casings, Efficiencies and Problems - I
Lecture 6 - Pump casings, Efficiencies and Problems - II
Lecture 7 - Pump casings, Efficiencies and Problems - III
Lecture 8 - Axial flow pump, HQ curve, System Resistance Curve - I
Lecture 9 - Axial flow pump, HQ curve, System Resistance Curve - II
Lecture 10 - HQ Curve, System Resistance Curve - I
Lecture 11 - HQ Curve, System Resistance Curve - II
Lecture 12 - Introduction to Cavitation
Lecture 13 - Condition for Cavitation and NPSH
Lecture 14 - Net Positive Suction Head (NPSH)
Lecture 15 - Suction number and Introduction to off design condition
Lecture 16 - Cavitation: The effect of off-design Conditions
Lecture 17 - Cavitation: Preventive Measures
Lecture 18 - Cavitation: Preventive Measures, Effect on Pump Characteristic
Lecture 19 - Problems on Cavitation
Lecture 20 - Introduction to Slip : Stodola Slip Model
Lecture 21 - Departure from Euler theory
Lecture 22 - Slip Velocity - I
Lecture 23 - Slip Velocity - II
Lecture 24 - Problem on slip
Lecture 25 - Degree of reaction of pump
Lecture 26 - Degree of reaction and axial pump design
Lecture 27 - Testing of radial flow pump - I
Lecture 28 - Testing of radial flow pump - II
Lecture 29 - Problem on radial flow pump testing

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Lecture 30 - Radial equilibrium of axial flow pump - I
Lecture 31 - Radial equilibrium of axial flow pump - II
Lecture 32 - Pump operation: series and parallel connection
Lecture 33 - Series and parallel operation of dissimilar pumps
Lecture 34 - Pumping system design
Lecture 35 - Design of parellel pumping system
Lecture 36 - Numerical problem on pumps - I
Lecture 37 - Numerical problem on pumps - II
Lecture 38 - Numerical problem on pumps - III
Lecture 39 - Working principle and Indicator diagram of PD pump
Lecture 40 - Working principle and Indicator diagram of PD pump (Continued...)
Lecture 41 - Modified indicator diagram and Head-Discharge curve
Lecture 42 - Analysis and Head-Discharge curve of PD pump
Lecture 43 - Analysis and efficiencies of PD pump
Lecture 44 - Requirement of air chamber in PD pump
Lecture 45 - Numerical problem on PD pump with air chamber
Lecture 46 - Similarity and dimensional analysis of hydraulic machines
Lecture 47 - Dimensional analysis of hydraulic machines: Buckingham's theorem
Lecture 48 - Buckingham's theorem: Specific speed of hydraulic machines
Lecture 49 - Turbine Classification and Operational principle of Pelton wheel
Lecture 50 - Velocity Tiangles and analysis
Lecture 51 - Operational Principle of Reaction turbine
Lecture 52 - Degree of Reaction and Introduction to axial flow turbine
Lecture 53 - Kaplan Turbine: Operational Principle, Turbine efficiencies
Lecture 54 - Draft Tube for Reaction Turbine and Cavitation
Lecture 55 - Energy Balance and NPSH
Lecture 56 - Thoma Cavitation Factor
Lecture 57 - Reaction Turbine: Design aspects and Characteristic Curves
Lecture 58 - Problems on Impulse and Reaction Turbines

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Abrasive Machining and Finishing Processes

Subject Co-ordinator - Prof. Mamilla Ravi Sankar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Abrasive Machining and Finishing Processes
Lecture 2 - Grinding Process
Lecture 3 - Grinding Fluids and Its Additives
Lecture 4 - Grinding Fluids and its Emissions
Lecture 5 - Sustainable Grinding Process
Lecture 6 - Sustainable Grinding Process
Lecture 7 - Honing Process
Lecture 8 - Lapping Process
Lecture 9 - Super Finishing and Sand Blasting
Lecture 10 - Vibratory Bowl Finishing,Rotary Barrel Finishing or Tumbling
Lecture 11 - Drag Finishing, Ice-bonded Abrasive Finishing, Pitch Polishing, Pad Polishing
Lecture 12 - Introduction to Surface Texture in abrasive Process
Lecture 13 - Representation of Surface Roughness
Lecture 14 - Abrasive Jet Machining (AJM)
Lecture 15 - Abrasive Water Jet Machining (AWJM)
Lecture 16 - Ultrasonic Machining (USM)
Lecture 17 - EDM, Wire-EDM, EDG, EDDG, AW-EDG
Lecture 18 - Elastic Emission Machining
Lecture 19 - PMEDM and ECD and ELID, ECH
Lecture 20 - Abrasive Flow Finishing
Lecture 21 - Abrasive Flow Finishing
Lecture 22 - Magnetic Field Assisted Abrasive Finishing
Lecture 23 - Magneto Rheological Finishing and BE-MRF
Lecture 24 - Magnetic Field Assisted Abrasive Finishing
Lecture 25 - Summary of the Course

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NPTEL Video Course - Mechanical Engineering - NOC:Theory of Rectangular Plates - Part 1

Subject Co-ordinator - Prof. Poonam Kumari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic of Solid Mechanics
Lecture 2 - Enegry Principles
Lecture 3 - Classification of Plate Theories and Some Basics
Lecture 4 - Tutorial
Lecture 5 - Governing Equation for Plate - 1
Lecture 6 - Governing Equation for Plate - 2
Lecture 7 - Tutorial
Lecture 8 - Navier Solution + Levy solution
Lecture 9 - Levy Solution
Lecture 10 - Tutorial
Lecture 11 - EKM and buckling of plates
Lecture 12 - 3D Solutions
Lecture 13 - Matlab Coding + ABAQUS
Lecture 14 - Tutorial

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NPTEL Video Course - Mechanical Engineering - NOC:Principles of Mechanical Measurement

Subject Co-ordinator - Prof. Dipankar N. Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to measurement
Lecture 2 - Generalized measurement system and static characteristics
Lecture 3 - Uncertainties in measurement
Lecture 4 - Statistical treatment of random errors
Lecture 5 - System response to periodic inputs
Lecture 6 - Zeroth and first order systems
Lecture 7 - First and second order systems
Lecture 8 - Basics of digitization and number systems
Lecture 9 - Binary logic gates and binary codes
Lecture 10 - Analog-to-digital conversion
Lecture 11 - Digital-to-analog conversion
Lecture 12 - Electromagnetic indicators
Lecture 13 - Electronic amplifiers and filters
Lecture 14 - Resistive devices
Lecture 15 - Inductive, capacitive and optical devices
Lecture 16 - Piezoelectric and nozzle-flapper transducers
Lecture 17 - Resistive strain gages and associated circuitry
Lecture 18 - Strain gage rosettes and gage orientation
Lecture 19 - Elastic and strain gage load cells
Lecture 20 - Various load cells and dynamometers
Lecture 21 - Principles of manometry
Lecture 22 - Piezometer and elastic pressure transducer
Lecture 23 - Electric pressure transducer and high and low pressure measurement
Lecture 24 - Bernoulli's equation in obstruction meters
Lecture 25 - Obstruction meters and volume flowmeters
Lecture 26 - Mass flowmeters and velocity probes
Lecture 27 - Expansion-based devices
Lecture 28 - RTD, Thermistor and Thermocouple
Lecture 29 - Introduction to pyrometers

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Lecture 30 - Basic seismic transducer
Lecture 31 - Vibro-, velo- and accelerometer
Lecture 32 - Introduction to acoustic measurement
Lecture 33 - Radioactivity and its biological effects

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NPTEL Video Course - Mechanical Engineering - NOC:IC Engines and Gas Turbines

Subject Co-ordinator - Dr. Vinayak Kulkarni, Prof. Pranab K. Mondal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - External and Internal combustion engines, Engine components, SI and CI engines
Lecture 2 - Four-stroke and Two-stroke engines, Comparison between SI and CI engines, and Four-stroke and Two
Lecture 3 - Classification of IC engines
Lecture 4 - Engine operating characteristics
Lecture 5 - Otto, Diesel and Dual cycles
Lecture 6 - Otto, Diesel and Dual cycles (Continued...)
Lecture 7 - Otto, Diesel and Dual cycles (Continued...)
Lecture 8 - Otto, Diesel and Dual cycles (Continued...)
Lecture 9 - Comparison between the cycles, Actual cycles and their analysis
Lecture 10 - Carburetor, Mixture requirements
Lecture 11 - Carburetor, Mixture requirements (Continued...)
Lecture 12 - Idling, cruising and power ranges
Lecture 13 - Idling, cruising and power ranges (Continued...)
Lecture 14 - Classification, types of nozzles, Ignition system, Battery and Magneto ignition systems
Lecture 15 - Classification, types of nozzles, Ignition system, Battery and Magneto ignition systems (Continu
Lecture 16 - Classification, types of nozzles, Ignition system, Battery and Magneto ignition systems (Continu
Lecture 17 - Engine friction, Lubrication systems, forces on piston
Lecture 18 - Lubricating oils, Thermochemistry and Fuels, Self-ignition
Lecture 19 - Octane and Cetane Numbers, Alternative Fuels - Methanol, Ethanol, hydrogen, Natural Gas
Lecture 20 - Octane and Cetane Numbers, Alternative Fuels - Methanol, Ethanol, hydrogen, Natural Gas (Continu
Lecture 21 - Combustion in SI and CI Engines, Pressure Crank Angle Diagram
Lecture 22 - Combustion in SI and CI Engines, Pressure Crank Angle Diagram (Continued...)
Lecture 23 - Combustion in SI and CI Engines, Pressure Crank Angle Diagram (Continued...)
Lecture 24 - SI engine injection system, Energy distribution, Engine temperatures, Heat transfer in combustio
Lecture 25 - SI engine injection system, Energy distribution, Engine temperatures, Heat transfer in combustio
Lecture 26 - CI engine injection systems, Air-cooled and liquid-cooled engines, Modern trends
Lecture 27 - CI engine injection systems, Air-cooled and liquid-cooled engines, Modern trends (Continued...)
Lecture 28 - CI engine injection systems, Air-cooled and liquid-cooled engines, Modern trends (Continued...)
Lecture 29 - Problems on IC engine

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Lecture 30 - Turbomachines, Gas Turbine theory
Lecture 31 - Open Cycle Gas Turbine Power Plant, Twin Shaft Arrangement
Lecture 32 - Closed Cycle, Multi-Spool Arrangement, Steam Power Plant
Lecture 33 - Basic Thermodynamics
Lecture 34 - Brayton Cycle
Lecture 35 - Brayton Cycle
Lecture 36 - Brayton Cycle with Heat Exchanger/Reheater
Lecture 37 - Brayton Cycle with Intercooler
Lecture 38 - Real Brayton Cycle, Solved Example for Ideal Cycle
Lecture 39 - Solved Examples for Real Brayton Cycle
Lecture 40 - Introduction and Performance Parameters of Propulsion System
Lecture 41 - Basics of Various Aircraft Engine
Lecture 42 - Eular Turbomachinary Equation
Lecture 43 - Introduction and Flow Analysis of Centrifugal Compressors
Lecture 44 - Thermodynamics Analysis of Centrifugal Compressors
Lecture 45 - Axial Compressor
Lecture 46 - Axial Compressor
Lecture 47 - Complete Analysis of Axial Flow Gas Turbine
Lecture 48 - Solved Examples for Axial Compressors,Centrifugal Compressors and Turbine
Lecture 49 - Radial Flow Turbine, Solved Example of Free vortex Condition
Lecture 50 - Nozzles and Diffuers

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamental of Welding Science and Technology

Subject Co-ordinator - Prof. Pankaj Biswas

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of welding
Lecture 2 - Classification of welding and joints
Lecture 3 - Parts of weld joint
Lecture 4 - Welding Symbol
Lecture 5 - welding power source - 1
Lecture 6 - Welding power source - 2
Lecture 7 - Welding Power sources characteristics - 1
Lecture 8 - Welding Power sources characteristics - 2
Lecture 9 - Physics of welding - 1
Lecture 10 - Physics of welding - 2
Lecture 11 - Physics of welding - 4 (Arc Stability and Arc Blow)
Lecture 12 - Physics of welding - 3
Lecture 13 - Physics of welding - 5 (Metal Transfer-1)
Lecture 14 - Physics of welding - 6 (Metal Transfer-2)
Lecture 15 - Physics of welding - 7 (Metal Transfer-3)
Lecture 16 - Physics of welding - 8 (Metal Transfer-4)
Lecture 17 - Physics of welding - 9 (Metal Transfer-5)
Lecture 18 - Physics of welding - 10 (Metalting Efficiency)
Lecture 19 - Oxy-Fuel Gas Welding
Lecture 20 - Shielded Metal Arc Welding
Lecture 21 - Gas Tungsten Arc Welding
Lecture 22 - Gas Metal Arc Welding
Lecture 23 - Submerged Arc Welding
Lecture 24 - Welding Defects and Inspection

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NPTEL Video Course - Mechanical Engineering - NOC:Polymer Assisted Abrasive Finishing Processes

Subject Co-ordinator - Prof. Mamilla Ravi Sankar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Polymer Assisted Abrasive Finishing Processes
Lecture 2 - Surface Integrity and Surface roughness representation - Part I
Lecture 3 - Surface Integrity and Surface roughness representation - Part II
Lecture 4 - Introduction to Grinding and Polymer assisted Grinding Wheels
Lecture 5 - Polymer medium for vibratory bowl finishing, Tumbling, Drag finishing
Lecture 6 - Polymer Pad and Chemo-mechanical Polishing
Lecture 7 - Elastic Emission Machining
Lecture 8 - Hydrodynamic Polishing, Elasto Abrasive Finishing
Lecture 9 - Abrasive Flow Machining and Finishing - Part I
Lecture 10 - Abrasive Flow Machining and Finishing - Part II
Lecture 11 - Advances in Abrasive Flow Finishing
Lecture 12 - Advances in Abrasive Flow Finishing
Lecture 13 - AFF Processes
Lecture 14 - Finishing of Biomedical implants (Micro AFF
Lecture 15 - Summary of the Course

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NPTEL Video Course - Mechanical Engineering - NOC:Mathematical Modeling of Manufacturing Processes

Subject Co-ordinator - Prof. Swarup bag

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Materials and manufacturing Processes - 1
Lecture 2 - Materials and manufacturing Processes - 2
Lecture 3 - Physics based modeling approach at different scale
Lecture 4 - Evaluation of properties and process modelling
Lecture 5 - Thermofluid and electromagnetic analysis
Lecture 6 - Solid-state deformation and residual stress - 1
Lecture 7 - Solid-state deformation and residual stress - 2
Lecture 8 - Meltiing, solidification and additive manufacturing
Lecture 9 - Force and velocity diagram - 1
Lecture 10 - Force and velocity diagram - 2
Lecture 11 - Heat transfer analysis
Lecture 12 - Principal and mechanism at different processes - 1
Lecture 13 - Principal and mechanism at different processes - 2
Lecture 14 - Mechanics of bulk metal forming
Lecture 15 - Mechanics of sheet metal forming - 1
Lecture 16 - Mechanics of sheet metal forming - 2
Lecture 17 - Heat transfer and thermomechanical processing
Lecture 18 - Fusion welding processes - 1
Lecture 19 - Fusion welding processes - 2
Lecture 20 - Physics of welding and metal transfer
Lecture 21 - Heat source model in fusion welding
Lecture 22 - Heat transfer and material flow
Lecture 23 - Solidification in welding - 1
Lecture 24 - Solidification in welding - 2
Lecture 25 - Solid state welding - 1
Lecture 26 - Solid state welding - 2
Lecture 27 - Hybrid welding, residual stress and distortion
Lecture 28 - Cooling and solidification at different casting processes
Lecture 29 - Powder metallurgy

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Lecture 30 - Principle of surface and coating technologies
Lecture 31 - Principle and development of additive manufacturing technologies - 1
Lecture 32 - Principle and development of additive manufacturing technologies - 2
Lecture 33 - Fundamentals of heat treatment
Lecture 34 - Evaluation of microstructural properties and residual stress
Lecture 35 - Down-scaling of conventional manufacturing processes and Micro-to-nano manufacturing
Lecture 36 - Packaging, micro-finishing and micro-manufacturing processes
Lecture 37 - Processing and shaping of non-metals and bio-materials
Lecture 38 - Principle of glass and ceramics processing and their shaping

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NPTEL Video Course - Mechanical Engineering - NOC:Two-Phase flow with phase change in Conventional and Miniat

Subject Co-ordinator - Prof. Manmohan Pandey

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Notation
Lecture 2 - Flow Regimes and Flow Regime Maps
Lecture 3 - The Homogeneous Model
Lecture 4 - The Separated Flow Model
Lecture 5 - The Separated Flow Model (Continued...)
Lecture 6 - The Drift Flux Model
Lecture 7 - Estimation of pressure drop in two phase flow
Lecture 8 - Two phase flow and pressure drop in miniature channels

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NPTEL Video Course - Mechanical Engineering - NOC:Applied Thermodynamics for Engineers

Subject Co-ordinator - Prof. Dipankar N. Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of thermodynamic system and state
Lecture 2 - First and second laws of thermodynamics
Lecture 3 - Concept of entropy and entropy generation
Lecture 4 - Concept of exergy and exergy destruction
Lecture 5 - Thermodynamic potentials and Maxwell relations
Lecture 6 - Generalized relations for entropy and specific heats
Lecture 7 - Joule-Thomson coefficient and Clapeyron equation
Lecture 8 - Liquid-vapor phase-change process
Lecture 9 - Use of property tables
Lecture 10 - Equations-of-state and Compressibility factor
Lecture 11 - Ideal cycles for reciprocating engines
Lecture 12 - Otto, Diesel and Dual combustion cycles
Lecture 13 - Stirling and Ericsson cycles
Lecture 14 - Fuel-air cycle
Lecture 15 - Numerical exercise on Fuel-air cycles
Lecture 16 - Losses in actual cycle and valve-timing diagram
Lecture 17 - Ideal Brayton cycle
Lecture 18 - Intercooling and reheating in Brayton cycle
Lecture 19 - Regeneration in Brayton cycle
Lecture 20 - Ideal Rankine cycle
Lecture 21 - Improvements and modifications in Rankine cycle
Lecture 22 - Regenerative Rankine cycle
Lecture 23 - Binary vapor power cycle
Lecture 24 - Combined gas-steam power plant
Lecture 25 - Different arrangments in combined cycles
Lecture 26 - Vapor compression refrigeration cycle
Lecture 27 - SSS cycles and refrigerants
Lecture 28 - Modifications in VCR systems
Lecture 29 - Vapor absorption refrigeration cycle

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Lecture 30 - P-v-T behavior of gas mixtures
Lecture 31 - Numerical examples
Lecture 32 - Properties of moist air
Lecture 33 - Psychrometric chart and various psychrometric processes
Lecture 34 - Sensible heat factor and bypass factor
Lecture 35 - Theoretical and actual combustion process
Lecture 36 - Thermodynamic analyses of reacting systems

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Conduction and Radiation

Subject Co-ordinator - Prof. Dipankar N. Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Relationship of Thermodynamics with Heat transfer
Lecture 2 - Modes of heat transfer
Lecture 3 - Fourier's law and thermal conductivity
Lecture 4 - Generalized heat diffusion equation
Lecture 5 - Heat diffusion equation in curvilinear coordinates
Lecture 6 - Concept of thermal resistance
Lecture 7 - Use of network of resistances in wall and cylinder
Lecture 8 - Critical thickness of insulation
Lecture 9 - Conduction with energy generation - I
Lecture 10 - Conduction with energy generation - II
Lecture 11 - General Heat Transfer Analysis
Lecture 12 - Fins with uniform cross-section area - I
Lecture 13 - Fins with uniform cross-section area - II
Lecture 14 - Fins with non-uniform cross-section area
Lecture 15 - Method of Separation of Variables
Lecture 16 - Graphical approach
Lecture 17 - Method of Superposition
Lecture 18 - Lumped capacitance approach - I
Lecture 19 - Lumped capacitance approach - II
Lecture 20 - Semi-infinite Solid
Lecture 21 - Steady Heat Conduction
Lecture 22 - Unsteady Heat Conduction
Lecture 23 - Problem solving using Energy Balance Method
Lecture 24 - Introduction to radiative heat fluxes
Lecture 25 - Spectral and directional definitions
Lecture 26 - Blackbody radiation
Lecture 27 - Emissivity
Lecture 28 - Irradiation of real surfaces
Lecture 29 - View factor

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Lecture 30 - Blackbody radiation exchange
Lecture 31 - Radiation networks
Lecture 32 - Gas radiation
Lecture 33 - Radiative Transfer Equation

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NPTEL Video Course - Mechanical Engineering - NOC:Steam Power Engineering

Subject Co-ordinator - Dr. Vinayak Kulkarni

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of thermodynamics
Lecture 2 - Rankine cycle
Lecture 3 - Performance estimation of steam power cycles
Lecture 4 - Carnot cycle examples
Lecture 5 - Rankine cycle with superheat
Lecture 6 - Rankine cycle with reheat theory and example
Lecture 7 - Examples of Rankine cycle
Lecture 8 - Examples of reheat Rankine cycle
Lecture 9 - Rankine cycle with regeneration
Lecture 10 - Feedwater heaters
Lecture 11 - Cogeneration of power and process heat
Lecture 12 - Examples of regeneration
Lecture 13 - Examples of regenerative Rankine cycle
Lecture 14 - Binary/multi-fluid cycles
Lecture 15 - Low temperature power cycles
Lecture 16 - Examples of binary cycles
Lecture 17 - Types of boilers
Lecture 18 - Boiler accessories
Lecture 19 - Practice examples
Lecture 20 - Stagnation conditions and Nozzle flow
Lecture 21 - Nozzle flow
Lecture 22 - Examples of Nozzle
Lecture 23 - Impulse Turbine - 1
Lecture 24 - Impulse Turbine - 2
Lecture 25 - Examples on Impulse Turbine
Lecture 26 - Reaction Turbine
Lecture 27 - Reheat Factor
Lecture 28 - Examples on Turbine - 1
Lecture 29 - Examples on Turbine - 2

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Lecture 30 - Gas Mixture
Lecture 31 - Psychrometry - 1
Lecture 32 - Psychrometry - 2
Lecture 33 - Condensers

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NPTEL Video Course - Mechanical Engineering - NOC:Dynamic Behaviour of Materials

Subject Co-ordinator - Prof. Prasenjit Khanikar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Dynamic Behaviour of Materials - I
Lecture 2 - Introduction to Dynamic Behaviour of Materials - II
Lecture 3 - Introduction to Waves
Lecture 4 - Quasi-static vs Dynamic Deformation
Lecture 5 - Elastic Wave and its Classification
Lecture 6 - Propagation of Elastic Waves in Continuum
Lecture 7 - Wave Reflection, Refraction and Interaction
Lecture 8 - General Solution of Elastic Wave Equation
Lecture 9 - Additional Considerations of Elastic Wave in Cylindrical Bar
Lecture 10 - Introduction to Plastic Waves
Lecture 11 - Plastic Waves of Uniaxial Stress
Lecture 12 - Plastic Waves of Combined Stress
Lecture 13 - Taylor's Experiment for Plastic Wave Propagation - 1
Lecture 14 - Taylor's Experiment for Plastic Wave Propagation - 2
Lecture 15 - Taylor's Experiment
Lecture 16 - Introduction to Shock Waves - I
Lecture 17 - Introduction to Shock Waves - II
Lecture 18 - Shock Wave
Lecture 19 - Rankine Hugonoit Treatment and Shock Wave under Impact
Lecture 20 - Shock Wave under Impact
Lecture 21 - Equations of States (Shock Waves)
Lecture 22 - Equations of States (Shock Waves)
Lecture 23 - Complex Problems of Shock Waves and Temperature Rise under Shock Wave
Lecture 24 - Shock Wave Attenuation, Interaction and Reflection - I
Lecture 25 - Shock Wave Attenuation, Interaction and Reflection - II
Lecture 26 - Shock Wave Interaction and Reflection
Lecture 27 - Fundamentals of Materials Science and Engineering
Lecture 28 - Shock Wave Induced Phase Transformations - 1
Lecture 29 - Shock Wave Induced Phase Transformations - 2

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Lecture 30 - Shock Wave Induced Phase Transformations - 3
Lecture 31 - Shock Wave Induced Phase Transformations - 4
Lecture 32 - Experimental Techniques for Dynamic Deformation - 1
Lecture 33 - Experimental Techniques for Dynamic Deformation - 2
Lecture 34 - Plastic Deformation at High Strain Rates - 1
Lecture 35 - Plastic Deformation at High Strain Rates - 2
Lecture 36 - Plastic Deformation at High Strain Rates - 3
Lecture 37 - Plastic Deformation at High Strain Rates - 4
Lecture 38 - Plastic Deformation at High Strain Rates - 5
Lecture 39 - Plastic Deformation Under Shock Waves - 1
Lecture 40 - Plastic Deformation Under Shock Waves - 2
Lecture 41 - Plastic Deformation Under Shock Waves - 3
Lecture 42 - Shear Band - 1
Lecture 43 - Shear Band - 2
Lecture 44 - Dynamic Fracture - 1
Lecture 45 - Dynamic Fracture - 2

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NPTEL Video Course - Mechanical Engineering - NOC:Plastic Working of Metallic Materials

Subject Co-ordinator - Prof. P.S. Robi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Plastic Working of Metals
Lecture 2 - Uniaxial Tension Test Analysis
Lecture 3 - Temperature effects in metal forming
Lecture 4 - Friction and Lubrication
Lecture 5 - Friction and Lubrication (Continued...)
Lecture 6 - Deformation zone + worked examples
Lecture 7 - Stresses at point and Theory of Plasticity
Lecture 8 - Slab Analysis
Lecture 9 - Slip Line Field Theory - Part 1
Lecture 10 - Slip Line Field Theory - Part 2
Lecture 11 - Upper Bound Theorem
Lecture 12 - Plasticity equations
Lecture 13 - Forging
Lecture 14 - Analysis of Forging
Lecture 15 - Analysis of Forging (Continued...)
Lecture 16 - Forging Die Design consideration
Lecture 17 - Forging Load
Lecture 18 - Rolling of Metals
Lecture 19 - Analysis of Rolling
Lecture 20 - Analysis of Rolling (Continued...)
Lecture 21 - Strain rate in the deformation zone
Lecture 22 - Rolling mills
Lecture 23 - Prblem on rolling
Lecture 24 - Drawing of Rods, Wires and Tubes
Lecture 25 - Drawing of Rods, Wires and Tubes (Continued...)
Lecture 26 - Analysis of Wire Drawing
Lecture 27 - Wire Drawing
Lecture 28 - Extrusion Process
Lecture 29 - Analysis of Extrusion

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Lecture 30 - Introduction
Lecture 31 - Sheet deformation process
Lecture 32 - Deformation of sheet in plane stress
Lecture 33 - Analysis of stamping
Lecture 34 - Instability in sheet metal forming
Lecture 35 - Deep drawing
Lecture 36 - Hydroforming

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Artificial Intelligence

Subject Co-ordinator - Prof. Shyamanta M. Hazarika

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Artificial Intelligence
Lecture 2 - Problem Solving as State Space Search
Lecture 3 - Uninformed Search
Lecture 4 - Heuristic Search
Lecture 5 - Informed Search
Lecture 6 - Constraint Satisfaction Problems
Lecture 7 - Searching AND/OR Graphs
Lecture 8 - Game Playing
Lecture 9 - Minimax + Alpha-Beta
Lecture 10 - Introduction to Knowledge Representation
Lecture 11 - Propositional Logic
Lecture 12 - First Order Logic - I
Lecture 13 - First Order Logic - II
Lecture 14 - Inference in First Order Logic - I
Lecture 15 - Inference in First Order Logic - II
Lecture 16 - Answer Extraction
Lecture 17 - Procedural Control of Reasoning
Lecture 18 - Reasoning under Uncertainty
Lecture 19 - Bayesian Network
Lecture 20 - Decision Network
Lecture 21 - Introduction to Planning
Lecture 22 - Plan Space Planning
Lecture 23 - Planning Graph and GraphPlan
Lecture 24 - Practical Planning and Acting
Lecture 25 - Sequential Decision Problems
Lecture 26 - Making Complex Decisions
Lecture 27 - Introduction to Machine Learning
Lecture 28 - Learning Decision Trees
Lecture 29 - Linear Regression

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Lecture 30 - Support Vector Machines
Lecture 31 - Unsupervised Learning
Lecture 32 - Reinforcement Learning
Lecture 33 - Learning in Neural Networks
Lecture 34 - Deep Learning

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NPTEL Video Course - Mechanical Engineering - NOC:Aircraft Propulsion

Subject Co-ordinator - Dr. Vinayak Kulkarni

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Basic Thermodynamics
Lecture 2 - Solved Examples for Flow process
Lecture 3 - Turbomachines
Lecture 4 - Components of Gas Turbine Power Plant, Gas Turbine Attachments
Lecture 5 - Introduction to Various Aircraft engines, Engine Performance parameters
Lecture 6 - Air Standard Ideal Brayton Cycle
Lecture 7 - Examples for Ideal Brayton Cycle
Lecture 8 - Non-Ideal Brayton Cycle
Lecture 9 - Examples for Non-Ideal Brayton Cycle
Lecture 10 - Brayton Cycle with Heat Exchanger / Re-heater
Lecture 11 - Brayton Cycle with Intercooler / All Attachments
Lecture 12 - Examples of Gas Turbine Attachment
Lecture 13 - Examples of Gas Turbine Attachment
Lecture 14 - Stagnation Conditions, Real Brayton Cycle with Stagnation Conditions
Lecture 15 - Polytropic Efficiency of Compressor and Turbine
Lecture 16 - Examples of Real Cycle
Lecture 17 - Nozzle Flow
Lecture 18 - Aircraft Engine Intake, Intake Efficiency
Lecture 19 - Propelling Nozzle, Nozzle Efficiency
Lecture 20 - Turbojet engine
Lecture 21 - Turbofan engine
Lecture 22 - Ramjet engine
Lecture 23 - Examples of Ramjet Engine
Lecture 24 - Thrust Augmentation and Engine performance parameters for Aircrafts
Lecture 25 - Introduction to Turbomachinary
Lecture 26 - Centrifugal Compressor
Lecture 27 - Centrifugal Compressor
Lecture 28 - Examples of Centrifugal compressor
Lecture 29 - Axial Flow Compressor

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Lecture 30 - Axial Flow Compressor
Lecture 31 - Examples of Axial Flow Compressor
Lecture 32 - Examples of Axial Flow Compressor
Lecture 33 - Examples of Axial Flow Compressor
Lecture 34 - Axial Turbine
Lecture 35 - Radial Turbine
Lecture 36 - Examples of Axial Turbine
Lecture 37 - Practice examples of Axial Turbine and cetrifugal compressor
Lecture 38 - Cascade theory and Blade design
Lecture 39 - Cascade variables and Turbine Cascade
Lecture 40 - Velocity diagrams of Turbine Cascade, Compressor cascade
Lecture 41 - Turbine cooling methods
Lecture 42 - Practice examples of aircraft engine

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NPTEL Video Course - Mechanical Engineering - NOC:Computational Fluid Dynamics for Incompressible Flows

Subject Co-ordinator - Prof. Amaresh Dalal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Applications of CFD
Lecture 2 - Basic equations of fluid dynamics and heat transfer
Lecture 3 - Initial and boundary conditions
Lecture 4 - Physical Classification, System of first-order PDEs
Lecture 5 - System of second-order PDEs
Lecture 6 - Finite difference by Taylor series expansion
Lecture 7 - Finite difference by general approximation and polynomials
Lecture 8 - Finite difference in non-uniform grid
Lecture 9 - Types of error and accuracy of FD solutions
Lecture 10 - Finite difference formulations of Elliptic Equations with boundary condition treatment
Lecture 11 - Iterative Methods
Lecture 12 - Applications
Lecture 13 - Linear Solvers
Lecture 14 - Finite difference formulations of Parabolic Equations
Lecture 15 - Finite difference formulations of Parabolic Equations
Lecture 16 - Finite difference formulations of Parabolic Equations
Lecture 17 - Finite difference formulations of Parabolic Equations
Lecture 18 - Finite difference formulations of the first order wave equation
Lecture 19 - Finite difference formulations of the first order wave equation
Lecture 20 - Von Neumann stability analysis of different schemes for Parabolic equations
Lecture 21 - Von Neumann stability analysis of different schemes for Parabolic equations
Lecture 22 - Von Neumann stability analysis of different schemes for Hyperbolic equations
Lecture 23 - Modified equation, Artificial viscosity, Numerical diffusion
Lecture 24 - Discretization vorticity-stream function equations using FDM
Lecture 25 - Boundary conditions for flow problems
Lecture 26 - Solutions of vorticity-stream function equations
Lecture 27 - Solution of Navier-Stokes Equation using FDM
Lecture 28 - Solution of Navier-Stokes Equation using FDM (Continued...)
Lecture 29 - Introduction to finite volume method

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Lecture 30 - Finite volume discretization of steady diffusion equation
Lecture 31 - Finite volume discretization of unsteady diffusion equation
Lecture 32 - Finite volume discretization of steady convection-diffusion equation
Lecture 33 - Finite volume discretization of unsteady convection-diffusion equation
Lecture 34 - Convection Schemes
Lecture 35 - Solution of Navier-Stokes Equations using FVM - I
Lecture 36 - Solution of Navier-Stokes Equations using FVM - II
Lecture 37 - Boundary Conditions

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NPTEL Video Course - Mechanical Engineering - NOC:Experimental Methods in Fluid Mechanics

Subject Co-ordinator - Prof. Pranab K. Mondal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts, Calibration
Lecture 2 - Dimensions, Units, Standards, Systems of dimensions, System of units, Unit conversion table
Lecture 3 - Basic concept of dynamic measurements
Lecture 4 - Basic concept of dynamic measurements (Continued...)
Lecture 5 - Basic concept of dynamic measurements (Continued...)
Lecture 6 - System response and distortion, Impedence matching
Lecture 7 - Dimensional measurement Gauge blocks, The pneumatic displacement gauge
Lecture 8 - Dimensional measurement Gauge blocks, The pneumatic displacement gauge
Lecture 9 - Pressure Measurements
Lecture 10 - Mechanical pressure measurement devices, U-tube manometer, The inclined well type manometer
Lecture 11 - The aneroid barometer, Diaphragm and Bellows Gauges
Lecture 12 - The Mcleod gauge, The Pirani gauge, The Ionization gauge
Lecture 13 - The Mcleod gauge, The Pirani gauge, The Ionization gauge (Continued...)
Lecture 14 - The Mcleod gauge, The Pirani gauge, The Ionization gauge (Continued...)
Lecture 15 - Pressure measurement using 3 holes/probes
Lecture 16 - Pressure measurement using 3 holes/probes (Continued...)
Lecture 17 - Flow obstruction flow rate measuerement(venturimeter/orificemeter), the Rotameter
Lecture 18 - Flow obstruction flow rate measuerement(venturimeter/orificemeter), the Rotameter (Continued...)
Lecture 19 - Thermal Anemometry(hot wire/hot film), Hot wire anemometer
Lecture 20 - Thermal Anemometry(hot wire/hot film), Hot wire anemometer (Continued...)
Lecture 21 - Laser Doppler anemometry
Lecture 22 - Measurement of velocity components by 3 holes and 4 holes probes
Lecture 23 - Ideal gas thermometer, Temperature measurement by mechanical and electrical effects
Lecture 24 - Ideal gas thermometer, Temperature measurement by mechanical and electrical effects (Continued..
Lecture 25 - Thermostatic temperature, Resistance Temperature Detectors (RTD), Thermistors, Thermocouples
Lecture 26 - Temperature measurement by Radiation, The optical pyrometer
Lecture 27 - Transient response of thermal system, Thermocouple compensation, high speed flow
Lecture 28 - Transient response of thermal system, Thermocouple compensation, high speed flow (Continued...)
Lecture 29 - Transient response of thermal system, Thermocouple compensation, high speed flow (Continued...)

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Lecture 30 - Constant temperature hot-wire anemometer, LDA
Lecture 31 - Use of PIV
Lecture 32 - Use of PIV (Continued...)
Lecture 33 - Use of PIV (Continued...)
Lecture 34 - Measurement of pitch angle
Lecture 35 - Measurement of torque by dynamometers, straingauge, transducers
Lecture 36 - Measurement of microscale flow features - I
Lecture 37 - Measurement of microscale flow features - II
Lecture 38 - Transient and Frequency response consideration
Lecture 39 - Examples
Lecture 40 - Analysis of experimental data, causes and types of experimental errors
Lecture 41 - Rejection of data
Lecture 42 - Error propagation
Lecture 43 - The Method of Least square with example

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NPTEL Video Course - Mechanical Engineering - NOC:Automation in Manufacturing

Subject Co-ordinator - Dr. Shrikrishna N. Joshi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts
Lecture 2 - Mechatronics
Lecture 3 - Mechatronics based systems
Lecture 4 - Automated systems and equipment used in manufacturing - Part I
Lecture 5 - Automated systems and equipment used in manufacturing - Part II
Lecture 6 - Selection of electrical and electronics components for mechatronics based systems
Lecture 7 - Terms related to performance of electro-mechanical systems
Lecture 8 - Computer aided design of components
Lecture 9 - Fabrication Processes
Lecture 10 - Measurement system and potentiometer sensors
Lecture 11 - Displacement, position and proximity sensors - I
Lecture 12 - Displacement, position and proximity sensors - II
Lecture 13 - Fluid flow, pressure, and temperature measurement
Lecture 14 - Signal Conditioning
Lecture 15 - Pulse modulation, Protection devices, and Wheatstone bridge
Lecture 16 - Signal conversion
Lecture 17 - Microprocessor Technology
Lecture 18 - Introduction to Microprocessor Programming
Lecture 19 - Application of electric drives in automation
Lecture 20 - DC and AC motors
Lecture 21 - Stepper motor and servo motor
Lecture 22 - Types of industrial automation and mechanisms
Lecture 23 - Ball screw based linear motion drives
Lecture 24 - Application of cams in automation
Lecture 25 - Application of indexing mechanisms in automation
Lecture 26 - Application of tool magazines in automation
Lecture 27 - Material handling systems
Lecture 28 - Fundamental concepts
Lecture 29 - Hydraulic pumps

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Lecture 30 - Direction control valves
Lecture 31 - Flow control and pressure relief valves
Lecture 32 - Graphical representation of hydraulic system elements
Lecture 33 - Basic concepts and air compressors
Lecture 34 - Air treatment and pressure regulation
Lecture 35 - Graphical representation and pneumatic circuits
Lecture 36 - Computer aided manufacturing and process planning
Lecture 37 - CNC machines and interpolation
Lecture 38 - CNC Programming

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Compressible Flow

Subject Co-ordinator - Prof. Niranjan Sahoo

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review Concepts of Fluid Mechanics and Thermodynamics - I
Lecture 2 - Review Concepts of Fluid Mechanics and Thermodynamics - II
Lecture 3 - Review Concepts of Fluid Mechanics and Thermodynamics - III
Lecture 4 - Wave Propagation in Compressible Medium - I
Lecture 5 - Wave Propagation in Compressible Medium - II
Lecture 6 - Wave Propagation in Compressible Medium - III
Lecture 7 - Quasi-One Dimensional Isentropic Flow - I
Lecture 8 - Quasi-One Dimensional Isentropic Flow - II
Lecture 9 - Quasi-One Dimensional Isentropic Flow - III
Lecture 10 - Normal Shock Waves - I
Lecture 11 - Normal Shock Waves - II
Lecture 12 - Normal Shock Waves - III
Lecture 13 - Normal Shock Waves - IV
Lecture 14 - Expansion Waves and Oblique Shocks - I
Lecture 15 - Expansion Waves and Oblique Shocks - II
Lecture 16 - Expansion Waves and Oblique Shocks - III
Lecture 17 - Expansion Waves and Oblique Shocks - IV
Lecture 18 - Expansion Waves and Oblique Shocks - V
Lecture 19 - Expansion Waves and Oblique Shocks - VI
Lecture 20 - Supersonic Nozzles and Diffusers - I
Lecture 21 - Supersonic Nozzles and Diffusers - II
Lecture 22 - Supersonic Nozzles and Diffusers - III
Lecture 23 - Measurement Diagnostics and Experimental Facilitates for Compressible Flow - II
Lecture 24 - Compressible Flow with Friction and Heat Transfer - II
Lecture 25 - Compressible Flow with Friction and Heat Transfer - III
Lecture 26 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - I
Lecture 27 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - II
Lecture 28 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - III
Lecture 29 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - IV

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Lecture 30 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - V
Lecture 31 - Measurement Diagnostics and Experimental Facilities for Compressible Flow - VI

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NPTEL Video Course - Mechanical Engineering - NOC:Finite Element Method: Variational Methods to Computer Prog

Subject Co-ordinator - Prof. Arup Nandy, Prof. Atanu Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functional, First variation, Euler Lagrange equation; Several Dependent variables
Lecture 2 - Functional with higher order derivatives; Variational statement
Lecture 3 - Differential equation, Variational statement and Minimization problem; Rayleigh-Ritz method
Lecture 4 - FEM steps
Lecture 5 - Solving one Ordinary Differential Equation using Linear Finite Element
Lecture 6 - Solving one Ordinary Differential Equation using Quadratic Finite Element
Lecture 7 - Bar Element
Lecture 8 - Bar Element
Lecture 9 - Truss Element
Lecture 10 - Beam Element
Lecture 11 - Beam Element
Lecture 12 - Beam Element
Lecture 13 - Frame Element
Lecture 14 - Frame Element
Lecture 15 - Generalization of Geometry data; Stiffness matrix, Load vector formation at element level
Lecture 16 - Generalization of Assembly, Imposition of Boundary condition and Load information
Lecture 17 - Indicial Notation
Lecture 18 - Second order tensor; Gradient, Divergence, Curl and Laplacian in Indicial notation
Lecture 19 - Gauss Divergence theorem and its application in Heat transfer and Structural analysis
Lecture 20 - Derivation of weak form of 2D steady-state heat conduction problem
Lecture 21 - Triangular element, calculating element stiffness and element force vector
Lecture 22 - Numerical example, assembly, mapping
Lecture 23 - Numerical integration, Neumann boundary, and higher order shape functions
Lecture 24 - Quadrilateral element, Lagrange shape functions, Serendipity elements
Lecture 25 - Development of a MATLAB code for solving 2D steady-state heat conduction problem
Lecture 26 - Demonstration of the MATLAB code
Lecture 27 - Elasticity problems in two dimension and obtaining the weak form
Lecture 28 - Deriving element stiffness matrix and element force vector, numerical example
Lecture 29 - Development of a MATLAB code for solving planar elasticity problems

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Lecture 30 - Superconvergent Patch Recovery, error estimator, adaptive refinement
Lecture 31 - Solving eigenvalue problem in bar and beam, writing FEM code in MATLAB
Lecture 32 - Solving eigenvalue problem of membrane, writing FEM code in MATLAB
Lecture 33 - Solving transient problems (parabolic type)
Lecture 34 - Solving transient problems (hyperbolic type)
Lecture 35 - Solving elasticity problems in 3D using FEM, Solvers

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NPTEL Video Course - Mechanical Engineering - NOC:Computational Continuum Mechanics

Subject Co-ordinator - Prof. Sachin Singh Gautam

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Origin of nonlinearities - 1
Lecture 2 - Origin of nonlinearities - 2
Lecture 3 - Tensor and Tensor Algebra - 1
Lecture 4 - Tensor and Tensor Algebra - 2
Lecture 5 - Tensor and Tensor Algebra - 3
Lecture 6 - Tensor and Tensor Algebra - 4
Lecture 7 - Linearization and directional derivative, Tensor analysis - 1
Lecture 8 - Linearization and directional derivative, Tensor analysis - 2
Lecture 9 - Worked Examples - 1
Lecture 10 - Worked Examples - 2
Lecture 11 - Idea of Motion, Material and Spatial Descriptions, Deformation Gradient Tensor
Lecture 12 - Strain, Polar Decomposition - 1
Lecture 13 - Polar Decomposition - 2, Volume and Area Change
Lecture 14 - Worked Examples, Linearized Kinematics
Lecture 15 - Velocity, Acceleration, Material Time Derivative
Lecture 16 - Velocity Gradient, Rate of Deformation tensor, Area and Volume Rate, Reynolds Transport Theorem
Lecture 17 - Solved Examples
Lecture 18 - Conservation of Mass, Balance of Linear Momentum, Cauchy's Stress Principle - 1
Lecture 19 - Cauchy's Stress Principle - 2, Cauchy Stress Tensor
Lecture 20 - Objectivity, Stress Objectivity, Equilibrium Equations - 1
Lecture 21 - Equilibrium Equations - 2, Principle of Virtual Work
Lecture 22 - Work Conjugacy, First Piola-Kirchhoff Stress Tensor
Lecture 23 - Second Piola-Kirchhoff Stress Tensor, Decomposition of Stress - 1
Lecture 24 - Decomposition of Stress - 2, Objective Stress Measures
Lecture 25 - Solved Examples
Lecture 26 - Constitutive relations and constraints, Hyperelasticity, Material elasticity tensor
Lecture 27 - Spatial Elasticity Tensor, Solved Example
Lecture 28 - Isotropic hyperelasticity - material and spatial description, Hyperelastic models
Lecture 29 - Isotropic Hyperelasticity, Neo-Hookean Material Model, Solved Examples

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Lecture 30 - Introduction, Linearization Process Overview
Lecture 31 - Linearization of Internal Virtual Work and External Virtual Work
Lecture 32 - Discretization of Kinematic Quantities, Equilibrium Equations
Lecture 33 - Discretization of Linearized Equilibrium Equations
Lecture 34 - Newton Raphson Method
Lecture 35 - Line Search Method
Lecture 36 - Arc Length Method, Solved Examples
Lecture 37 - FE Formulation of Ductile Fracture in Dynamic Elasto-Plastic Contact Problem - Introduction
Lecture 38 - FE Formulation of Ductile Fracture in Dynamic Elasto-Plastic Contact Problem - Formulation
Lecture 39 - FE Formulation of Ductile Fracture in Dynamic Elasto-Plastic Contact Problem - FEM
Lecture 40 - FE Formulation of Ductile Fracture in Dynamic Elasto-Plastic Contact Problem - Results

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Convective Heat Transfer

Subject Co-ordinator - Prof. Amaresh Dalal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Application of convective heat transfer
Lecture 2 - Foundations of heat transfer
Lecture 3 - Derivation of energy equation
Lecture 4 - Derivation of boundary layer equation
Lecture 5 - Derivation of boundary layer energy equation
Lecture 6 - Blasius solution
Lecture 7 - Pohlhausen solution
Lecture 8 - Pohlhausen solution
Lecture 9 - Falkner-Skan equation
Lecture 10 - Momentum integral equation for flat plate boundary layer
Lecture 11 - Laminar BL flow over flat plate
Lecture 12 - Laminar BL flow over flat plate
Lecture 13 - Solution of example problems
Lecture 14 - Hydrodynamic and thermal regions
Lecture 15 - Energy balance in channel flow
Lecture 16 - Determination of heat transfer coefficient
Lecture 17 - Velocity profile in fully-developed channel flows
Lecture 18 - Thermally fully developed laminar slug flow with uniform wall heat flux condition
Lecture 19 - Hydrodynamically and thermally fully developed flow with uniform wall heat flux condition
Lecture 20 - Fully developed flow through parallel plate channel with uniform wall temperature
Lecture 21 - Fully developed flow through circular pipe with uniform wall temperature
Lecture 22 - Thermally developing flow through circular pipe with uniform wall heat flux
Lecture 23 - Thermally developing flow through circular pipe with uniform wall temperature
Lecture 24 - Heat transfer in plane Couette flow
Lecture 25 - Solutions of example problems
Lecture 26 - Introduction and scale analysis
Lecture 27 - Natural convection over a vertical plate
Lecture 28 - Natural convection over a vertical plate
Lecture 29 - Natural convection over a vertical plate

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Lecture 30 - Natural convection over inclined plate and mixed convection
Lecture 31 - Natural convection inside enclosures
Lecture 32 - Solution of example problems
Lecture 33 - Basics of finite difference method
Lecture 34 - Solution of Navier-Stokes equations
Lecture 35 - Solution of energy equation
Lecture 36 - Derivation of Reynolds Averaged Navier-Stokes Equations
Lecture 37 - External Turbulent Flow
Lecture 38 - Integral solution for turbulent boundary layer flow over a flat plate
Lecture 39 - Convection in turbulent pipe flow
Lecture 40 - Boiling regimes and boiling curve
Lecture 41 - Laminar film condensation on a vertical plate
Lecture 42 - Laminar film condensation on horizontal tube
Lecture 43 - Solution of example problems

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NPTEL Video Course - Mechanical Engineering - NOC:Theory of Composite Shells

Subject Co-ordinator - Prof. Poonam Kumari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to composite materials
Lecture 2 - Basic terminology in Shell
Lecture 3 - Derivation of fundamental theorem of surfaces
Lecture 4 - Derivative of unit vectors and various theorems
Lecture 5 - Classification of shells
Lecture 6 - Derivation of strain-displacement relation
Lecture 7 - Derivation of shell governing equations - 1
Lecture 8 - Derivation of shell governing equations - 2
Lecture 9 - Derivation of shell governing equations - 3
Lecture 10 - Derivation of special cases
Lecture 11 - Derivation of shell constitutive relations
Lecture 12 - Solved examples on membrane theory and moment shell theory
Lecture 13 - Shell of revolution problems
Lecture 14 - Derivation of Navier solution for infinite shell panel
Lecture 15 - Basics of MATLAB coding
Lecture 16 - Derivation of Navier solution for finite shell panel
Lecture 17 - ABAQUS Modelling
Lecture 18 - Extended Kanatrovich method for shell panel
Lecture 19 - Free Vibration solution of shell panels under Navier and Levy supports - 1
Lecture 20 - Free Vibration solution of shell panels under Navier and Levy supports - 2
Lecture 21 - Basics of Buckling of shells
Lecture 22 - Buckling of cylindrical shells
Lecture 23 - Buckling of Levy-type cylindrical shells
Lecture 24 - 3D Bending
Lecture 25 - 3D Free vibration
Lecture 26 - 3D Buckling
Lecture 27 - Advanced Material
Lecture 28 - Free vibration of a composite cylindrical shell

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NPTEL Video Course - Mechanical Engineering - NOC:Finite Element Modeling of Welding Processes

Subject Co-ordinator - Prof. Swarup bag

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Properties, Modelling approaches, Process modelling and Optimization
Lecture 2 - Fusion welding - 1
Lecture 3 - Fusion welding - 2
Lecture 4 - Soldering, Brazing, Solid-state welding processes
Lecture 5 - Advanced welding processes
Lecture 6 - Advances in laser microwelding
Lecture 7 - Additive manufacturing processes
Lecture 8 - Elastic stress analysis - I
Lecture 9 - Elastic stress analysis - II and Potential energy method
Lecture 10 - Three-Dimensional element
Lecture 11 - Weighted residual method
Lecture 12 - Material nonlineaity - I
Lecture 13 - Material nonlineaity - II
Lecture 14 - Fluid flow and Natural coordinate system - I
Lecture 15 - Natural coordinate system in 3D and XFEM
Lecture 16 - Introduction to heat source model
Lecture 17 - Heat source models in welding - I
Lecture 18 - Heat source models in welding - II
Lecture 19 - Heat source model for Keyhole mode and solid state welding
Lecture 20 - Implementation of FEM in fusion welding processes
Lecture 21 - Implementation of FEM for fluid flow in fusion welding processes
Lecture 22 - FEM modeling of EBW and RSW
Lecture 23 - FEM modeling of FSW and hybrid FSW
Lecture 24 - Demonstration of thermal model development using commercial software
Lecture 25 - Fluid flow modeling in welding processes
Lecture 26 - Heat transfer and fluid flow analysis in quasi-steady state
Lecture 27 - Prediction of free surface profile
Lecture 28 - Principle stress, Hydrostatic and Deviatoric Components of Stress
Lecture 29 - Yield Function, Von Mises Yield Surface and Hardening rule

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Lecture 30 - Material models, Residual stress and distortion
Lecture 31 - Phase transformation effect on Residual stress and distortion
Lecture 32 - Demonstration of thermo-mechanical model development using commercial software
Lecture 33 - Fundamentals of metal transfer in arc welding
Lecture 34 - FE-based modelling approaches
Lecture 35 - Theoretical development of heat transfer model
Lecture 36 - Heating of nano-film
Lecture 37 - Theoretical development of stress analysis model
Lecture 38 - Fundamentals of wire arc additive manufacturing processes - I
Lecture 39 - Fundamentals of wire arc additive manufacturing processes - II
Lecture 40 - Modelling approaches of additive manufacturing

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NPTEL Video Course - Mechanical Engineering - NOC:Nonlinear Vibration

Subject Co-ordinator - Prof. S. K. Dwivedy

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to mechanical systems
Lecture 2 - Superposition rule, Commonly used nonlinear equations
Lecture 3 - Equilibrium points: potential function
Lecture 4 - Force and moment based Approach, Lagrange Principle
Lecture 5 - Extended Hamiltonâ s principle
Lecture 6 - Use of scaling and book-keeping parameter for ordering
Lecture 7 - Numerical solution, Analytical solutions: Harmonic Balance method
Lecture 8 - Straight forward expansion
Lecture 9 - Lindstd-Poincareâ method
Lecture 10 - Method of Averaging
Lecture 11 - Method of multiple scales
Lecture 12 - Method of generalized Harmonic Balance method
Lecture 13 - Free vibration of undamped and damped SDOF systems with quadratic and cubic nonlinearity
Lecture 14 - Super and sub harmonic resonance conditions
Lecture 15 - Bifurcation analysis of fixed-point response
Lecture 16 - Nonlinear system with hard excitations
Lecture 17 - Super and sub harmonic resonance conditions
Lecture 18 - Bifurcation analysis of fixed-point response
Lecture 19 - Floquet theory, Hill's infinite determinant, Resonance in parametrically excited systems
Lecture 20 - Parametrically excited pneumatic artificial muscle
Lecture 21 - Parametric instability of sandwich plate
Lecture 22 - Analysis of periodic, quasi-periodic and chaotic systems
Lecture 23 - Stability and bifurcation analysis of periodic and quasi-periodic response
Lecture 24 - Analysis of chaotic system
Lecture 25 - Numerical methods for finding roots and solutions of ODE
Lecture 26 - Time response, phase portraits, frequency response
Lecture 27 - Poincare section, FFT, Lyapunov exponent
Lecture 28 - Pasive and active vibration absorber with displacement and acceleration feedback
Lecture 29 - Active vibration absorber with time delay acceleration feedback by HBM

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Lecture 30 - Application of Active vibration absorber with combination feedback
Lecture 31 - Cantilever beam with tip mass for principal parametric resonance
Lecture 32 - Cantilever beam with tip mass for combination resonance
Lecture 33 - Cantilever beam based piezoelectric based energy harvestor
Lecture 34 - Nonlinear dynamics of turning operation with delay and internal resonance
Lecture 35 - Chatter in rolling mills and dynamic analysis of artificial pneumatic muscle
Lecture 36 - Chaotic systems and control of chaos

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NPTEL Video Course - Mechanical Engineering - NOC:Evolutionary Computation for Single and Multi Objective Opt

Subject Co-ordinator - Prof. Deepak Sharma

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization
Lecture 2 - Introduction to Evolutionary Computation
Lecture 3 - Binary-Coded Genetic Algorithm (BGA)
Lecture 4 - Operators and Simulations of Binary-Coded Genetic Algorithm
Lecture 5 - Real-Coded Genetic Algorithm (RGA)
Lecture 6 - Operators and Simulations of Real-Coded Genetic Algorithm
Lecture 7 - Algorithmic Implementation of BGA and RGA
Lecture 8 - Particle Swarm Optimization (PSO)
Lecture 9 - Simulations and Algorithmic Implementation of Particle Swarm Optimization
Lecture 10 - Differential Evolution (DE)
Lecture 11 - Simulations and Algorithmic Implementation of Differential Evolution
Lecture 12 - Constrained Optimization: Introduction and Optimality
Lecture 13 - Penalty Function Methods for Evolutionary Computing Techniques
Lecture 14 - Evolutionary Computing Techniques: Separation of Objective Function and Constraints
Lecture 15 - Simulations of Constraint Handling Techniques - Part 1
Lecture 16 - Simulations of Constraint Handling Techniques - Part 2
Lecture 17 - Introduction to Multi-Objective Optimization - Part 1
Lecture 18 - Introduction to Multi-Objective Optimization - Part 2
Lecture 19 - Multi-Objective Optimization: Ranking and Diversity
Lecture 20 - Classical Multi-Objective Optimization Methods
Lecture 21 - Non-Dominated Genetic Algorithm: NSGA-II: Introduction
Lecture 22 - Non-Dominated Genetic Algorithm: NSGA-II: Simulations
Lecture 23 - Strength Pareto Evolutionary Algorithm: SPEA2: Introduction
Lecture 24 - Strength Pareto Evolutionary Algorithm: SPEA2: Simulations
Lecture 25 - Performance Assessment of Multi-Objective EC Techniques
Lecture 26 - Closure of EC for Single and Multi-Objective Optimization

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NPTEL Video Course - Mechanical Engineering - NOC:Viscous Fluid Flow

Subject Co-ordinator - Prof. Amaresh Dalal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preliminary concepts
Lecture 2 - Fluid Kinematics
Lecture 3 - Derivation of incompressible Navier-Stokes equations
Lecture 4 - Initial and Boundary Conditions
Lecture 5 - Plane Couette Flow
Lecture 6 - Plane Poiseuille Flow
Lecture 7 - Plane Poiseuille Flow with Slip and Thin Film Flow
Lecture 8 - Combined Couette - Poiseuille Flow
Lecture 9 - Example Problems
Lecture 10 - Hagen - Poiseuille Flow
Lecture 11 - Thin Film Flow and Annular Flow
Lecture 12 - Steady Flow Between Rotating Cylinders
Lecture 13 - Flow near a plate suddenly set in motion
Lecture 14 - Flow due to an oscillating plate
Lecture 15 - Transient Plane Couette Flow
Lecture 16 - Transient Axisymmetric Poiseuille Flow
Lecture 17 - Flow Through Rectangular Duct
Lecture 18 - Flow Through Equilateral Triangular Duct
Lecture 19 - Flow Through Elliptical Duct
Lecture 20 - Example Problems
Lecture 21 - Creeping Flow Around a Sphere
Lecture 22 - Reynolds Equation for Lubrication
Lecture 23 - One-dimensional Slider Bearing
Lecture 24 - Journal Bearing and Piston-ring Lubrication
Lecture 25 - Derivation of Boundary Layer Equations
Lecture 26 - Blasius Flow Over A Flat Plate: Similarity Solution
Lecture 27 - Momentum Integral Equation For Flat Plate Boundary Layer
Lecture 28 - Falkner-Skan equation: Boundary layer flow over a wedge
Lecture 29 - Karman-Pohlhausen Method for Non-zero Pressure Gradient Flows

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Lecture 30 - The Correlation Method by Thwaites
Lecture 31 - Separation of Boundary Layer
Lecture 32 - Example Problems
Lecture 33 - Two-dimensional Laminar Jet
Lecture 34 - Flow in the Wake of a Flat Plate
Lecture 35 - Free Shear Layer Between Two Different Streams
Lecture 36 - Derivation of Orr-Sommerfeld Equation
Lecture 37 - Viscous Stability
Lecture 38 - Inviscid Analysis
Lecture 39 - Introduction to Turbulent Flows
Lecture 40 - Derivation of Reynolds Averaged Navier-Stokes Equations
Lecture 41 - External Turbulent Flows
Lecture 42 - Integral Solution for Turbulent Boundary Layer Flow
Lecture 43 - Internal Turbulent Flow
Lecture 44 - Turbulence Modelling

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NPTEL Video Course - Mechanical Engineering - NOC:Welding Application Technology

Subject Co-ordinator - Prof. Pankaj Biswas

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Plasma Arc Welding (PAW)
Lecture 2 - Flux Cored Arc Welding (FCAW)
Lecture 3 - Thermit Welding
Lecture 4 - Resistance Welding - Part 1 (Resistance Spot Welding)
Lecture 5 - Resistance Welding - Part 2 (Types of Resistance Welding)
Lecture 6 - Friction Welding
Lecture 7 - Friction Stir Welding - Part 1
Lecture 8 - Friction Stir Welding - Part 2
Lecture 9 - Soldering
Lecture 10 - Brazing
Lecture 11 - Residual Stress - Part 1
Lecture 12 - Residual Stress - Part 2
Lecture 13 - Influencing Factors and Control of Residual Stresses
Lecture 14 - Residual Stress Measurement - 1
Lecture 15 - Residual Stress Measurement - 2
Lecture 16 - Residual Stress Measurement by NDT
Lecture 17 - Welding Induced Distortion
Lecture 18 - Welding Induced Distortion (Control and Measurement)
Lecture 19 - Welding Induced Distortion (Measurement and Prediction)
Lecture 20 - Welded Joint Analysis
Lecture 21 - Welded Joints Analysis (Strength of Parallel and Transverse Fillet Welds)
Lecture 22 - Welded Joints Analysis (Analysis of Eccentrically Loaded Welded Joint)
Lecture 23 - Welded Joints Static Analysis (Analysis of Eccentrically Loaded Welded Joint - Part 1)
Lecture 24 - Welded Joints Static Analysis (Analysis of Eccentrically Loaded Welded Joint - Part 2)
Lecture 25 - Welded Joints Static Analysis (Welded Joint Subjected to Bending Moment)
Lecture 26 - Welded Joints Static Analysis (Welded Joint Subjected to Bending Moment - Part 1)
Lecture 27 - Welded Joints Static Analysis (Welded Joint Subjected to Bending Moment - Part 2)

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Additive Manufacturing Technologies

Subject Co-ordinator - Prof. Sajan Kapil

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Additive Manufacturing
Lecture 2 - CAD Models for Additive Manufacturing
Lecture 3 - Manipulation of STL Files
Lecture 4 - Slicing Methods - Part A
Lecture 5 - Slicing Methods - Part B
Lecture 6 - Toolpath Planning
Lecture 7 - Demonstration of CAD-CAM Packages
Lecture 8 - Introduction to Liquid AM
Lecture 9 - Stereolithography Apparatus: Fundamentals of Photopolymerization - Part 1
Lecture 10 - Stereolithography Apparatus: Fundamentals of Photopolymerization - Part 2
Lecture 11 - Stereolithography Apparatus: Sub-systems - Part 1
Lecture 12 - Stereolithography Apparatus: Sub-systems - Part 2
Lecture 13 - Other Liquid AM Processes - 1
Lecture 14 - Other Liquid AM Processes - 2
Lecture 15 - Sheet Additive Manufacturing - Part 1
Lecture 16 - Sheet Additive Manufacturing - Part 2
Lecture 17 - Wire Additive Manufacturing
Lecture 18 - Fused Deposition Modeling
Lecture 19 - Metal Wire Additive Manufacturing
Lecture 20 - Metal Inert Gas-Wire Arc Additive Manufacturing (MIG-WAAM) - Part 1
Lecture 21 - Metal Inert Gas-Wire Arc Additive Manufacturing (MIG-WAAM) - Part 2
Lecture 22 - Tungsten Inert Gas/Plasma-Wire Arc Additive Manufacturing (TIG/Plasma-WAAM)
Lecture 23 - Electron beam-based Wire Beam Additive Manufacturing (WBAM)
Lecture 24 - Laser Metal Wire Additive Manufacturing
Lecture 25 - Powder-Feed Additive Manufacturing - Part 1
Lecture 26 - Powder-Feed Additive Manufacturing - Part 2
Lecture 27 - Process Modeling for Powder Feed Additive Manufacturing - Part 1
Lecture 28 - Process Modeling for Powder Feed Additive Manufacturing - Part 2
Lecture 29 - Laser Beam based Powder Bed Additive Manufacturing - Part 1

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Lecture 30 - Laser Beam based Powder Bed Additive Manufacturing - Part 2
Lecture 31 - Electron Beam based Powder Bed Additive Manufacturing
Lecture 32 - Binder based Powder Bed Additive Manufacturing - Part 1
Lecture 33 - Binder based Powder Bed Additive Manufacturing - Part 2

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NPTEL Video Course - Mechanical Engineering - NOC:Applied Thermodynamics

Subject Co-ordinator - Prof. Niranjan Sahoo

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thermodynamic Systems and Pure Substance
Lecture 2 - Heat and Work Transfer - First Law of Thermodynamics
Lecture 3 - Second Law of Thermodynamics
Lecture 4 - Entropy and Exergy
Lecture 5 - Introduction to Steam Power Plant
Lecture 6 - Thermodynamics aspects of Steam Power Plant-Efficiency and Work ration
Lecture 7 - Rankine Cycle and its analysis
Lecture 8 - Improvement in Rankine Cycle Efficiency: Superheating and Reheating
Lecture 9 - Improvement in Rankine Cycle Efficiency: Reheating and Regenerative Methods
Lecture 10 - Improvement in Rankine Cycle Efficiency: Regenerative Methods
Lecture 11 - Regenerative Cycles
Lecture 12 - Impulse Steam Turbine: Velocity Diagrams,Work Transfer,Blade Efficiency
Lecture 13 - Impulse Steam Turbine: Velocity Diagrams,Work Transfer,Blade Efficiency (Continued...)
Lecture 14 - Reaction Steam Turbine
Lecture 15 - Reaction Steam Turbine: Velocity Diagram, Work transfer, Blade Efficiency
Lecture 16 - Steam Nozzle: Analysis and Efficiency
Lecture 17 - Steam Nozzle: Analysis and Efficiency (Continued...)
Lecture 18 - Boilers and Condensers
Lecture 19 - Condensers and Second Law Analysis of Steam Power cycle
Lecture 20 - Exergy Analysis of a Steam Turbine
Lecture 21 - Numerical Problems: Steam Power Cycle
Lecture 22 - IC engine-Components, Nomenclature and Classifications
Lecture 23 - Basic Engine Cycle and Engine Kinematic Analysis
Lecture 24 - Engine Operating Characteristics
Lecture 25 - Thermodynamics Analysis of Air Standard Cycles
Lecture 26 - Valve Timing Diagram and Fuel-Air Cycle
Lecture 27 - Thermochemistry and Fuel Characteristics
Lecture 28 - Combustion Phenomena in Engines
Lecture 29 - Heat Transfer Analysis in Engines

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Lecture 30 - Exergy Analysis and Engine Emission/Pollution
Lecture 31 - Gas Turbine Engine-Components and Thermal Circuit
Lecture 32 - Gas Turbine Performance Cycle - I
Lecture 33 - Gas Turbine Performance Cycle - II
Lecture 34 - Real Gas Turbine Performance Cycle
Lecture 35 - Aircraft Propulsion Cycle - I
Lecture 36 - Aircraft Propulsion Cycle - II
Lecture 37 - Vapour Compression Refrigeration System - I
Lecture 38 - Vapour Compression Refrigeration System - II
Lecture 39 - Absorption Refrigeration and Refrigerants
Lecture 40 - Fundamentals of Psychrometrics
Lecture 41 - Air-Conditioning Processes
Lecture 42 - Cooling Tower and Air Washers
Lecture 43 - Reciprocating Compressor - Analysis and Modelling
Lecture 44 - Multistage Compression - Analysis and Modelling

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanics of Fiber Reinforced Polymer Composite Structures

Subject Co-ordinator - Prof. Debabrata Chakraborty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Composite Materials - Introduction
Lecture 2 - Composite Materials - Classification
Lecture 3 - Anisotropic Elasticity
Lecture 4 - Orthotropic Materials
Lecture 5 - Hookeâ s Law for 2D Lamina
Lecture 6 - Engineering Constants for 2D Lamina
Lecture 7 - Strength Failure Criteria - Part I
Lecture 8 - Strength Failure Criteria - Part II
Lecture 9 - Hygrothermal Behavior of Lamina
Lecture 10 - Introduction and Terminologies
Lecture 11 - Evaluation of Elastic Moduli
Lecture 12 - Evaluation of Longitudinal Strength
Lecture 13 - Evaluation of Transverse and Shear Strengths
Lecture 14 - Evaluation of Hygrothermal Properties
Lecture 15 - Elasticity Approach
Lecture 16 - Experimental Evaluation
Lecture 17 - Laminate - Introduction
Lecture 18 - Classical Lamination Theory - Part I
Lecture 19 - Classical Lamination Theory - Part II
Lecture 20 - Response of Laminate - Significance of ABBD
Lecture 21 - Special Classes of Laminates
Lecture 22 - Engineering Constants of Laminates
Lecture 23 - Hygrothermal Behaviour of Laminates
Lecture 24 - Analysis of Laminates
Lecture 25 - Failure of Laminates
Lecture 26 - Failure Analysis under Combined Loading
Lecture 27 - Design Example - I
Lecture 28 - Design Example - II
Lecture 29 - Interlaminar Stresses- Delamination

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Lecture 30 - Prediction of Delamination
Lecture 31 - Transverse Deflection
Lecture 32 - Buckling and Free Vibration

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NPTEL Video Course - Mechanical Engineering - NOC:Laser Based Manufacturing

Subject Co-ordinator - Prof. Shrikrishna N. Joshi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lasers in Manufacturing: Importance and Applications
Lecture 2 - Fundamentals of Laser Technology
Lecture 3 - Laser System: Construction and Types
Lecture 4 - Principle of Operation, Types of Laser Cutting, and Kerf Geometry
Lecture 5 - Types of Lasers in Material Removal, Process and Performance Parameters
Lecture 6 - A Case-study on Cutting a Circular Part using CO2 Laser Machine
Lecture 7 - Mechanisms of Laser Welding - Part I
Lecture 8 - Mechanisms of Laser Welding - Part II
Lecture 9 - Effects of Process Parameters during Laser Welding and Study of Defects in Weld Beads
Lecture 10 - A Case Study on Welding of Mild Steel Sheets using 2.5 kW CO2 Laser Machine
Lecture 11 - Material Forming and Fundamentals of Laser Forming
Lecture 12 - Mechanisms of Laser Forming
Lecture 13 - Process Parameters and their Effects on the Performance of Laser Forming
Lecture 14 - Surface Treatment and Application of Lasers
Lecture 15 - Laser Surface Hardening
Lecture 16 - Laser Surface Alloying
Lecture 17 - Laser Cladding
Lecture 18 - Additive Manufacturing Techniques
Lecture 19 - Laser Scanning Stereolithography
Lecture 20 - Selective Laser Sintering and Selective Laser Melting
Lecture 21 - Process and Performance Parameters of Laser Based Additive Manufacturing Techniques
Lecture 22 - Lasers in Manufacturing Automation
Lecture 23 - CNC for Laser Based Manufacturing
Lecture 24 - CAD for Laser Based Manufacturing
Lecture 25 - Laser-assisted Material Forming
Lecture 26 - Effect of Coatings, 3D Laser Forming and Micro-forming

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Thermodynamics and Combustion

Subject Co-ordinator - Prof. Niranjan Sahoo

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Temperature and Zeroth Law of Thermodynamics
Lecture 2 - Work and Heat Transfer - First Law of Thermodynamics
Lecture 3 - Heat Engines and Refrigerators/Heat Pump - Second Law of Thermodynamics
Lecture 4 - Entropy Analysis - Part I
Lecture 5 - Entropy Analysis - Part II
Lecture 6 - Entropy Analysis - Part III
Lecture 7 - Exergy Analysis - Part I
Lecture 8 - Exergy Analysis - Part II
Lecture 9 - Exergy Analysis - Part III
Lecture 10 - Thermodynamic Functions and Maxwell's Equations
Lecture 11 - Property Relations for Phase Change Processes
Lecture 12 - Property Relations for Single Phase Systems
Lecture 13 - Heat Capacity Equations and its Applications
Lecture 14 - Joule - Thomson Coefficient and Liquefaction of Gases
Lecture 15 - Ideal Gas and Real Gas
Lecture 16 - Gas Mixtures and Multi-Component System
Lecture 17 - Ideal Gas Mixture
Lecture 18 - Mixing Analysis of Thermodynamic Systems
Lecture 19 - Thermodynamic Considerations of Combustion
Lecture 20 - Conservation of Energy for Reacting Systems
Lecture 21 - Adiabatic Flame Temperature, Entropy and Gibbs Function for Reacting System
Lecture 22 - Equilibrium Products of Combustion and Effective Energy Utilization
Lecture 23 - Fundamentals of Chemical Reactions
Lecture 24 - Reaction Mechanisms - Part I
Lecture 25 - Reaction Mechanisms - Part II
Lecture 26 - Chemical and Thermal Analysis of Reacting Systems
Lecture 27 - Simplified Conservation Equations for Reacting Flows
Lecture 28 - Laminar Premixed Flame - Part I
Lecture 29 - Laminar Premixed Flame - Part II

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Lecture 30 - Laminar Diffusion Flame
Lecture 31 - Droplet Evaporation and Turbulent Flame
Lecture 32 - Engine Combustion and Pollution

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NPTEL Video Course - Mechanical Engineering - NOC:Thermal Engineering: Basic and Applied

Subject Co-ordinator - Prof. Pranab K. Mondal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - First law of Thermodynamics for control mass and control volume systems
Lecture 2 - First law of Thermodynamics for control volume system (Flow system)
Lecture 3 - Steady State Steady Flow Processes, combination of First and Second Laws
Lecture 4 - Second Law of Thermodynamics: A Brief Review
Lecture 5 - Combined First and Second Laws Applied to Processes
Lecture 6 - Combined First and Second Laws: Flow and Non-Flow Processes
Lecture 7 - Description of Steam Power Plant: Application of 1st and 2nd Laws to Different Processes
Lecture 8 - Second Law Applied to Processes of Power Plant and Ideal Cycle of Power Plant
Lecture 9 - Steam Power Plant: Thermodynamic aspects, Efficiency, Work ratio and Ideal Cycle
Lecture 10 - Ideal Power Cycle and its Limitations, Introduction to Actual Power Cycle
Lecture 11 - Limitations of Carnot Cycle, Simple Rankine Cycle and Analysis
Lecture 12 - Analysis of Simple Rankine Cycle and its Design Modifications
Lecture 13 - Reheat Cycle and Analysis
Lecture 14 - Reheat Cycle and Analysis (Continued...)
Lecture 15 - Regenerative Principle of Steam Power Cycles
Lecture 16 - Analysis of Regenerative Steam Power Cycles
Lecture 17 - Regenerative Steam Power Cycle with Closed Feed-Water Heater, Ideal Working Fluid
Lecture 18 - Multi-fluid Cycle and Analysis
Lecture 19 - Analysis of Multi-fluid Cycle; Second Law Analysis of Steam Power Cycle
Lecture 20 - Problems of Steam Power Cycle
Lecture 21 - Problems of Steam Power Cycle (Continued...)
Lecture 22 - Types of Boiler, Different Cycles in Boiler Operation, Boiler attachment
Lecture 23 - Cochran Boiler Operation, Boiler attachment
Lecture 24 - Boiler Attachments
Lecture 25 - Superheaters and their Arrangements, Steam Temperature Control
Lecture 26 - Characteristics of Convective and Radiant Superheaters; Steam Temperature Control
Lecture 27 - Problems on Boiler/Steam Generator
Lecture 28 - Use of nozzles in steam power plant, flow analysis of steam in nozzle
Lecture 29 - Flow analysis of steam in nozzle: Mass flow rate

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Lecture 30 - Mass flow rate of steam in nozzle, Critical Pressure Ratio
Lecture 31 - Critical Pressure Ratio and its Physical Significance
Lecture 32 - Nozzle efficiency and factors that affect the efficiency
Lecture 33 - Factors that affect the efficiency, problem on flow nozzle
Lecture 34 - Problem on flow nozzle
Lecture 35 - Steam Turbines: types and analysis using velocity triangles
Lecture 36 - Analysis of Impulse Steam Turbine
Lecture 37 - Compounding of Steam Turbine
Lecture 38 - Analysis of Reaction Steam Turbine
Lecture 39 - Problems on Steam Turbine
Lecture 40 - The Role of Condenser in Power Plant
Lecture 41 - Cooling Tower: Types and Analysis
Lecture 42 - Cooling Tower Performance
Lecture 43 - IC Engines, Classification, Different Parts, SI and CI Engines
Lecture 44 - Comparison of 2-stroke and 4-stroke Engines
Lecture 45 - Comparison of SI and CI Engines, Compression Ratio
Lecture 46 - Introduction to Carburettor and Regimes of Engine Operation
Lecture 47 - Regimes of Engine Operation and Simple Float Type Carburettor
Lecture 48 - Simple Float Type Carburettor and its Analysis
Lecture 49 - Mass Flow Rate of Fuel and limitations of Simple Float Type Carburettor
Lecture 50 - Limitations of Simple Float Type Carburettor, Problem on Carburettion
Lecture 51 - Engine Operating Characteristics: MEP and Indicator diagram
Lecture 52 - Performance Analysis parameters of IC Engine
Lecture 53 - Fuel of IC Engines
Lecture 54 - Alternative Fuels and Self Ignition Characteristics of Fuel: Octane Numner, Cetane Number
Lecture 55 - Thermodynamic Analysis of SI Engine
Lecture 56 - Thermodynamic Analysis of CI Engine
Lecture 57 - Numerical Problems on Engine Performance
Lecture 58 - Pressure-Crank angle diagram, Engine Efficiencies
Lecture 59 - Numerical Problems on SI and CI Engines
Lecture 60 - Vapour Compression Refrigeration Cycle and its analysis
Lecture 61 - Problems on Vapour Compression Refrigeration Cycle
Lecture 62 - Gas Turbine Units and Thermodynamic Cycles
Lecture 63 - Gas Compressor and Optimum Pressure Ratio
Lecture 64 - Compressor Efficiency and Multistage Compression with Intercooling
Lecture 65 - Gas Turbine Unit: Combined Cycle
Lecture 66 - Problems On Gas Turbine Cycle

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanics of Sheet Metal Forming

Subject Co-ordinator - Prof. R Ganesh Narayanan

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to sheet forming and tensile test of sheets
Lecture 2 - Tensile test, effect of properties, exercise problem
Lecture 3 - Sheet deformation processes
Lecture 4 - Sheet deformation processes (Continued...)
Lecture 5 - Sheet deformation processes (Continued...)
Lecture 6 - Sheet deformation in plane stress
Lecture 7 - Sheet deformation in plane stress (Continued...)
Lecture 8 - Stamping analyses
Lecture 9 - Load instability and tearing
Lecture 10 - Load instability and tearing
Lecture 11 - Formability testing of sheet metals
Lecture 12 - Sheet formability
Lecture 13 - Sheet formability (Continued...)
Lecture 14 - Bending of sheets
Lecture 15 - Bending of sheets (Continued...)
Lecture 16 - Cup deep drawing
Lecture 17 - Deep drawing, redrawing, ironing of cup
Lecture 18 - Stretching of sheet
Lecture 19 - Hydroforming
Lecture 20 - Yield functions with sheet anisotropy
Lecture 21 - Demonstration of sheet forming experiments

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NPTEL Video Course - Mechanical Engineering - NOC:Power Plant System Engineering

Subject Co-ordinator - Prof. Niranjan Sahoo

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thermodynamics Concepts - Part I
Lecture 2 - Thermodynamics Concepts - Part II
Lecture 3 - Thermodynamic Analysis of Vapor Power Cycle
Lecture 4 - Rankine Cycle
Lecture 5 - Modified Rankine Cycle
Lecture 6 - Exergy Analysis of Vapor Power Cycles
Lecture 7 - Rotodynambic Machines
Lecture 8 - Impulse Turbine
Lecture 9 - Reaction Turbine
Lecture 10 - Performance Analysis of Steam Turbines
Lecture 11 - Steam Nozzles - Part I
Lecture 12 - Steam Nozzles - Part II
Lecture 13 - Steam Generator
Lecture 14 - Water Tube Boiler - Part I
Lecture 15 - Water Tube Boiler - Part II
Lecture 16 - Fuels and Combustion - Part I
Lecture 17 - Fuels and Combustion - Part II
Lecture 18 - Steam Condenser
Lecture 19 - Feed Water Heaters
Lecture 20 - Cooling Towers
Lecture 21 - Fundamentals of Gas turbine systems
Lecture 22 - Modifications of Brayton cycle
Lecture 23 - Combined Power cycle
Lecture 24 - Gas Turbines for Aircraft Propulsion
Lecture 25 - Hydro-Power System - Part I
Lecture 26 - Hydro-Power System - Part II
Lecture 27 - Wind Energy - Part I
Lecture 28 - Wind Energy - Part II
Lecture 29 - Energy From Oceans - Part I

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Lecture 30 - Energy From Oceans - Part II
Lecture 31 - Geothermal Energy
Lecture 32 - Energy Storage - I
Lecture 33 - Energy Storage - II
Lecture 34 - Energy Storage - III

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Solidification Processing

Subject Co-ordinator - Prof. Swarup Bag

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to phase diagrams
Lecture 2 - Thermodynamic relations
Lecture 3 - Single component system and binary solutions
Lecture 4 - Regular solutions
Lecture 5 - Real solutions
Lecture 6 - Phase transformations
Lecture 7 - Practice problems (Module 1)
Lecture 8 - Introduction to homogenous nucleation process
Lecture 9 - Fundamental to heterogeneous nucleation
Lecture 10 - Growth of pure metal
Lecture 11 - Alloy solidification
Lecture 12 - Formation of different S/L interface
Lecture 13 - Solidifcation structures and segregation
Lecture 14 - Weld Metal Solidification and Microstructure - I
Lecture 15 - Weld Metal Solidification and Microstructure - II
Lecture 16 - Solidification of additive manufacturing - I
Lecture 17 - Solidification of additive manufacturing - II
Lecture 18 - Rate of solidification-sand casting
Lecture 19 - Rate of solidification-die casting
Lecture 20 - Riser design and solidification of pure metal
Lecture 21 - Zone melting and rapid solidification
Lecture 22 - Semisolid processing and other solidification techniques
Lecture 23 - Demonstration of the solidification process and numerical problems

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NPTEL Video Course - Mechanical Engineering - NOC:Materials Processing (Casting, Forming and Welding)

Subject Co-ordinator - Prof. Swarup Bag

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Materials and microcture evolutions - 1
Lecture 2 - Materials and microcture evolutions - 2
Lecture 3 - Materials and microcture evolutions - 3
Lecture 4 - Basics of heat conduction - 1
Lecture 5 - Basics of heat conduction - 2
Lecture 6 - Basics of heat conduction - 3
Lecture 7 - Basics of heat conduction - 4
Lecture 8 - Basics of fluid flow - 1
Lecture 9 - Basics of fluid flow - 2
Lecture 10 - Solidification processing - 1
Lecture 11 - Solidification processing - 2
Lecture 12 - Casting and welding - 1
Lecture 13 - Casting and welding - 2
Lecture 14 - Casting and welding - 3
Lecture 15 - Casting and welding - 4
Lecture 16 - Material forming
Lecture 17 - Material forming: Numerical problem
Lecture 18 - Processing of metal: Casting Process - I
Lecture 19 - Processing of metal: Casting Process - II
Lecture 20 - Processing of polymer: Thermoplastic and thermosets
Lecture 21 - Processing of polymer: Extrusion
Lecture 22 - Processing of polymer: Injection molding
Lecture 23 - Processing of polymer: Blow molding
Lecture 24 - Processing of polymer: Thermosets
Lecture 25 - Processing of ceramics - I
Lecture 26 - Processing of ceramics - II
Lecture 27 - Processing of galss and fused depostion modeling
Lecture 28 - Arc wellding processes
Lecture 29 - Welding of polymers

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Lecture 30 - Laser and electron beam welding processes
Lecture 31 - Advanced welding processes
Lecture 32 - Welding solidification
Lecture 33 - Metallic wire additive manufacturing
Lecture 34 - Mechanical responses of metals and polymers
Lecture 35 - Hot working and cold working
Lecture 36 - Types of metal forming processes - I
Lecture 37 - Types of metal forming processes - II
Lecture 38 - Types of metal forming processes - III and Hot rolling of steel
Lecture 39 - Solid state deformation - 1
Lecture 40 - Solid state deformation - 2
Lecture 41 - Powder processing - 1
Lecture 42 - Powder processing - 2
Lecture 43 - Powder processing - 3
Lecture 44 - Ceramic processing: Dry pressing and plastic forming methods
Lecture 45 - Ceramic processing: Colloidal processing, casting, and coating techniques
Lecture 46 - Introduction to steel making and single crystal production
Lecture 47 - Integrated Analysis of Steel Solidification, Fluid Flow, and Prodder Processing Technologies
Lecture 48 - Processing of electronics Materials, A case Study: semiconductor measurements
Lecture 49 - Processing of magnetic materials and Processing of magnetic materials for advanced materials
Lecture 50 - Processing of optics materials and pertaining case study

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NPTEL Video Course - Mechanical Engineering - NOC:Engine System and Performance

Subject Co-ordinator - Prof. Pranab K. Mondal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engine Systems and Its Types: A Focus on Ignition System
Lecture 2 - A Focus on Lubrication and Cooling Systems
Lecture 3 - Engine Classifications and Nomenclature
Lecture 4 - Analysis of Basic Cycles
Lecture 5 - Description of Engine Components
Lecture 6 - Design and Constructional Features of Engine Hardware
Lecture 7 - Shape and Material of Engine Components
Lecture 8 - Concept of Hybrid Engines and Working Principle
Lecture 9 - Types of Hybrid Arrangements
Lecture 10 - Description of Energy Transfer Mechanism
Lecture 11 - Components Involved: Energy Transfer
Lecture 12 - Components Involved and Numerical Problems: Energy Transfer
Lecture 13 - Introduction to Electronic Control Unit (ECU) and its functions
Lecture 14 - Description of Electronic Control Unit (ECU) and types of control system: Open-loop and Close lo
Lecture 15 - Memory-based and Adaptive-based control systems
Lecture 16 - Control system layout and types of sensors: Coolant temperature sensor and Crankshaft position s
Lecture 17 - Manifold Absolute Pressure sensor (MAP) and Throttle Position Sensor (TPS)
Lecture 18 - Actuators in control system: Solenoids, Piezoelectric and Stepper motor
Lecture 19 - Key elements of ECU: Microprocessor and Memory chips
Lecture 20 - Introduction to electronic devices and circuits
Lecture 21 - Introduction to Transistors
Lecture 22 - Introduction to Digital circuits
Lecture 23 - Functional layout of Electronic Control Unit (ECU)
Lecture 24 - Electronic ignition system
Lecture 25 - Electronic Fuel-Injection System: Injection schemes
Lecture 26 - An overview of injection duration calculation
Lecture 27 - Modes for fuel control, Integrated engine control system
Lecture 28 - Introduction to Engine performance and its measurement
Lecture 29 - Measurement of fuel flow rate, air flow rate and needle lift in a CI engine

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Lecture 30 - Measurement of indicated work, Numerical problem
Lecture 31 - Measurement of torque: Power output from engine, Numerical problem
Lecture 32 - Measurement of volumetric efficiency
Lecture 33 - SI engine performance curves and Performance characteristics
Lecture 34 - Performance map, Analytical method of performance estimation
Lecture 35 - CI engine performance, factors affecting engine performance
Lecture 36 - Introduction to Superchargers
Lecture 37 - Performance Map of Superchargers and Numerical Problems
Lecture 38 - Introduction to Turbocharger and Phenomenon of Turbo-lag in Turbochargers
Lecture 39 - Introduction to Variable Geometry Turbine
Lecture 40 - Numerical Problems on Turbocharger
Lecture 41 - Engine heat balance
Lecture 42 - Measurement of heat losses in engines and Numerical problem
Lecture 43 - Speed control of IC engines
Lecture 44 - Mechanical and Electronic governor
Lecture 45 - Trend of recent technologies to achieve better performance and reduce pollution

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Thermo-Mechanical and Fatigue Analysis of W

Subject Co-ordinator - Prof. Pankaj Biswas

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Weld Induced Thermal History (Basics of Heat Flow in Welding)
Lecture 2 - Weld Induced Thermal History (Basics of Heat Flow in Welding)
Lecture 3 - Weld Induced Thermal History (Basics of Heat Flow in Welding)
Lecture 4 - Weld Induced Thermal History (Basics of Heat Flow in Welding)
Lecture 5 - Weld Induced Thermal History (2D-3D Heat Flow and Cooling Rate)
Lecture 6 - Weld Induced Thermal History (2D-3D Heat Flow and Cooling Rate)
Lecture 7 - Common Heat Treatment Processes (Types, Preheating, Inter-pass Temperature, PWHT)
Lecture 8 - Common Heat Treatment Processes (Types, Preheating, Inter-pass Temperature, PWHT)
Lecture 9 - Common Heat Treat Treatment Processes (PWHT)
Lecture 10 - Common Heat Treat Treatment Processes (PWHT)
Lecture 11 - Fundamental of Different Types of Welding Heat Sources
Lecture 12 - Fundamental of Different Types of Welding Heat Sources
Lecture 13 - Fundamental of Different Types of Welding Heat Source
Lecture 14 - Fundamental of Different Types of Welding Heat Sources
Lecture 15 - Designing of Welded Joints Subjected to Combined Loads
Lecture 16 - Designing of Welded Joints Subjected to Combined Loads
Lecture 17 - Design of Welds Subjected to Combined Stresses
Lecture 18 - Design of Welds Subjected to Combined Stresses
Lecture 19 - Design of Welds Subjected to Combined Stresses
Lecture 20 - Design of Welds Subjected to Combined Stresses
Lecture 21 - Fundamental of Creep on Welded Joints
Lecture 22 - Fundamental of Creep on Welded Joints
Lecture 23 - Basics of Fatigue Analysis
Lecture 24 - Basics of Fatigue Analysis
Lecture 25 - Basics of Fatigue Life Prediction
Lecture 26 - Basics of Fatigue Life Prediction
Lecture 27 - Some Problems on Fatigue Life Prediction of Welded Joints
Lecture 28 - Some Problems on Fatigue Life Prediction of Welded Joints
Lecture 29 - Fatigue Analysis, Design and Life Estimation Procedures

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Lecture 30 - Fatigue Analysis, Design and Life Estimation Procedures
Lecture 31 - Examples of Fatigue Design Methods
Lecture 32 - Examples of Fatigue Design Methods
Lecture 33 - Rainflow Counting Method
Lecture 34 - Rainflow Counting Method
Lecture 35 - Cumulative Fatigue Damage and Palmgren-Miner's Rule
Lecture 36 - Cumulative Fatigue Damage and Palmgren-Miner's Rule
Lecture 37 - Fatigue Design and Analysis due to Fluctuating Stresses and Fatigue Failure Criteria
Lecture 38 - Fatigue Design and Analysis due to Fluctuating Stresses and Fatigue Failure Criteria
Lecture 39 - Modified Goodman Diagrams and Examples
Lecture 40 - Modified Goodman Diagrams and Examples
Lecture 41 - Modified Goodman Diagrams for Fluctuating Torsional Shear Stresses and Examples
Lecture 42 - Modified Goodman Diagrams for Fluctuating Torsional Shear Stresses and Examples
Lecture 43 - Basquin's and Coffin's Law of Fatigue and Mean Stress Corrections in Fatigue
Lecture 44 - Basquin's and Coffin's Law of Fatigue and Mean Stress Corrections in Fatigue
Lecture 45 - Example of Basquin's Law of Fatigue and Linear Elastic FractureMechanics Approach
Lecture 46 - Example of Basquin's Law of Fatigue and Linear Elastic FractureMechanics Approach
Lecture 47 - Linear Elastic Fracture Mechanics Approach (Paris-Erdogan's Law)
Lecture 48 - Linear Elastic Fracture Mechanics Approach (Paris-Erdogan's Law)
Lecture 49 - Weld Fatigue Life Estimation Procedures (Nominal Stress Method)
Lecture 50 - Weld Fatigue Life Estimation Procedures (Nominal Stress Method)
Lecture 51 - Weld Fatigue Life Estimation Procedures (Nominal Stress Method)
Lecture 52 - Weld Fatigue Life Estimation Procedures (Nominal Stress Method)
Lecture 53 - Hot Spot Stress Approach
Lecture 54 - Hot Spot Stress Approach

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NPTEL Video Course - Mechanical Engineering - NOC:Industrial Engineering and Operations Research

Subject Co-ordinator - Prof. Uday Shanker Dixit

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Industrial Engineering and Operations Research
Lecture 2 - Production Planning and Control, Aggregate production planning
Lecture 3 - Product Design - Part 1
Lecture 4 - Product Design - Part 2
Lecture 5 - Job, Batch, and Flow Production methods
Lecture 6 - Work study: Enhancing Productivity through Methods and Measurement
Lecture 7 - Work Sampling and Ergonomics
Lecture 8 - Inventory Management - Part 1
Lecture 9 - Inventory Management - Part 2
Lecture 10 - Supply chain Management
Lecture 11 - Total Quality Management
Lecture 12 - Application of Statistics in TQM
Lecture 13 - Acceptance Sampling
Lecture 14 - Control Charts
Lecture 15 - Taguchi's Method, Six Sigma, ISO9001
Lecture 16 - Forecasting - Part 1
Lecture 17 - Forecasting - Part 2
Lecture 18 - Scheduling - Part 1
Lecture 19 - Scheduling - Part 2
Lecture 20 - Assignment Problems
Lecture 21 - Line Balancing
Lecture 22 - Break-Even Analysis - Part 1
Lecture 23 - Break-Even Analysis - Part 2
Lecture 24 - Industry 4.0
Lecture 25 - Industry 4.0 and 5.0
Lecture 26 - Big Data and Analytics
Lecture 27 - Machine learning
Lecture 28 - Internet of Things
Lecture 29 - Smart Factories

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Lecture 30 - Digital Twins
Lecture 31 - Linear programming
Lecture 32 - Linear Programming: Graphical Method
Lecture 33 - Linear Programming: Simplex Method
Lecture 34 - Simplex Method: Big M and Two Phase
Lecture 35 - Special Problems in Linear Programming
Lecture 36 - Dual Problems
Lecture 37 - Properties of Dual Problem
Lecture 38 - Unit Worth of Resource
Lecture 39 - Dual Prices as Lagrange Multipliers
Lecture 40 - Linear Programming: Some Exercise Problems
Lecture 41 - Transportation Models: An Introduction
Lecture 42 - Transportation Models: Northwest-Corner Method
Lecture 43 - Transportation Models: Least-Cost Method
Lecture 44 - Transportation Models: Vogel Approximation Method (VAM)
Lecture 45 - Transportation Models: Optimality Test
Lecture 46 - Critical Path Method
Lecture 47 - CPM: Finding Critical Path
Lecture 48 - CPM: Float of an Activity
Lecture 49 - PERT
Lecture 50 - Project Crashing
Lecture 51 - Queuing Theory - Part 1
Lecture 52 - Queuing Theory - Part 2
Lecture 53 - Queuing Theory - Part 3
Lecture 54 - Queuing Theory - Part 4
Lecture 55 - Queuing Theory - Part 5
Lecture 56 - Deterministic Inventory models
Lecture 57 - Probabilistic Inventory models - Part 1
Lecture 58 - Probabilistic Inventory models - Part 2
Lecture 59 - Probabilistic Inventory models - Part 3
Lecture 60 - Probabilistic Inventory models - Part 4

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NPTEL Video Course - Mechanical Engineering - Acoustics

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro, sound wave versus vibration, different types of waves, octave, music scales, sense of SPL
Lecture 2 - Review
Lecture 3 - Review
Lecture 4 - Review
Lecture 5 - 1-D wave equation, and its solution
Lecture 6 - Solution for 1-D wave equation
Lecture 7 - Waveguides, transmission line equations, and standing waves
Lecture 8 - Waveguides, transmission line equations, and standing waves
Lecture 9 - Examples of 1-D waves in tubes, short tubes, Kundt's tube
Lecture 10 - Thermodynamic processes during sound transmission
Lecture 11 - Numerical examples
Lecture 12 - Sound transmission through walls
Lecture 13 - Sound transmission through walls
Lecture 14 - Leakage in walls, STC Ratings, Octave bands
Lecture 15 - Instantaneous power flow
Lecture 16 - Radial propagation of sound, monopoles, and dipoles
Lecture 17 - Radial propagation of sound, monopoles, and dipoles
Lecture 18 - Radial propagation of sound, monopoles, and dipoles
Lecture 19 - Numerical examples
Lecture 20 - Numerical examples
Lecture 21 - Directivity
Lecture 22 - Directivity
Lecture 23 - Directivity
Lecture 24 - Directivity
Lecture 25 - Generalized elements
Lecture 26 - Examples of electromechanical systems
Lecture 27 - Transformers, radiation impedance, and Helmholtz resonator
Lecture 28 - Radiation impedance
Lecture 29 - Radiation impedance

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Lecture 30 - Models of electro-mechanical-acoustic systems
Lecture 31 - Solution for a loudspeaker model
Lecture 32 - Microphones
Lecture 33 - Vibro-meter, seismometer, accelerometer, shaker table
Lecture 34 - Sound propagation in rooms, 1-D rooms, 2D rooms
Lecture 35 - Sound in 3-D rooms
Lecture 36 - Absorption coefficient, and irregular rooms
Lecture 37 - Room constant, and Sabine's coefficient
Lecture 38 - Design of a muffler
Lecture 39 - Noise in machines, basics of noise management

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NPTEL Video Course - Mechanical Engineering - Advanced Machining Processes

Subject Co-ordinator - Prof. Vijay K. Jain

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Advanced Machining Processes
Lecture 2 - Advanced Machining Processes
Lecture 3 - Advanced Machining Processes
Lecture 4 - Advanced Machining Processes
Lecture 5 - Advanced Machining Processes
Lecture 6 - Advanced Machining Processes
Lecture 7 - Advanced Machining Processes
Lecture 8 - Advanced Machining Processes
Lecture 9 - Advanced Machining Processes
Lecture 10 - Advanced Machining Processes
Lecture 11 - Advanced Machining Processes
Lecture 12 - Advanced Machining Processes
Lecture 13 - Advanced Machining Processes
Lecture 14 - Advanced Machining Processes
Lecture 15 - Advanced Machining Processes
Lecture 16 - Advanced Machining Processes
Lecture 17 - Advanced Machining Processes
Lecture 18 - Advanced Machining Processes
Lecture 19 - Advanced Machining Processes
Lecture 20 - Advanced Machining Processes
Lecture 21 - Advanced Machining Processes
Lecture 22 - Advanced Machining Processes
Lecture 23 - Advanced Machining Processes
Lecture 24 - Advanced Machining Processes
Lecture 25 - Advanced Machining Processes
Lecture 26 - Advanced Machining Processes
Lecture 27 - Advanced Machining Processes
Lecture 28 - Advanced Machining Processes
Lecture 29 - Advanced Machining Processes

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Lecture 30 - Advanced Machining Processes
Lecture 31 - Advanced Machining Processes
Lecture 32 - Advanced Machining Processes
Lecture 33 - Advanced Machining Processes
Lecture 34 - Advanced Machining Processes

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NPTEL Video Course - Mechanical Engineering - Biomicroelectromechanical systems

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10 (same as 9)
Lecture 11
Lecture 12 (Lecture Missing)
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

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NPTEL Video Course - Mechanical Engineering - Computer Aided Engineering Design

Subject Co-ordinator - Dr. Anupam Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
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Lecture 28
Lecture 29

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Lecture 30
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Lecture 40

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NPTEL Video Course - Mechanical Engineering - Mathematical Methods in Engineering and Science

Subject Co-ordinator - Dr. Bhaskar Dasgupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic Ideas of Applied Linear Algebra
Lecture 3 - Systems of Linear Equations
Lecture 4 - Square Non-Singular Systems
Lecture 5 - Ill-Conditioned and Ill-Posed Systems
Lecture 6 - The Algebraic Eigenvalue Problem
Lecture 7 - Canonical Forms, Symmetric Matrices
Lecture 8 - Methods of Plane Rotations
Lecture 9 - Householder Method, Tridiagonal Matrices
Lecture 10 - QR Decomposition, General Matrices
Lecture 11 - Singular Value Decomposition
Lecture 12 - Vector Space
Lecture 13 - Multivariate Calculus
Lecture 14 - Vector Calculus in Geometry
Lecture 15 - Vector Calculus in Physics
Lecture 16 - Solution of Equations
Lecture 17 - Introdcution to Optimization
Lecture 18 - Multivariate Optimization
Lecture 19 - Constrained Optimization
Lecture 20 - Constrained Optimization
Lecture 21 - Interpolation
Lecture 22 - Numerical Integration
Lecture 23 - Numerical Solution of ODE's as IVP
Lecture 24 - Boundary Value Problems, Question of Stability in IVP Solution
Lecture 25 - Stiff Differential Equations, Existence and Uniqueness Theory
Lecture 26 - Theory of First Order ODE's
Lecture 27 - Linear Second Order ODE's
Lecture 28 - Methods of Linear ODE's
Lecture 29 - ODE Systems

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Lecture 30 - Stability of Dynamic Systems
Lecture 31 - Series Solutions and Special Functions
Lecture 32 - Sturm-Liouville Theory
Lecture 33 - Approximation Theory and Fourier Series
Lecture 34 - Fourier Integral to Fourier Transform, Minimax Approximation
Lecture 35 - Separation of Variables in PDE's, Hyperbolic Equations
Lecture 36 - Parabolic and Elliptic Equations, Membrane Equation
Lecture 37 - Analytic Functions
Lecture 38 - Integration of Complex Functions
Lecture 39 - Singularities and Residues
Lecture 40 - Calculus of Variations

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NPTEL Video Course - Mechanical Engineering - Dynamics of Machines

Subject Co-ordinator - Prof. Amitabha Ghosh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rigid Body Motion - Part 1
Lecture 2 - Rigid Body Motion - Part 2
Lecture 3 - Dynamic Force Analysis of Mechanisms
Lecture 4 - Space Motion of Rigid Bodies
Lecture 5 - Inertia Tensor Angular Momentum
Lecture 6 - Euler's Equation of Motion
Lecture 7 - Gyroscopic Action in Machines
Lecture 8 - Unbalance in Machines
Lecture 9 - Rotary Balancing
Lecture 10 - Balancing Machines
Lecture 11 - Field Balancing of Rotors
Lecture 12 - Single-Cylinder Engine Balancing
Lecture 13 - Balancing of Single Slider Machines
Lecture 14 - In-Line Engine Balancing
Lecture 15 - V and Radial Engine Balancing
Lecture 16 - Turning Moment Diagram
Lecture 17 - Flywheel Analysis
Lecture 18 - Dynamics of Machines
Lecture 19 - Dynamics of Machines
Lecture 20 - Dynamics of Machines
Lecture 21 - Dynamics of Machines
Lecture 22 - Dynamics of Machines
Lecture 23 - Dynamics of Machines
Lecture 24 - Dynamics of Machines
Lecture 25 - Dynamics of Machines
Lecture 26 - Dynamics of Machines
Lecture 27 - Dynamics of Machines
Lecture 28 - Dynamics of Machines
Lecture 29 - Rotating Vector Approach

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Lecture 30 - Equivalent viscous damping
Lecture 31 - Dynamics of Machines
Lecture 32 - Systems with two degree of freedom
Lecture 33 - Tuned Vibration Absorber
Lecture 34 - Design of Vibration Absorbers
Lecture 35 - Flexibility Matrix Influence Coeff
Lecture 36 - Forced Vibration of multiple
Lecture 37 - Forced Vibration of Multiple degrees
Lecture 38 - Vibration of Continuous Systems
Lecture 39 - Vibration of Continuous Systems
Lecture 40 - Vibration of Beams
Lecture 41 - Rayleigh's method
Lecture 42 - Rayleigh-Ritz Method
Lecture 43 - Vibration Measurement
Lecture 44 - Vibration Measurement Types of Pickups

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NPTEL Video Course - Mechanical Engineering - Finite Element Method

Subject Co-ordinator - Prof. C.S. Upadhyay

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module 1 - Lecture 1
Module 1 - Lecture 2
Module 1 - Lecture 3
Module 2 - Lecture 1
Module 2 - Lecture 2
Module 2 - Lecture 3
Module 2 - Lecture 4
Module 3 - Lecture 1
Module 3 - Lecture 2
Module 3 - Lecture 3
Module 4 - Lecture 1
Module 4 - Lecture 2
Module 4 - Lecture 3
Module 5 - Lecture 1
Module 5 - Lecture 2
Module 5 - Lecture 3
Module 6 - Lecture 1
Module 6 - Lecture 2
Module 6 - Lecture 3
Module 7 - Lecture 1
Module 7 - Lecture 2
Module 7 - Lecture 3
Module 7 - Lecture 4
Module 8 - Lecture 1
Module 8 - Lecture 2
Module 8 - Lecture 3
Module 9 - Lecture 1
Module 9 - Lecture 2
Module 9 - Lecture 3

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Module 10 - Lecture 1
Module 10 - Lecture 2
Module 11 - Lecture 1
Module 11 - Lecture 2
Module 12 - Lecture 1
Module 13 - Lecture 1
Module 13 - Lecture 2
Module 14 - Lecture 1
Module 14 - Lecture 2

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NPTEL Video Course - Mechanical Engineering - Kinematics of Machines

Subject Co-ordinator - Prof. Ashok K Mallik

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module 1 - Lecture 1
Module 1 - Lecture 2
Module 1 - Lecture 3
Module 2 - Lecture 1
Module 2 - Lecture 2
Module 2 - Lecture 3
Module 3 - Lecture 1
Module 3 - Lecture 2
Module 3 - Lecture 3
Module 3 - Lecture 4
Module 4 - Lecture 1
Module 4 - Lecture 2
Module 5 - Lecture 1
Module 5 - Lecture 2
Module 5 - Lecture 3
Module 6 - Lecture 1
Module 6 - Lecture 2
Module 6 - Lecture 3
Module 7 - Lecture 1
Module 7 - Lecture 2
Module 7 - Lecture 3
Module 8 - Lecture 1
Module 8 - Lecture 2
Module 9 - Lecture 1
Module 9 - Lecture 2
Module 9 - Lecture 3
Module 9 - Lecture 4
Module 10 - Lecture 1
Module 10 - Lecture 2

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Module 10 - Lecture 3
Module 11 - Lecture 1
Module 11 - Lecture 2
Module 11 - Lecture 3
Module 12 - Lecture 1
Module 12 - Lecture 2
Module 12 - Lecture 3
Module 13 - Lecture 1
Module 13 - Lecture 2
Module 13 - Lecture 3

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NPTEL Video Course - Mechanical Engineering - Advanced manufacturing process for micro sytem fabrication

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lab session 1 - Advanced manufacturing process for micro sytem fabrication
Lab session 2 - EDM Micro Machening
Lab session 3 - EDM Micro Drilling
Lab session 4 - Laser Machening Process
Lab session 5 - Vaccume Assisted Forming
Lab session 6 - Vaccume Forming
Lab session 7 - Photolithiography
Lab session 8 - Replication part 1
Lab session 9 - Replication part 2
Lab session 10 - PCB Making
Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19

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Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28

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NPTEL Video Course - Mechanical Engineering - Engineering Drawing (Dr. Anupam Saxena)

Subject Co-ordinator - Dr. Anupam Saxena

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lab Session 1
Lab Session 2
Lab Session 3
Lab Session 4
Lab Session 5
Lab Session 6
Lab Session 7
Lab Session 8
Lab Session 9
Lab Session 10
Lab Session 11
Lab Session 12
Lecture 1 - Technical Arts 101
Lecture 2 - Technical Arts 101
Lecture 3 - Technical Arts 101
Lecture 4 - Technical Arts 101
Lecture 5 - Technical Arts 101
Lecture 6 - Technical Arts 101
Lecture 7 - Technical Arts 101
Lecture 8 - Technical Arts 101
Lecture 9 - Technical Arts 101
Lecture 10 - Technical Arts 101
Lecture 11 - Technical Arts 101
Lecture 12 - Technical Arts 101
Lecture 13 - Technical Arts 101
Lecture 14 - Technical Arts 101
Lecture 15 - Technical Arts 101
Lecture 16 - Technical Arts 101
Lecture 17 - Technical Arts 101

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Lecture 18 - Technical Arts 101
Lecture 19 - Technical Arts 101
Lecture 20 - Technical Arts 101
Lecture 21 - Technical Arts 101
Lecture 22 - Technical Arts 101
Lecture 23 - Technical Arts 101
Lecture 24 - Technical Arts 101
Lecture 25 - Technical Arts 101
Lecture 26 - Technical Arts 101
Lecture 27 - Technical Arts 101
Lecture 28 - Technical Arts 101

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NPTEL Video Course - Mechanical Engineering - NOC:BioMEMS and Microsystems

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1
Lecture 2 - Lecture 2
Lecture 3 - Lecture 3
Lecture 4 - Review Lecture 1,2,3
Lecture 5 - Lecture 4
Lecture 6 - Lecture 5
Lecture 7 - Lecture 6
Lecture 8 - Review Lecture 4,5,6
Lecture 9 - Lecture 7
Lecture 10 - Lecture 8
Lecture 11 - Lecture 9-10
Lecture 12 - Lecture-11
Lecture 13 - Lecture-12
Lecture 14 - Lecture-13
Lecture 15 - Lecture-14
Lecture 16 - Lecture-15
Lecture 17 - Lecture-16
Lecture 18 - Lecture-17
Lecture 19 - Lecture-18
Lecture 20 - Lecture-19
Lecture 21 - Review Lecture 7 to 10
Lecture 22 - Review Lecture 11 to 13
Lecture 23 - Review Lecture 14 to 16
Lecture 24 - Lecture-20
Lecture 25 - Lecture-21
Lecture 26 - Lecture-22
Lecture 27 - Lecture-23
Lecture 28 - Lecture-24
Lecture 29 - Lecture-25

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Lecture 30 - Review Lecture 17,18,19
Lecture 31 - Review Lecture 20,21,22
Lecture 32 - Lecture-26
Lecture 33 - Lecture-27
Lecture 34 - Lecture-28
Lecture 35 - Lecture-29
Lecture 36 - Lecture-30
Lecture 37 - Lecture-31
Lecture 38 - Lecture-32
Lecture 39 - Lecture-33
Lecture 40 - Review lecture 23,24,25
Lecture 41 - Review lecture 26,27,28
Lecture 42 - Review lecture 29 to 33

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Systems Technology

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
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Lecture 23
Lecture 24
Lecture 25
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Lecture 27
Lecture 28
Lecture 29

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Lecture 30
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Lecture 47
Lecture 48

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Systems Technology - Part II

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Quality Engineering
Lecture 2 - Quality Costs
Lecture 3 - Product Design
Lecture 4 - Design of Experiments
Lecture 5 - Applications of Quality Loss Function
Lecture 6 - Product Selection Strategies
Lecture 7 - Robust Design Approaches
Lecture 8 - Taguchi's Method
Lecture 9 - Failure mode and effects analysis
Lecture 10 - Problem Solving : Failure mode and effects analysis - 1
Lecture 11 - Problem solving : Failure mode and effects analysis - 2
Lecture 12 - Product quality improvement methods
Lecture 13 - Quality tools - Part 1
Lecture 14 - Quality Tools - Part 2
Lecture 15 - Different types of control charts
Lecture 16 - Mean, Variance and Standard deviation
Lecture 17 - X bar chart, R-chart
Lecture 18 - Plotting methods for control charts
Lecture 19 - Six Sigma - Part 1
Lecture 20 - Six Sigma - Part 2
Lecture 21 - Theory of probability
Lecture 22 - Determining the defective products using Probability
Lecture 23 - Sampling based on Permutations and Combinations
Lecture 24 - Bionomial distribution
Lecture 25 - Poisson distribution
Lecture 26 - Poisson distribution
Lecture 27 - Normal Distribution
Lecture 28 - Overview of control charts and different types of distribution
Lecture 29 - Fundamental of Robotics and its applications in Automated Systems

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Lecture 30 - Joint configuration systems of Robot

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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Finite Element Analysis

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Finite Element Analysis(FEA)
Lecture 2 - Introduction of FEA, Nodes, Elements and Shape Functions
Lecture 3 - Nodes, Elements and Shape Functions
Lecture 4 - Polynomials as Shape Functions, Weighted Residuals, Elements and Assembly Level Equations
Lecture 5 - Types of Errors in FEA, Overall FEA Process and Convergence
Lecture 6 - Strengths of FE Method, Continuity conditions at Interfaces
Lecture 7 - Key concepts and terminologies
Lecture 8 - Weighted integral statements
Lecture 9 - Integration by parts - Review
Lecture 10 - Gradient and Divergence Theorems-Part - I
Lecture 11 - Gradient and Divergence Theorems Part - II
Lecture 12 - Functionals
Lecture 13 - Variational Operator
Lecture 14 - Weighted Integral and Weak Formulation
Lecture 15 - Weak Formulation
Lecture 16 - Weak Formulation and Weighted Integral
Lecture 17 - Variational Methods
Lecture 18 - Rayleigh Ritz Method
Lecture 19 - Method of Weighted Residuals
Lecture 20 - Different types of Weighted Residual Methods - Part I
Lecture 21 - Different types of Weighted Residual Methods - Part II
Lecture 22 - FEA formulation for 2nd order BVP - Part I
Lecture 23 - FEA formulation for 2nd order BVP - Part II
Lecture 24 - Element Level Equations
Lecture 25 - 2nd Order Boundary Value Problem
Lecture 26 - Assembly of element equations
Lecture 27 - Assembly of element equations and implementation of boundary conditions
Lecture 28 - Assembly process and the connectivity matrix
Lecture 29 - Radially Symmetric Problems

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Lecture 30 - One dimensional heat transfer
Lecture 31 - 1D-Heat conduction with convective effects
Lecture 32 - Euler-Bernoulli beam
Lecture 33 - Interpolation functions for Euler-Bernoulli beam
Lecture 34 - Finite element equations for Euler-Bernoulli beam
Lecture 35 - Assembly equations for Euler-Bernoulli beam
Lecture 36 - Boundary conditions for Euler-Bernoulli beam
Lecture 37 - Shear deformable beams
Lecture 38 - Finite element formulation for shear deformable beams
Lecture 39 - Finite element formulation for shear deformable beams
Lecture 40 - Equal interpolation but reduced integration element
Lecture 41 - Eigenvalue problems
Lecture 42 - Eigenvalue problems
Lecture 43 - Introduction to time dependent problems
Lecture 44 - Spatial approximation
Lecture 45 - Temporal approximation for parabolic problems
Lecture 46 - Temporal approximation for parabolic problems
Lecture 47 - Temporal approximation for hyperbolic problems
Lecture 48 - Explicit and implicit method, diagonalization of mass matrix, closure

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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Noise and Its Measurements

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Vibration versus Waves
Lecture 3 - Nature of Sound
Lecture 4 - The Decibel Scale
Lecture 5 - Some Key Terms
Lecture 6 - Adding Decibels
Lecture 7 - Modeling Sound Propagation
Lecture 8 - The Momentum Equation
Lecture 9 - The Continuity Equation and The Gas Law
Lecture 10 - 1-D Wave Equation
Lecture 11 - General Solution for 1-D Wave Equation
Lecture 12 - Complex Time Signal and Transfer Functions
Lecture 13 - Transmission line equations
Lecture 14 - Planar Waves in Closed Tubes
Lecture 15 - Planar Waves in 1-D Open Tubes
Lecture 16 - A Semi-Infinite Tube and Overall Summary
Lecture 17 - 1-D Tubes with Imperfect Terminations
Lecture 18 - Measuring Impedance Through KundtÂ s Apparatus
Lecture 19 - Classification of Microphones
Lecture 20 - Classification of Microphones - Continuation
Lecture 21 - Classification of Microphones by Application
Lecture 22 - Microphone Sensitivity
Lecture 23 - Microphone Sensitivity- Continuation
Lecture 24 - Selecting the Right Microphone
Lecture 25 - Fourier Series Expansion
Lecture 26 - Fourier Series Expansion - Continuation
Lecture 27 - Fourier Integral
Lecture 28 - Fourier Integral - Continuation
Lecture 29 - Fourier Transform

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Lecture 30 - Fourier Transform - Continuation
Lecture 31 - Discrete Fourier Transform (DFT)
Lecture 32 - Discrete Fourier Transform (DFT) - Continuation
Lecture 33 - DFT - Calculating Frequencies and Padding
Lecture 34 - DFT - Influence of Duration and Sampling frequency on resolution
Lecture 35 - FFT and Inverse FFT
Lecture 36 - Considerations while deciding instrumentation
Lecture 37 - Considerations while selecting instruments for noise measurements
Lecture 38 - Measuring impedance through two microphone method
Lecture 39 - Designing an impedance measurement tube
Lecture 40 - Octave band analysis
Lecture 41 - Calculating results in octave bands
Lecture 42 - Weighting
Lecture 43 - Short time Fourier transforms (STFT)
Lecture 44 - Spectrograms
Lecture 45 - Reverberation time
Lecture 46 - Anechoic rooms
Lecture 47 - STC, NRC and sound attenuation
Lecture 48 - Reverberant rooms

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Process Technology - Part I

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Manufacturing Process Tecnology
Lecture 2 - Structure of Matter (Bonding of Solids,Crystal Structures)
Lecture 3 - Brief introduction of non-conventional machining processes
Lecture 4 - Structure of matters (bonding of solids, crystal structures)
Lecture 5 - Elastic and Plastic Deformation
Lecture 6 - Crystal imperfaction and dislocation
Lecture 7 - Plastic Deformation
Lecture 8 - Material Properties, Stress Strain Diagram for differnt types of materials
Lecture 9 - Friction and Wear, Solid solutions
Lecture 10 - Equilibrium Phase Diagram
Lecture 11 - Iron-carbon equilibrium phase diagram
Lecture 12 - Control of material properties (Alloying and heat treatment), Mechanical properties and Recrysta
Lecture 13 - Introduction To Casting Process
Lecture 14 - Pattern and Mold Design
Lecture 15 - Mold Making Procedures
Lecture 16 - Fundamentals of Melting and Furnaces & Pouring and Gating Design
Lecture 17 - Vertical and Bottom Gating Systems Edit Lesson
Lecture 18 - Numerical Estimation To Find Mold Filling Time and Mold Design
Lecture 19 - Effects of friction and velocity distribution in time of filling
Lecture 20 - Numerical design of gating systems using frictional and bending losses
Lecture 21 - Principle of cooling and solidification in single and multiphase systems
Lecture 22 - Estimation of rate of solidification
Lecture 23 - Principles of cooling and solidification of casting
Lecture 24 - Modeling of Solidification Rates of Thin Casting in a Metal Mold
Lecture 25 - Solidification with Predominant Interface Resistance
Lecture 26 - Solidification with Constant Casting Surface Temperature
Lecture 27 - Solidification of Casting with Predominant Resistance in Mold and Solidified Metal
Lecture 28 - Solidification Time for Permanent Mold Casting
Lecture 29 - Solidification with Constant Casting Surface

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Lecture 30 - Riser Design and Placement - Part 1
Lecture 31 - Riser Design and Placement - Part 2
Lecture 32 - Riser Design and Placement - Part 3
Lecture 33 - Introduction of Machining Processes
Lecture 34 - Review of Basic Machining Processes and the Mechanics of Chip Formation
Lecture 35 - Estimation of Cutting Ratio and Shear Angle
Lecture 36 - Merchant's Force Analysis
Lecture 37 - Merchant Theory (Cutting Forces Analysis)
Lecture 38 - Merchant Theory (Force analysis) Part-2
Lecture 39 - Lee Shaffer's Solution
Lecture 40 - Specific Energy Model for Cutting
Lecture 41 - Modeling of Heat Generation and Cutting Tool Temperature
Lecture 42 - Temperature in Cutting and Builtup Edge Formation
Lecture 43 - Metal Cutting Operation
Lecture 44 - Tool life and Tool wear
Lecture 45 - Economics of Machining
Lecture 46 - Joining Process
Lecture 47 - Principle of Solid State Welding
Lecture 48 - Numerical Design of Welding Power Sources in Arc Welding

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NPTEL Video Course - Mechanical Engineering - Manufacturing Systems Technology - I and II

Subject Co-ordinator - Prof. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Manufacturing Process Tecnology
Lecture 2 - Structure of Matter (Bonding of Solids, Crystal Structures)
Lecture 3 - Brief introduction of non-conventional machining processes
Lecture 4 - Structure of matters (bonding of solids, crystal structures)
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Lecture 7 - Plastic Deformation
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Lecture 27 - Solidification of Casting with Predominant Resistance in Mold and Solidified Metal
Lecture 28 - Solidification Time for Permanent Mold Casting
Lecture 29 - Solidification with Constant Casting Surface

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Lecture 40 - Specific Energy Model for Cutting
Lecture 41 - Modeling of Heat Generation and Cutting Tool Temperature
Lecture 42 - Temperature in Cutting and Builtup Edge Formation
Lecture 43 - Metal Cutting Operation
Lecture 44 - Tool life and Tool wear
Lecture 45 - Economics of Machining
Lecture 46 - Joining Process
Lecture 47 - Principle of Solid State Welding
Lecture 48 - Numerical Design of Welding Power Sources in Arc Welding
Lecture 49 - Modes of metal transfer in arc welding
Lecture 50 - Metal forming Processes Edit Lesson
Lecture 51 - Yield Criterion used in Metal Forming Processes Edit Lesson
Lecture 52 - Concept of Principal stress, strain
Lecture 53 - Trescas' Yield criteria and Rolling Process
Lecture 54 - Rolling Processes - Part 1
Lecture 55 - Rolling Processes - Part 2
Lecture 56 - Introduction to Advanced Machining Processes
Lecture 57 - Classification of Machining Processes
Lecture 58 - Silicon growth and Crystallography
Lecture 59 - Micro Fabrication Technology
Lecture 60 - Photolithography
Lecture 61 - Soft Lithography
Lecture 62 - Introduction to Wet Etching Techniques
Lecture 63 - Introduction to Dry Etching Techniques
Lecture 64 - Introduction to Abrasive Jet Machining Process
Lecture 65 - Ultrasonic Machining Process
Lecture 66 - Determination of MRR of Ultrasonic Machining Process
Lecture 67 - Mechanics of Ultrasonic Machining (USM)
Lecture 68 - Effect of Process parameters of USM

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Lecture 69 - Ultrasonic Machining Unit
Lecture 70 - Introductions of Electro-chemical Drilling Process
Lecture 71 - Electric Discharge Machining Process
Lecture 72 - EDM - Part 2
Lecture 73 - Effect of various process parameters on EDM process
Lecture 74 - Analysis of RC circuit for EDM
Lecture 75 - Electrodischarge machining sytem
Lecture 76 - Effect of various parameters on EDM Process
Lecture 77 - Tool Electrodes and Dielectric fluids and Electron Beam Machining
Lecture 78 - Introduction to Finishing Process
Lecture 79 - Electrochemical Machining Processes (ECM)
Lecture 80 - Material Removal Rate of ECM
Lecture 81 - Electrode Double Layer
Lecture 82 - Material removal rate of an alloy in ECM
Lecture 83 - Kinematics and Dynamics of ECM
Lecture 84 - Temperature and Pressure rise during ECM
Lecture 85 - Determination of Electrolyte flow velocity in ECM
Lecture 86 - Theoretical determination of Tool shape
Lecture 87 - Design for Electrolyte flow in ECM
Lecture 88 - Mechanics of Electron Beam Machining Process
Lecture 89 - Functional Characteristics of EBM Process Edit Lesson
Lecture 90 - Introduction of Laser Beam Machining Process
Lecture 91 - Material removal rate of LBM
Lecture 92 - Heat conduction and Temperature rise during LBM
Lecture 93 - Modelling of LBM processes
Lecture 94 - Introduction of Additive Techniques
Lecture 95 - Additive Manufacturing Processes
Lecture 96 - Fused Deposition Modeling Process

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NPTEL Video Course - Mechanical Engineering - NOC:Nature and Property of Materials

Subject Co-ordinator - Prof. Bishakh Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History and Evolution of Materials
Lecture 2 - Classification of Materials
Lecture 3 - Advanced and Exotic Materials
Lecture 4 - Mechanical Properties of Materials - I
Lecture 5 - Mechanical Properties of Materials - II
Lecture 6 - Mechanical Properties of Materials - III
Lecture 7 - Bonding between atoms
Lecture 8 - The Role of Crystal Structure - I
Lecture 9 - The Role of Crystal Structure - II
Lecture 10 - The Role of Crystal Structure - III
Lecture 11 - Metals - I (Ferrous alloys)
Lecture 12 - Metals - II (Non-Ferrous alloys)
Lecture 13 - Metals - III (Strengthening and Degradation)
Lecture 14 - Ceramics - I
Lecture 15 - Ceramics - II
Lecture 16 - Polymers
Lecture 17 - Polymeric Structure
Lecture 18 - Effects of Glass transition temperature
Lecture 19 - Polymer Mechanical properties
Lecture 20 - Composites - I
Lecture 21 - Composites - II
Lecture 22 - Composites - III
Lecture 23 - Smart Materials - I (Introduction)
Lecture 24 - Smart Materials - II (Piezoelectricity)
Lecture 25 - Smart Materials - III (Magnetostriction)
Lecture 26 - Smart Materials - IV (Smart Polymers)
Lecture 27 - Smart Materials - V (SMA)
Lecture 28 - Materials Selection in Engineering Design
Lecture 29 - Numerical

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Lecture 30 - Numerical
Lecture 31 - Numerical
Lecture 32 - Numerical
Lecture 33 - Optical Properties
Lecture 34 - Optical Fiber
Lecture 35 - Thermal Properties
Lecture 36 - Numerical
Lecture 37 - Electric Properties - I
Lecture 38 - Electric Properties - II
Lecture 39 - Magnetic Properties
Lecture 40 - Laboratory demonstration

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Process Technology - Part II

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Advanced Machining Processes
Lecture 2 - Classification of Machining Processes
Lecture 3 - Silicon growth and Crystallography
Lecture 4 - Micro Fabrication Technology
Lecture 5 - Photolithography
Lecture 6 - Soft Lithography
Lecture 7 - Introduction to Wet Etching Techniques
Lecture 8 - Introduction to Dry Etching Techniques
Lecture 9 - Introduction of Additive Techniques
Lecture 10 - Introduction to Abrasive Jet Machining Process
Lecture 11 - Ultrasonic Machining Process
Lecture 12 - Determination of MRR of Ultrasonic Machining Process
Lecture 13 - Mechanics of Ultrasonic Machining (USM)
Lecture 14 - Effect of Process parameters of USM
Lecture 15 - Ultrasonic Machining Unit
Lecture 16 - Electrochemical Machining Processes (ECM)
Lecture 17 - Material Removal Rate of ECM
Lecture 18 - Electrode Double Layer
Lecture 19 - Material removal rate of an alloy in ECM
Lecture 20 - Kinematics and Dynamics of ECM
Lecture 21 - Temperature and Pressure rise during ECM
Lecture 22 - Determination of Electrolyte flow velocity in ECM
Lecture 23 - Effect of heat and Hydrogen bubble generation during ECM Process
Lecture 24 - Theoretical determination of Tool shape
Lecture 25 - Design for Electrolyte flow in ECM
Lecture 26 - Introductions of Electro-chemical Drilling Process
Lecture 27 - Introduction to Finishing Process
Lecture 28 - Electric Discharge Machining Process
Lecture 29 - EDM part-2

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Lecture 30 - Effect of various process parameters on EDM process
Lecture 31 - Analysis of RC circuit for EDM
Lecture 32 - Electrodischarge machining sytem
Lecture 33 - Effect of various parameters on EDM Process
Lecture 34 - Tool Electrodes and Dielectric fluids and Electron Beam Machining
Lecture 35 - Mechanics of Electron Beam Machining Process
Lecture 36 - Functional Characteristics of EBM Process Edit Lesson
Lecture 37 - Introduction of Laser Beam Machining Process
Lecture 38 - Material removal rate of LBM
Lecture 39 - Heat conduction and Temperature rise during LBM
Lecture 40 - Modelling of LBM processes
Lecture 41 - Metal forming Processes Edit Lesson
Lecture 42 - Yield Criterion used in Metal Forming Processes Edit Lesson
Lecture 43 - Concept of Principal stress, strain
Lecture 44 - Trescas' Yield criteria and Rolling Process
Lecture 45 - Rolling Processes - Part 1
Lecture 46 - Rolling Processes - Part 2
Lecture 47 - Additive Manufacturing Processes
Lecture 48 - Fused Deposition Modeling Process

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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Finite Element Analysis - II

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of the Course
Lecture 2 - Fundamental principles
Lecture 3 - Steps followed in FEA
Lecture 4 - Weak Formulation
Lecture 5 - Weak Formulation
Lecture 6 - Assembling element level equations
Lecture 7 - Errors in FEA Solution
Lecture 8 - Measures of Errors in FEA Solution
Lecture 9 - Convergence and Accuracy of Solution - Part I
Lecture 10 - Convergence and Accuracy of Solution - Part II
Lecture 11 - Convergence - Part I
Lecture 12 - Convergence - Part II
Lecture 13 - Numerical Integration Schemes - Part I
Lecture 14 - Numerical Integration Schemes - Part II
Lecture 15 - Approximations - Part I
Lecture 16 - Approximations - Part II
Lecture 17 - Approximations - Part III
Lecture 18 - Gauss Quadrature
Lecture 19 - Gaussian Quadrature review
Lecture 20 - Gaussian Quadrature - Part II
Lecture 21 - Gaussian Quadrature - Part III
Lecture 22 - Newton-Cotes Quadrature
Lecture 23 - Two dimensional FEM problem
Lecture 24 - Two dimensional one variable FEM problem
Lecture 25 - 2D Finite element problems with single variable (Model equation)
Lecture 26 - 2D Finite element problems with single variable (Weak formulation)
Lecture 27 - Elemental level 2D finite element equations
Lecture 28 - Interpolation functions for 2D finite element problems
Lecture 29 - Interpolation functions for linear triangular elements - Part I

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Lecture 30 - Interpolation functions for linear triangular elements - Part II
Lecture 31 - Interpolation functions for Triangular and Rectangular elements
Lecture 32 - Evaluation of Stiffness and Force matrices
Lecture 33 - Stiffness and Force matrices for Triangular element
Lecture 34 - Stiffness and Force matrices for Rectangular element
Lecture 35 - Boundary elements for Finite element Equations
Lecture 36 - Boundary integrals for Triangular element
Lecture 37 - Assembly of 2-D finite elements - Part I
Lecture 38 - Assembly of 2-D finite elements - Part II
Lecture 39 - 2-D Heat transfer problems - Part I
Lecture 40 - 2-D Heat transfer problems - Part II
Lecture 41 - Numerical integration schemes for 2-D problems
Lecture 42 - Jacobian and transformation matrix for 2-D problems
Lecture 43 - Numerical Integration Schemes for 2-D Problems
Lecture 44 - Post-processing
Lecture 45 - Plane Elasticity Problems
Lecture 46 - Plane Elasticity Problems
Lecture 47 - Plane Elasticity Problems
Lecture 48 - Plane Elasticity Problems

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NPTEL Video Course - Mechanical Engineering - NOC:Principles of Vibration Control

Subject Co-ordinator - Prof. Bishakh Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Vibration control
Lecture 2 - Strategies and Steps in Vibration Control
Lecture 3 - Strategies, Active control, Detuning and Decoupling
Lecture 4 - Viscous damping model
Lecture 5 - Coulomb and Hysteretic damping model
Lecture 6 - Energy Dissipation in Structural Materials
Lecture 7 - Material Selection Criterion against Damping
Lecture 8 - Design for Enhanced Material Damping
Lecture 9 - Linear Viscoelastic Materials and Models
Lecture 10 - Maxwell and 3-Parameter Models
Lecture 11 - Complex modulus and Applications of VEM
Lecture 12 - Basics of Dynamic Vibration Absorber
Lecture 13 - Modelling of Dynamic Vibration Absorber
Lecture 14 - Proof mass Actuator
Lecture 15 - Springs for Vibration Isolation
Lecture 16 - Introduction to Active Vibration Control
Lecture 17 - Basics of Classical Control System
Lecture 18 - Basics of State Space Control
Lecture 19 - Controllability and Observability of System
Lecture 20 - Full State Feedback Control
Lecture 21 - SMSS Laboratory Demonstration

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Acoustics

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lesson 1 - Course Overview
Lecture 2 - Lesson 2 - Introduction
Lecture 3 - Lesson 3 - Nature Of Sound
Lecture 4 - Lesson 4 - The Decibel scale
Lecture 5 - Lesson 5 - Key Terms In Acoustics
Lecture 6 - Lesson 6 - Adding Decibels
Lecture 7 - Lesson 1 - Important Mathematical Concepts-Complex Algebra
Lecture 8 - Lesson 2 - Important Mathematical Concepts-Complex Time Signals
Lecture 9 - Lesson 3 - Important Mathematical Concepts-Transfer Function
Lecture 10 - Lesson 4 - Important Mathematical Concepts-Pole Zero Plot
Lecture 11 - Lesson 5 - Important Mathematical Concepts - Bode Plot For Simple Pole
Lecture 12 - Lesson 6 - Important Mathematical Concepts - Bode Plot For Simple Zero
Lecture 13 - Lesson 1 - Bode Plots (Magnitude) for Complex Transfer Functions
Lecture 14 - Lesson 2 - Momentum Equation for 1-D Sound Propagation
Lecture 15 - Lesson 3 - Continuity Equation for 1-D Sound Propagation
Lecture 16 - Lesson 4 - Gas Law for 1-D Sound Propagation
Lecture 17 - Lesson 5 - 1-D Wave Equation
Lecture 18 - Lesson 6 - Solution for 1-D Wave Equation
Lecture 19 - Lesson 1 - Waveguide
Lecture 20 - Lesson 2 - Transmission Line Equations - Part I
Lecture 21 - Lesson 3 - Transmission Line Equations - Part II
Lecture 22 - Lesson 4 - Transmission Line Equations - Part III
Lecture 23 - Lesson 5 - Transmission Line Equations - Part IV
Lecture 24 - Lesson 6 - Transmission Line Equations - Part V
Lecture 25 - Lesson 1 - Instantaneous Power
Lecture 26 - Lesson 2 - Instantaneous Power in a L-R Circuit
Lecture 27 - Lesson 3 - Power Factor, and Acoustic Power
Lecture 28 - Lesson 4 - Power Flow into an Infinitely Long Tube
Lecture 29 - Lesson 5 - Point Sources of Sound

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Lecture 30 - Lesson 6 - Relations for Outward Travelling Spherical Acoustic Wave
Lecture 31 - Lesson 1 - Specific Acoustic Impedance for a Closed Tube
Lecture 32 - Lesson 2 - Specific Acoustic Impedance for an Open Tube and an Infinitely Long Tube
Lecture 33 - Lesson 3 - Specific Acoustic Impedance for a Tube with Imperfect Termination
Lecture 34 - Lesson 4 - KundtÂ s Tube
Lecture 35 - Lesson 5 - Volume Velocity
Lecture 36 - Lesson 6 - Comparison of Impedances for a Radially Propagating Wave and a Planar Wave
Lecture 37 - Lesson 1 - Interference of sound sources - Part I
Lecture 38 - Lesson 2 - Interference of sound sources - Part II
Lecture 39 - Lesson 3 - Interference of sound sources - Part III
Lecture 40 - Lesson 4 - Interference of sound sources - Part IV
Lecture 41 - Lesson 5 - Directivity
Lecture 42 - Lesson 6 - Complex power, pressure and velocity for a spherical source
Lecture 43 - Lesson 1 - Noise reduction - Mass Attenuation Method
Lecture 44 - Lesson 2 - Noise Reduction - Pressure Ratio
Lecture 45 - Lesson 3 - Noise Reduction - Velocity of Wall
Lecture 46 - Lesson 4 - 3 Media Problem - Introduction
Lecture 47 - Lesson 5 - 3 Media Problem - Apply Boundary Conditions
Lecture 48 - Lesson 6 - 3 Media Problem - Special cases
Lecture 49 - Lesson 1 - Mufflers
Lecture 50 - Lesson 2 - Designing of Reactive Mufflers
Lecture 51 - Lesson 3 - Designing of Dissipative Mufflers
Lecture 52 - Lesson 4 - Time and Frequency Domain Representation of a Signal
Lecture 53 - Lesson 5 - Fourier Series
Lecture 54 - Lesson 6 - Fourier Series
Lecture 55 - Lesson 1 - Fourier Transform
Lecture 56 - Lesson 2 - Fourier Transform
Lecture 57 - Lesson 3 - Fourier Transform
Lecture 58 - Lesson 4 - Discrete Fourier Transform (DFT)
Lecture 59 - Lesson 5 - Discrete Fourier Transform (DFT)
Lecture 60 - Lesson 6 - Discrete Fourier Transform (DFT)
Lecture 61 - Lesson 1 - Measuring Sound Signals
Lecture 62 - Lesson 2 - Microphones
Lecture 63 - Lesson 3 - Microphones
Lecture 64 - Lesson 4 - Weighting
Lecture 65 - Lesson 5 - Loudness
Lecture 66 - Lesson 6 - Loudness
Lecture 67 - Lesson 1 - Octave Band Analysis - Part I
Lecture 68 - Lesson 2 - Octave Band Analysis Â Part II

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Lecture 69 - Lesson 3 - Octave Band Analysis Â Part III
Lecture 70 - Lesson 4 - Reverberation Time
Lecture 71 - Lesson 5 - Calculation of Reverberation Time and Sound Transmission Class (STC)
Lecture 72 - Lesson 6 - Noise Reduction Coefficient (NRC)

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NPTEL Video Course - Mechanical Engineering - NOC:Heat Treatment and Surface Hardening - II

Subject Co-ordinator - Dr. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Recap - I
Lecture 2 - Recap - II
Lecture 3 - Recap - III
Lecture 4 - Determination of Phase Diagram (Experimentally) - I
Lecture 5 - Determination of Phase Diagram (Experimentally) - II
Lecture 6 - Determination of Phase Diagram (Thermodynamically)
Lecture 7 - Effect of pressure on phase transformation temperature and concept of equilibrium between condens
Lecture 8 - Effect of different parameters on heat treatment and concept of saturation vapor pressure with ex
Lecture 9 - Title
Lecture 10 - G-X diagrams (Part- II) and concept of chemical potential (Micro Sign) from G-X diagrams.
Lecture 11 - Concept of common tangent for equilibrium between two phases
Lecture 12 - Expressions for equilibrium of two phases - I
Lecture 13 - Expressions for equilibrium of two phases - II
Lecture 14 - Expressions for equilibrium of two phases - III
Lecture 15 - Determining nucleation of phases using G-X plot
Lecture 16 - Î G for nucleation and overall transformation, concepts of solid state transformation including
Lecture 17 - Introduction to real solutions and expression of Î Hmix based on the Quasi-Chemical Model (QCM)
Lecture 18 - Expression for Î Hmix as a function of interaction energy and mole fraction, based on the QCM -
Lecture 19 - Expression for Î Hmix as a function of interaction energy and mole fraction, based on the QCM -
Lecture 20 - Graphical representation of Î Gmix, Î Hmix, and -TÎ Smix for real solutions and evolution of eut
Lecture 21 - Effect of Î Hmix on determination of phase diagrams (same crystal structure)
Lecture 22 - Effect of Î Hmix on determination of phase diagrams (Continued...)
Lecture 23 - Importance of phase diagrams
Lecture 24 - Effect of heat treatment on microstructure evolution in steel - I
Lecture 25 - Effect of heat treatment on microstructure evolution in steel - II
Lecture 26 - Recap of homogeneous and heterogeneous nucleation for solid to solid transformation
Lecture 27 - Nucleation rate and its dependence on T (temp. of interest), Î T, Î G v and Î G* and, introducti
Lecture 28 - Growth kinetics (Continued...)
Lecture 29 - Growth rate variation with undercooling and kinetics of overall phase transformation

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Lecture 30 - Implication of Avramiâ s equation with example on excel spreadsheet
Lecture 31 - Experimental verification of Avrami Equation
Lecture 32 - Linear regression (least squares) method to find the value of n and k in Avrami equation
Lecture 33 - In this lecture, method to determine the goodness of fit has been explained. Procedure to estima
Lecture 34 - Stereology and quantitative metallography - I
Lecture 35 - Stereology and quantitative metallography - II
Lecture 36 - Grain size measurements methods
Lecture 37 - Statistical tools for analysis and reporting of obtained data with examples
Lecture 38 - Evolution of TTT and CCT diagram from f vs. t plots
Lecture 39 - TTT, CCT continue and hardenability of steel
Lecture 40 - Importance of heat treatment practices in real life (with examples)

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NPTEL Video Course - Mechanical Engineering - NOC:Phase Transformation in Materials

Subject Co-ordinator - Dr. Krishanu Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Introduction
Lecture 2 - Define Phase, Equilibrium
Lecture 3 - Free Energy, Stability of Phases
Lecture 4 - Gibbs Free Energy of Binary Solution
Lecture 5 - Ideal Solution and Chemical Potential
Lecture 6 - Thermodynamics of solid solutions
Lecture 7 - G vs X curves
Lecture 8 - Solid solutions
Lecture 9 - Heterogeneous phase equilibria
Lecture 10 - G vs X curves for eutectic system
Lecture 11 - G-X plot for peritectic system
Lecture 12 - Effect of temperature of solid solubility, Influence of interfaces on Equilibrium
Lecture 13 - Introduction of Diffusion
Lecture 14 - Mechanism of Diffusion, Fick's I law
Lecture 15 - Fick's II law
Lecture 16 - Fick's II law (Continued...), Diffusion and Temperature
Lecture 17 - Interfacial Free Energy,Solid/Vapor Interface
Lecture 18 - Boundaries in single phase solids
Lecture 19 - High angle grain boundaries, Equilibrium in poly-crystalline materials, Interphase interfaces ir
Lecture 20 - Interphase interfaces in solids (Continued...)
Lecture 21 - CSL Boundaries
Lecture 22 - Types of Nucleations
Lecture 23 - Homogeneous Nucleation
Lecture 24 - Homogeneous Nucleation (Continued...)
Lecture 25 - Heterogeneous Nucleation
Lecture 26 - Heterogeneous nucleation (Continued...)
Lecture 27 - Growth
Lecture 28 - Atomic mechanism of growth
Lecture 29 - Dendritic Solidification

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Lecture 30 - Growth rate for dendrite formation
Lecture 31 - Alloy solidification
Lecture 32 - Alloy solidification (Continued...)
Lecture 33 - Eutectic
Lecture 34 - Eutectic
Lecture 35 - Solidification of casting / ingot
Lecture 36 - Precipitation hardenable alloy
Lecture 37 - Precipitation age- hardening alloy (Continued...)
Lecture 38 - Age hardening alloy
Lecture 39 - Eutectoid transformation
Lecture 40 - Eutectoid transformation (Continued....)
Lecture 41 - Eutectoid transformation in steel (Continued...)
Lecture 42 - Martensite
Lecture 43 - Martensite (Continued...)
Lecture 44 - Martensite (Continued...) and TTT curves
Lecture 45 - TTT diagram
Lecture 46 - Recovery, Recrystallization and Grain growth
Lecture 47 - Recovery
Lecture 48 - Recrystallization
Lecture 49 - Recrystallization (Continued...)
Lecture 50 - Introduction to spinodal decomposition

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing of Composites

Subject Co-ordinator - Prof. J. Ramkumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Composites
Lecture 2 - Matrices
Lecture 3 - Fiber reinforcements
Lecture 4 - Fiber reinforcements (Continued...)
Lecture 5 - Composites properties
Lecture 6 - Composites testing
Lecture 7 - Selection of material
Lecture 8 - Selection of material (Continued...)
Lecture 9 - Design for Manufacturing
Lecture 10 - Design for Manufacturing (Continued...)
Lecture 11 - Composite Manufacturing Processes
Lecture 12 - Filament winding Processes
Lecture 13 - Resin transfer moulding
Lecture 14 - Pultrusion
Lecture 15 - Compression Moulding Process
Lecture 16 - Vacuum Impregnation Methods
Lecture 17 - Stacking of Composites
Lecture 18 - Thermoplastic Composites Manufacturing Processes - Part 1
Lecture 19 - Thermoplastic Composites Manufacturing Processes - Part 2 (Continued...)
Lecture 20 - Non-destructive testing methods for composite materials
Lecture 21 - Metal Matrix Composites
Lecture 22 - Metal Matrix Composites applications (Continued...)
Lecture 23 - Processing of Metal Matrix Composites - Part 1
Lecture 24 - Processing of Metal Matrix Composites - Part 2
Lecture 25 - Ceramic Matrix Composites
Lecture 26 - Fabrication of Ceramic Matrix Composites (CMCs)
Lecture 27 - Carbon - Carbon Composites
Lecture 28 - Polymer Matrix and Nano Composites
Lecture 29 - Machining of Composites

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Lecture 30 - Repair of Composites
Lecture 31 - Manufacturing Processes

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NPTEL Video Course - Mechanical Engineering - NOC:Applied Ergonomics

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30 - Work Systems
Lecture 31 - Measures of Productivity
Lecture 32 - Productivity Measurement
Lecture 33 - Work Study
Lecture 34 - Motion and time study
Lecture 35 - (Missing)
Lecture 36 - (Missing)
Lecture 37 - (Missing)
Lecture 38 - (Missing)
Lecture 39 - (Missing)
Lecture 40 - Industrial accidents
Lecture 41 - Human Errors
Lecture 42 - Workers compensation laws
Lecture 43 - Organisation Ergonomics - Part 1
Lecture 44 - Organisation Ergonomics - Part 2
Lecture 45 - Job Satisfaction
Lecture 46 - Worker behavior

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NPTEL Video Course - Mechanical Engineering - NOC:Sustainability through Green Manufacturing Systems - An App

Subject Co-ordinator - Dr. Deepu Philip, Dr. Amandeep Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Production
Lecture 2 - Basics of Production (Continued...)
Lecture 3 - Sustainability and Manufacturing
Lecture 4 - Introduction to Simulation
Lecture 5 - Introduction to Simulation (Continued...)
Lecture 6 - Basic Statistical Concepts for Sustainable Manufacturing Analysis
Lecture 7 - Basic Statistical Concepts for Sustainable Manufacturing Analysis (Continued...)
Lecture 8 - Life Cycle Assessment
Lecture 9 - Life Cycle Assessment Elements
Lecture 10 - Life Cycle Assessment Procedure
Lecture 11 - Life Cycle Assessment (Continued...)
Lecture 12 - Sustainability Framework
Lecture 13 - Basic Modeling Concepts for Factory Simulation
Lecture 14 - Basic Modeling Concepts for Factory Simulation (Continued...)
Lecture 15 - Green Manufacturing Modelling
Lecture 16 - Green Manufacturing Modelling (Continued...) Indices for Green Manufacturing
Lecture 17 - Green Manufacturing Modelling (Continued...) Developing Green Manufacturing System
Lecture 18 - Productivity and Sustainability
Lecture 19 - Productivity and Sustainability (Continued...)
Lecture 20 - Green Manufacturing Techniques
Lecture 21 - Green Manufacturing Techniques (Continued...)
Lecture 22 - Renewable Sources of Energy
Lecture 23 - Renewable Sources of Energy (Continued...)
Lecture 24 - Renewable energy in India and Industrial Symbiosis
Lecture 25 - Demonstration of Various Instruments Used for Green Machining
Lecture 26 - Laboratory demonstration

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NPTEL Video Course - Mechanical Engineering - NOC:Noise Management and Control

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Introduction
Lecture 3 - Nature Of Sound
Lecture 4 - Beats
Lecture 5 - The Decibel Scale
Lecture 6 - Key Terms in Acoustics
Lecture 7 - Decibel Scale - Part 1
Lecture 8 - Decibel Scale - Part 2
Lecture 9 - Decibel Scale - Part 3
Lecture 10 - Complex Numbers
Lecture 11 - Complex Time Function
Lecture 12 - Linear Systems
Lecture 13 - Transfer Functions
Lecture 14 - Introduction to One Dimensional Wave Equation
Lecture 15 - The Momentum Equation
Lecture 16 - The Continuity Equation and The Gas Law
Lecture 17 - One Dimensional Wave Equation
Lecture 18 - Solution for One Dimensional Wave Equation
Lecture 19 - Transmission Line Equations
Lecture 20 - One Dimensional Example Problems
Lecture 21 - Impedance
Lecture 22 - Pressure Wave Travels in a Closed Tube
Lecture 23 - Standing Wave Formation in a Closed Tube With Rigid Termination
Lecture 24 - Pressure Wave Travels in an Open Tube
Lecture 25 - 1-D sound wave propagation
Lecture 26 - 1-D sound wave propagation
Lecture 27 - Radially propagating sound waves in spherical coordinate system - I
Lecture 28 - Radially propagating sound waves in spherical coordinate system - II
Lecture 29 - Complex impedance for radially propagating sound waves in spherical coordinate system

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Lecture 30 - Volume velocity - I
Lecture 31 - Interference of 1-D spherically propagating sound waves - I
Lecture 32 - Interference of 1-D spherically propagating sound waves - II
Lecture 33 - Noise sources and introduction to microphones
Lecture 34 - Classification of microphones - I
Lecture 35 - Classification of microphones - II
Lecture 36 - Classification of microphones - III
Lecture 37 - Microphone Parameters
Lecture 38 - Understanding microphone specifications
Lecture 39 - Noise Source
Lecture 40 - Noise Source
Lecture 41 - Noise Source
Lecture 42 - Noise Source
Lecture 43 - Noise Source
Lecture 44 - Noise Source
Lecture 45 - Measuring Sound Power Level - Understanding standard octave bands
Lecture 46 - Measuring Sound Power Level - Fan noise - Part I
Lecture 47 - Measuring Sound Power Level - Fan noise - Part II
Lecture 48 - Measuring Sound Power Level - Fan noise - Part III
Lecture 49 - Weighting
Lecture 50 - Noise coming from Motors
Lecture 51 - Noise coming from Motors and Pumps
Lecture 52 - Noise coming from Pump and Motor Working Simultaneously
Lecture 53 - Noise coming from Compressors
Lecture 54 - Example problems regarding Noise coming from Compressor
Lecture 55 - Noise Spread Mechanisms
Lecture 56 - Reverberation time
Lecture 57 - Reverberation time example problem
Lecture 58 - Noise from Adjacent Room
Lecture 59 - Acoustic Enclosures
Lecture 60 - Acoustic Enclosures - Example Problems
Lecture 61 - Large acoustical enclosures - I
Lecture 62 - Large acoustical enclosures - II
Lecture 63 - Acoustic barriers - I
Lecture 64 - Acoustic barriers - II
Lecture 65 - Acoustic barriers - III
Lecture 66 - Helmholtz resonator - I

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NPTEL Video Course - Mechanical Engineering - NOC:Design Practice

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief introduction of Design systems
Lecture 2 - Product Developement
Lecture 3 - Basic protocols of industrial design
Lecture 4 - Design thinking and innovation
Lecture 5 - Brain Storming
Lecture 6 - Design prototyping
Lecture 7 - Generic Phases of the Design
Lecture 8 - Configurational Design Aspects
Lecture 9 - Concurrent Engineering
Lecture 10 - Concurrent Engineering - 2
Lecture 11 - Concurrent Engineering Approaches
Lecture 12 - Concurrent Engineering Approaches - 2
Lecture 13 - Benefits of concurrent engineering
Lecture 14 - Concurrent engineering environment influencing dimensions
Lecture 15 - Concurrent engineering environment influencing dimensions - 2
Lecture 16 - Program and product Interface dimensions in Concurrent engineering
Lecture 17 - Product Developement Methodology
Lecture 18 - Elements of concurrent engineering
Lecture 19 - Business relationships in concurrent engineering
Lecture 20 - Organizational elements in concurrent engineering
Lecture 21 - Techniques for the Implementation of concurrent engineering environment
Lecture 22 - Average quality loss
Lecture 23 - Robustness in Design
Lecture 24 - Robustness in Design - 2
Lecture 25 - Material selection in Engineering design
Lecture 26 - Material selection in Engineering Design.
Lecture 27 - Basic steps in Material Selection Process
Lecture 28 - Design of Work Systems
Lecture 29 - Motion Study

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Lecture 30 - Axiomatic Design
Lecture 31 - Introduction to group technology
Lecture 32 - Failure Mode Effect Analysis

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Composites

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition of the composite materials
Lecture 2 - Composite materials and its applications
Lecture 3 - Classification of the composite materials
Lecture 4 - What Makes fiber so strong?
Lecture 5 - Advantages and limitations of composite materials
Lecture 6 - Properties of the composite materials.
Lecture 7 - Different Types of Fiber
Lecture 8 - Production process and different types of Glass Fiber
Lecture 9 - Graphite Fibers
Lecture 10 - Aramid and Boron Fibers
Lecture 11 - Ceramic Fibers
Lecture 12 - Matrix - Properties and classifications
Lecture 13 - Polymers as matrix material and its classification
Lecture 14 - Thermosets and thermoplastics
Lecture 15 - Properties of thermosets and thermoplastics
Lecture 16 - Thermoset materials and its production methods
Lecture 17 - Thermoplastics and metals as matrix materials
Lecture 18 - Ceramic and carbon matrices
Lecture 19 - What is a good fabrication process of a composite?
Lecture 20 - Fabrication of Thermoset Composites
Lecture 21 - Hand Lay-Up Process
Lecture 22 - Bag Molding Process
Lecture 23 - Resin Transfer Molding Process
Lecture 24 - Fabrication of Thermoplastic, Metal and Ceramic Matrix based Composites
Lecture 25 - Terminologies and basic concepts
Lecture 26 - Orthotropic material
Lecture 27 - Modeling of unidirectional composites
Lecture 28 - Composite density as a function of mass fraction and volume fraction
Lecture 29 - Calculation of longitudinal modulus for unidirectional composites

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Lecture 30 - Failure modes of unidirectional composite
Lecture 31 - Failure of Unidirectional Lamina
Lecture 32 - Minimum Volume Fraction and Critical Volume Fraction
Lecture 33 - Example based on Failure of Composite Material
Lecture 34 - Example based on Minimum and Critical Volume Fraction
Lecture 35 - Transverse Modulus of Unidirectional Composite
Lecture 36 - Halpin-Tsai Relation for Transverse Modulus
Lecture 37 - Transverse modulus of unidirectional composites
Lecture 38 - Transverse strength of unidirectional composites
Lecture 39 - Poissonâ s ratio of unidirectional composites
Lecture 40 - Failure modes of composite materials
Lecture 41 - Failure modes of composite materials
Lecture 42 - Other properties
Lecture 43 - Concept of Tensor
Lecture 44 - Stress Transformation (Two Dimensional)
Lecture 45 - Analysis of Specially Orthotropic Lamina
Lecture 46 - Analysis of Generally Orthotropic Lamina
Lecture 47 - Transformation of Engineering Constants - Part I
Lecture 48 - Transformation of Engineering Constants - Part II
Lecture 49 - Variation of elastic constants with respect to fiber orientation for generally orthotropic lamir
Lecture 50 - Generally orthotropic lamina
Lecture 51 - Generalized Hookeâ s law for anisotropic materials
Lecture 52 - Generalized Hookeâ s law for anisotropic materials
Lecture 53 - Elastic constants for Specially orthotropic materials
Lecture 54 - Elastic constants for Specially orthotropic materials in plane stress
Lecture 55 - Relation Betweeen Engineering Constants and Elements of Stiffness and Compliance Matrices - Part
Lecture 56 - Relation Betweeen Engineering Constants and Elements of Stiffness and Compliance Matrices - Part
Lecture 57 - Stress Strain Relations for A Lamina With Arbitrary Orientation - Part I
Lecture 58 - Stress- Strain Relation for A Lamina With Arbitrary Orientation - Part II
Lecture 59 - Strength of An Orthotropic Lamina
Lecture 60 - Importance of Sign of Shear Stress in context of Strength of A Unidirectional Lamina
Lecture 61 - Strain displacement relations for a laminate
Lecture 62 - Stress-strain relations for individual layers of a laminate
Lecture 63 - Resultant forces and moments
Lecture 64 - Relations between force and moment resultants and mid-plane strains and curvatures
Lecture 65 - Physical significance of extensional stiffness matrix [A], coupling matrix [B] and bending stiff
Lecture 66 - Lamination sequence (standard laminate code)
Lecture 67 - Calculation of A, B and D Matrices.
Lecture 68 - Simplification of Stiffness Matrices - Part I

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Lecture 69 - Simplification of Stiffness Matrices - Part II
Lecture 70 - Quasi-Isotropic Laminates - Part I
Lecture 71 - Quasi-Isotropic Laminates - Part II
Lecture 72 - Failure of Composite Laminates

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NPTEL Video Course - Mechanical Engineering - NOC:Product Design and Manufacturing

Subject Co-ordinator - Dr. Amandeep Singh, Prof. J. Ramkumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to product design and Manufacturing
Lecture 2 - Introduction to product design and Manufacturing (Continued...)
Lecture 3 - Fundamentals of Manufacturing towards Product Development
Lecture 4 - Fundamentals of Manufacturing towards Product Development (Continued...)
Lecture 5 - Engineering Design Process
Lecture 6 - Product design morphology
Lecture 7 - Product characteristics
Lecture 8 - Elements of Visual Design - Part 1
Lecture 9 - Elements of Visual Design - Part 2
Lecture 10 - Elements of Visual Design - Part 3
Lecture 11 - Translating Customer Needs
Lecture 12 - Translating Customer Needs
Lecture 13 - Value Engineering, an introduction
Lecture 14 - Value Engineering Methodology - Part 1
Lecture 15 - Value Engineering Methodology - Part 2, FAST diagramming
Lecture 16 - Value Engineering Methodology - Part 3
Lecture 17 - Value Engineering, case study
Lecture 18 - Materials Selection - Part 1
Lecture 19 - Materials Selection - Part 2
Lecture 20 - Manufacturing Process Selection - Part 1
Lecture 21 - Manufacturing Process Selection - Part 2
Lecture 22 - Product Costing
Lecture 23 - Design for Manufacturing
Lecture 24 - Design for Assembly
Lecture 25 - Design for Maintenance
Lecture 26 - Design for Environment - Part 1
Lecture 27 - Design for Environment - Part 2
Lecture 28 - Quality Control
Lecture 29 - Quality Assurance

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Lecture 30 - Patent - Part 1
Lecture 31 - Patent - Part 2
Lecture 32 - Creativity techniques - Part 1
Lecture 33 - Creativity techniques - Part 2
Lecture 34 - Frugal Innovation
Lecture 35 - Rapid Prototyping, an introduction
Lecture 36 - Rapid Prototyping Modelling
Lecture 37 - Rapid Prototyping Processes - Part 1
Lecture 38 - Rapid Prototyping Processes - Part 2
Lecture 39 - Laboratory demonstration; 3D printing - Part 1
Lecture 40 - Laboratory demonstration; 3D printing - Part 2
Lecture 41 - Laboratory demonstration; 3D printing - Part 3
Lecture 42 - Plant Layout Planning - Part 1
Lecture 43 - Plant Layout Planning - Part 2
Lecture 44 - Laboratory demonstration; Plant Simulation - Part 1
Lecture 45 - Laboratory demonstration; Plant Simulation - Part 2
Lecture 46 - Laboratory demonstration; Plant Simulation - Part 3
Lecture 47 - Computer Integrated Manufacturing - Part 1
Lecture 48 - Computer Integrated Manufacturing - Part 2
Lecture 49 - Reverse Engineering
Lecture 50 - Managing Competitiveness

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NPTEL Video Course - Mechanical Engineering - NOC:Phase Equilibria in Materials - Nature and Properties of Ma

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Thermodynamics
Lecture 2 - Basic Thermodynamics
Lecture 3 - Phase Stability in Materials
Lecture 4 - Effects of Temperature and Pressure on Single Components System
Lecture 5 - Clausisus-Clapeyron Equation and Binary Solution
Lecture 6 - Calculation of Configurational Entropy
Lecture 7 - Chemical Potential
Lecture 8 - Phase Stability in Binary Solution
Lecture 9 - Activity and Thermodynamics of Regular Solution
Lecture 10 - Thermodynamic of Real Solution
Lecture 11 - Free Energy Curves and Various Systems
Lecture 12 - Solubility Limits 2-phase Co-existence
Lecture 13 - Phase Diagram Formation
Lecture 14 - Phase Diagram Construction
Lecture 15 - Phase Diagram Construction
Lecture 16 - Intermetallics and Phase Diagrams
Lecture 17 - Phase Rule
Lecture 18 - Gibb's Phase Rule
Lecture 19 - Gibb's Phase Rule
Lecture 20 - Phase Fraction Calculation in a Phase Diagram
Lecture 21 - Microstructure evolution in Cu-Ni binary system
Lecture 22 - Microstructure evolution (Continued...)
Lecture 23 - Phase evolution in hypoeutectic region
Lecture 24 - Phase evolution at Eutectic point
Lecture 25 - Phase Diagrams of Cu-Ni and Al-Si
Lecture 26 - Phase Diagrams of Pb-Sn and Fe-C
Lecture 27 - Phase Diagram of Fe-C (Continued...)
Lecture 28 - Fe-C Phase Diagram (Continued...)
Lecture 29 - Fe-C Phase Diagram (Continued...)

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Lecture 30 - Phase Diagrams for non-Ferrous Alloys
Lecture 31 - Method of measuring Phase diagram
Lecture 32 - Methods of measuring phase diagram (Continued...)
Lecture 33 - Methods of measuring phase diagram
Lecture 34 - Ternary Phase Diagram
Lecture 35 - Ternay Phase Diagram (Continued...)
Lecture 36 - Ternary system with two phases
Lecture 37 - Ternary system with three phases
Lecture 38 - Ternary phase diagram with 4 phases
Lecture 39 - Application of Phases diagrams
Lecture 40 - Summary of Course

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Composites

Subject Co-ordinator - Prof. Nachiketa Tiwari

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of composite materials
Lecture 2 - Different type of Fibers
Lecture 3 - Properties of single layer continuous fiber composites
Lecture 4 - Properties of single layer continuous fiber composites
Lecture 5 - Strength of single layer continuous fiber composites
Lecture 6 - Strength of single layer continuous fiber composites
Lecture 7 - Concept of Tensor
Lecture 8 - General Anisotropic Material
Lecture 9 - Specially Orthotropic Material
Lecture 10 - Specially Orthotropic Material Under Plane Stress
Lecture 11 - Stress and Strain Transformation
Lecture 12 - Transformation of Stiffness and Compliance Matrices
Lecture 13 - Strain - Displacement relations
Lecture 14 - Relations for stress and strain along thickness of laminate
Lecture 15 - Stress - Strain variation along Laminate thickness
Lecture 16 - Force and Moment resultant - Part 1
Lecture 17 - Force and Moment resultant - Part 2
Lecture 18 - Important observation related to [A], [B] and [D] matrices
Lecture 19 - Quasi-Isotropic Laminates
Lecture 20 - Maximum Stress Theory
Lecture 21 - Maximum Strain Theory
Lecture 22 - Importance of Sign of Shear Stress.
Lecture 23 - Failure Initiation in Composite Laminate.
Lecture 24 - Progressive Failure of Laminae in A Laminate
Lecture 25 - Governing equations for composite plates
Lecture 26 - Force equilibrium in Z-direction
Lecture 27 - Moment equilibrium equations
Lecture 28 - Equilibrium equations for composite plates
Lecture 29 - Boundary conditions associated with different edges of composite plate - Part 1

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Lecture 30 - Boundary conditions associated with different edges of composite plate - Part 2
Lecture 31 - Generalized Solution for Semi-Infinite Plate - Part I
Lecture 32 - Generalized Solution for Semi-Infinite Plate - Part II
Lecture 33 - Particular Solution for Semi-Infinite Plate
Lecture 34 - Particular Solution for Semi-Infinite Plate
Lecture 35 - Particular Solution for Semi-Infinite Plate
Lecture 36 - Particular Solution for Semi-Infinite Plate
Lecture 37 - Solution for governing equation related to semi-infinite composite plate
Lecture 38 - Nature of displacement u0(x) and how it gets influence by important parameters of lamination sec
Lecture 39 - Semi-infinite plate loaded in the x-direction - Part 1
Lecture 40 - Semi-infinite plate loaded in the x-direction - Part 2
Lecture 41 - Thermal effects in composite laminates - Part 1
Lecture 42 - Thermal effects in composite laminates - Part 2
Lecture 43 - Thermal effects in composite laminates - Part 3
Lecture 44 - Finite Rectangular Plate
Lecture 45 - Different Boundary Conditions in Finite Rectangular Plate
Lecture 46 - Example Based On a Finite Rectangular Plate
Lecture 47 - Example Based On a Finite Rectangular Plate
Lecture 48 - Example Based On a Finite Rectangular Plate
Lecture 49 - Anticlastic curvature
Lecture 50 - Principle of virtual work
Lecture 51 - Virtual work method
Lecture 52 - Virtual work method
Lecture 53 - Beam (two term solution)
Lecture 54 - 3rd Interpretation of special Galerkin method
Lecture 55 - Role of D16 and D26 Terms On Laminated Plate Response
Lecture 56 - Role of D16 and D26 Terms On Laminated Plate Response
Lecture 57 - Role of D16 and D26 Terms On Laminated Plate Response
Lecture 58 - Role of D16 and D26 Terms On Laminated Plate Response
Lecture 59 - Free Vibration in Composite Plate
Lecture 60 - Free Vibration in Composite Plate
Lecture 61 - Buckling of composite plates
Lecture 62 - Force equilibrium in z-direction for buckling of composite plates
Lecture 63 - Moment equilibrium around x, y and z-directions for buckling of composite plates
Lecture 64 - Buckling of an infinitely long composite plate
Lecture 65 - Buckling of a simply supported finite plate
Lecture 66 - Composite plate under bidirectional compression
Lecture 67 - Shear Bucking in Rectangular Composite Plate
Lecture 68 - Shear Bucking in Rectangular Composite Plate

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Lecture 69 - Introduction to Short-Fiber Composites
Lecture 70 - Theories of Stress Transfer
Lecture 71 - Theories of Stress Transfer
Lecture 72 - Modulus of Short-Fiber Composites and Closure

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Metrology

Subject Co-ordinator - Dr. Amandeep Singh, Prof. J. Ramkumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to measurements and metrology
Lecture 2 - Instruments in measurement systems
Lecture 3 - Instruments in measurement systems
Lecture 4 - General concepts and definitions in metrology
Lecture 5 - Standards of measurement
Lecture 6 - Limits, Fits, and Tolerances - Part 1
Lecture 7 - Limits, Fits, and Tolerances - Part 2
Lecture 8 - Limits, Fits, and Tolerances - Part 3
Lecture 9 - Limits, Fits, and Tolerances - Part 4
Lecture 10 - Linear Measurements - Part 1
Lecture 11 - Linear Measurements - Part 2
Lecture 12 - Laboratory demonstration, Vernier Caliper
Lecture 13 - Laboratory demonstration, Dial gauge and vernier, micrometer, surface plate, feeler gauge
Lecture 14 - Angular Measurements - Part 1
Lecture 15 - Angular Measurements - Part 2
Lecture 16 - Laboratory demonstration, Vernier height gauge
Lecture 17 - Laboratory demonstration, Thread gauge, spirit level
Lecture 18 - Laboratory demonstration, Combination set, slip gauges, sine bar
Lecture 19 - Comparators - Part 1
Lecture 20 - Comparators - Part 2
Lecture 21 - Transducers - Part 1
Lecture 22 - Transducers - Part 2
Lecture 23 - Screw thread metrology
Lecture 24 - Gears metrology - Part 1
Lecture 25 - Gears metrology - Part 2
Lecture 26 - Laboratory demonstration, Gear Vernier
Lecture 27 - Surface metrology
Lecture 28 - Temperature measurements
Lecture 29 - Pressure measurements - Part 1

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Lecture 30 - Pressure measurements - Part 2
Lecture 31 - Strain measurements - Part 1
Lecture 32 - Strain measurements - Part 2
Lecture 33 - Optical measurements and Nanometrology - Part 1
Lecture 34 - Optical measurements and Nanometrology - Part 2
Lecture 35 - Optical measurements and Nanometrology - Part 3
Lecture 36 - Statistics in Metrology, an intoduction - Part 1
Lecture 37 - Statistics in Metrology, an intoduction - Part 2
Lecture 38 - Data and scales in measurements
Lecture 39 - Discrete and continuous data
Lecture 40 - Statistics for metrology, fundamental concepts - Part 1
Lecture 41 - Statistics for metrology, fundamental concepts - Part 2
Lecture 42 - Statistics for metrology, fundamental concepts - Part 3
Lecture 43 - Probability distributions for estimating measurement
Lecture 44 - Normal distribution
Lecture 45 - Statistics for proportions
Lecture 46 - Chi square distribution, and Data outlier detection
Lecture 47 - Quality Control, introduction
Lecture 48 - Quality Control, control charts for variables
Lecture 49 - Quality Control, control charts for attributes
Lecture 50 - Quality Control, critical aspects
Lecture 51 - 3D measurements, Coordinate Measuring Machine (CMM)
Lecture 52 - Laboratory demonstration, Coordinate Measuring Machine (CMM))

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NPTEL Video Course - Mechanical Engineering - NOC:Smart Materials and Intelligent System Design

Subject Co-ordinator - Prof. Bisakh Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Smart Materials
Lecture 2 - Piezoelectric Material
Lecture 3 - Magnetostrictive Material
Lecture 4 - Active Smart Polymer
Lecture 5 - Shape Memory Alloys
Lecture 6 - Introduction to composites
Lecture 7 - Classification of Composites
Lecture 8 - Micromechanics and Macromechanics of Composites
Lecture 9 - Classical Laminated Plate Theory
Lecture 10 - ABD Matrices
Lecture 11 - Modelling of piezoelectric material 1
Lecture 12 - Modelling of piezoelectric material 2
Lecture 13 - Modelling of Magnetostrictive material
Lecture 14 - Modelling of Shape memory Alloys
Lecture 15 - Smart Actuators
Lecture 16 - Smart Materials based MEMS
Lecture 17 - Smart MEMS Applications
Lecture 18 - Energy Harvesting
Lecture 19 - Concept of Self Healing

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NPTEL Video Course - Mechanical Engineering - NOC:Design Practice-II

Subject Co-ordinator - Dr. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Design concepts
Lecture 2 - Computer Aided Design (CAD)
Lecture 3 - Geometrical transformation
Lecture 4 - Composition of geometrical transformation
Lecture 5 - Geometric modeling
Lecture 6 - Representation of curves
Lecture 7 - Parametric representation of synthetic curves
Lecture 8 - Curve fitting problem (Hermite case)
Lecture 9 - Problem solving (based on Bezier curve)
Lecture 10 - Representation of Surfaces
Lecture 11 - Introduction to Micro-Elctro mechanical Systems (MEMS)
Lecture 12 - Lab-on-Chip
Lecture 13 - Introduction to Sensors
Lecture 14 - Introduction to Transducers
Lecture 15 - Introduction to device fabrications
Lecture 16 - Introduction to Silicon as a MEMS material
Lecture 17 - Etching processes
Lecture 18 - Types of Photolithography
Lecture 19 - Introduction to actuators
Lecture 20 - Designing of the Micro-Valve
Lecture 21 - Electrochemical valves
Lecture 22 - Micropumps
Lecture 23 - Designing of peristaltic pumps
Lecture 24 - Different types of pumps and sensors
Lecture 25 - Computer Numerical Control
Lecture 26 - Numerical control programming
Lecture 27 - NC part programming
Lecture 28 - Introduction to rapid prototyping
Lecture 29 - Different types of rapid prototyping technologies

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Lecture 30 - Fused Deposition Modeling
Lecture 31 - LAB demonstration of Fused Deposition Modelling Techniques
Lecture 32 - LAB demonstrtion of Fused Deposition Modelling Process
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37

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NPTEL Video Course - Mechanical Engineering - NOC:Rapid Manufacturing

Subject Co-ordinator - Prof. J. Ramkumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Rapid Manufacturing - Part 1
Lecture 2 - Introduction to Rapid Manufacturing - Part 2
Lecture 3 - Introduction to Rapid Manufacturing - Part 3
Lecture 4 - Product Development Process - Part 1
Lecture 5 - Product Development Process - Part 2
Lecture 6 - Product Development Process - Part 3
Lecture 7 - Design for Modularity (Manufacturing)
Lecture 8 - Design for Modularity (Assembly; Part 1)
Lecture 9 - Design for Modularity (Assembly; Part 2)
Lecture 10 - Design for Modularity
Lecture 11 - Subtractive versus Rapid Manufacturing
Lecture 12 - Reverse Engineering - Part 1
Lecture 13 - Reverse Engineering - Part 2
Lecture 14 - Laboratory Demonstration, Co-ordinate Measuring Machine - Part 1
Lecture 15 - Laboratory Demonstration, Co-ordinate Measuring Machine - Part 2
Lecture 16 - Laboratory Demonstration, 3D scanners - Part 1
Lecture 17 - Laboratory Demonstration, 3D scanners - Part 2
Lecture 18 - Polymerization Processes - Part 1
Lecture 19 - Polymerization Processes - Part 2
Lecture 20 - Powder based processes - Part 1
Lecture 21 - Powder based processes - Part 2
Lecture 22 - Powder based processes - Part 3
Lecture 23 - Extrusion based processes - Part 1
Lecture 24 - Extrusion based processes - Part 2
Lecture 25 - Sheet Stacking processes
Lecture 26 - 3D printing processes
Lecture 27 - Laboratory Demonstration, 3D printing - Part 1
Lecture 28 - Laboratory Demonstration, 3D printing - Part 2
Lecture 29 - Laboratory Demonstration, 3D printing - Part 3

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Lecture 30 - Beam Deposition processes
Lecture 31 - Materials in Rapid Manufacturing - Part 1
Lecture 32 - Materials in Rapid Manufacturing - Part 2
Lecture 33 - Post-processing concerns - Part 1
Lecture 34 - Post-processing concerns - Part 2
Lecture 35 - Product costing for Rapid Manufacturing - Part 1
Lecture 36 - Product costing for Rapid Manufacturing - Part 2
Lecture 37 - Rapid Product Development, CAD/CAM - Part 1
Lecture 38 - Rapid Product Development, CAD/CAM - Part 2
Lecture 39 - Rapid Product Development, CAD/CAM - Part 3
Lecture 40 - Rapid Product Development, CAE and CIM
Lecture 41 - Rapid Product Development, Technomatix, Plant Simulation 10 - Part 1
Lecture 42 - Rapid Product Development, Technomatix, Plant Simulation 10 - Part 2
Lecture 43 - Rapid Product Development, Technomatix, Plant Simulation 10 - Part 3
Lecture 44 - Rapid Manufactiuring, case studies

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NPTEL Video Course - Mechanical Engineering - NOC:Turbulent Combustion: Theory and Modelling

Subject Co-ordinator - Prof. Ashoke De

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Combustion
Lecture 2 - Introduction to Combustion (Continued...)
Lecture 3 - Introduction to Combustion (Continued...)
Lecture 4 - Introduction to Combustion (Continued...) + Combustion and Thermochemistry
Lecture 5 - Combustion and Thermochemistry
Lecture 6 - Combustion and Thermochemistry (Continued...)
Lecture 7 - Combustion and Thermochemistry (Continued...) + Chemical Kinetics
Lecture 8 - Chemical Kinetics (Continued...)
Lecture 9 - Chemical Kinetics (Continued...)
Lecture 10 - Chemical Kinetics (Continued...) + Combustion Chemistry
Lecture 11 - Combustion Chemistry (Continued...)
Lecture 12 - Heat and Mass Transfer
Lecture 13 - Heat and Mass Transfer + Coupling of Chemical Kinetics and Thermodynamics
Lecture 14 - Coupling of Chemical Kinetics and Thermodynamics (Continued...)
Lecture 15 - Coupling of Chemical Kinetics and Thermodynamics + Laminar Premixed Flames
Lecture 16 - Laminar Premixed Flames (Continued...)
Lecture 17 - Laminar Premixed Flames (Continued...)
Lecture 18 - Laminar Premixed Flames (Continued...) + Laminar Non-Premixed Flames
Lecture 19 - Laminar Non-Premixed Flames (Continued...)
Lecture 20 - Laminar Non-Premixed Flames (Continued...)
Lecture 21 - Laminar Non-Premixed Flames
Lecture 22 - Laminar Non-Premixed Flames (Continued...)
Lecture 23 - Laminar Non-Premixed Flames (Continued...)
Lecture 24 - Laminar Non-Premixed Flames (Continued...)
Lecture 25 - Laminar Non-Premixed Flames (Continued...)
Lecture 26 - Laminar Non-Premixed Flames + Turbulence
Lecture 27 - Turbulence
Lecture 28 - Turbulence
Lecture 29 - Turbulence

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Lecture 30 - Turbulence
Lecture 31 - Turbulence
Lecture 32 - Turbulence
Lecture 33 - Turbulence
Lecture 34 - Turbulence
Lecture 35 - Turbulence
Lecture 36 - Turbulence
Lecture 37 - Turbulence
Lecture 38 - Turbulence
Lecture 39 - Turbulence
Lecture 40 - Turbulence
Lecture 41 - Turbulence
Lecture 42 - Turbulence
Lecture 43 - Turbulence
Lecture 44 - Turbulence
Lecture 45 - Turbulence
Lecture 46 - Turbulent Combustion
Lecture 47 - Turbulent Combustion
Lecture 48 - Turbulent Combustion
Lecture 49 - Turbulent Combustion
Lecture 50 - Turbulent Combustion
Lecture 51 - Turbulent Combustion
Lecture 52 - Turbulent Combustion
Lecture 53 - Turbulent Combustion
Lecture 54 - Turbulent Combustion
Lecture 55 - Turbulent Combustion
Lecture 56 - Turbulent Combustion
Lecture 57 - Turbulent Combustion
Lecture 58 - Multiphase Combustion
Lecture 59 - Multiphase Combustion
Lecture 60 - Multiphase Combustion

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Automation

Subject Co-ordinator - Prof. Sounak Kumar Choudhury

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Manufacturing Automation
Lecture 2 - Various Aspects of Manufacturing Automation
Lecture 3 - Part Transfer Mechanisms
Lecture 4 - Automated Flow Lines
Lecture 5 - Analysis of Automated Flow Lines
Lecture 6 - Vibratory Bowl Feeder
Lecture 7 - Analysis of Vibratory Bowl Feeder
Lecture 8 - Reciprocating Tube Hopper Feeder
Lecture 9 - Centreboard Hopper Feeder and its analysis
Lecture 10 - Reciprocating fork and External Gate Hopper Feeders
Lecture 11 - Rotary Disc Feeder and Centrifugal Hopper Feeder
Lecture 12 - Bladed Wheel and Tumbling Barrel Hopper Feeders
Lecture 13 - Rotary Centreboard and Magnetic Feeders
Lecture 14 - Part Orienting Devices
Lecture 15 - Feed Tracks and their analysis
Lecture 16 - Powered Feed Track and Escapements
Lecture 17 - Various Escapements and Part Placing Mechanisms
Lecture 18 - Design for Automatic Assembly
Lecture 19 - Performance and Economics of Assembly Systems
Lecture 20 - Performance of Indexing and Free Transfer Machines

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NPTEL Video Course - Mechanical Engineering - NOC:Computer Integrated Manufacturing

Subject Co-ordinator - Prof. J. Ramkumar, Prof. Amandeep Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to CIM - Part 1
Lecture 2 - Introduction to CIM - Part 2
Lecture 3 - Computers and Manufacturing Systems - Part 1
Lecture 4 - Computers and Manufacturing Systems - Part 2
Lecture 5 - Computers and Manufacturing Systems - Part 3
Lecture 6 - Computer Graphics - Part 1
Lecture 7 - Computer Graphics - Part 2
Lecture 8 - Computer Graphics - Part 3
Lecture 9 - Computer Graphics - Part 4
Lecture 10 - Geometric Modelling - Part 1
Lecture 11 - Geometric Modelling - Part 2
Lecture 12 - Computer Numerical Control - Part 1
Lecture 13 - Computer Numerical Control - Part 2
Lecture 14 - Computer Numerical Control - Part 3
Lecture 15 - Computer Numerical Control - Part 4
Lecture 16 - CNC Machining - Part 1
Lecture 17 - CNC Machining - Part 2
Lecture 18 - CNC Tooling
Lecture 19 - CNC Part Programming - Part 1
Lecture 20 - CNC Part Programming - Part 2
Lecture 21 - CNC Part Programming - Part 3
Lecture 22 - CNC Part Programming - Part 4
Lecture 23 - Laboratory Demonstration, Computer Aided Design - Part 1
Lecture 24 - Laboratory Demonstration, Computer Aided Design - Part 2
Lecture 25 - CAM softwares
Lecture 26 - Laboratory Demonstration, Computer Aided Manufacturing - Part 1
Lecture 27 - Laboratory Demonstration, Computer Aided Manufacturing - Part 2
Lecture 28 - Group Technology
Lecture 29 - Computer Aided Process Planning - Part 1

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Lecture 30 - Computer Aided Process Planning - Part 2
Lecture 31 - Flexible Manufacturing System
Lecture 32 - Robotics
Lecture 33 - Programmable Logic Controller
Lecture 34 - Automatic Identification and Data Capture
Lecture 35 - Computer Aided Quality Control - Part 1
Lecture 36 - Computer Aided Quality Control - Part 2
Lecture 37 - Laboratory Demonstration, Coordinate Measuring Machine
Lecture 38 - Rapid Manufacturing - Part 1
Lecture 39 - Rapid Manufacturing - Part 2
Lecture 40 - Laboratory demonstration, Rapid Manufacturing - Part 1
Lecture 41 - Laboratory demonstration, Rapid Manufacturing - Part 2
Lecture 42 - Laboratory Demonstration, CAD using Fusion 360, an introduction
Lecture 43 - Laboratory Demonstration, CAD using Fusion 360, Rendering and 3D printing
Lecture 44 - Material Handling
Lecture 45 - Laboratory Demonstration, Plant Simulation software - Part 1
Lecture 46 - Laboratory Demonstration, Plant Simulation software - Part 2
Lecture 47 - Laboratory Demonstration, Plant Simulation software - Part 3
Lecture 48 - Computers in Manufacturing Industry, current scenario - Part 1
Lecture 49 - Computers in Manufacturing Industry, current scenario - Part 2
Lecture 50 - Computers in Manufacturing Industry, current scenario - Part 3

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NPTEL Video Course - Mechanical Engineering - NOC:Machining Science

Subject Co-ordinator - Prof. Sounak Kumar Choudhury

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Machining
Lecture 2 - Mechanism of plastic deformation
Lecture 3 - Basic machining parameters, Cutting Tools and Types of Machining
Lecture 4 - Types of Chips, Tool nomenclature and tool angles
Lecture 5 - Tool Nomenclature in Normal Rake System and conversion of angles
Lecture 6 - Selection of Tool angles
Lecture 7 - Forces in machining, Merchantâ s Circle Diagram
Lecture 8 - Stress, Strain and Strain Rate and Shear Plane Angle
Lecture 9 - Numerical Examples; Lee and Shafferâ s model
Lecture 10 - Friction in metal cutting
Lecture 11 - Practical Machining Operations
Lecture 12 - Slab Milling; Measurement of Cutting Forces
Lecture 13 - Dynamometers; Tool Wear and Tool Life
Lecture 14 - Factors affecting tool life; Abrasive Machining Processes
Lecture 15 - Mechanics of Grinding Process
Lecture 16 - Chip length and specific energy in Grinding
Lecture 17 - Grinding wheel wear; Oblique Cutting
Lecture 18 - Rake angles in oblique cutting; Economics of Machining
Lecture 19 - Economics of Machining (Continued...); Thermal aspects of machining
Lecture 20 - Surface finish

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NPTEL Video Course - Mechanical Engineering - NOC:Foundations of Cognitive Robotics

Subject Co-ordinator - Prof. Bishakh Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cognitive Robotics (Private)
Lecture 2 - Smart Materials - I (Private)
Lecture 3 - Smart Materials - II (Private)
Lecture 4 - Smart Materials - III (Private)
Lecture 5 - Architecture of the Brain
Lecture 6 - Architecture of the Brain (Continued...)
Lecture 7 - Nerve Cells
Lecture 8 - Introduction to Synchronisation Models
Lecture 9 - Synchronisation models (Continued...)
Lecture 10 - Introduction to EEG
Lecture 11 - Theories of Intelligence - I
Lecture 12 - Theories of Intelligence - II
Lecture 13 - Kuramoto Model
Lecture 14 - Child Robot Interaction

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Robotics

Subject Co-ordinator - Prof. Ashish Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Robotics
Lecture 2 - Robot Joints and Work Volume
Lecture 3 - Spatial transformations
Lecture 4 - Homogenous Transformtions
Lecture 5 - Practice Problems with MATLAB in Rotation matrices
Lecture 6 - Kinematics: Derivation of Link Transformations
Lecture 7 - Problem Solving DH Parameters
Lecture 8 - Forward Kinematics
Lecture 9 - Inverse Kinematics
Lecture 10 - Problems in Kinematics
Lecture 11 - Inverse Kinematics of PUMA Robot
Lecture 12 - Jacobian and Singularity
Lecture 13 - Velocity and Static Forces
Lecture 14 - Dynamics - Lagrangian Euler
Lecture 15 - Newton Euler Dynamics
Lecture 16 - Trajectory Planning
Lecture 17 - Inverse Dynamics using MATLAB
Lecture 18 - Sensors
Lecture 19 - Actuators and Basic Control System
Lecture 20 - Block Diagram Reduction and Position Regulator
Lecture 21 - Control of a single joint
Lecture 22 - Non Linear Control of Manipulators
Lecture 23 - Force Control
Lecture 24 - Manipulator Mechanism Design
Lecture 25 - Industrial Robots and Applications
Lecture 26 - Specifications and Programming
Lecture 27 - VAL programming
Lecture 28 - Experiment With PUMA Robot Using VAL- II

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NPTEL Video Course - Mechanical Engineering - NOC:Muffler Acoustics - Application to Automotive Exhaust Noise

Subject Co-ordinator - Prof. Akhilesh Mimani

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Acoustic Wave Propagation
Lecture 2 - D'Alemberts's solution and 1-D Continuity equation
Lecture 3 - Muffler Acoustics-Application to Automotive Exhaust Noise Control
Lecture 4 - Linearization of governing equations, and Development of 1-D Acoustic wave and Helmholtz equation
Lecture 5 - Solution of 1-D Helmholtz equation: Propagation in 1-D ducts/pipes
Lecture 6 - 1-D Acoustic Wave Equation in Ducts Carrying Uniform Mean Flow: Derivation
Lecture 7 - 1-D Acoustic Wave Equation in Ducts Carrying Uniform Mean Flow: Solution
Lecture 8 - 3-D Acoustic Wave Equation in Rectangular and Circular Waveguides: Derivation, Modal Solution and
Lecture 9 - Sound Pressure Level, Intensity Level and Sound Power Level
Lecture 10 - Acoustic Impedance and Reflection Coefficient
Lecture 11 - Lumped System Analysis: Inertance and Compliance
Lecture 12 - Lumped Analysis of a Uniform Pipe Closed/Open at an End, Concept of End Correction
Lecture 13 - Helmholtz Resonator, Electro-Acoustic Analogy and Layout of a typical engine exhaust system
Lecture 14 - Muffler Performance Measures: Insertion Loss
Lecture 15 - Muffler Performance Measures: Transmission Loss and Level Difference
Lecture 16 - Lumpted Analysis of a Tube, Simple Area Discontinuity and Transfer Matrices
Lecture 17 - Sudden area Discontinuity (Continued...)
Lecture 18 - Simple Expansion Chamber Analysis Using Transfer Matrix Method
Lecture 19 - Transmission Loss (TL) Graph for a Simple Expansion Muffler (MATLAB)
Lecture 20 - Extended-Inlet and Extended-Outlet Muffler Analysis
Lecture 21 - Extended-Inlet and Extended-Outlet Muffler Analysis (Continued...)
Lecture 22 - TL Analysis of Extended-Inlet and Extended-Outlet Muffler (MATLAB)
Lecture 23 - TL Analysis of Side-Inlet and Side-Outlet Muffler Using Transfer Matrix Method
Lecture 24 - Wave Propagation in Gradually Varying Area Ducts: Websterâ s Horn Equation
Lecture 25 - Websterâ s Horn Equation (Continued...) and Exponential Ducts
Lecture 26 - Solution of Websterâ s Horn Equation for Conical Ducts
Lecture 27 - TL analysis for Conical Muffler Configurations (MATLAB)
Lecture 28 - Segmentation Approach for Analysing Gradually Varying Area Ducts (MATLAB)
Lecture 29 - Acoustic Intensity (Energy Flux) in a Pipe with Mean Flow, and Transmission Loss Expression

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Lecture 30 - Aeroacoustic State Variables Transfer Matrix for a Tubular Element (Uniform Pipe)
Lecture 31 - Transfer Matrix for Extended-Inlet and Outlet Element and Use of Perforated Elements in Commerci
Lecture 32 - Two-interacting Duct Configurations: Development of Equations and Concentric Tube Resonators
Lecture 33 - Concentric Tube Resonator: Partially Perforated Pipe or Airway (MATLAB)
Lecture 34 - Review of Perforate Impedance Expressions
Lecture 35 - MATLAB Demonstration for Fully and Partially Perforated CTR
Lecture 36 - Cross-Flow elements: Setting-up the Equations
Lecture 37 - Cross-Flow elements: MATLAB Demonstration for Simple Configurations
Lecture 38 - Plug Mufflers, Three-pass Perforated Element Muffler (Commercial Configurations) - MATLAB
Lecture 39 - Multiply-Connected Mufflers: HQ Tubes
Lecture 40 - TL Analysis of HQ Tubes (MATLAB): Network Analysis and Analytical Formula
Lecture 41 - Transmission Loss in terms of Scattering and Impedance Matrix Parameters
Lecture 42 - Rectangular Chamber Muffler: Characterization and TL Analysis using 3-D Piston-driven Model
Lecture 43 - Circular Chambers: Characterization and TL Analysis Using 3-D Piston-driven Model
Lecture 44 - Analytical Mode-Matching for Extended-Inlet and Outlet Muffler: Setting-up of the Equations
Lecture 45 - MATLAB Demonstration for Transmission Loss Calculations
Lecture 46 - Dissipative Mufflers (Lined Circular duct) - A Brief Discussion
Lecture 47 - Summary of the Topics Covered in This Course, Topics to be Covered in a Future Course

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NPTEL Video Course - Mechanical Engineering - NOC:Elements of Solar Energy Conversion

Subject Co-ordinator - Prof. Jishnu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Processes - Casting and Joining

Subject Co-ordinator - Prof. Sounak Kumar Choudhury

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Casting: Introduction to Casting
Lecture 2 - Various aspects of Casting
Lecture 3 - Patterns and Moulds
Lecture 4 - Sand Mould and Gating System
Lecture 5 - Gating System Design
Lecture 6 - Aspiration Effects and Riser Design
Lecture 7 - Solidification of Metals and Alloys
Lecture 8 - Stress, Strain and Strain Rate and Shear Plane Angle
Lecture 9 - Steps in Sand Casting Processes
Lecture 10 - Expendable Mould Casting Processes
Lecture 11 - Permanent Mould Casting
Lecture 12 - Various Casting Processes and Cost Analysis
Lecture 13 - Cost analysis, Casting Defects and Product Design
Lecture 14 - Introduction to Joining Processes
Lecture 15 - Characteristic Features of Welding Processes
Lecture 16 - Various Welding Processes
Lecture 17 - Advanced Welding Processes
Lecture 18 - Characteristic Features of Arc Welding
Lecture 19 - Shielded metal arc welding, MIG and TIG Welding
Lecture 20 - Gas Welding, Brazing and Soldering, Welding Defects

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NPTEL Video Course - Mechanical Engineering - NOC:Computational Fluid Dynamics and Heat Transfer

Subject Co-ordinator - Prof. Gautam Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical Perspectives and Introduction to the Course
Lecture 2 - Finite Difference Method - Basic Idea of Discretization
Lecture 3 - Explicit and Implicit Formulations, Stability Analysis - Part 1
Lecture 4 - Stability Analysis - Part 2
Lecture 5 - Important Aspects of Flow Modelling - Part 1
Lecture 6 - Important Aspects of Flow Modelling - Part 2
Lecture 7 - Important Aspects of Flow Modelling - Part 3
Lecture 8 - Applications of Our Knowledge to a Problem of Practical Interest and Setting up an Algorithm
Lecture 9 - Finite Volume Method - Part 1
Lecture 10 - Finite Volume Method - Part 2
Lecture 11 - Finite Volume Method - Part 3
Lecture 12 - Introduction to Finite Element Method (Preliminary Concepts)
Lecture 13 - Introduction to Finite Elelment Method (Galerkin Weighted Residual Method)
Lecture 14 - Introduction to Finite element Method (Elemental contributions and formation of Global Matrix)
Lecture 15 - Vorticity Stream Function Approach (Formulation and Algorithm)
Lecture 16 - Vorticity-Stream Function Approach For Solving Navier-Stokes Equations
Lecture 17 - Solving Navier-Stokes Equations For Incompressible Flows using SIMPLE Algorithm - Part 1
Lecture 18 - Solving Navier-Stokes Equations For Incompressible Flows using SIMPLE Algorithm - Part 2
Lecture 19 - Solving Navier-Stokes Equations For Incompressible Flows using MAC Algorithm - Part 2
Lecture 20 - MAC Algorithm (Pressure - Velocity Iteration and the Solution)
Lecture 21 - MAC Algorithm (Solution of Energy Equation)
Lecture 22 - A Finite Volume Method to solve NS Equations in 3D Complex Geometry - Part 1
Lecture 23 - A Finite Volume Method to solve NS Equations in 3D Complex Geometry - Part 2
Lecture 24 - A Finite Volume Method to solve NS Equations in 3D Complex Geometry - Part 3
Lecture 25 - Mathematical Approaches to Turbulent Flows (Preliminaries and Modeling Framework)
Lecture 26 - Mathematical Approaches to Turbulent Flows (Modeling on the basis of RANS)

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NPTEL Video Course - Mechanical Engineering - NOC:Production Technology: Theory and Practice

Subject Co-ordinator - Prof. Sounak Kumar Choudhury

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Engineering Materials and Their Properties - 1
Lecture 2 - Engineering Materials and Their Properties - 2
Lecture 3 - Engineering Materials and Their Properties - 3
Lecture 4 - Metal Machining-1: Introduction to Machining
Lecture 5 - Metal Machining-2: Mechanism of plastic deformation
Lecture 6 - Metal Machining-3: Types of Chips, Tool nomenclature and tool angles
Lecture 7 - Metal Machining-4: Selection of Tool angles, Forces in machining
Lecture 8 - Metal Machining-5: Merchantâ s Circle Diagram
Lecture 9 - Metal Machining-6: Friction in Metal Cutting
Lecture 10 - Metal Machining-7: Practical Machining Operations; Force Measurement
Lecture 11 - Metal Machining-8: Force Measurement
Lecture 12 - Metal Machining-9: Tool Wear and Tool Life
Lecture 13 - Metal Machining-10: Factors affecting Tool Life
Lecture 14 - Metal Machining-11: Abrasive Machining Processes
Lecture 15 - Metal Machining-12: Abrasive Machining Processes
Lecture 16 - Metal Machining-13: Grinding; Economics of Machining
Lecture 17 - Machining-14: Economics of Machining
Lecture 18 - Non-Traditional Machining-1: Introduction; Classification
Lecture 19 - Non-Traditional Machining-2: Various Non-Traditional Machining Processes
Lecture 20 - Non-Traditional Machining-3, Computer Numerical Control (CNC) -1
Lecture 21 - Computer Numerical Control (CNC) - 2
Lecture 22 - Computer Numerical Control (CNC) - 3
Lecture 23 - Engineering Metrology
Lecture 24 - Laboratory Demonstration/Hands-On Practice - 1
Lecture 25 - Laboratory Demonstration/Hands-On Practice - 2
Lecture 26 - Laboratory Demonstration/Hands-On Practice - 3
Lecture 27 - Laboratory Demonstration/Hands-On Practice - 4
Lecture 28 - Laboratory Demonstration/Hands-On Practice - 5
Lecture 29 - Laboratory Demonstration/Hands-On Practice - 6

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Lecture 30 - Laboratory Demonstration/Hands-On Practice - 7
Lecture 31 - Laboratory Demonstration/Hands-On Practice - 8
Lecture 32 - Laboratory Demonstration/Hands-On Practice - 9
Lecture 33 - Laboratory Demonstration/Hands-On Practice - 10

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Turbomachinery

Subject Co-ordinator - Prof. Subrata Sarkar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Classification
Lecture 2 - Introduction and Classification (Continued...)
Lecture 3 - Review of the Fundamental Laws
Lecture 4 - Equation of Motion in Rotating Frame
Lecture 5 - Euler Equation for Turbomachinery
Lecture 6 - Euler Equation for Turbomachinery: Illustration
Lecture 7 - Problem Session - Chapter-1: Applications of Euler Equation
Lecture 8 - Similarity Analysis - I
Lecture 9 - Similarity Analysis - II
Lecture 10 - Similarity Analysis - III
Lecture 11 - Problem Session - II
Lecture 12 - Cassade Analysis - I
Lecture 13 - Cassade Analysis - II
Lecture 14 - Cassade Analysis - III
Lecture 15 - Cassade Analysis - IV
Lecture 16 - Cassade Analysis (Problem Session)
Lecture 17 - Gas Turbine Cycle Analysis - I
Lecture 18 - Gas Turbine Cycle Analysis - II
Lecture 19 - Gas Turbine Cycle Analysis - III
Lecture 20 - Gas Turbine Cycle Analysis - IV
Lecture 21 - Gas Turbine Cycle Analysis - V
Lecture 22 - Illustrative Examples Gas Turbine Cycle
Lecture 23 - Illustrative Examples Jet Propulsion
Lecture 24 - Axial Flow Compressor - I
Lecture 25 - Axial Flow Compressor - II
Lecture 26 - Axial Flow Compressor - III
Lecture 27 - Axial Flow Compressor - IV
Lecture 28 - Illustrative Examples Axial Flow Compressor
Lecture 29 - Centrifugal Compressor - I

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Lecture 30 - Centrifugal Compressor - II
Lecture 31 - Centrifugal Compressor - III
Lecture 32 - Axial Flow Turbine - I
Lecture 33 - Axial Flow Turbine - II
Lecture 34 - Axial Flow Turbine - III
Lecture 35 - Axial Flow Turbine - IV
Lecture 36 - Axial Flow Turbine - V
Lecture 37 - Axial Flow Steam Turbine - I
Lecture 38 - Axial Flow Steam Turbine - II
Lecture 39 - Axial Flow Steam Turbine - III
Lecture 40 - Axial Flow Steam Turbine - IV
Lecture 41 - Axial Flow Steam Turbine - V
Lecture 42 - Axial Flow Steam Turbine - VI
Lecture 43 - Hydraulic Turbines - I (Pelton Wheel)
Lecture 44 - Hydraulic Turbines - II (Illustrations on Pelton Wheel)
Lecture 45 - Hydraulic Turbines - III (Reaction Turbine)
Lecture 46 - Hydraulic Turbines - IV (Cavitation)
Lecture 47 - Hydraulic Turbines - V (Illustrations on Reaction Turbine)
Lecture 48 - CFD and Turbomachinery - I
Lecture 49 - CFD and Turbomachinery - II
Lecture 50 - CFD and Turbomachinery - III

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NPTEL Video Course - Mechanical Engineering - NOC:Robot Motion Planning

Subject Co-ordinator - Prof. Ashish Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Joints and Degrees of Freedom
Lecture 3 - Work Volume and Rotation Transformation
Lecture 4 - Transformations
Lecture 5 - Kinematics
Lecture 6 - Bug Algorithms
Lecture 7 - Configuration Space
Lecture 8 - C Obstacle
Lecture 9 - Topology of C Space
Lecture 10 - Road Map Methods
Lecture 11 - Cell Decomposition Methods
Lecture 12 - Sampling Based Planning
Lecture 13 - Potential Field Methods - I
Lecture 14 - Navigation Function and Potential Field in 3D
Lecture 15 - Basic Search Algorithms
Lecture 16 - Motion Planning with Kinematic Constraints
Lecture 17 - Controllability
Lecture 18 - Kinematic Constraints and Multifinger Robot
Lecture 19 - Multifinger Robot Hands
Lecture 20 - Optimization in Motion Planning

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NPTEL Video Course - Mechanical Engineering - NOC:Metal Additive Manufacturing

Subject Co-ordinator - Prof. Amandeep Singh Oberoi, Prof. Janakranjan Ramkumar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Metal Additive Manufacturing
Lecture 2 - Additive Manufacturing Processes: Classification and Challenges
Lecture 3 - Additive Manufacturing Processes: Applications and Challenges
Lecture 4 - Metal Additive Manufacturing, Glossary - Part 1
Lecture 5 - Metal Additive Manufacturing, Glossary - Part 2
Lecture 6 - CAD for Additive Manufacturing
Lecture 7 - Basic Processes - Part 1
Lecture 8 - Basic Processes - Part 2
Lecture 9 - Laser Based Processes - Part 1
Lecture 10 - Laser Based Processes - Part 2
Lecture 11 - Electron Beam Process
Lecture 12 - Powder/Wire Fed Systems
Lecture 13 - Solidification of Parts - Part 1
Lecture 14 - Solidification of Parts - Part 2
Lecture 15 - Solidification of Parts - Part 3
Lecture 16 - Process Parameters
Lecture 17 - MAM Printed Parts: Mechanical Properties, Hardness
Lecture 18 - MAM Printed Parts: Mechanical Properties, Strength
Lecture 19 - Common Defects and Post Processing
Lecture 20 - Design for Additive Manufacturing (DFAM) - Part 1
Lecture 21 - Design for Additive Manufacturing (DFAM) - Part 2
Lecture 22 - Topology Optimization Techniques
Lecture 23 - On-Machine Sensing in MAM - Part 1
Lecture 24 - On-Machine Sensing in MAM - Part 2
Lecture 25 - In-situ Control Systems
Lecture 26 - Additive Manufacturing of Metal Matrix Composites - Part 1
Lecture 27 - Additive Manufacturing of Metal Matrix Composites - Part 2
Lecture 28 - Additive Manufacturing of Metal Matrix Composites - Part 3
Lecture 29 - Additive Manufacturing of Metal Matrix Composites - Part 4

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Lecture 30 - Reverse Engineering in MAM - Part 1
Lecture 31 - Reverse Engineering in MAM - Part 2
Lecture 32 - Reverse Engineering in MAM - Laboratory Demonstration - I
Lecture 33 - Reverse Engineering in MAM - Laboratory Demonstration - II
Lecture 34 - CAD and Topology Optimization Laboratory Demonstration - I
Lecture 35 - CAD and Topology Optimization Laboratory Demonstration - II
Lecture 36 - Non-Destructive Testing - Part 1
Lecture 37 - Non-Destructive Testing - Part 2
Lecture 38 - Sustainability in MAM - Part 1
Lecture 39 - Sustainability in MAM - Part 2
Lecture 40 - Sustainability in MAM - Part 3
Lecture 41 - Metal 3D Printing Laboratory Demonstration - I
Lecture 42 - Metal 3D Printing Laboratory Demonstration - II
Lecture 43 - Safety in MAM
Lecture 44 - Costing in MAM - Part 1
Lecture 45 - Costing in MAM - Part 2
Lecture 46 - Costing in MAM - Part 3
Lecture 47 - Industry 4.0 and MAM

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NPTEL Video Course - Mechanical Engineering - NOC:Conduction and Convection: Fundamentals and Applications

Subject Co-ordinator - Prof. Gautam Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Robotics

Subject Co-ordinator - Prof. Ashish Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 30

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NPTEL Video Course - Mechanical Engineering - NOC:Applied Numerical Methods

Subject Co-ordinator - Prof. Malay K. Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Mechanical Engineering - NOC:Social Innovation in Industry 4.0

Subject Co-ordinator - Prof. Janakranjan Ramkumar, Prof. Amandeep Singh Oberoi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Thermodynamics in Hindi

Subject Co-ordinator - Prof. Jayant K. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Machining Processes (2024)

Subject Co-ordinator - Prof. Shantanu Bhattacharya

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Advanced Manufacturing Processes
Lecture 2 - Ultrasonic Machining
Lecture 3
Lecture 4
Lecture 5 - Abrasive Jet Machining
Lecture 6 - Adrasive Jet Micro-Machining and Mask Materials for AJMM
Lecture 7 - Electro-Chemical Machining
Lecture 8 - Electrochemical Machining - I
Lecture 9 - Electrochemical Machining - II
Lecture 10 - Electrochemical Machining - III
Lecture 11 - Electrochemical Machining - IV
Lecture 12 - Electrochemical Machining - V
Lecture 13 - Electrochemical Machining - VI
Lecture 14 - Electrochemical Machining - VII
Lecture 15 - Electrochemical Machining - VIII
Lecture 16 - Machining Applications
Lecture 17 - Electric Discharge Machining - I
Lecture 18 - Electric Discharge Machining - II
Lecture 19 - Electric Discharge Machining - III
Lecture 20 - Electric Discharge Machining - IV
Lecture 21 - Electric Discharge Machining - IV and Electron Beam Machining - I
Lecture 22 - Electron Beam Machining - II
Lecture 23 - Laser Beam Machining - I
Lecture 24 - Laser Beam Machining - II
Lecture 25 - Silicon and Processing of Silicon - I
Lecture 26 - Silicon and Processing of Silicon - II
Lecture 27 - Polymer Processing
Lecture 28 - Advanced Finishing Processes
Lecture 29 - Lab Session-I: Water Abrasive Jet Machining Process

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Lecture 30 - Lab Session-II: Electro-discharge Machining Process - I
Lecture 31 - Lab Session-III: Electro-discharge Machining Process - II
Lecture 32 - Lab Session-IV: Laser Beam Machining
Lecture 33 - Lab Session-V: Photolithiography

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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Mechanical Engineering - 1

Subject Co-ordinator - Prof. Janakranjan Ramkumar, Prof. Amandeep Singh Oberoi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Units, Dimensions, and Dimensional Analysis - Part 1
Lecture 2 - Units, Dimensions, and Dimensional Analysis - Part 2
Lecture 3 - Laws of Motion, Inertia and Momentum
Lecture 4 - Scalars and Vectors, Vector Algebra
Lecture 5 - Statics, Kinetics and Kinematics
Lecture 6 - Friction and Lubrication
Lecture 7 - Moment of Inertia and Gravity
Lecture 8 - Mechanical Properties - Stress Strain and Residual Stress
Lecture 9 - Stress Strain Curve, Elasticity and Poission's Ratio
Lecture 10 - Principal Stress and Castigliano's Theorem
Lecture 11 - Hardness, Toughness, Impact and Creep
Lecture 12 - Homogeneous Materials, Isotropic and Anisotropic Materials
Lecture 13 - Static and Fatigue Loading, Critical Loads - Part 1
Lecture 14 - Static and Fatigue Loading, Critical Loads - Part 2
Lecture 15 - Tutorial-1 - Part 1
Lecture 16 - Tutorial-1 - Part 2
Lecture 17 - Tutorial-2 - Part 1
Lecture 18 - Tutorial-2 - Part 2
Lecture 19 - Stress in Cylinders and Spheres - Part 1
Lecture 20 - Stress in Cylinders and Spheres - Part 2
Lecture 21 - Buckling of columns
Lecture 22 - Materials, Metals and Composites - Part 1
Lecture 23 - Materials, Metals and Composites - Part 2
Lecture 24 - Mohr's circle
Lecture 25 - Shear Force and Bending Moment Diagram - Part 1
Lecture 26 - Shear Force and Bending Moment Diagram - Part 2
Lecture 27 - Shear Force and Bending Moment Diagram - Part 3
Lecture 28 - Factor of Safety, Degree of Freedom, Endurance Limit
Lecture 29 - Tutorial-3 - Part 1

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Lecture 30 - Tutorial-3 - Part 2
Lecture 31 - Linkages and Mechanisms
Lecture 32 - Stress Concentration and Notch Sensitivity - Part 1
Lecture 33 - Stress Concentration and Notch Sensitivity - Part 2
Lecture 34 - Brittleness and ductility
Lecture 35 - Testing for Tension
Lecture 36 - Testing for Compression
Lecture 37 - Testing for bending
Lecture 38 - Testing for impact loads
Lecture 39 - Testing for hardness, and fracture
Lecture 40 - Spring-Mass Systems - Part 1
Lecture 41 - Spring-Mass Systems - Part 2
Lecture 42 - Gears: Basic Concepts
Lecture 43 - Cam and Follower Design
Lecture 44 - Couplings and Shafts
Lecture 45 - Keys, Nuts, Bolts, Screws and Fasteners
Lecture 46 - Chains, Pulleys, and Belts
Lecture 47 - Clutches, Brakes and Flywheels
Lecture 48 - Permanent Joints
Lecture 49 - Vibration and Acoustics
Lecture 50 - Introduction to Engineering Statistics

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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Mechanical Engineering - II

Subject Co-ordinator - Prof. Janakranjan Ramkumar, Prof. Amandeep Singh Oberoi

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Manufacturing Engineering
Lecture 2 - Engineering Materials - Part 1
Lecture 3 - Engineering Materials - Part 2
Lecture 4 - Engineering Materials - Part 3
Lecture 5 - Crystal Structures
Lecture 6 - Phase Diagrams
Lecture 7 - Heat Treatment
Lecture 8 - Tutorial 1 (Atomic Packing Factor, and Phase Diagram)
Lecture 9 - Basics of Casting - Part 1
Lecture 10 - Basics of Casting - Part 2
Lecture 11 - Basics of Casting - Part 3
Lecture 12 - Casting Processes
Lecture 13 - Tutorial 2 (Casting) - Part 1
Lecture 14 - Tutorial 2 (Casting) - Part 2
Lecture 15 - Virtual Lab, Demonstration (Casting)
Lecture 16 - Basics of Forming - Part 1
Lecture 17 - Basics of Forming - Part 2
Lecture 18 - Basics of Forming - Part 3
Lecture 19 - Basics of Forming - Part 4
Lecture 20 - Basics of Forming - Part 5
Lecture 21 - Tutorial 3 (Forming) - Part 1
Lecture 22 - Tutorial 3 (Forming) - Part 2
Lecture 23 - Virtual Lab, Demonstration (Forming)
Lecture 24 - Basics of Welding - Part 1
Lecture 25 - Basics of Welding - Part 2
Lecture 26 - Basics of Welding - Part 3
Lecture 27 - Basics of Welding - Part 4
Lecture 28 - Basics of Welding - Part 5
Lecture 29 - Basics of Welding - Part 6

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Lecture 30 - Basics of Welding - Part 7
Lecture 31 - Tutorial 4 (Welding)
Lecture 32 - Virtual Lab, Demonstration (Welding)
Lecture 33 - Basics of Machining - Part 1
Lecture 34 - Basics of Machining - Part 2
Lecture 35 - Basics of Machining - Part 3
Lecture 36 - Basics of Machining - Part 4
Lecture 37 - Basics of Machining - Part 5
Lecture 38 - Basics of Machining - Part 6
Lecture 39 - Basics of Machining - Part 7
Lecture 40 - Tutorial 5 (Machining) - Part 1
Lecture 41 - Tutorial 5 (Machining) - Part 2
Lecture 42 - Virtual Lab, Demonstration (Machining)
Lecture 43 - Non-Conventional Machining - Part 1
Lecture 44 - Non-Conventional Machining - Part 2
Lecture 45 - Non-Conventional Machining - Part 3
Lecture 46 - Tutorial 6 (Non-Conventional Machining)
Lecture 47 - Virtual Lab, Demonstration (Non-Conventional Machining)
Lecture 48 - Introduction to Sustainable Manufacturing
Lecture 49 - Life Cycle Assessment
Lecture 50 - Green Machining
Lecture 51 - Metrics for Sustainable Manufacturing

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Robotics Applications

Subject Co-ordinator - Prof. Ashish Dutta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Joints
Lecture 3 - Transformations
Lecture 4 - DH Parameters
Lecture 5 - DH Table
Lecture 6 - Kinematics
Lecture 7 - Sensors
Lecture 8 - Actuators
Lecture 9 - Trajectory Planning
Lecture 10 - Basics of Linear Control
Lecture 11 - Robot Programming
Lecture 12 - Microcontroller
Lecture 13 - Basics of Microcontroller Experiments
Lecture 14 - Sensors
Lecture 15 - Stepper - Servo
Lecture 16 - DC Motor - Encoder and Speed
Lecture 17 - Serial - Parallel Arm
Lecture 18 - Parallel Robot and Mobile Robot
Lecture 19 - Svaya and PUMA Robot
Lecture 20 - Biped Locomotion
Lecture 21 - Biped Research
Lecture 22 - Exoskeleton

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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Mechanical Engineering - 3

Subject Co-ordinator - Prof. Janakranjan Ramkumar, Prof. Amandeep Singh Oberoi

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Thermodynamics
Lecture 2 - Thermodynamic System
Lecture 3 - Thermodynamics Energies
Lecture 4 - Thermodynamics Processes - Part 1
Lecture 5 - Thermodynamics Processes - Part 2
Lecture 6 - Basic Laws of Thermodynamics - Part 1
Lecture 7 - Basic Laws of Thermodynamics - Part 2
Lecture 8 - Basic Laws of Thermodynamics - Part 3
Lecture 9 - Basic Laws of Thermodynamics - Part 4
Lecture 10 - Basic Laws of Thermodynamics - Part 5
Lecture 11 - Tutorial-1 (Introduction to Thermodynamics)
Lecture 12 - Tutorial-2 (Heat Engine and Pump, Entropy, Exergy)
Lecture 13 - Gas Cycles in Thermodynamics - Part 1
Lecture 14 - Gas Cycles in Thermodynamics - Part 2
Lecture 15 - Vapour Power Cycles
Lecture 16 - Pure Substances, Phase and Phase Change
Lecture 17 - Properties of Pure Substances
Lecture 18 - Property Tables
Lecture 19 - Psychrometry of Air
Lecture 20 - Tutorial-3 (Power Cycles - Part 1)
Lecture 21 - Tutorial-4 (Power Cycles - Part 2)
Lecture 22 - Tutorial-5 (Psychrometrics)
Lecture 23 - Heat Transfer
Lecture 24 - Heat Exchangers and Mass Transfer
Lecture 25 - Basics of Power Plants - Part 1
Lecture 26 - Basics of Power Plants - Part 2
Lecture 27 - Basics of IC Engines
Lecture 28 - Basics of Electric and Hybrid Vehicles
Lecture 29 - Tutorial-6 (Heat Transfer - Part 1

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Lecture 30 - Tutorial-7 (Heat Transfer - Part 2
Lecture 31 - Tutorial-8 (Mass Transfer and Applications)
Lecture 32 - Virtual Lab. Demonstration (Thermodynamics)
Lecture 33 - Introduction to Fluid Mechanics
Lecture 34 - Properties of Fluids
Lecture 35 - Classification of Flow - Part 1
Lecture 36 - Classification of Flow - Part 2
Lecture 37 - Types of Line Pattern in Fluid Mechanics
Lecture 38 - Basic Theory of Fluid Mechanics - Part 1
Lecture 39 - Basic Theory of Fluid Mechanics - Part 2
Lecture 40 - Basics of Fluid Aerodynamics
Lecture 41 - Tutorial 9 (Introduction to Fluid Mechanics)
Lecture 42 - Tutorial 10 (Concepts of Fluid Mechanics)
Lecture 43 - Tutorial 11 (Laws of Fluid Mechanics)
Lecture 44 - Basics of Turbines and Pumps
Lecture 45 - Basics of Nozzles
Lecture 46 - Basics of Compressors
Lecture 47 - Virtual Lab. Demonstration (Fluid Mechanics - Part 1)
Lecture 48 - Virtual Lab. Demonstration (Fluid Mechanics - Part 2)
Lecture 49 - Virtual Lab. Demonstration (Fluid Mechanics - Part 3)
Lecture 50 - Basics of Engineering Statistics
Lecture 51 - Basics of Descriptive Statistics
Lecture 52 - Basics of Inferential Statistics
Lecture 53 - Design of Experiments

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NPTEL Video Course - Mechanical Engineering - Computational Fluid Dynamics (Prof. S. Chakraborty)

Subject Co-ordinator - Prof. S. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computational Fluid Dynamics and Principles of Conservation
Lecture 2 - Conservation of Mass and Momentum
Lecture 3 - Navier Stokes Equation (Continued.)
Lecture 4 - Energy Equation and General Structure of Conservation Equations
Lecture 5 - Classification of Partial Differential Equations and Physical Behaviour
Lecture 6 - Classification of Partial Differential Equations and Physical Behaviour (Continued.)
Lecture 7 - Approximate Solutions of Differential Equations
Lecture 8 - Approximate Solutions of Differential Equations
Lecture 9 - Weighted Residual Approach and Introduction to Discretization
Lecture 10 - Fundamentals of Discretization
Lecture 11 - Fundamentals of Discretization
Lecture 12 - Fundamentals of Discretization
Lecture 13 - Finite Volume Method
Lecture 14 - Finite Volume Method
Lecture 15 - Finite Volume Method
Lecture 16 - Important Consequences of Discretization of Unsteady State Problems
Lecture 17 - Important Consequences of Discretization of Time Dependent Diffusion Type Problems (Continued.)
Lecture 18 - Discretization of Hyperbolic Equations
Lecture 19 - PART 1
Lecture 20 - PART 1
Lecture 21 - Solution of Systems of Linear Algebraic Equations
Lecture 22 - Solution of Systems of Linear Algebraic Equations
Lecture 23 - Solution of Systems of Linear Algebraic Equations
Lecture 24 - Elimination Methods
Lecture 25 - Iterative Methods for Numerical Solution of Systems of Linear Algebraic Equations
Lecture 26 - Iterative Methods for Numerical Solution of Systems of Linear Algebraic Equations (Continued.)
Lecture 27 - Iterative Methods
Lecture 28 - PART 1
Lecture 29 - Gradient Search Methods (Continued.)

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Lecture 30 - Discretization of Convection-Diffusion Equations
Lecture 31 - Discretization of Convection-Diffusion Equations
Lecture 32 - Discretization of Convection- Diffusion Equations
Lecture 33 - Discretization of Convection -Diffusion Equations
Lecture 34 - Discretization of Convection-Diffusion Equations
Lecture 35 - Discretization of Navier Stokes Equations
Lecture 36 - Discretization of Navier Stokes Equations (Continued.)
Lecture 37 - Discretization of Navier Stokes Equations (Continued.)
Lecture 38 - PART 1
Lecture 39 - Unstructured Grid Formulation (Continued.)
Lecture 40 - What is there in implementing a CFD Code
Lecture 41 - Introduction to Turbulence Modeling
Lecture 42 - Introduction to Turbulence Modeling (Continued.)
Lecture 43 - End Semester Questions Review

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NPTEL Video Course - Mechanical Engineering - Fundamentals of Industrial Oil Hydraulics and Pneumatics

Subject Co-ordinator - Prof. R.N. Maiti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Hydraulic and Pneumatic System
Lecture 2 - Basic Components, Symbols and Circuits
Lecture 3 - Incompressible Fluids - Some Fundamental Properties
Lecture 4 - Incompressible Fluid Flow related to Fluid Drive
Lecture 5 - Capillary Fluid (incompressible) Flow and Hydrodynamic Lubrication
Lecture 6 - Basis for Calculating Hydraulic Systems
Lecture 7 - Different types of Valves - Features and Operations - I
Lecture 8 - Hydraulic Valves (General) Different types of Valves - Features and Operations - II
Lecture 9 - Hydraulic Circuits and Valves
Lecture 10 - Hydraulic Servomechanism and Servo and Proportional Control Valves
Lecture 11 - Basic Spool Valve Design Analysis
Lecture 12 - General Control Valve Analysis
Lecture 13 - Critical Centre Spool Valve Analysis
Lecture 14 - Critical Centre Spool Valve Analysis - Stroking Forces
Lecture 15 - Proportional Solenoid Pilot Operated Two Stage Pressure Relief Valve
Lecture 16 - Proportional Solenoid Pilot Operated Two Stage Pressure Relief Valve (Continued...)
Lecture 17 - Introduction to Positive Displacement Hydrostatic Units (Hydraulic Pumps and Motors)
Lecture 18 - Basic features of some Hydraulic Pumps and Motors
Lecture 19 - Analysis of an axial - Piston Swash Plate type Hydrostatic Pump (Discharge Flow Characteristics)
Lecture 20 - Analysis of an axial - Piston Swash Plate type Hydrostatic Pump (Estimation of Torque on Drive S
Lecture 21 - Analysis of an Axial - Piston Swash Plate type Hydrostatic unit (Pressure Ripple and Swash Plate
Lecture 22 - Design Analysis of Gear Pumps - I
Lecture 23 - Design Analysis of Gear Pumps - II
Lecture 24 - Basic Concept of Hydrostatic Transmission (HST) System
Lecture 25 - Selection of HST units and components
Lecture 26 - Regenerative Circuits
Lecture 27 - Introduction to Fluid Logic
Lecture 28 - Basic Devices, Symbols and Circuits
Lecture 29 - Logic Circuits

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Lecture 30 - Design Analysis of ORBIT Motor - I
Lecture 31 - Design Analysis of ORBIT Motor - II
Lecture 32 - Design Analysis of ORBIT Motor - III
Lecture 33 - Application and Selection of Accumulators - Part I
Lecture 34 - Application and Selection of Accumulators - Part II
Lecture 35 - Hydraulic Circuits in Industrial Applications
Lecture 36 - Air preparation - Compressor and Accessories
Lecture 37 - Pneumatic Circuits
Lecture 38 - Analysis of Three - Way (Spool and Flapper Nozzle Valve)
Lecture 39 - Analysis of Flapper Nozzle Valves
Lecture 40 - Flow Force Compensation and Spool Design (Electro - hydraulic valves)
Lecture 41 - Premier and Guide to Oil - hydraulic fluids ; and Introduction to Fluid Power Symbols
Lecture 42 - Symbols in Oil Hydraulics
Lecture 43 - AppendicesTutorial on Basic Calculation on HST System and Hydraulic Fluids

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NPTEL Video Course - Mechanical Engineering - Machinery fault diagnosis and signal processing

Subject Co-ordinator - Prof. A.R. Mohanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Principles of Maintenance
Lecture 3 - Failure Modes Effects and Criticality Analysis
Lecture 4 - Fault Diagnostics and Prognostics
Lecture 5 - Basics of Machinery Vibration
Lecture 6 - Engineering Applications of Vibration
Lecture 7 - Rotordynamics
Lecture 8 - Time Domain Signal Analysis
Lecture 9 - Frequency Domain Signal Analysis
Lecture 10 - Computer Aided Data Acquisition
Lecture 11 - FFT Analysis
Lecture 12 - Modulation and Sidebands
Lecture 13 - Envelope Analysis
Lecture 14 - Cepstrum Analysis
Lecture 15 - Order Analysis
Lecture 16 - Basics of Instrumentation
Lecture 17 - Sensors and Transducers
Lecture 18 - Data Recording and Transmission
Lecture 19 - Vibration Transducers
Lecture 20 - Vibration Monitoring
Lecture 21 - Basics of Noise and Noise Monitoring
Lecture 22 - Numericals in Noise Vibration and Data Acquisition
Lecture 23 - Unbalance Detection
Lecture 24 - Field Balancing
Lecture 25 - Misalignment Detection
Lecture 26 - Cracked Shaft Detection
Lecture 27 - Looseness and Rub Detection
Lecture 28 - Ball and Journal Bearings
Lecture 29 - Gear Fault Detection

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Lecture 30 - Fans, Blowers and Compressors
Lecture 31 - Pumps and Turbines
Lecture 32 - Contaminant Analysis
Lecture 33 - Oil Analysis
Lecture 34 - Fault Detection in Motors and Transformers
Lecture 35 - Motor Current Signature Analysis
Lecture 36 - Thermography
Lecture 37 - Ultrasonics
Lecture 38 - Acoustic Emission and Eddy Current Testing
Lecture 39 - Radiography,Dye Penetrant Test and Visual Inspection
Lecture 40 - Case Studies

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NPTEL Video Course - Mechanical Engineering - Solar Energy Technology

Subject Co-ordinator - Prof. V.V. Satyamurty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy and Dependence on External Sources and Sun, Physical Descriptions and Reactions
Lecture 2 - Sun - Earth Geometry
Lecture 3 - Terminology Extra - Terrestrial Radiation Terrestria Radiation
Lecture 4 - Measuring Instruments
Lecture 5 - Estimation of Solar Radiation or Details
Lecture 6 - Radiation Processing - Long Term
Lecture 7 - Evaluation of the Apparent Sunrise and Sunset Angles
Lecture 8 - Estimation of Daily/Monthly Average daily Tilt Factor Under Terrestrial Conditions
Lecture 9 - Solar Colector Basics
Lecture 10 - Transmission - Absorptance Product
Lecture 11 - Daily (Or Monthly Average Daily) Transmittance - Absorptance Product Analytical Evaluation
Lecture 12 - Theory of Flat Plate Collectors - Liquid Based (A)
Lecture 13 - Theory of Flat Plate Collectors - Liquid Based (B)
Lecture 14 - Theory of Flat Plate Collectors - Liquid Based (C)
Lecture 15 - Mean temperature and Heat Capacity Effects
Lecture 16 - Theory of Air Based Solar Flat Plate Collectors
Lecture 17 - Theory of Air Based Solar Flat Plate Collectors (Continued.)
Lecture 18 - Other Collector Geometries
Lecture 19 - Concentrating Collectors
Lecture 20 - Concentrating Collectors (Continued.)
Lecture 21 - Concentrating Collectors (Continued.)
Lecture 22 - Compound Parabolic Collectors
Lecture 23 - Exercise - I
Lecture 24 - Exercise - I (Continued.)
Lecture 25 - Device and System Performance
Lecture 26 - Long Term Solar Energy System Performance
Lecture 27 - Exercise - I (Continued.)
Lecture 28 - Long Term Solar Energy System Performance Simplified Design Methods
Lecture 29 - Long Term Solar Energy System Performance Simplified Design Methods (Continued.)

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Lecture 30 - Monthly Average Daily Utilizability
Lecture 31 - The phi(bar) - f chart method (Continued.)
Lecture 32 - The phi(bar) - f chart method Tank Losses and Finite Heat Exchanger
Lecture 33 - Exercise - 2
Lecture 34 - Exercise - 2 (Continued.)
Lecture 35 - Exercise - 2 (Continued.)
Lecture 36 - Economic Analysis
Lecture 37 - Life Cycle Savings
Lecture 38 - Passive Devices
Lecture 39 - Passive Architecture, Overhangs and Wing Walls
Lecture 40 - Passive Architecture, Overhangs and Wing Walls (Continued.)
Lecture 41 - Summary
Lecture 42 - Summary (Continued.)
Lecture 43 - Summary (Continued.)

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NPTEL Video Course - Mechanical Engineering - Technology of Surface Coating

Subject Co-ordinator - Prof. A.K. Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - CVD Reaction
Lecture 3 - Adhesion of Surface Coating
Lecture 4 - CVD System
Lecture 5 - CDV of Tic
Lecture 6 - Chemical Vapour Deposition of Nitride Coating
Lecture 7 - Chemical Vapour Deposition of Carbo-Nitride Coating
Lecture 8 - Chemical Vapour Deposition of Cromium
Lecture 9 - Chemical Vapour Deposition of Aluminium Oxide
Lecture 10 - Chemical Vapour Deposition of Diamond
Lecture 11 - Vacuum Evaporation Deposition
Lecture 12 - Reactive Evaporation Deposition
Lecture 13 - Cathodic Arc Evaporation Deposition
Lecture 14 - Sputtering
Lecture 15 - Magnetron Sputtering
Lecture 16 - Unbalanced Magnetron Sputtering
Lecture 17 - Radio frequency and pulsed DC sputtering
Lecture 18 - Sputter Deposition of Nitride Coating
Lecture 19 - Sputter Deposition of Molybdenum Di Sulphide Coating
Lecture 20 - Influence of Architecture of Sputter Deposited Molybdenum Di Sulphide Coating
Lecture 21 - Electro Plating,Anodizing and Electro-Less Plating
Lecture 22 - Coating of Monolayer Abrasive Grain by Electro Plating
Lecture 23 - Mechansim of Wetting
Lecture 24 - Coating on Ceramics by Wetting
Lecture 25 - Coating of Monolayer Abrasive Grain by Wetting
Lecture 26 - Coating on Abrasive Grain
Lecture 27 - Combustion Spray Process
Lecture 28 - Plasma Spray Process
Lecture 29 - Mechanical, Chemical and Ion-Assisted Method

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Lecture 30 - Combustion Spray Process
Lecture 31 - Production of Low Vacuum
Lecture 32 - Production of High Vacuum
Lecture 33 - Measurement of Low Pressure and Gas Flow in Coating Deposition System
Lecture 34 - Physical Characterization
Lecture 35 - Assessment of Coating Hardness
Lecture 36 - Assessment of Friction and Wear of Coating
Lecture 37 - Assessment of Surface Roughness and Thickness of Coating
Lecture 38 - Assessment of Adhesion of Coating
Lecture 39 - Performance Evaluation of TiN Coated Tool
Lecture 40 - Performance Evaluation of HFCVD Diamond Coated Tool

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NPTEL Video Course - Mechanical Engineering - Vibration of Structures

Subject Co-ordinator - Prof. A. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Transverse Vibrations of Strings - I
Lecture 2 - Transverse Vibrations of Strings - II
Lecture 3 - Axial and Torsional Vibrations of Bars
Lecture 4 - Variational Formulation - I
Lecture 5 - Variational Formulation - II
Lecture 6 - Modal Analysis - I
Lecture 7 - Modal Analysis - II
Lecture 8 - Properties of the Eigenvalue Problem
Lecture 9 - Modal Analysis
Lecture 10 - Modal Analysis
Lecture 11 - The Initial Value Problem
Lecture 12 - Forced Vibration Analysis - I
Lecture 13 - Forced Vibration Analysis - II
Lecture 14 - Forced Vibration Analysis - III
Lecture 15 - Damping in Structures
Lecture 16 - Axially Translating Strings
Lecture 17 - d' Alembert's Solution - I
Lecture 18 - d' Alembert's Solution - II
Lecture 19 - Harmonic Waves and Energetics of Wave Motion
Lecture 20 - Scattering of Waves
Lecture 21 - Applications of Wave Solution - I
Lecture 22 - Applications of Wave Solution - II
Lecture 23 - Beam Models - I
Lecture 24 - Beam Models - II
Lecture 25 - Modal Analysis of Beams
Lecture 26 - Applications of Modal Solution
Lecture 27 - Approximate Methods
Lecture 28 - Topic in Beam Vibration - I
Lecture 29 - Topic in Beam Vibration - II

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Lecture 30 - Wave Propagation in Beams
Lecture 31 - Dynamics of Curved Beams
Lecture 32 - Vibrations of Rings and Arches
Lecture 33 - Dynamics of Membranes
Lecture 34 - Vibrations of Rectangular Membrane
Lecture 35 - Vibrations of Circular Membrane
Lecture 36 - Special Problems in Membrane Vibrations
Lecture 37 - Dynamics of Plates
Lecture 38 - Vibrations of Rectangular Plates
Lecture 39 - Vibrations of Circular Plates
Lecture 40 - Special Problems in Plate Vibrations

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NPTEL Video Course - Mechanical Engineering - Basic Thermodynamics

Subject Co-ordinator - Prof. S.K. Som

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Fundamental Concepts
Lecture 2 - Zeroth Law and Fundamental Concepts
Lecture 3 - Different Kind of Energy and First Low - I
Lecture 4 - First Low - II
Lecture 5 - First Low - III
Lecture 6 - Second Law and Its Corollaries - I
Lecture 7 - Second Law and Its Corollaries - II
Lecture 8 - Second Law and Its Corollaries - III
Lecture 9 - Second Law and Its Corollaries - IV
Lecture 10 - Second Law and Available Energy - I
Lecture 11 - Second Law and Available Energy - II
Lecture 12 - Second Law and Available Energy - III
Lecture 13 - Thermodynamic Property Relations - I
Lecture 14 - Thermodynamic Property Relations - II
Lecture 15 - Joule-Kelvin Expansion
Lecture 16 - Properties of Pure Substances - I
Lecture 17 - Properties of Pure Substances - II
Lecture 18 - Properties of Pure Substances
Lecture 19 - Properties of Ideal Gases
Lecture 20 - Vapors Power Cycle - I
Lecture 21 - Vapor Power Cycle - II
Lecture 22 - Vapor Power Cycle - III
Lecture 23 - Vapor Power Cycle - IV
Lecture 24 - Gas Power Cycle - I
Lecture 25 - Gas Power Cycle - II
Lecture 26 - Gas Power Cycle - III
Lecture 27 - Thermodynamics of Reacting System - I
Lecture 28 - Thermodynamics of Reacting System - II
Lecture 29 - Thermodynamics of Reacting System - III

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Lecture 30 - Thermodynamics of Multi Component System - I
Lecture 31 - Thermodynamics of Multi Component System - II
Lecture 32 - Thermodynamics of Multi Component System - III

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NPTEL Video Course - Mechanical Engineering - Design of Machine Elements I

Subject Co-ordinator - Prof. G. Chakraborty, Prof. B. Maiti, Prof. S.K. Roychowdhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Design Philosophy
Lecture 2 - Design And Manufacturing
Lecture 3 - Engineering Materials
Lecture 4 - Engineering Materials
Lecture 5 - Simple Stresses In Machine Elements
Lecture 6 - Simple Stresses In Machine Elements
Lecture 7 - Compound Stresses In Machine Elements
Lecture 8 - Design For Strength
Lecture 9 - Design for Strength
Lecture 10 - Design For Strength
Lecture 11 - Design for Strength
Lecture 12 - Design for Strength
Lecture 13 - Design of Fasteners - I
Lecture 14 - Design of Fasteners - II
Lecture 15 - Design Of Keys and Splines
Lecture 16 - Threaded Fasteners
Lecture 17 - Design Of Threaded Fasteners
Lecture 18 - Power Screws
Lecture 19 - Design Of Power Screws
Lecture 20 - Shaft Coupling - I
Lecture 21 - Shaft Coupling - II
Lecture 22 - Rivet Joints
Lecture 23 - Design of Welded Joints - I
Lecture 24 - Design of Welded Joints - II
Lecture 25 - Design of Joints With Eccentric Loading
Lecture 26 - Design of Joints With Variable Loading
Lecture 27 - Design of Springs
Lecture 28 - Design Of Springs
Lecture 29 - Design Of Springs

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Lecture 30 - Belt Drives
Lecture 31 - Belt Drives
Lecture 32 - Belt Drives
Lecture 33 - Design for Strength
Lecture 34 - Design of Shafts
Lecture 35 - Design of Machine Elements - I (V & W)
Lecture 36 - Design of Machine Elements - II (V & W)
Lecture 37 - Design of Cylinders & Pressure Vessels - II
Lecture 38 - Design of Cylinders & Pressure Vessels - III
Lecture 39 - Design of Brakes - I
Lecture 40 - Design of Brakes - II

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NPTEL Video Course - Mechanical Engineering - Manufacturing Processes II

Subject Co-ordinator - Prof. S. Paul, Prof. A.B. Chattopadhyay, Prof. A.K. Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Instructional Objectives - I (Manufacturing Process II)
Lecture 2 - Instructional Objectives - II
Lecture 3 - On Tool Geometry
Lecture 4 - Interrelations Among The Tool Angles
Lecture 5 - Mechanism of Chip Formation
Lecture 6 - Orthogonal and Oblique Cutting
Lecture 7 - Use of Chip Breaker in Machining
Lecture 8 - Machining Forces
Lecture 9 - Analytical and Experimental
Lecture 10 - Dynamometers for Measuring Cutting Forces
Lecture 11 - CTCEAC
Lecture 12 - CCTCFA
Lecture 13 - Concept of Machinability and its Improvement
Lecture 14 - Tool Life
Lecture 15 - Conventional Cutting Tool Maths
Lecture 16 - Advanced Tool Materials
Lecture 17 - Kinematics System of Centre Lathe
Lecture 18 - General Purpose Machine Tool Drills
Lecture 19 - Kinematic Systems and Operations
Lecture 20 - Configuration and Kinematic System
Lecture 21 - Mounting of jobs and Cutting Tools in Machine
Lecture 22 - Mounting of jobs and Cutting Tools in Machine
Lecture 23 - Construction, Operation and Tool Layout
Lecture 24 - Use of Attachments In Machine Tools
Lecture 25 - Forces Developing and Acting In Machine Tools
Lecture 26 - Estimation of Machining Time
Lecture 27 - Broaching - Principle Systems and Applications
Lecture 28 - Grinding Principle and Application
Lecture 29 - Abrasive Processes

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Lecture 30 - Abrasive Processes (Grinding)
Lecture 31 - Super finishing Processes
Lecture 32 - Production of Screw Threads
Lecture 33 - Gear Manufacturing
Lecture 34 - Jigs and Fixtures For Machine Shops
Lecture 35 - Design and Applications of Jigs and Fixtures
Lecture 36 - Non Traditional Manufacturing
Lecture 37 - Ultrasonic Machining
Lecture 38 - Water Jet Machining and Abrasive Water Jet
Lecture 39 - Electro - Chemical Machining
Lecture 40 - Electro - Discharge Machining
Lecture 41 - EBM and LBM

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NPTEL Video Course - Mechanical Engineering - Refrigeration and Air Conditioning

Subject Co-ordinator - Prof. M. Ramgopal, Prof. R.C. Arora

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of Refrigeration
Lecture 2 - Refrigerant Compressors & Development
Lecture 3 - Applications of RTAC
Lecture 4 - Review of Fundamentals Thermodynamics - I
Lecture 5 - Review of Fundamentals
Lecture 6 - Fundamentals of Fluid Flow
Lecture 7 - Fundamentals of Heat Transfer
Lecture 8 - Methods of Producing low Temperatures
Lecture 9 - Air Cycle Refrigeration Systems
Lecture 10 - Vapour Compression Refrigeration Systems
Lecture 11 - Vapour Compression Refrigeration Systems (Continued...)
Lecture 12 - Vapour Compression Refrigeration Systems (Continued...)
Lecture 13 - Vapour Compression Refrigeration Systems (Continued...)
Lecture 14 - Vapour Absorption Refrigeration Systems
Lecture 15 - Vapour Absorption Refrigeration System
Lecture 16 - Vapour Absorption Refrigeration Systems (Continued...)
Lecture 17 - Vapour Absorption Refrigeration Systems (Continued...)
Lecture 18 - Worked Out Examples - I
Lecture 19 - Worked Out Examples - II
Lecture 20 - Refrigeration System Components
Lecture 21 - Refrigeration System Components
Lecture 22 - Refrigeration System Components
Lecture 23 - Refrigeration System Components
Lecture 24 - Refrigeration System Components
Lecture 25 - Refrigeration System Components
Lecture 26 - Refrigeration System Components
Lecture 27 - Refrigeration System Components
Lecture 28 - Refrigeration System Components
Lecture 29 - Refrigeration System Components

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Lecture 30 - Refrigeration System Components
Lecture 31 - Refrigeration System Components
Lecture 32 - Analysis of Complete Vapour Compression System
Lecture 33 - Refrigerants
Lecture 34 - Psychrometry
Lecture 35 - Psychrometric Processes
Lecture 36 - Inside Design Condition Thermal Comfort
Lecture 37 - Psychrometry of Air Conditioning Systems
Lecture 38 - Air Conditioning Systems
Lecture 39 - Cooling and Heating Load Calculation
Lecture 40 - Cooling and Heating Load Calculations
Lecture 41 - Cooling and Heating Load Calculations (Continued...)
Lecture 42 - Cooling and Heating Load Calculations (Continued...)
Lecture 43 - Selection of Air Conditioning Systems
Lecture 44 - Transmission and Distribution of Air
Lecture 45 - Transmission and Distribution of Air (Continued..)
Lecture 46 - Space Air Distribution

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NPTEL Video Course - Mechanical Engineering - Fluid Mechanics

Subject Co-ordinator - Prof. S.K. Som

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Fundamental Concepts - Part I
Lecture 2 - Introduction and Fundamental Concepts - Part II
Lecture 3 - Introduction and Fundamental Concepts - Part III
Lecture 4 - Fluid Statics - Part I
Lecture 5 - Fluid Statics - Part II
Lecture 6 - Fluid Statics - Part III
Lecture 7 - Fluid Statics - Part IV
Lecture 8 - Fluid Statics - Part V
Lecture 9 - Fluid Statics - Part VI
Lecture 10 - Kinematics of Fluid - Part I
Lecture 11 - Kinematics of Fluid - Part II
Lecture 12 - Kinematics of Fluid - Part III
Lecture 13 - Conservation Equations in Fluid Flow - Part I
Lecture 14 - Conservation Equations in Fluid Flow - Part II
Lecture 15 - Conservation Equations in Fluid Flow - Part III
Lecture 16 - Conservation Equations in Fluid Flow - Part IV
Lecture 17 - Conservation Equations in Fluid Flow - Part V
Lecture 18 - Conservation Equations in Fluid Flow - Part VI
Lecture 19 - Conservation Equations in Fluid Flow - Part VII
Lecture 20 - Conservation Equations in Fluid Flow - Part VIII
Lecture 21 - Conservation Equations in Fluid Flow - Part IX
Lecture 22 - Fluid Flow Applications - Part I
Lecture 23 - Fluid Flow Applications - Part II
Lecture 24 - Fluid Flow Applications - Part III
Lecture 25 - Fluid Flow Applications - Part IV
Lecture 26 - Fluid Flow Applications - Part V
Lecture 27 - Fluid Flow Applications - Part VI
Lecture 28 - Fluid Flow Applications - Part VII
Lecture 29 - Incompressible Viscous Flows - Part I

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Lecture 30 - Incompressible Viscous Flows - Part II
Lecture 31 - Incompressible Viscous Flows - Part III
Lecture 32 - Incompressible Viscous Flows - Part IV
Lecture 33 - Application of ViscousFlow Through Pipes - Part I
Lecture 34 - Application of ViscousFlow Through Pipes - Part II
Lecture 35 - Application of ViscousFlow Through Pipes - Part III
Lecture 36 - Principles of Similarity - Part I
Lecture 37 - Principles of Similarity - Part II
Lecture 38 - Principles of Similarity - Part III
Lecture 39 - Flow of Ideal Fluids - Part I
Lecture 40 - Flow of Ideal Fluids - Part II
Lecture 41 - Flows with a Free Surface - Part I
Lecture 42 - Flows with a Free Surface - Part II
Lecture 43 - Flows with a Free Surface - Part III
Lecture 44 - A Few Unsteady Flow Phenomena in Practice - Part I
Lecture 45 - A Few Unsteady Flow Phenomena in Practice - Part II
Lecture 46 - Introduction to Laminar Boundary Layer - Part I
Lecture 47 - Introduction to Laminar Boundary Layer - Part II
Lecture 48 - Introduction to Turbulent Flow - Part I
Lecture 49 - Introduction to Turbulent Flow - Part II

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NPTEL Video Course - Mechanical Engineering - Introduction to Fluid Machines and Compressible Flow

Subject Co-ordinator - Prof. S.K. Som

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fluid Machines 1
Lecture 2 - Energy Transfer in Fluid Machines Part - I
Lecture 3 - Energy Transfer in Fluid Machines Part - II
Lecture 4 - Energy Transfer - impulse and Reaction Machines, efficiencies of Fluid Machines
Lecture 5 - Principles of Similarity in Fluid Machines
Lecture 6 - Concept of specific speed and introduction to Impulse Hydraulic Turbine
Lecture 7 - Analysis of force on the Bucket of Pelton wheel and Power Generation
Lecture 8 - Specific speed, Governing and Limitation of a Pelton Turbine
Lecture 9 - Introduction to reaction Type of Hydraulic Turbine - A Francis Turbine
Lecture 10 - Analysis of Force on Francis Runner and Power Generation
Lecture 11 - Axial Flow Machine and Draft Tube
Lecture 12 - Governing of Reaction Turbine
Lecture 13 - Introduction to Rotodynamic Pumps
Lecture 14 - Flow and Energy Transfer in a Centrifugal Pump
Lecture 15 - Characteristics of a Centrifugal Pump
Lecture 16 - Matching of Pump and System Characteristics
Lecture 17 - Diffuser and Cavitation
Lecture 18 - Axial Flow Pump
Lecture 19 - Reciprocating Pump - Part I
Lecture 20 - Reciprocating Pump - Part II
Lecture 21 - Centrifugal Compressor - Part I
Lecture 22 - Centrifugal Compressor - Part II
Lecture 23 - Centrifugal Compressor - Part III
Lecture 24 - Axial Flow Compressor - Part I
Lecture 25 - Axial Flow Compressor - Part II
Lecture 26 - Introduction to Compressible Flow - Part I
Lecture 27 - Introduction to Compressible Flow - Part II
Lecture 28 - Thermodynamic Relations and Speed of Sound
Lecture 29 - Disturbance propagation, Stagnation and Sonic Properties

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Lecture 30 - Effects of Area Variation on Properties in an Isentropic Flow
Lecture 31 - Choking in a Converging Nozzle
Lecture 32 - Isentropic Flow through Convergent - Divergent Duct
Lecture 33 - Normal Shock - Part I
Lecture 34 - Normal Shock - Part II
Lecture 35 - Normal Shock - Part III
Lecture 36 - Normal Shock - Part IV
Lecture 37 - Normal Shock - Part V
Lecture 38 - Oblique Shock - Part I
Lecture 39 - Oblique Shock - Part II
Lecture 40 - Introduction to Expansion Wave and Prandtl Meyer Flow

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NPTEL Video Course - Mechanical Engineering - Introduction to Fluid Mechanics and Fluid Engineering

Subject Co-ordinator - Prof. S. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Concepts
Lecture 2 - Introductory Concepts (Continued...)
Lecture 3 - Introductory Concepts (Continued...)
Lecture 4 - Viscosity
Lecture 5 - Viscosity (Continued...)
Lecture 6 - Viscosity (Continued...) and Surface Tension
Lecture 7 - Surface Tension (Continued...) and Fluid Statics
Lecture 8 - Fluid Statics (Continued...)
Lecture 9 - Fluid Statics (Continued...)
Lecture 10 - Fluid Statics (Continued...) and Fluid Under Rigid Body Motion
Lecture 11 - Fluid Kinematics
Lecture 12 - Fluid Kinematics (Continued...)
Lecture 13 - Fluid Kinematics (Continued...)
Lecture 14 - Fluid Kinematics (Continued...)
Lecture 15 - Fluid Kinematics (Continued...)
Lecture 16 - Dynamics of Inviscid Flows
Lecture 17 - Dynamics of Inviscid Flows (Continued...)
Lecture 18 - Dynamics of Inviscid Flows (Continued...)
Lecture 19 - Dynamics of Inviscid Flows (Continued...)
Lecture 20 - Dynamics of Inviscid Flows (Continued...)
Lecture 21 - Integral Forms of Control Volume Conservation Equations (Reynolds Transport Theorem)
Lecture 22 - Integral Forms of Control Volume Conservation Equations (Reynolds Transport Theorem) (Continued.
Lecture 23 - Integral Forms of Control Volume Conservation Equations (Reynolds Transport Theorem) (Continued.
Lecture 24 - Integral Forms of Control Volume Conservation Equations (Reynolds Transport Theorem) (Continued.
Lecture 25 - Integral Forms of Control Volume Conservation Equations (Reynolds Transport Theorem) (Continued.
Lecture 26 - Integral Forms of Control Volume Conservation Equations (Reynolds Transport Theorem) (Continued.
Lecture 27 - Integral Forms of Control Volume Conservation Equations (Reynolds Transport Theorem) (Continued.
Lecture 28 - Dynamics of Viscous Flows
Lecture 29 - Dynamics of Viscous Flows

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Lecture 30 - Some Exact Solutions of Navier Stokes Equation
Lecture 31 - Some Exact Solutions of Navier Stokes Equation (Continued...)
Lecture 32 - Some Exact Solutions of Navier Stokes Equation (Continued...)
Lecture 33 - Introduction to Turbulence
Lecture 34 - Introduction to Turbulence (Continued...)
Lecture 35 - Introduction to Turbulence (Continued...)
Lecture 36 - Introduction to Turbulence (Continued...)
Lecture 37 - Boundary Layer Theory
Lecture 38 - Boundary Layer Theory (Continued...)
Lecture 39 - Boundary Layer Theory (Continued...)
Lecture 40 - Boundary Layer Theory (Continued...) and Flow Past Immersed Bodies
Lecture 41 - Flow past Immersed Bodies (Continued...)
Lecture 42 - Potential Flow Past Immersed Bodies
Lecture 43 - Potential Flow (Continued...) and Flow Past Immersed Bodies of Special Shapes
Lecture 44 - Flow Past Immersed Bodies (Continued...) and Sports Ball Aerodynamics
Lecture 45 - Pipe Flow
Lecture 46 - Pipe Flow (Continued...)
Lecture 47 - Pipe Flow (Continued...)
Lecture 48 - Principles of Similarity and Dimensional Analysis
Lecture 49 - Introduction to Fluid Machines
Lecture 50 - Introduction to Fluid Machines (Continued...)
Lecture 51 - Introduction to Fluid Machines (Continued...)
Lecture 52 - Introduction to Fluid Machines (Continued...)
Lecture 53 - Introduction to Fluid Machines (Continued...)
Lecture 54 - Compressible Flows
Lecture 55 - Compressible Flows (Continued...)
Lecture 56 - Compressible Flows (Continued...)
Lecture 57 - Compressible Flows (Continued...)
Lecture 58 - Compressible Flows (Continued...)

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NPTEL Video Course - Mechanical Engineering - Micro fluidics

Subject Co-ordinator - Prof. S. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microfluidics
Lecture 2 - Microfluidics
Lecture 3 - Microfluidics
Lecture 4 - Equations of Conservation
Lecture 5 - Navier Stokes Equation
Lecture 6 - Navier Stokes Equation (Continued...)
Lecture 7 - Energy Equation
Lecture 8 - Energy Equation (Continued...) and Species Conservation Equation
Lecture 9 - Pressure-driven Microflows
Lecture 10 - Pressure-driven Microflows (Continued...)
Lecture 11 - Pressure-driven Microflows (Continued...)
Lecture 12 - Pressure-driven Microflows (Continued...)
Lecture 13 - Pressure -driven Microflows (Continued...)
Lecture 14 - Some Examples of Unsteady Flows
Lecture 15 - Some Examples of Unsteady Flows (Continued...)
Lecture 16 - Some Examples of Unsteady Flows (Continued...)
Lecture 17 - Stokes Drag on a Sphere
Lecture 18 - Stokes Drag on a Sphere (Continued...) and Introduction to Lubrication Theory
Lecture 19 - Lubircation Theory (Continued...)
Lecture 20 - Lubrication Theory (Continued...)
Lecture 21 - Boundary Condition in Fluid Mechanics
Lecture 22 - Boundary Condition in Fluid Mechanics
Lecture 23 - Surface Tension Driven Flows
Lecture 24 - Surface Tension Driven Flows (Continued...)
Lecture 25 - Surface Tension Driven Flows (Continued...)
Lecture 26 - Surface Tension Driven Flows (Continued...)
Lecture 27 - Surface Tension Driven Flows (Continued...) and Modulating Surface Tension
Lecture 28 - Modulating Surface Tension (Continued...)
Lecture 29 - Thin Film Dynamics

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Lecture 30 - Thin Film Dynamics (Continued...)
Lecture 31 - Thin Film Dynamics (Continued...)
Lecture 32 - Thin Film Dynamics (Continued...)
Lecture 33 - Lab on a CD
Lecture 34 - Lab on a CD (Continued...)
Lecture 35 - Introduction to Microfabrication
Lecture 36 - Electrokinetics
Lecture 37 - Electrokinetics (Continued...)
Lecture 38 - Electrokinetics (Continued...)
Lecture 39 - Electrokinetics (Continued...)
Lecture 40 - Electrokinetics (Continued...)
Lecture 41 - Electrokinetics (Continued...)
Lecture 42 - Dispersion
Lecture 43 - Introduction to Nanofluidics
Lecture 44 - Introduction to Nanofluidics (Continued...) and Molecular Dynamics Simulations
Lecture 45 - Introduction to Molecular Dynamics Simulations (Continued...)
Lecture 46 - Biomicrofluidics
Lecture 47 - Biomicrofluidics (Continued...)
Lecture 48 - Nanofluidic Energy Conversion

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NPTEL Video Course - Mechanical Engineering - NOC:Conduction and Convection Heat Transfer

Subject Co-ordinator - Prof. S.K. Som, Prof. S. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Fundamental Concepts - I
Lecture 2 - Introduction and Fundamental Concepts - II
Lecture 3 - Heat Conduction Equation
Lecture 4 - Heat Conduction Equation and Different Types of Boundary Conditions
Lecture 5 - 1D Steady State Heat Conduction In Plane Wall Without Generation of Thermal Energy
Lecture 6 - 1D Steady State Heat Conduction In Plane Wall With Generation of Thermal Energy
Lecture 7 - Problems on 1D Steady State Heat Conduction In Plane Wall
Lecture 8 - 1D Steady State Heat Conduction In Cylindrical Geometry
Lecture 9 - 1D Steady State Heat Conduction In Cylindrical Geometry (Continued...)
Lecture 10 - 1D Steady State Heat Conduction in Spherical Geometry
Lecture 11 - Hear Transfer from Extended Surfaces (Fins)
Lecture 12 - Hear Transfer from Extended Surfaces (Continued...)
Lecture 13 - Two-dimensional Steady State Heat Conduction
Lecture 14 - Unsteady State Heat Conduction
Lecture 15 - Unsteady State Heat Conduction (Continued...)
Lecture 16 - One Dimensional Unsteady State Heat Conduction - I
Lecture 17 - One Dimensional Unsteady State Heat Conduction - II
Lecture 18 - Introduction to Convection
Lecture 19 - Convection - I
Lecture 20 - Review of Fluid Mechanics - I
Lecture 21 - Review of Fluid Mechanics - II
Lecture 22 - Review of Fluid Mechanics - III
Lecture 23 - Review of Fluid Mechanics - IV
Lecture 24 - Review of Fluid Mechanics - V
Lecture 25 - Review of Fluid Mechanics - VI
Lecture 26 - Review of Fluid Mechanics - VIII
Lecture 27 - Energy Equation - I
Lecture 28 - Energy Equation - II and Thermal Boundary Layer - I
Lecture 29 - Thermal Boundary Layer - II

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Lecture 30 - Integral Method for Thermal BL Analysis
Lecture 31 - Internal Forced Convection - I
Lecture 32 - Internal Forced Convection - II
Lecture 33 - Internal Forced Convection - III
Lecture 34 - Internal Forced Convection - IV
Lecture 35 - Free Convection - I (Natural Convection)
Lecture 36 - Free Convection - II (Natural Convection)
Lecture 37 - Boiling and Condensation - I
Lecture 38 - Boiling and Condensation - II
Lecture 39 - Heat Exchanger - I
Lecture 40 - Heat Exchanger - II
Lecture 41 - Heat Exchanger - II (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC:Vibrations of Structures

Subject Co-ordinator - Prof. A. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Transverse Vibrations of Strings - I
Lecture 2 - Transverse Vibrations of Strings - II
Lecture 3 - Axial and Torsional Vibrations of Bars
Lecture 4 - Variational Formulation - I
Lecture 5 - Variational Formulation - II
Lecture 6 - Modal Analysis - I
Lecture 7 - Modal Analysis - II
Lecture 8 - Properties of the Eigenvalue Problem
Lecture 9 - Modal Analysis
Lecture 10 - Modal Analysis
Lecture 11 - The Initial Value Problem
Lecture 12 - Forced Vibration Analysis - I
Lecture 13 - Forced Vibration Analysis - II
Lecture 14 - Forced Vibration Analysis - III
Lecture 15 - Dumping in Structures - I
Lecture 16 - Damping in Structures - II
Lecture 17 - Beam Models - I
Lecture 18 - Beam Models - II
Lecture 19 - Modal Analysis of Beams
Lecture 20 - Application of Modal Solution
Lecture 21 - Approximate Methods
Lecture 22 - Topics in Beam Vibrations - I
Lecture 23 - Topics in Beam Vibrations - II
Lecture 24 - Dynamics of Curved Beams
Lecture 25 - Vibrations of Rings and Arches - I
Lecture 26 - Vibrations of Rings and Arches - II
Lecture 27 - Dynamics of Membranes
Lecture 28 - Vibrations of Rectangular Membranes
Lecture 29 - Vibrations of Circular Membranes - I

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Lecture 30 - Vibrations of Circular Membranes - II
Lecture 31 - Dynamics of Plates
Lecture 32 - Vibrations of Rectangular Plates
Lecture 33 - Vibrations of Circular Plates
Lecture 34 - Special Problems in Plate Vibrations - I
Lecture 35 - Special Problems in Plate Vibrations - II

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NPTEL Video Course - Mechanical Engineering - NOC:Fluid Machines

Subject Co-ordinator - Prof. S.K. Som

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition of Fluid Machines and Energy Transfer in Fluid Machines - Part I
Lecture 2 - Energy Transfer in Fluid Machines - Part II
Lecture 3 - Impulse and Reaction Machines
Lecture 4 - Principles of Similarity in Fluid Machine
Lecture 5 - Concept of Specific Speed
Lecture 6 - Basic Principles, Analysis of Force and Power Generation - Part I
Lecture 7 - Basic Principles, Analysis of Force and Power Generation - Part II
Lecture 8 - Specific Speed Governing and Limitations of Impulse Turbine
Lecture 9 - Tutorial - I
Lecture 10 - Tutorial - II
Lecture 11 - Introduction and Analysis of Force on Francis Turbine (Radial Flow) - Part I
Lecture 12 - Analysis of Force (Part-II) and Power Generation
Lecture 13 - Draft Tube
Lecture 14 - Tutorial - III
Lecture 15 - Tutorial - IV
Lecture 16 - Axial Flow Turbine
Lecture 17 - Governing of Reaction Turbine
Lecture 18 - Introduction to Rotodynamic Pumps
Lecture 19 - Flow and Energy Transfer to Centrifugal Pumps
Lecture 20 - Tutorial - V
Lecture 21 - Characteristics of a Centrifugal Pump
Lecture 22 - Matching of Pump and System Characteristics
Lecture 23 - Diffuser and Cavitation
Lecture 24 - Tutorial - VI
Lecture 25 - Tutorial - VIII
Lecture 26 - Axial Flow Pump
Lecture 27 - Reciprocating Pump - Part I
Lecture 28 - Reciprocating Pump - Part II
Lecture 29 - Tutorial - VIII

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Lecture 30 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part I
Lecture 31 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part II
Lecture 32 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part III
Lecture 33 - Basic Principles and Energy Transfer in Centrifugal Compressor - Part IV and Losses in Centrifug
Lecture 34 - Performance Characteristics of Centrifugal Compressors - Part I
Lecture 35 - Performance Characteristics of Centrifugal Compressors - Part II
Lecture 36 - Basic Principles and Energy Transfer in Axial Flow Compressor - Part I
Lecture 37 - Basic Principles and Energy Transfer in Axial Flow Compressor - Part II
Lecture 38 - Fans and Blowers - Part I
Lecture 39 - Fans and Blowers - Part II

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NPTEL Video Course - Mechanical Engineering - NOC:Computer numerical control (CNC) of machine tools and proce

Subject Co-ordinator - Prof. Asimava Roy Choudhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to computer control Â role of computers in automation
Lecture 2 - Introduction (Continued...) - binary logic and logic gates
Lecture 3 - Classification of Computer numerical control (CNC) Â Point to point and continuous control
Lecture 4 - Classification (Continued...) - Closed loop and open loop control
Lecture 5 - Tutorial involving simple calculations on different aspects of CNC controls
Lecture 6 - Questions, MCQ Discussions on Motors, Encoders, Decoders and Programming Practice
Lecture 7 - Stepper motors, Permanent magnet DC motors
Lecture 8 - Binary circuits and decoders
Lecture 9 - Tachogenerator, printed circuit motors, Encoders
Lecture 10 - Programming Practice - I
Lecture 11 - Programming Practice - II
Lecture 12 - Computer Aided Offline Programming
Lecture 13 - Interpolators - Linear
Lecture 14 - Interpolators - Curvilinear
Lecture 15 - Questions on Programming and Interpolation
Lecture 16 - 3-D Machining - Basic Concepts
Lecture 17 - Curved Surface Geometry
Lecture 18 - Cutter Path Generation for Curved Surfaces
Lecture 19 - Cutter Path Generation (Concluding Part) and Current Status - CNC Machining and Related Processe
Lecture 20 - Questions and Discussions on Curved Surface Machining

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NPTEL Video Course - Mechanical Engineering - NOC:Non Traditional Abrasive Machining Processes - Ultrasonic,

Subject Co-ordinator - Prof. Asimava Roy Choudhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Non-traditonal abrasive machining
Lecture 2 - Ultrasonic Machining
Lecture 3 - Ultrasonic Machining (Continued...)
Lecture 4 - Utrrasonic Machining - Free Impacts and Problem Solving
Lecture 5 - Ultrasonic Machining - Problems and MCQs
Lecture 6 - USM - Horn Design
Lecture 7 - USM - Horn Design (Continued...)
Lecture 8 - Ultrasonic Machining - Feed Mechanism, Head design and other aspects
Lecture 9 - Ultrasonic Machining - Effects of Various Inputs on the Output
Lecture 10 - Ultrasonic Machining - Numerical and MCQs
Lecture 11 - A JM (Abrasive jet machining)
Lecture 12
Lecture 13 - A JM - Numerical problems
Lecture 14 - A JM - Process Parameters and Response Characteristics take - home assignment discussing
Lecture 15 - A JM - MCQs
Lecture 16
Lecture 17 - AWJM - Equipment
Lecture 18 - AWJM - Numerical Problems
Lecture 19 - AWJM - Application Equipment Details
Lecture 20 - AWJM - MCQs

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Fluid Mechanics

Subject Co-ordinator - Dr. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lagrangian and Eulerian Approach, Types of fluid flow
Lecture 2 - Streamlines, Streakline and Pathline
Lecture 3 - Acceleration of fluid flow
Lecture 4 - Deformation and Conservation of mass of fluid a element
Lecture 5 - Angular deformation of a fluid element, vorticity and streamfunction and velocity potential
Lecture 6 - Eulerâ s equation
Lecture 7 - Bernoulliâ s equation - Part I
Lecture 8 - Kinematic viscosity, Reynolds number
Lecture 9 - Non-Newtonian fluids
Lecture 10 - Problems and Solutions
Lecture 11 - Problems and Solutions
Lecture 12 - Surface Tension - Part I
Lecture 13 - Surface Tension - Part II
Lecture 14 - Governing equation of fluid statics
Lecture 15 - Manometers
Lecture 16 - Force on a surface immersed in fluid - Part I
Lecture 17 - Force on a surface immersed in fluid - Part II
Lecture 18 - Force on a surface immersed in fluid - Part III, Stability of solid bodies in fluid - Part I
Lecture 19 - Stability of solid bodies in fluid - Part II
Lecture 20 - Fluid under rigid body motion
Lecture 21 - Lagrangian and Eulerian approaches
Lecture 22 - Concept of different flow lines
Lecture 23 - Acceleration of fluid flow
Lecture 24 - Deformation of fluid elements - Part I
Lecture 25 - Derivation of continuity equation
Lecture 26 - Problems and Solutions
Lecture 27 - Deformation of fluid elements - Part II
Lecture 28 - Deformation of fluid elements - Part III
Lecture 29 - Stream Function

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Lecture 30 - Circulation, Velocity Potential
Lecture 31 - Eulerâ s equation
Lecture 32 - Bernoulliâ s equation - Part I
Lecture 33 - Bernoulliâ s equation - Part II
Lecture 34 - Bernoulliâ s equation - Part III
Lecture 35 - Eulerâ s equation in streamline coordinates
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
Lecture 41
Lecture 42
Lecture 43
Lecture 44
Lecture 45
Lecture 46
Lecture 47
Lecture 48
Lecture 49
Lecture 50
Lecture 51 - Navier-Stokes equation - Part I
Lecture 52 - Navier-Stokes equation - Part II
Lecture 53 - Navier-Stokes equation - Part III
Lecture 54 - Navier-Stokes equation - Part IV
Lecture 55 - Pipe Flow - Part I
Lecture 56 - Pipe Flow - Part II
Lecture 57 - Pipe Flow - Part III
Lecture 58 - Pipe Flow - Part IV
Lecture 59 - Principle of Similarity and Dynamical Analysis - Part I
Lecture 60 - Principle of Similarity and Dynamical Analysis - Part II

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NPTEL Video Course - Mechanical Engineering - NOC:Spur and Helical Gear Cutting

Subject Co-ordinator - Prof. Asimava Roy Choudhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Simple Gear Calculations
Lecture 3 - Gear Geometry
Lecture 4 - Helical Gear Problems
Lecture 5 - Numerical Problem MCQ
Lecture 6 - Numerical Problem Milling of Helical Gears
Lecture 7 - Simple and Compound Indexing
Lecture 8 - Differential Indexing
Lecture 9 - Helical Gear Cutting on Milling Machine
Lecture 10 - Numerical Problems on Gear Milling
Lecture 11 - Gear Shaping - I
Lecture 12 - Gear Shaping - II
Lecture 13 - Gear Shaping - III
Lecture 14 - Gear Shaping - IV
Lecture 15 - Gear Hobbing - I
Lecture 16 - Gear Hobbing - II
Lecture 17 - Gear Hobbing - III
Lecture 18 - Gear Hobbing - IV
Lecture 19 - Gear Hobbing - V
Lecture 20 - Gear Hobbing - VI

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NPTEL Video Course - Mechanical Engineering - NOC:Laws of Thermodynamics

Subject Co-ordinator - Prof. Suman Chakraborty, Prof. S.K. Som

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Definition of System, Properties and State of a System
Lecture 2 - Properties of pure substances
Lecture 3 - Properties of pure substances (Continued...)
Lecture 4 - Heat and Work
Lecture 5 - Tutorial 1
Lecture 6 - Zeroth Law of Thermodynamics
Lecture 7 - First law of thermodynamics for closed systems - Part I
Lecture 8 - First law of thermodynamics for closed systems - Part II, some examples
Lecture 9 - Tutorial 2
Lecture 10 - First law of thermodynamics for open systems
Lecture 11 - Tutorial 3
Lecture 12 - Second law and its corollaries - Part I
Lecture 13 - Second law and its corollaries - Part II
Lecture 14 - Second law and its corollaries - Part III
Lecture 15 - Definition of entropy and entropy change in closed systems
Lecture 16 - Entropy change in closed systems (Continued...)
Lecture 17 - Tutorial 4
Lecture 18 - Entropy and its transport
Lecture 19 - Tutorial 5
Lecture 20 - Introduction to Third Law
Lecture 21 - Review of learning concepts

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NPTEL Video Course - Mechanical Engineering - NOC:Energy Conservation and Waste Heat Recovery

Subject Co-ordinator - Prof. PK Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to waste heat recovery
Lecture 2 - Introduction to waste heat recovery (Continued...)
Lecture 3 - Introduction to waste heat recovery (Continued...)
Lecture 4 - Introduction to waste heat recovery (Continued...)
Lecture 5 - Thermodynamic principles of waste heat recovery
Lecture 6 - Thermodynamic principles of waste heat recovery (Continued...)
Lecture 7 - Thermodynamic principles of waste heat recovery (Continued...)
Lecture 8 - Thermodynamic principles of waste heat recovery (Continued...)
Lecture 9 - Reversible Cycles
Lecture 10 - Reversible Cycles (Continued...)
Lecture 11 - Entropy
Lecture 12 - Entropy (Continued...)
Lecture 13 - Entropy (Continued...), Exergy
Lecture 14 - Exergy, Second Law efficiency
Lecture 15 - Second Law efficiency (Continued...)
Lecture 16 - Recapitulation of common power cycles
Lecture 17 - Recapitulation of common power cycles (Continued...)
Lecture 18 - Recapitulation of common power cycles (Continued...)
Lecture 19 - Recapitulation of common power cycles (Continued...)
Lecture 20 - Recapitulation of common power cycles (Continued...)
Lecture 21 - Recapitulation of common power cycles (Continued...)
Lecture 22 - Gas Turbine cycle
Lecture 23 - Combined cycle
Lecture 24 - Combined cycle (Continued...)
Lecture 25 - Combined Cycle (Continued...)
Lecture 26 - Heat recovery steam generator
Lecture 27 - Thermodynamic cycles for low temperature application
Lecture 28 - Thermodynamic cycles for low temperature application (Continued...), Cogeneration
Lecture 29 - Heat Exchanger

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Lecture 30 - Heat Exchanger (Continued...)
Lecture 31 - Heat Exchanger (Continued...)
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37 - Heat Pipe - Part I
Lecture 38 - Heat Pipe - Part II
Lecture 39 - Heat Pipe - Part III
Lecture 40 - Direct Conversion - Introduction to TEG
Lecture 41 - Thermoelectric Generators - Functioning and Applications
Lecture 42 - TEG - performance analysis
Lecture 43 - TEG - performance optimization
Lecture 44 - Direct Conversion - Magneto Hydro dynamics (MHD)
Lecture 45 - Direct Conversion - Thermo-Ionic generation
Lecture 46 - Direct Conversion - Thermo Photo Voltaic generation (TPV)
Lecture 47 - Heat Pumps - I
Lecture 48 - Heat Pumps - II
Lecture 49 - Heat Pumps - III
Lecture 50 - Waste Heat Recovery from Incinerator Plants
Lecture 51 - Energy Storage Systems - I
Lecture 52 - Energy Storage Systems - II
Lecture 53 - Energy Storage Systems - III
Lecture 54 - Energy Storage Systems - IV
Lecture 55 - Energy Storage Systems - V
Lecture 56 - Energy Storage Systems - VI
Lecture 57
Lecture 58
Lecture 59
Lecture 60
Lecture 61
Lecture 62
Lecture 63
Lecture 64
Lecture 65
Lecture 66
Lecture 67
Lecture 68 - Corrigendum

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Mechanical Micro Machining

Subject Co-ordinator - Prof. Ajay M Sidpara

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Introduction (Continued...)
Lecture 7 - Scaling Laws
Lecture 8 - Scaling laws (Continued...)
Lecture 9 - Scaling laws (Continued...)
Lecture 10 - Difference between macro and micro machining
Lecture 11 - Difference between macro and micro machining (Continued...)
Lecture 12 - Difference between micro and macro machining (Continued...)
Lecture 13 - Difference between micro and macro machining (Continued...)
Lecture 14 - Difference between macro and micro machining (Continued...)
Lecture 15 - Difference between macro and micro machining (Continued...)
Lecture 16 - Difference between macro and micro machining (Continued...)
Lecture 17 - Difference between macro and micro machining (Continued...)
Lecture 18 - Difference between macro and micro machining (Continued...)
Lecture 19 - Difference between macro and micro machining (Continued...)
Lecture 20 - Difference between macro and micro machining (Continued...)
Lecture 21 - Difference between macro and micro machining (Continued...)
Lecture 22 - Component of the machine tool
Lecture 23 - Components of the machine tool (Continued...)
Lecture 24 - Components of the machine tool (Continued...)
Lecture 25 - Components of the machine tool (Continued...)
Lecture 26 - Components of the machine tool (Continued...)
Lecture 27 - Errors in machine tool (Continued...)
Lecture 28 - Errors in machine tool (Continued...)
Lecture 29 - Errors in machine tool (Continued...)

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Lecture 30 - Errors in machine tool (Continued...)
Lecture 31 - Components of machine tool
Lecture 32 - Components of machine tool (Continued...)
Lecture 33 - Components of machine tool (Continued...)
Lecture 34 - Components of machine tool (Continued...)
Lecture 35 - Components of machine tool (Continued...)
Lecture 36 - Components of machine tool (Continued...)
Lecture 37 - Components of machine tool (Continued...)
Lecture 38 - Components of machine tool (Continued...)
Lecture 39 - Components of machine tool (Continued...)
Lecture 40 - Components of machine tool (Continued...)
Lecture 41 - Components of machine tool (Continued...)
Lecture 42 - Components of machine tool (Continued...)
Lecture 43 - Components of machine tool (Continued...)
Lecture 44 - Components of machine tool (Continued...)
Lecture 45 - Components of machine tool (Continued...)
Lecture 46 - Components of machine tool (Continued...)
Lecture 47 - Components of machine tool (Continued...)
Lecture 48 - Components of machine tool (Continued...)
Lecture 49 - Micro tools
Lecture 50 - Micro tools (Continued...)
Lecture 51 - Micro tools (Continued...)
Lecture 52 - Fabrication of micro tool by EDM process
Lecture 53 - Micro tools (Continued...)
Lecture 54 - Micro machines
Lecture 55 - Micro machines (Continued...)
Lecture 56 - Diamond turning
Lecture 57 - Diamond turning (Continued...)
Lecture 58 - Diamond turning (Continued...)
Lecture 59 - Diamond turning (Continued...)
Lecture 60 - Sensors and metrology for micro machining
Lecture 61 - Sensors and metrology for micro machining (Continued...)
Lecture 62 - Sensors and metrology for micro machining (Continued...)
Lecture 63 - 3D surface measurement using interferometer

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NPTEL Video Course - Mechanical Engineering - NOC:Machinery Fault Diagnosis and Signal Processing

Subject Co-ordinator - Prof. Amiya Ranjan Mohanty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Maintenance Principles
Lecture 3 - FMECA
Lecture 4 - Fault Diagnostics and Prognostics
Lecture 5 - Machine Learning in CBM
Lecture 6 - Basics of Vibration
Lecture 7 - Free and Forced Response
Lecture 8 - Vibration and Shock Isolation
Lecture 9 - Rotordynamics
Lecture 10 - Practical Examples of Vibration
Lecture 11 - Time Domain Analysis
Lecture 12 - Frequency Domain Analysis
Lecture 13 - Non Stationary Signal Analysis
Lecture 14 - Modulation and Beats
Lecture 15 - Orbit and Order Analysis
Lecture 16 - Computer aided data acquisition
Lecture 17 - Orbit and Order Analysis
Lecture 18 - Data Recording
Lecture 19 - Cepstrum Analysis
Lecture 20 - Hilbert Transform in Condition Monitoring
Lecture 21 - Introduction to MATLAB
Lecture 22 - Signal Processing using MATLAB
Lecture 23 - Numericals in Signal Processing and Data Acquisition
Lecture 24 - Signal Hetrodyning
Lecture 25 - Practical Signals
Lecture 26 - Basics Of Instrumentation
Lecture 27 - Signal Conditioning And Filtering
Lecture 28 - Errors In Measurements
Lecture 29 - Dynamic Range And Frequency Response

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Lecture 30 - Overview Of Transducers For Cbm
Lecture 31 - Accelerometers
Lecture 32 - Vibration Monitoring
Lecture 33 - Rotational Speed Measurements
Lecture 34 - Basics of Noise
Lecture 35 - Noise Monitoring
Lecture 36 - Introduction to Faults in Rotating Machines
Lecture 37 - Unbalance Detection
Lecture 38 - Field Balancing
Lecture 39 - Misalignment
Lecture 40 - Crack and Looseness
Lecture 41 - Journal and Anti-Friction Bearings
Lecture 42 - Gears
Lecture 43 - Pumps and Cavitation
Lecture 44 - IC Engines
Lecture 45 - Machinery Diagnostic Chart
Lecture 46 - Principles of Motor Current Signature Analysis
Lecture 47 - Faults in Electrical Machines
Lecture 48 - Thermography
Lecture 49 - Wear Debris Analysis
Lecture 50 - Oil Analysis
Lecture 51 - Ultrasonics
Lecture 52 - Eddy Current and Acoustic Emission
Lecture 53 - Radiography, Dye Penetrant Tests
Lecture 54 - Tool Condition Monitoring
Lecture 55 - Experimental Modal Analysis
Lecture 56 - Introduction to Failure Analysis
Lecture 57 - Railway Locomotive Noise and Vibration Monitoring
Lecture 58 - Paper Mill Vibration Monitoring
Lecture 59 - Overview of CBM facilities at IIT Kharagpur
Lecture 60 - Future of Condition based Monitoring

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NPTEL Video Course - Mechanical Engineering - NOC:Metal Cutting and Machine Tools

Subject Co-ordinator - Prof. Asimava Roy Choudhury

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Geometry of single point turning tools - 1
Lecture 3 - Geometry of turning tools - 2
Lecture 4 - Geometry of single point turning tools - 3
Lecture 5 - Geometry of cutting tools and numerical problems
Lecture 6 - Different types of tools and mcq
Lecture 7 - Mechanism of chip formation
Lecture 8 - Mechanics of material removal
Lecture 9 - Measurement of Cutting Forces
Lecture 10 - Numerical problems and MCQ
Lecture 11 - Tool wear and Tool life
Lecture 12 - Wear and life of cutting tools - 2
Lecture 13 - The lathe
Lecture 14 - Calculations on mechanisms in machine tools
Lecture 15 - Numerical problems on lathe
Lecture 16 - Milling machines
Lecture 17 - Milling machine - indexing
Lecture 18 - Gear cutting CNC and non traditional machining
Lecture 19 - CNC and non-traditional machining methods
Lecture 20 - Numerical problems for week 4
Lecture 21 - Live Session

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NPTEL Video Course - Mechanical Engineering - NOC:Gear and Gear Unit Design - Theory and Practice

Subject Co-ordinator - Prof. Rathindranath Maiti

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Motivation and Theme of the Course
Lecture 2 - Laws of Gearing, Kinematics and Geometry - Part I
Lecture 3 - Laws of Gearing, Kinematics and Geometry - Part II
Lecture 4 - Involute Toothed Gear- Properties and Terminology
Lecture 5 - Tutorial
Lecture 6 - Involute Straight Tooth Spur Gear
Lecture 7 - Helical Tooth Spur Gear and Loads on Gear Shaft
Lecture 8 - Design of Bevel Gear
Lecture 9 - Crossed Helical Gear - I
Lecture 10 - Crossed Helical Gear - II and Worm Gear
Lecture 11 - Gear Unit Design - Selection of Stage Ratios, Pinion and Gear Teeth Numbers
Lecture 12 - Gear Unit Design - First Stage Pinion and Gear Design- I (Module on Beam Strength Basis)
Lecture 13 - Gear Unit Design - Failure of Gear Tooth (Probable Dynamic Load and Wear Load Capacity)
Lecture 14 - Gear Unit Design - 1st. Stage Pinion and Gear Design-II (Probable Dynamic Load and Wear Load Ca
Lecture 15 - Gear Unit Design - 1st. Layout (After Gear Design)
Lecture 16 - Bearing Arrangement - Gear Box Shafts
Lecture 17 - Bearing Load Calculation - Intermediate Shaft
Lecture 18 - Bearing Selection and Introduction to Shaft Design Verification
Lecture 19 - Design Verification of Gear Box Shafts
Lecture 20 - Development (Layout) of Intermediate Shaft
Lecture 21 - Development (Layout) of Input Shaft and Integral Pinion
Lecture 22 - Development (Layout) of Output Shaft and 2nd. Stage (Output) Gear
Lecture 23 - Development (Layout) of Output Shaft (Continued...), Loads on Shaft and Bearings
Lecture 24 - Output Shaft-Bearing Lives
Lecture 25 - Design Verification of Output Shaft
Lecture 26 - Design Verification of Input Shaft (including Bearing Life Estimation)
Lecture 27 - Finalizing Design including the Sizes of the Keys
Lecture 28 - Development of Plan and Elevation of Gear Reduction Unit - I
Lecture 29 - Development of Plan and Elevation of Gear Reduction Unit - II

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Lecture 30 - Development of Plan and Elevation of Gear Reduction Unit - III
Lecture 31
Lecture 32
Lecture 33 - Involute Spur Gear Tooth Correction
Lecture 34 - Involute Spur Gear Tooth Correction
Lecture 35 - Involute Spur Gear Tooth Correction
Lecture 36 - Involute Spur Gear Tooth Correction
Lecture 37 - Involute Spur Gear Tooth Correction
Lecture 38 - Tooth Tip Interference, Avoidance and Contact Ratio in Involute Internal Gearing
Lecture 39
Lecture 40
Lecture 41
Lecture 42
Lecture 43
Lecture 44
Lecture 45 - Live Session

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NPTEL Video Course - Mechanical Engineering - NOC:Traditional and Non-Traditional Optimization Tools

Subject Co-ordinator - Prof. Dilip Kumar Pratihar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principle of Optimization
Lecture 2 - Traditional Methods of Optimization
Lecture 3 - Traditional Methods of Optimization (Continued...)
Lecture 4 - Binary-Coded Genetic Algorithm (BCGA)
Lecture 5 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 6 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 7 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 8 - Binary-Coded Genetic Algorithm (BCGA) (Continued...)
Lecture 9 - Schema Theorem of BCGA
Lecture 10 - Schema Theorem of BCGA (Continued...)
Lecture 11 - Constraint Handling
Lecture 12 - Real-Coded GA
Lecture 13 - Faster Genetic Algorithms
Lecture 14 - Faster Genetic Algorithms (Continued...)
Lecture 15 - Faster Genetic Algorithms (Continued...)
Lecture 16 - Faster Genetic Algorithms (Continued...)
Lecture 17 - Scheduling GA
Lecture 18 - Scheduling GA (Continued...)
Lecture 19 - Scheduling GA (Continued...)
Lecture 20 - Simmulated Annealing
Lecture 21 - Particle Swarm Optimization
Lecture 22 - Multi-Objective Optimization
Lecture 23 - Multi-Objective Optimization (Continued...)
Lecture 24 - Multi-Objective Optimization (Continued...)
Lecture 25 - Multi-Objective Optimization (Continued...)
Lecture 26 - Multi-Objective Optimization (Continued...)
Lecture 27 - Intelligent Optimization Toolture
Lecture 28 - A Practical Optimization Problem
Lecture 29 - A Practical Optimization Problem (Continued...)

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Lecture 30 - A Practical Optimization Problem (Continued...)
Lecture 31 - A Practical Optimization Problem (Continued...)
Lecture 32 - A Practical Optimization Problem (Continued...)
Lecture 33 - A Practical Optimization Problem (Continued...)
Lecture 34 - A Practical Optimization Problem (Continued...)
Lecture 35 - A Practical Optimization Problem (Continued...)
Lecture 36 - A Practical Optimization Problem (Continued...)
Lecture 37 - Genetic Algorithm as Evolution Tool
Lecture 38 - Genetic Algorithm as Evolution Tool (Continued...)
Lecture 39 - Genetic Algorithm as Evolution Tool (Continued...)
Lecture 40 - Genetic Algorithm as Evolution Tool (Continued...)
Lecture 41 - Genetic Algorithm as Evolution Tool (Continued...)
Lecture 42 - Genetic Algorithm as Evolution Tool (Continued...)
Lecture 43 - Summary 1
Lecture 44 - Summary 2
Lecture 45 - Summary 3

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanism and Robot Kinematics

Subject Co-ordinator - Dr. Anirvan Das Gupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Nomenclature
Lecture 3 - Kinematic Diagram
Lecture 4 - Degree of Freedom - I
Lecture 5 - Degree of Freedom - II
Lecture 6 - Degree of Freedom - Failure
Lecture 7 - Grashof Criteria - I
Lecture 8 - Grashof Criteria - II
Lecture 9 - Geometry and Representation of Vectors
Lecture 10 - Displacement Analysis
Lecture 11 - Displacement Analysis
Lecture 12 - Displacement Analysis
Lecture 13 - Displacement Analysis
Lecture 14 - Displacement Analysis
Lecture 15 - Displacement Analysis
Lecture 16 - Displacement Analysis
Lecture 17 - Displacement Analysis
Lecture 18 - Displacement Analysis
Lecture 19 - Displacement Analysis
Lecture 20 - Velocity Analysis
Lecture 21 - Velocity Analysis
Lecture 22 - Velocity Analysis
Lecture 23 - Velocity Analysis
Lecture 24 - Velocity Analysis
Lecture 25 - Velocity Analysis
Lecture 26 - Velocity Analysis
Lecture 27 - Velocity Analysis
Lecture 28 - Velocity Analysis
Lecture 29 - Serial Manipulator Velocity Analysis - I

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Lecture 30 - Serial Manipulator Velocity Analysis - II
Lecture 31 - Serial Manipulator Velocity Analysis - III
Lecture 32 - Parallel Manipulator Velocity Analysis
Lecture 33 - Path Generation Problem
Lecture 34 - Acceleration Analysis - I
Lecture 35 - Acceleration Analysis - II
Lecture 36 - Force Analysis - I
Lecture 37 - Force Analysis - II
Lecture 38 - Coordinate transformation - I
Lecture 39 - Coordinate transformation - II
Lecture 40 - Coordinate transformation - III

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NPTEL Video Course - Mechanical Engineering - NOC:Heat Exchangers: Fundamentals and Design Analysis

Subject Co-ordinator - Prof. Prasanta Kr Das, Prof. Somnath Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Applications of Heat Exchangers
Lecture 3 - Classification of Heat Exchangers
Lecture 4 - Classification of Heat Exchangers (Continued...)
Lecture 5 - Design and Simulation of Heat Exchangers
Lecture 6 - Design and Simulation
Lecture 7 - Design and Simulation of Heat Exchangers - Numerical Problem
Lecture 8 - Design and Simulation of Heat Exchangers - Numerical Problem (Continued...)
Lecture 9 - Design and Simulation of Heat Exchangers - Numerical Problem (Continued...)
Lecture 10 - Tubular Heat Exchanger Types
Lecture 11 - Tubular Heat Exchanger Types
Lecture 12 - Tubular Heat Exchanger
Lecture 13 - Tubular Heat Exchanger
Lecture 14 - Tubular Heat Exchanger
Lecture 15 - Tubular Heat Exchanger
Lecture 16 - Enhancement of Heat Transfer compact Heat Exchangers
Lecture 17 - Extended Surface Heat Transfer
Lecture 18 - Extended Surface Heat Transfer
Lecture 19 - Extended Surface Heat Exchangers
Lecture 20 - Analysis of fin plates of finned tube heat exchanger
Lecture 21 - Finned tube heat exchanger
Lecture 22 - Finned tube heat exchanger (Continued...)
Lecture 23 - Finned tube heat exchanger (Continued...)
Lecture 24 - Plate fin heat exchanger
Lecture 25 - Plate fin heat exchanger (Continued...)
Lecture 26 - Plate fin heat exchanger (Continued...)
Lecture 27 - Plate fin heat exchanger
Lecture 28 - Plate fin heat exchanger
Lecture 29 - Plate fin heat exchanger

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Lecture 30 - Plate fin heat exchanger
Lecture 31 - Plate fin heat exchanger
Lecture 32 - Plate fin heat exchanger
Lecture 33 - Plate fin heat exchanger
Lecture 34 - Plate fin heat exchanger
Lecture 35 - Plate fin heat exchanger
Lecture 36 - Phase change heat exchangers
Lecture 37 - Phase change heat exchangers (Continued...)
Lecture 38 - Surface Condenser
Lecture 39 - Surface Condenser (Continued...)
Lecture 40 - Surface Condenser (Continued...)
Lecture 41 - Surface Condenser (Continued...)
Lecture 42 - In tube condensation
Lecture 43 - Heat pipes and Heat pipe heat exchangers
Lecture 44 - Heat pipes and Heat pipe heat exchangers (Continued...)
Lecture 45 - Heat pipes and Heat exchangers
Lecture 46 - Heat pipes and Heat exchangers (Continued...)
Lecture 47 - Micro Heat Exchanger Introduction
Lecture 48 - Micro scale Heat Transfer
Lecture 49 - Micro scale Heat Transfer (Continued...)
Lecture 50 - Micro Channel
Lecture 51 - Micro Heat Exchanger
Lecture 52 - Regenerators
Lecture 53 - Fixed Bed Regenerator Analysis
Lecture 54 - Design and Simulation of Regenerator (Fixed Bed)
Lecture 55 - Fixed Bed Regenerator (Numerical)
Lecture 56 - Fixed Bed Regenerator (Numerical) (Continued...)
Lecture 57 - Fouling in Heat Exchangers
Lecture 58 - Fouling in Heat Exchangers (Continued...)
Lecture 59 - Fouling in Heat Exchangers (Continued...)
Lecture 60 - Direct Contact heat exchanger
Lecture 61 - Direct Contact heat exchanger (Continued...)
Lecture 62 - Heat exchanger network synthesis
Lecture 63 - Heat exchanger network
Lecture 64 - Heat exchanger network (Continued...)
Lecture 65 - Heat Exchanger Testing
Lecture 66 - Heat Exchanger Testing (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC:Robotics

Subject Co-ordinator - Prof. Dilip Kumar Pratihar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Robots and Robotics
Lecture 2 - Introduction to Robots and Robotics (Continued...)
Lecture 3 - Introduction to Robots and Robotics (Continued...)
Lecture 4 - Introduction to Robots and Robotics (Continued...)
Lecture 5 - Introduction to Robots and Robotics (Continued...)
Lecture 6 - Introduction to Robots and Robotics (Continued...)
Lecture 7 - Introduction to Robots and Robotics (Continued...)
Lecture 8 - Introduction to Robots and Robotics (Continued...)
Lecture 9 - Introduction to Robots and Robotics (Continued...)
Lecture 10 - Introduction to Robots and Robotics (Continued...)
Lecture 11 - Robot Kinematics
Lecture 12 - Robot Kinematics (Continued...)
Lecture 13 - Robot Kinematics (Continued...)
Lecture 14 - Robot Kinematics (Continued...)
Lecture 15 - Robot Kinematics (Continued...)
Lecture 16 - Robot Kinematics (Continued...)
Lecture 17 - Robot Kinematics (Continued...)
Lecture 18 - Robot Kinematics (Continued...)
Lecture 19 - Robot Kinematics (Continued...)
Lecture 20 - Robot Kinematics (Continued...)
Lecture 21 - Trajectory Planning
Lecture 22 - Trajectory Planning (Continued...)
Lecture 23 - Singularity Checking
Lecture 24 - Robot Dynamics
Lecture 25 - Robot Dynamics (Continued...)
Lecture 26 - Robot Dynamics (Continued...)
Lecture 27 - Robot Dynamics (Continued...)
Lecture 28 - Robot Dynamics (Continued...)
Lecture 29 - Robot Dynamics (Continued...)

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Lecture 30 - Control Scheme
Lecture 31 - Sensors
Lecture 32 - Sensors (Continued...)
Lecture 33 - Sensors (Continued...)
Lecture 34 - Robot Vision
Lecture 35 - Robot Vision (Continued...)
Lecture 36 - Robot Vision (Continued...)
Lecture 37 - Robot Motion Planning
Lecture 38 - Robot Motion Planning (Continued...)
Lecture 39 - Robot Motion Planning (Continued...)
Lecture 40 - Robot Motion Planning (Continued...)
Lecture 41 - Intelligent Robot
Lecture 42 - Biped Walking
Lecture 43 - Biped Walking (Continued...)
Lecture 44 - Summary
Lecture 45 - Summary (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC:Computational Fluid Dynamics

Subject Co-ordinator - Prof. S. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intoduction to CFD
Lecture 2 - Classification of partial differential equations
Lecture 3 - Examples of partial differential equations
Lecture 4 - Examples of partial differential equations (Continued...)
Lecture 5 - Nature of the characteristics of partial differential equation
Lecture 6 - Euler-Lagrangian equation
Lecture 7 - Approximate Solutions of Differential Equations
Lecture 8 - Variational formulation
Lecture 9 - Example of variational formulation and introduction to weighted residual method
Lecture 10 - Weighted residual method (Continued...)
Lecture 11 - Point Collocation method, the Galerkin's method and the 'M' form
Lecture 12 - Finite element method (FEM) of discretization
Lecture 13 - Finite element method of discretization (Continued...)
Lecture 14 - Finite difference method (FDM) of discretization
Lecture 15 - Well posed boundary value problem
Lecture 16 - Finite volume method (FVM) of discretization
Lecture 17 - Illustrative examples of finite volume method
Lecture 18 - Illustrative examples of finite volume method (Continued...)
Lecture 19 - Basic rules of finite volume discretization
Lecture 20 - Implementation of boundary conditions in FVM
Lecture 21 - Implementation of boundary conditions in FVM (Continued...)
Lecture 22 - 1-D Unsteady state diffusion problem
Lecture 23 - 1-D Unsteady state diffusion problem (Continued...)
Lecture 24 - Consequences of Discretization of Unsteady State Problems
Lecture 25 - FTCS scheme
Lecture 26 - CTCS scheme (Leap frog scheme) and Dufort-Frankel scheme
Lecture 27 - Part 1
Lecture 28 - Solution to linear algebraic equations (Continued...)
Lecture 29 - Elemination methods

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Lecture 30 - Gaussian elemination and LU Decomposition methods
Lecture 31 - Illustrative example of elemination method
Lecture 32 - Tri-Diagonal Matrix Algorithm (TDMA)
Lecture 33 - Elimination Methods
Lecture 34 - Elimination Methods
Lecture 35 - Iteration methods
Lecture 36 - Generalized analysis of Iteration method
Lecture 37 - Further discussion on Iterative methods
Lecture 38 - Illustrative examples of Iterative methods
Lecture 39 - Gradient Search based methods
Lecture 40 - Steepest descent method (Continued...)
Lecture 41 - Conjugate gradient method
Lecture 42 - Convection diffusion equation
Lecture 43 - Central difference scheme applied to convection-diffusion equation
Lecture 44 - Upwind scheme
Lecture 45 - Illustrative examples
Lecture 46 - Exact solution of 1-D steady state convection diffusion equation (Continued...)
Lecture 47 - Exponential scheme
Lecture 48 - Generalized convection diffusion formulation
Lecture 49 - 2-D convection diffusion problem
Lecture 50 - False (numerical) diffusion scheme and the QUICK scheme
Lecture 51 - Discretization of Navier Stokes equation
Lecture 52 - Discretization of Navier Stokes equation (Continued...)
Lecture 53 - Concept of staggered grid
Lecture 54 - SIMPLE algorithm
Lecture 55 - Salient features of SIMPLE algorithm
Lecture 56 - Illustrative examples on the use of SIMPLE algorithm
Lecture 57 - SIMPLER algorithm
Lecture 58 - Illustrative examples of SIMPLER algorithm
Lecture 59 - What is there in implementing a CFD Code
Lecture 60 - Some representative case studies

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NPTEL Video Course - Mechanical Engineering - NOC:Concepts of Thermodynamics

Subject Co-ordinator - Prof. Aditya Bandopadhyay, Prof. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory Concepts
Lecture 2 - Properties of Pure Substances
Lecture 3 - Properties of Pure Substances (Continued...)
Lecture 4 - Introduction to Property Tables
Lecture 5 - Properties of Pure Substances
Lecture 6 - Properties of Pure Substances
Lecture 7 - Use of Computer as Means of Learning Thermodynamics
Lecture 8 - Properties of Pure Substances (Continued...)
Lecture 9 - Properties of Pure Substances Spring - Piston Problem
Lecture 10 - Heat and Work
Lecture 11 - Heat and Work
Lecture 12 - Heat and Work
Lecture 13 - Heat and Work
Lecture 14 - First Law of Thermodynamics for a Control Mass System
Lecture 15 - Enthalpy and Specific Heats
Lecture 16 - First Law for a Control Mass System
Lecture 17 - First Law for a Control Mass System
Lecture 18 - First Law for a Control Mass System
Lecture 19 - Control Volume Conservation Reynolds Transport Theorem
Lecture 20 - Control Volume Mass and Energy Balance
Lecture 21 - Supplementary Lecture
Lecture 22 - First Law for Steady State Steady Flow (SSSF) Process
Lecture 23 - First Law for SSSF Process
Lecture 24 - First Law for SSSF Process
Lecture 25 - First Law for SSSF Process
Lecture 26 - First Law for SSSF Process
Lecture 27 - Supplementary Lecture
Lecture 28 - First Law of Thermodynamics for Unsteady Processes in a Control Volume
Lecture 29 - First Law for Unsteady Problems - Examples

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Lecture 30 - First Law for Unsteady Problems - Examples (Continued...)
Lecture 31 - First Law for Unsteady Problems - Examples (Continued...)
Lecture 32 - Supplementary Lecture
Lecture 33 - Introduction to Second Law of Thermodynamics
Lecture 34 - Statements of the Second Law of Thermodynamics
Lecture 35 - Perpetual Motion Machines; Reversible and Irreversible Processes
Lecture 36 - Factors for Irreversibility and Introduction to Reversible Cycles
Lecture 37 - Carnot Theorem and Absolute Temperature Scale
Lecture 38 - Second Law
Lecture 39 - Clausius Inequality and Introduction to Entropy
Lecture 40 - Thermodynamic Property Relationships; Entropy change for Solids, Liquids and Ideal gases
Lecture 41 - Entropy balance for Reversible and Irreversible Processes
Lecture 42 - What is Entropy ?
Lecture 43 - Entropy Change in closed system
Lecture 44 - Entropy Change in closed system
Lecture 45 - Supplementary Lecture
Lecture 46 - Supplementary Lecture
Lecture 47 - Entropy Transport for a flow process
Lecture 48 - Entropy Transport for flow process
Lecture 49 - Entropy Transport for flow process
Lecture 50 - Entropy Transport for flow process
Lecture 51 - Entropy Transport for flow process
Lecture 52 - Supplementary Lecture
Lecture 53 - Exergy (Availability)
Lecture 54 - Exergy (Availability) (Continued...)
Lecture 55 - Exergy Analysis
Lecture 56 - Exergy Analysis
Lecture 57 - Thermodynamic Relationships
Lecture 58 - Thermodynamic Relationships (Continued...)
Lecture 59 - Otto Cycle
Lecture 60 - Diesel Cycle
Lecture 61 - Example Problems
Lecture 62 - Brayton Cycle
Lecture 63 - Carnot Cycle and Rankine Cycle
Lecture 64 - Carnot Cycle and Rankine Cycle (Continued...)
Lecture 65 - Vapour Compression Refrigeration Cycle
Lecture 66 - Review of Learning Concepts
Lecture 67 - Supplementary Lecture
Lecture 68 - Supplementary Lecture

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NPTEL Video Course - Mechanical Engineering - NOC:Electronic Packaging and Manufacturing

Subject Co-ordinator - Prof. A Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1
Lecture 2 - Introduction - 2
Lecture 3 - Introduction - 3
Lecture 4 - Semiconductors and Components - 1
Lecture 5 - Semiconductors and Components - 2
Lecture 6 - 1st Level Packaging - I
Lecture 7 - 1st Level Packaging - II
Lecture 8 - Area Array Packages - I
Lecture 9 - Area Array Packages - II
Lecture 10 - Area Array Packages - III
Lecture 11 - Flip Chip Technology
Lecture 12 - 1st Level Interconnections - I
Lecture 13 - 1st Level Interconnections - II
Lecture 14 - 1st Level Interconnections - III
Lecture 15 - Advanced Packaging
Lecture 16 - 2nd Level Packaging
Lecture 17 - 2nd Level Packaging
Lecture 18 - 2nd Level Packaging
Lecture 19 - 2nd Level Packaging
Lecture 20 - 2nd Level Packaging
Lecture 21 - System Integration
Lecture 22 - Thermal Management 1
Lecture 23 - Thermal Management 2
Lecture 24 - Thermal Management 3
Lecture 25 - Thermal Management 4
Lecture 26 - Thermal Management 5
Lecture 27 - Thermal Management 6
Lecture 28 - Thermal Management 7
Lecture 29 - Thermal Management 8

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Lecture 30 - Thermal Management 9
Lecture 31 - Shock and Vibration - 1
Lecture 32 - Shock and Vibration - 2
Lecture 33 - Shock and Vibration - 3
Lecture 34 - Shock and Vibration - 4
Lecture 35 - Electronic Packaging Reliability - 1
Lecture 36 - Electronic Packaging Reliability - 2
Lecture 37 - Electronic Packaging Reliability - 3
Lecture 38 - Electronic Packaging Reliability - 4
Lecture 39 - Power Electronics Packaging
Lecture 40 - Special Topics

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NPTEL Video Course - Mechanical Engineering - NOC:Kinematics of Mechanisms and Machines

Subject Co-ordinator - Prof. A. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation
Lecture 2 - Nomenclature and Classification
Lecture 3 - Kinematic Diagram
Lecture 4 - Degree of Freedom
Lecture 5 - Constrained and Robotic Mechanisms
Lecture 6 - Failure of DOF Calculation
Lecture 7 - Grashof Criterion - I
Lecture 8 - Grashof Criterion - II
Lecture 9 - Grashof Criterion - Problems
Lecture 10 - Displacement Analysis - I
Lecture 11 - Displacement Analysis - II
Lecture 12 - Displacement Analysis Example - I
Lecture 13 - Displacement Analysis Example - II
Lecture 14 - Steering Mechanisms
Lecture 15 - Displacement Analysis of Robots - I
Lecture 16 - Displacement Analysis of Robots - II
Lecture 17 - Displacement Analysis of Robots - III
Lecture 18 - Geometric Velocity Analysis - I
Lecture 19 - Geometric Velocity Analysis - II
Lecture 20 - Geometric Velocity Analysis - III
Lecture 21 - Velocity Analysis
Lecture 22 - Velocity Analysis
Lecture 23 - Velocity Analysis
Lecture 24 - Analytical Velocity Analysis - I
Lecture 25 - Analytical Velocity Analysis - II
Lecture 26 - Analytical Velocity Analysis - III
Lecture 27 - Velocity Analysis Examples
Lecture 28 - Robot Velocity Analysis - I
Lecture 29 - Robot Velocity Analysis - II

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Lecture 30 - Robot Velocity Analysis - III
Lecture 31 - Robot Path Generation
Lecture 32 - Acceleration Analysis - I
Lecture 33 - Acceleration Analysis - II
Lecture 34 - Force Analysis - I
Lecture 35 - Force Analysis - II
Lecture 36 - Force Analysis Examples
Lecture 37 - Gear Kinematics
Lecture 38 - Gear trains - I
Lecture 39 - Gear trains - II
Lecture 40 - Gear trains - III

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Fluid Mechanics (2019)

Subject Co-ordinator - Prof. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivations of studying fluid mechanics
Lecture 2 - Macroscopic and microscopic point of views
Lecture 3 - Concept of traction vector
Lecture 4 - Cauchy's theorem
Lecture 5 - Concept of pressure in a fluid
Lecture 6 - Density, Bulk Modulus, Viscosity
Lecture 7 - Viscosity, Newtonian fluid
Lecture 8 - Kinematic viscosity, Reynolds number
Lecture 9 - Non-Newtonian fluids
Lecture 10 - Some illustrative examples solved
Lecture 11 - Problems and Solutions
Lecture 12 - Surface Tension - Part I
Lecture 13 - Surface Tension - Part II
Lecture 14 - Governing equation of fluid statics
Lecture 15 - Manometers
Lecture 16 - Force on a surface immersed in fluid - Part I
Lecture 17 - Force on a surface immersed in fluid - Part II
Lecture 18 - Force on a surface immersed in fluid - Part III, Stability of solid bodies in fluid - Part I
Lecture 19 - Stability of solid bodies in fluid - Part II
Lecture 20 - Fluid under rigid body motion
Lecture 21 - Lagrangian and Eulerian approaches
Lecture 22 - Concept of different flow lines
Lecture 23 - Acceleration of fluid flow
Lecture 24 - Deformation of fluid elements - Part I
Lecture 25 - Derivation of continuity equation
Lecture 26 - Problems and Solutions
Lecture 27 - Deformation of fluid elements - Part II
Lecture 28 - Deformation of fluid elements - Part III
Lecture 29 - Stream Function

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Lecture 30 - Circulation, Velocity Potential
Lecture 31 - Euler's equation
Lecture 32 - Bernoulliâ s equation - Part I
Lecture 33 - Bernoulliâ s equation - Part II
Lecture 34 - Bernoulli's equation - Part III
Lecture 35 - Eulerâ s equation in streamline coordinates
Lecture 36 - Problems and Solutions
Lecture 37 - Problems and Solutions
Lecture 38 - Application of Bernoulli's equation - Part I
Lecture 39 - Application of Bernoulli's equation - Part II
Lecture 40 - Application of Bernoulli's equation - Part III
Lecture 41 - Reynolds Transport Theorem (RTT)
Lecture 42 - Application of RTT
Lecture 43 - Problems and Solutions
Lecture 44 - Problems and Solutions
Lecture 45 - Application of RTT
Lecture 46 - Problems and Solutions
Lecture 47 - Problems and Solutions
Lecture 48 - Problems and Solutions
Lecture 49 - Application of RTT
Lecture 50 - Problems and Solutions
Lecture 51 - Navier-Stokes equation - Part I
Lecture 52 - Navier-Stokes equation - Part II
Lecture 53 - Navier-Stokes equation - Part III
Lecture 54 - Navier-Stokes equation - Part IV
Lecture 55 - Pipe Flow - Part I
Lecture 56 - Pipe Flow - Part II
Lecture 57 - Pipe Flow - Part III
Lecture 58 - Pipe Flow - Part IV
Lecture 59 - Principle of Similarity and Dynamical Analysis - Part I
Lecture 60 - Principle of Similarity and Dynamical Analysis - Part II

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NPTEL Video Course - Mechanical Engineering - NOC:Conduction and Convection Heat Transfer (Prof. S. Chakrabor

Subject Co-ordinator - Prof. S. Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction To Conduction
Lecture 2 - 1-D Steady State Conduction
Lecture 3 - Introduction To Convection
Lecture 4 - Conduction Equation:Internal Energy Form
Lecture 5 - Conduction Equation:C-P Form
Lecture 6 - Conduction Equation:Boundary Conditions And Problems
Lecture 7 - 1-D Steady State Conduction
Lecture 8 - Concept Of Thermal Resistance
Lecture 9 - 1-D Steady State Conduction - II
Lecture 10 - 1-D Steady State Conduction - II (Continued...)
Lecture 11 - Problems On 1-D Steady State Conduction - I
Lecture 12 - Problems On 1-D Steady State Conduction - I (Continued....)
Lecture 13 - Problems On 1-D Steady State Conduction - II
Lecture 14 - Conduction In Cylindrical Geometry
Lecture 15 - Critical Insulation Thickness
Lecture 16 - Critical Insulation Thickness (Continued...)
Lecture 17 - Problems On Conduction In Cylindrical Geomerty - I
Lecture 18 - Problems On Conduction In Cylindrical Geometry - I (Continued...)
Lecture 19 - Problems On Conduction In Cylindrical Geometry - II and Conduction in Spherical Geometry
Lecture 20 - Heat Transfer From Extended surfaces
Lecture 21 - Boundary Conditions at the FIN tip
Lecture 22 - Boundary Conditions at the FIN tip
Lecture 23 - Problems on Heat Transfer from Extended Surfaces
Lecture 24 - 2D Steady State Conduction
Lecture 25 - Separation of Variables Method for 2-D Steady State Conduction
Lecture 26 - Superposition Method for 2-D Steady State Conduction
Lecture 27 - Transient Conduction: Lumped Parameter Approach
Lecture 28 - Problems on Lumped Parameter Approach
Lecture 29 - Transient Conduction: Infinite Slab

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Lecture 30 - Transient Conduction: Semi - Infinite Slab - I
Lecture 31 - Transient Conduction: Semi - Infinite Slab - II
Lecture 32 - Introduction to Convection
Lecture 33 - Review of Fluid Mechanics - I
Lecture 34 - Review of Fluid Mechanics - II
Lecture 35 - Review of Fluid Mechanics - III
Lecture 36 - Review of Fluid Mechanics - IV
Lecture 37 - Review of Fluid Mechanics - V
Lecture 38 - Energy Conservation Equation - I
Lecture 39 - Energy Conservation Equation - II
Lecture 40 - Energy Conservation Equation - III
Lecture 41 - Thermal Boundary Layer - I
Lecture 42 - Thermal Boundary Layer - II
Lecture 43 - Energy Integral Equation - I
Lecture 44 - Energy Integral Equation - II
Lecture 45 - Internal Forced Convection - 1
Lecture 46 - Internal Forced Convection - 2
Lecture 47 - Internal Forced Convection - 3
Lecture 48 - Internal Forced Convection - 4
Lecture 49 - Internal Forced Convection - 5
Lecture 50 - Internal Forced Convection - 6
Lecture 51 - Viscous Dissipation - 1
Lecture 52 - Viscous Dissipation - 2
Lecture 53 - Natural Convection - 1
Lecture 54 - Natural Convection - 2
Lecture 55 - Natural Convection - 3
Lecture 56 - Natural Convection - 4
Lecture 57 - Condensation - I
Lecture 58 - Condensation - II
Lecture 59 - Boiling
Lecture 60 - Heat Exchangers - I
Lecture 61 - Heat Exchangers - II
Lecture 62 - Heat Exchangers - III
Lecture 63 - Heat Exchangers - IV
Lecture 64 - Heat Exchangers - V
Lecture 65 - Problems on Heat Exchangers

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Concepts in Fluid Mechanics

Subject Co-ordinator - Prof. Aditya Bandopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Eulerian and Lagrangian Description of Fluid Motion
Lecture 2 - Lines of Flow Visualization and Acceleration of Flow
Lecture 3 - Angular Deformation of Fluid Elements
Lecture 4 - Linear and Volumetric Deformation; Perspectives from Mass Conservation
Lecture 5 - Continuity Education in Integral Form
Lecture 6 - Euler Equation for Inviscid Flow
Lecture 7 - Bernoulli's Equation
Lecture 8 - Examples of Bernoulli's Equation
Lecture 9 - Reynolds Transport Equation
Lecture 10 - Reynolds Transport Theorem
Lecture 11 - Reynolds transport theorem
Lecture 12 - Reynolds transport theorem
Lecture 13 - Introduction to traction vector and stress tensor
Lecture 14 - Cauchy/Navier equation
Lecture 15 - Navier Stokes equation
Lecture 16 - Navier Stokes equation (Continued...)
Lecture 17 - Some exact solutions of the Navier Stokes equation
Lecture 18 - Interfacial boundary conditions and example of thin film flows
Lecture 19 - Exact solutions of the Navier Stokes equations in cylindrical polar coordinates
Lecture 20 - Exact solutions of the Navier Stokes equation for some unsteady flows
Lecture 21 - Confined oscillatory flows
Lecture 22 - Introduction to Turbulence
Lecture 23 - Statistical Treatment of Turbulence and Near - Wall Velocity Profiles
Lecture 24 - Introduction to Boundary Layer Theory
Lecture 25 - Similarity Solution of Boundary Layer Equation
Lecture 26 - Momentum Integral Method
Lecture 27 - Application of Momentum Integral Method and Boundary Layer Separation
Lecture 28 - Potential Flow
Lecture 29 - Potential Flow (Continued...)

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Lecture 30 - Potential Flow (Continued...)
Lecture 31 - Potential Flow (Continued...)
Lecture 32 - Potential Flow (Continued...)
Lecture 33 - Potential Flow (Continued...)
Lecture 34 - Stokes Flow past a Sphere
Lecture 35 - Stokes Flow past a Sphere (Continued...)
Lecture 36 - Stokes Flow past a Sphere (Continued...)
Lecture 37 - Lubrication Theory
Lecture 38 - Lubrication Theory (Continued...)
Lecture 39 - Lubrication Theory (Continued...)
Lecture 40 - Thin Film Dynamics
Lecture 41 - Thin Film Dynamics (Continued...)
Lecture 42 - Thin Film Dynamics (Continued...)
Lecture 43 - Thin Film Dynamics (Continued...)
Lecture 44 - Thin Film Dynamics (Continued...)
Lecture 45 - Thin Film Dynamics (Continued...)
Lecture 46 - Thin Film Dynamics (Continued...)
Lecture 47 - Thin Film Dynamics (Continued...)
Lecture 48 - Compressible Flows
Lecture 49 - Compressible Flows (Continued...)
Lecture 50 - Compressible Flows (Stagnation Properties)
Lecture 51 - Compressible Flows (Stagnation Properties, Variable Area)
Lecture 52 - Compressible Flows (Variable Area)
Lecture 53 - Compressible Flows (Variable Area)
Lecture 54 - Compressible Flows (Normal Shock)
Lecture 55 - Compressible Flows (Normal Shock) (Continued...)
Lecture 56 - Compressible Flows (Converging Nozzle)
Lecture 57 - Compressible Flows (Converging Diverging Nozzle)
Lecture 58 - Compressible Flows (Converging Diverging Nozzle) (Continued...)
Lecture 59 - Compressible Flows with Friction

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NPTEL Video Course - Mechanical Engineering - NOC:High Performance Computing for Scientists and Engineers

Subject Co-ordinator - Prof. Somnath Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to High Performance Computing
Lecture 2 - Architecture for Parallel Computing
Lecture 3 - Architecture for Parallel Computing (Continued...)
Lecture 4 - Architecture for Parallel Computing (Continued...)
Lecture 5 - Shared Memory and Distributed Memory in Parallel Computing
Lecture 6 - Shared Memory and Distributed Memory in Parallel Computing (Continued...)
Lecture 7 - Parallel Algorithms
Lecture 8 - Parallel Algorithms (Continued...)
Lecture 9 - Parallel Algorithms (Continued...)
Lecture 10 - Performance Metrics of Parallel Systems
Lecture 11 - Performance Metrics of Parallel Systems (Continued...)
Lecture 12 - Introduction to OpenMP
Lecture 13 - Introduction to OpenMP (Continued...)
Lecture 14 - Introduction to OpenMP (Continued...)
Lecture 15 - Essentials of OpenMP Programming
Lecture 16 - Essentials of OpenMP Programming (Continued...)
Lecture 17 - Data sharing and synchronization
Lecture 18 - Efficient OpenMP programming for matrix computing
Lecture 19 - Introduction to MPI and Distributed Memory Parallel Programming
Lecture 20 - Introduction to MPI and Distributed Memory Parallel Programming (Continued...)
Lecture 21 - Communication using MPI
Lecture 22 - Communication using MPI (Continued...)
Lecture 23 - Communication using MPI (Continued...)
Lecture 24 - Matrix Representation of Physical Systems - Matrix Solvers
Lecture 25 - Domain Decomposition Technique
Lecture 26 - Domain decomposition based parallelization of matrix solvers
Lecture 27 - Domain decomposition based parallelization of matrix solvers (Continued...)
Lecture 28 - Domain decomposition based parallelization of matrix solvers (Continued...)
Lecture 29 - MPI routines for parallel matrix solvers

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Lecture 30 - Introduction to GPGPU and CUDA
Lecture 31 - Introduction to GPGPU and CUDA (Continued...)
Lecture 32 - Introduction to GPGPU and CUDA (Continued...)
Lecture 33 - Introduction to GPGPU and CUDA (Continued...)
Lecture 34 - Introduction to CUDA programming
Lecture 35 - Introduction to CUDA programming (Continued...)
Lecture 36 - Thread execution in CUDA program - scheduling and memory access
Lecture 37 - Thread execution in CUDA program (Continued...)
Lecture 38 - Matrix multiplications in CUDA
Lecture 39 - OpenACC programming for GPU-s
Lecture 40 - Hybrid parallelization and exascale computing

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Drawing and Computer Graphics

Subject Co-ordinator - Prof. Rajaram Lakkaraju

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Introduction - III
Lecture 4 - Introduction - IV
Lecture 5 - Introduction - V
Lecture 6 - Introduction - VI
Lecture 7 - Conic Sections - I
Lecture 8 - Conic Sections - II
Lecture 9 - Practice - I
Lecture 10 - Practice - II
Lecture 11 - Conic Sections - III
Lecture 12 - Conic Sections - IV
Lecture 13 - Conic Sections - V
Lecture 14 - Conic Sections - VI
Lecture 15 - Conic Sections - VII
Lecture 16 - Conic Sections - VIII
Lecture 17 - Conic Sections - IX
Lecture 18 - Conic Sections - X
Lecture 19 - Conic Sections - XI
Lecture 20 - Conic Sections - XII
Lecture 21 - Orthographic Projections I - Part 1
Lecture 22 - Orthographic Projections I - Part 2
Lecture 23 - Orthographic Projections I - Part 3
Lecture 24 - Orthographic Projections I - Part 4
Lecture 25 - Orthographic Projections I - Part 5
Lecture 26 - Orthographic Projections I - Part 6
Lecture 27 - Orthographic Projections I - Part 7
Lecture 28 - Orthographic Projections I - Part 8
Lecture 29 - Orthographic Projections I - Part 9

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Lecture 30 - Orthographic Projections I - Part 10
Lecture 31 - Orthographic Projections II - Part 1
Lecture 32 - Orthographic Projections II - Part 2
Lecture 33 - Orthographic Projections II - Part 3
Lecture 34 - Orthographic Projections II - Part 4
Lecture 35 - Orthographic Projections II - Part 5
Lecture 36 - Orthographic Projections II - Part 6
Lecture 37 - Orthographic Projections II - Part 7
Lecture 38 - Orthographic Projections II - Part 8
Lecture 39 - Orthographic Projections II - Part 9
Lecture 40 - Orthographic Projections II - Part 10
Lecture 41 - Orthographic Projections II - Part 11
Lecture 42 - Projection of Solids - I
Lecture 43 - Projection of Solids - II
Lecture 44 - Projection of Solids - III
Lecture 45 - Sections and Sectional Views
Lecture 46 - Sections and Sectional Views (Continued...)
Lecture 47 - Sections and Sectional Views (Continued...)
Lecture 48 - Isometric Projections
Lecture 49 - Isometric Projections (Continued...)
Lecture 50 - Isometric Projections (Continued...)
Lecture 51 - Overview of Computer Graphics - I
Lecture 52 - Overview of Computer Graphics - II
Lecture 53 - Overview of Computer Graphics - III
Lecture 54 - Overview of Computer Graphics - IV
Lecture 55 - Solidworks
Lecture 56 - Solidworks (Continued...)
Lecture 57 - Solidworks (Continued...)
Lecture 58 - Solidworks (Continued...)
Lecture 59 - Solidworks (Continued...)
Lecture 60 - Solidworks (Continued...)
Lecture 61 - Assembly Drawing
Lecture 62 - Assembly Drawing (Continued...)
Lecture 63 - Assembly Drawing (Continued...)
Lecture 64 - Assembly Drawing (Continued...)
Lecture 65 - Assembly Drawing (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC:Tools in Scientific Computing

Subject Co-ordinator - Prof. Aditya Bandopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Preliminaries and Data types
Lecture 2 - Loops and Conditionals Implementation of bubble sort
Lecture 3 - Commonly used Functions
Lecture 4 - Matrix Manipulations Mohr's circle
Lecture 5 - Nonlinear algebraic equations - Visualizing convergence
Lecture 6 - Nonlinear algebraic equations - system of equation and Newton's basin of attraction
Lecture 7 - Overview of Jupyterlab, Octave GUI, Spyder GUI
Lecture 8 - Interactivity with Python - Ipywidgets
Lecture 9 - Geometric Interpretations of ODEs
Lecture 10 - Bifurcation: Saddle node bifurcation
Lecture 11 - Bifurcation: Transcritical bifurcation
Lecture 12 - Bifurcation: Pitchfork bifurcation
Lecture 13 - Imperfect bifurcations and catastrophies
Lecture 14 - 2D flows - linear systems
Lecture 15 - 2D flows - Trajectories: spirals, star and degeneracy
Lecture 16 - Phase portraits - nonlinear systems
Lecture 17 - 2D phase portraits - limit cycles
Lecture 18 - Bifurcations and 3D flows
Lecture 19 - 1D Maps
Lecture 20 - Probability density functions and sampling
Lecture 21 - Monte-carlo simulations: Darts and Buffon's needle
Lecture 22 - 1D Random walks
Lecture 23 - 2D Random walks
Lecture 24 - Boundary Value Problems - Part 1
Lecture 25 - Boundary Value Problems - Part 2
Lecture 26 - Regular Perturbation for ODE
Lecture 27 - Singular Perturbation for ODE
Lecture 28 - 2D Boundary Values Problems
Lecture 29 - PETSc and MPI basics

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Lecture 30 - PETSc - Creating Vectors and Matrices
Lecture 31 - KSP object and solving a system
Lecture 32 - Poisson equation in PETSc
Lecture 33 - Nonlinear Solver of PETSc
Lecture 34 - Nonlinear solver with Jacobian in PETSc
Lecture 35 - Reaction-diffusion system in PETSc
Lecture 36 - Time stepping in PETSc
Lecture 37 - Heat transport using PETSc
Lecture 38 - Solving nonlinear PDE on a periodic domain yielding different patterns
Lecture 39 - Audio analysis - Determine motor RPM
Lecture 40 - Spectrogram and Doppler shift
Lecture 41 - Image processing - Preliminaries
Lecture 42 - Balloon problem and viscous fingers
Lecture 43 - Analyzing data files and 2D interpolation

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Dynamics

Subject Co-ordinator - Prof. Anirvan DasGupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Coordinate Systems - I
Lecture 2 - Coordinate Systems - II
Lecture 3 - Relative Motion - I
Lecture 4 - Relative Motion - II
Lecture 5 - Relative Motion - III
Lecture 6 - Particle kinetics - I
Lecture 7 - Particle kinetics - II
Lecture 8 - Particle kinetics - III
Lecture 9 - Particle kinetics - IV
Lecture 10 - Particle kinetics - V
Lecture 11 - Work-energy relation - I
Lecture 12 - Work-energy relation - II
Lecture 13 - Impulse-momentum relation - I
Lecture 14 - Impulse-momentum relation - II
Lecture 15 - Particle impact - I
Lecture 16 - Particle impact - II
Lecture 17 - Central force motion - I
Lecture 18 - Central force motion - II
Lecture 19 - Central force motion - III
Lecture 20 - Central force motion - IV
Lecture 21 - Systems with Mass Flow - I
Lecture 22 - Systems with Mass Flow - II
Lecture 23 - Kinetics of a System of Particles - I
Lecture 24 - Kinetics of a System of Particles - II
Lecture 25 - Kinetics of a System of Particles - III
Lecture 26 - Kinetics of a System of Particles: Extension to Rigid Bodies
Lecture 27 - Planar Kinetics of Rigid Bodies - I
Lecture 28 - Planar Kinetics of Rigid Bodies - II
Lecture 29 - Planar Kinetics: Work-Energy Relations - I

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Lecture 30 - Planar Kinetics: Work-Energy Relations - II
Lecture 31 - Planar kinetics: impulse-momentum relations - I
Lecture 32 - Planar kinetics: impulse-momentum relations - II
Lecture 33 - Spatial kinematics of rigid bodies - I
Lecture 34 - Spatial kinematics of rigid bodies - II
Lecture 35 - Spatial kinetics of rigid bodies - I
Lecture 36 - Spatial kinetics of rigid bodies - II
Lecture 37 - Spatial kinetics of rigid bodies - III
Lecture 38 - Gyroscopic motion - I
Lecture 39 - Gyroscopic motion - II
Lecture 40 - Gyroscopic motion - III
Lecture 41 - Kinematics of rotation - I
Lecture 42 - Kinematics of rotation - II
Lecture 43 - Kinematics of rotation - III
Lecture 44 - Kinematics of rotation - IV
Lecture 45 - Kinematics of rotation - V
Lecture 46 - Introduction to Analytical Dynamics: generalized coordinates - I
Lecture 47 - Introduction to Analytical Dynamics: generalized coordinates - II
Lecture 48 - Hamilton's principle and Lagrange's equation of motion - I
Lecture 49 - Hamilton's principle and Lagrange's equation of motion - II
Lecture 50 - Hamilton's principle and Lagrange's equation of motion - III
Lecture 51 - Hamilton's principle and Lagrange's equation of motion - IV
Lecture 52 - Systems with constraints - I
Lecture 53 - Systems with constraints - II
Lecture 54 - Systems with constraints - III
Lecture 55 - Systems with constraints - IV
Lecture 56 - Symmetries and conservation laws - I
Lecture 57 - Symmetries and conservation laws - II
Lecture 58 - Symmetries and conservation laws - III
Lecture 59 - Symmetries and conservation laws - IV
Lecture 60 - Intermediate axis theorem

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NPTEL Video Course - Mechanical Engineering - NOC:Biomechanics of Joints and Orthopaedic Implants

Subject Co-ordinator - Prof. Sanjay Gupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction to the Course
Lecture 2 - Musculoskeletal System
Lecture 3 - Synovial Joints
Lecture 4 - The Hip Joint
Lecture 5 - The Knee Joint
Lecture 6 - The Shoulder and Elbow Joints
Lecture 7 - The Spine
Lecture 8 - Biomechanics of the Hip Joint
Lecture 9 - Biomechanics of the Knee Joint
Lecture 10 - Biomechanics of the Shoulder Joint
Lecture 11 - Biomechanics of the Elbow Joint - Part I
Lecture 12 - Biomechanics of the Elbow Joint - Part II
Lecture 13 - Biomechanics of the Spine
Lecture 14 - Gait Cycle
Lecture 15 - Gait Analysis and Abnormalities
Lecture 16 - Measurement Techniques of Gait Analysis - Part I
Lecture 17 - Measurement Techniques of Gait Analysis - Part II
Lecture 18 - Motion Capture System
Lecture 19 - Fundamentals of Joint Kinematics
Lecture 20 - Joint Kinematics and Kinetics
Lecture 21 - Introduction to Musculoskeletal Modelling
Lecture 22 - Inverse Dynamics in Musculoskeletal Modelling
Lecture 23 - Muscle Force Estimation Using Static Optimization
Lecture 24 - Concepts of Stress and Strain
Lecture 25 - Stress Transformation
Lecture 26 - Bone Structure and Mechanical Behaviour
Lecture 27 - Bone Adaptation and Viscoelastic Behaviour
Lecture 28 - Anisotropic Nature of Bone
Lecture 29 - Implant Classification and Failure Mechanisms

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Lecture 30 - Introduction to Finite Element Modelling of Bone and Implant
Lecture 31 - Finite Element Modelling and Analysis of Hip and Shoulder
Lecture 32 - Modelling and Analysis of Intact and Implanted Lumbar Spine
Lecture 33 - Experimental Validation of Pre-Clinical Analysis
Lecture 34 - Adaptive Bone Remodelling
Lecture 35 - Bone Remodelling Around Resurfaced Femur and Pelvic Bone
Lecture 36 - Design Optimization of HIP Implant
Lecture 37 - Orthotropic Bone Remodelling
Lecture 38 - Biomaterials and Design of Orthopaedic Implants
Lecture 39 - Bone Fracture Healing
Lecture 40 - Bone Ingrowth and Mechanoregulatory Principles
Lecture 41 - Mathematical Modelling of Tissue Differentiation
Lecture 42 - Bone Ingrowth around Porous Coated Femoral Implant
Lecture 43 - Tissue Differentiation around Porous Coated Acetabular Implant
Lecture 44 - Concluding Remarks

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NPTEL Video Course - Mechanical Engineering - NOC:Elements of Metal Cutting, Machine tools, Gear Cutting and

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Geometry of single point turning tools - 1
Lecture 3 - Geometry of turning tools - 2
Lecture 4 - Geometry of single point turning tools -3
Lecture 5 - Geometry of cutting tools and numerical problems
Lecture 6 - Different types of tools and mcq
Lecture 7 - Mechanism of chip formation
Lecture 8 - Mechanics of material removal
Lecture 9 - Measurement Of Cutting Forces
Lecture 10 - Numerical problems and MCQ
Lecture 11 - Tool wear and Tool life
Lecture 12 - Wear and life of cutting tools - 2
Lecture 13 - The lathe
Lecture 14 - Calculations on mechanisms in machine tools
Lecture 15 - Numerical problems on lathe
Lecture 16 - milling machines
Lecture 17 - Milling machine - indexing
Lecture 18 - Gear cutting CNC and non traditional machining
Lecture 19 - CNC and non-traditional machining methods
Lecture 20 - Numerical problems for week 4
Lecture 21 - Introduction
Lecture 22 - Simple Gear Calculations
Lecture 23 - Gear Geometry
Lecture 24 - Helical Gear Problems
Lecture 25 - Numerical Problem MCQ
Lecture 26 - Numerical Problem Milling of Helical Gears
Lecture 27 - Simple and Compound Indexing
Lecture 28 - Differential Indexing
Lecture 29 - Helical Gear Cutting on Milling Machine

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Lecture 30 - Numerical Problems on Gear Milling
Lecture 31 - Gear Shaping - I
Lecture 32 - Gear Shaping - II
Lecture 33 - Gear Shaping - III
Lecture 34 - Gear Shaping - IV
Lecture 35 - Gear Hobbing - I
Lecture 36 - Gear Hobbing - II
Lecture 37 - Gear Hobbing - III
Lecture 38 - Gear Hobbing - IV
Lecture 39 - Gear Hobbing - V
Lecture 40 - Gear Hobbing - VI
Lecture 41 - Introduction to computer control role of computers in automation
Lecture 42 - Introduction (Continued...) binary logic and logic gates
Lecture 43 - Classification of Computer numerical control (CNC) Point to point and continuous control
Lecture 44 - Classification (Continued...) : Closed loop and open loop control
Lecture 45 - Tutorial involving simple calculations on different aspects of CNC controls
Lecture 46 - Questions, MCQ Discussions on Motors, Encoders, Decoders and Programming Practice
Lecture 47 - Stepper motors, Permanent magnet DC motors
Lecture 48 - Binary circuits and decoders
Lecture 49 - Tachogenerator, printed circuit motors, Encoders
Lecture 50 - Programming Practice - I
Lecture 51 - Programming Practice - 1I
Lecture 52 - Computer Aided Offline Programming
Lecture 53 - Interpolators - Linear
Lecture 54 - Interpolators - Curvilinear
Lecture 55 - Questions on Programming and Interpolation
Lecture 56 - 3-D Machining - Basic Concepts
Lecture 57 - Curved Surface Geometry
Lecture 58 - Cutter Path Generation for Curved Surfaces
Lecture 59 - Cutter Path Generation (Concluding Part) and Current Status - CNC Machining and Related Processe
Lecture 60 - Questions and Discussions on Curved Surface Machining

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NPTEL Video Course - Mechanical Engineering - NOC:Finite Element Method

Subject Co-ordinator - Prof. Biswanath Banerjee, Prof. Amit Shaw

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Elements of Calculation of Variations - I
Lecture 7 - Elements of Calculation of Variations - II
Lecture 8 - Elements of Calculation of Variations - III
Lecture 9 - Strong Form and Weak Form
Lecture 10 - Rayleigh - Ritz Method - I
Lecture 11 - Rayleigh - Ritz Method - II
Lecture 12 - Weighted Residual Method
Lecture 13 - Weighted Residual Method - Example
Lecture 14 - Concepts of Element and Axial Bar Problem
Lecture 15 - Axial Bar Problem
Lecture 16 - Axial Bar - II
Lecture 17 - Beam Formulation
Lecture 18 - Beam Stiffness Matrix
Lecture 19 - Problems
Lecture 20 - Beam Column
Lecture 21 - Problem
Lecture 22 - Share Deformable Beam Theory
Lecture 23 - Weak Form and Discretization
Lecture 24 - Reduced Integration Based Stiffness Matrix
Lecture 25 - Problem
Lecture 26 - Problem (Continued...)
Lecture 27 - Element of Formulation
Lecture 28 - Analysis of Plane Truss
Lecture 29 - Analysis of Plane Truss (Computer Implementation)

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Lecture 30 - Analysis of Euler-Bernoulli Beam (Computer Implementation)
Lecture 31 - Analysis of Plane Frame (Computer Implementation)
Lecture 32 - Introduction to FEM in 2D
Lecture 33 - Continuity and Completeness
Lecture 34 - Shape Functions
Lecture 35 - Numerical Integration (Gaussian Quadrature)
Lecture 36 - Gaussian Quadrature in two dimension
Lecture 37 - Weak Form
Lecture 38 - Example
Lecture 39 - Iso-Parametric Formulation
Lecture 40 - Example with Quadrilateral Element
Lecture 41 - Computer Implementation
Lecture 42 - 2D Elasticity and Weak Form
Lecture 43 - Weak Form and Matrix Formulation
Lecture 44 - Weak Form to Matrix Form
Lecture 45 - Problems
Lecture 46 - Thermoelastic Problem
Lecture 47 - Torsion
Lecture 48 - Triangular Elements
Lecture 49 - Triangular Elements (Continued...)
Lecture 50 - Examples and Computer Implementation
Lecture 51 - Examples and Computer Implementation (Continued...)
Lecture 52 - Shear Locking
Lecture 53 - Selective reduced Integration and Modes of Q4 Element
Lecture 54 - Incompatible Elements
Lecture 55 - Nearly Incompressible Material
Lecture 56
Lecture 57 - B-Bar Method
Lecture 58 - Different Elements
Lecture 59 - Iso-parametric Formulation and Guass Quadrature
Lecture 60 - Closure

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NPTEL Video Course - Mechanical Engineering - NOC:Product Engineering and Design Thinking

Subject Co-ordinator - Prof. Pranab K Dan, Prof. Prabir Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to product engineering
Lecture 2 - Introduction to Product design
Lecture 3 - Introduction to Design Thinking
Lecture 4 - Conceptual Design
Lecture 5 - Design Planning and Innovation Engineering
Lecture 6 - FFE Interface with HLD and DT
Lecture 7 - High Level Design in the Context of Front End Innovation
Lecture 8 - Functional and Physical Decomposition and QFD
Lecture 9 - Product Design Specification
Lecture 10 - FAST in Functional Design
Lecture 11 - Design Thinking and Product Conceptualization and Development
Lecture 12 - Product specification and related methods
Lecture 13 - Conceptual design stemmed from Idea generation
Lecture 14 - Conceptual design: tools and techniques
Lecture 15 - Quality Function Deployment (QFD): Example
Lecture 16 - Kano Model and Analysis
Lecture 17 - Concept Generation methods
Lecture 18 - Concept evaluation methods
Lecture 19 - Concept testing methods
Lecture 20 - Morphological Design Concept
Lecture 21 - Embodiment, Architectural, Configuration, and Parametric Design
Lecture 22 - Pugh Method (Concept Selection leading to Embodiment Design)
Lecture 23 - Introduction to Sustainability
Lecture 24 - Sustainability and Eco-design
Lecture 25 - LCA and design thinking on LCA
Lecture 26 - Introduction to Additive Manufacturing
Lecture 27 - Design for Rapid prototyping, DFAM
Lecture 28 - Introduction to Design for Manufacturing (DFM) and Assembly (DFA)
Lecture 29 - Rapid: Digital Prototyping

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Lecture 30 - A Primer on Design for Quality: Robust and Reliability Engineering
Lecture 31 - Tolerance Design: Taguchi Robust Engineering
Lecture 32 - Complexity Mitigation in Multidisciplinary, System: Concurrent Engineering Precepts
Lecture 33 - Design Thinking steps
Lecture 34 - Design Thinking Methodologies and Tools
Lecture 35 - Frugal Engineering-A Disruptive Innovation Paradigm in Product Design and Development
Lecture 36 - Design-Driven Innovation
Lecture 37 - User interface and Experience (UI/UX) Design in Product Engineering
Lecture 38 - Industrial Design: Aesthetics and Ergonomics
Lecture 39 - Design Thinking in Industrial Design - Case Studies
Lecture 40 - Product Engineering'- Led Technology Entrepreneurship

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NPTEL Video Course - Mechanical Engineering - NOC:Microfluidics and Nanofluidics

Subject Co-ordinator - Prof. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microfluidics
Lecture 2 - Introduction to Microfluidics (Continued...)
Lecture 3 - Introduction to Microfluidics (Continued...)
Lecture 4 - Introduction to Microfluidics (Continued...)
Lecture 5 - Introduction to Microfluidics (Continued...)
Lecture 6 - Introduction to Microfluidics (Continued...)
Lecture 7 - Introduction to Microfluidics (Continued...)
Lecture 8 - Introduction to Microfluidics (Continued...)
Lecture 9 - Introduction to Microfluidics (Continued...)
Lecture 10 - Introduction to Microfluidics (Continued...)
Lecture 11 - Introduction to Microfluidics (Continued...)
Lecture 12 - Foundations of Fluid Dynamics
Lecture 13 - Foundations of Fluid Dynamics (Continued...)
Lecture 14 - Foundations of Fluid Dynamics (Continued...)
Lecture 15 - Foundations of Fluid Dynamics (Continued...)
Lecture 16 - Foundations of Fluid Dynamics (Continued...)
Lecture 17 - Foundations of Fluid Dynamics (Continued...)
Lecture 18 - Foundations of Fluid Dynamics (Continued...)
Lecture 19 - Foundations of Fluid Dynamics (Continued...)
Lecture 20 - Foundations of Fluid Dynamics (Continued...)
Lecture 21 - Foundations of Fluid Dynamics (Continued...)
Lecture 22 - Pressure-driven Microchannel Flows
Lecture 23 - Pressure-driven Microchannel Flows (Continued...)
Lecture 24 - Pressure-driven Microchannel Flows (Continued...)
Lecture 25 - Pressure-driven Microchannel Flows (Continued...)
Lecture 26 - Pressure-driven Microchannel Flows (Continued...)
Lecture 27 - Insights on Inertia-free Flows
Lecture 28 - Inertia-free Flow in Circular Capillaries and Generalizing the Force balance
Lecture 29 - Inertia-free flows for general fluids - Concepts for Microelectric Materials

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Lecture 30 - Microelectric Fluid Flow through Microchannel
Lecture 31 - Fluid Flow through Deformable Microchanels
Lecture 32 - Fluid Flow through Deformable Microchanels (Continued...)
Lecture 33 - Lubrication Theory
Lecture 34 - Lubrication Theory (Continued...)
Lecture 35 - Lubrication Theory (Continued...)
Lecture 36 - Lubrication Theory (Continued...)
Lecture 37 - Lubrication Theory (Continued...)
Lecture 38 - Lubrication Theory - 2 Dimensional Problems
Lecture 39 - Unsteady Flows
Lecture 40 - Unsteady Flows (Continued...)
Lecture 41 - Unsteady Flows: Stoke's 1st problem (Continued...)
Lecture 42 - Unsteady Flows: Stoke's 1st problem (Continued...)
Lecture 43 - Unsteady Flows: Stoke's 2nd Problem
Lecture 44 - Unsteady Flows: Stoke's 2nd Problem (Continued...)
Lecture 45 - Unsteady Flows: Stoke's 2nd Problem (Continued...)
Lecture 46 - Stokes Flow Past a Sphere
Lecture 47 - Stokes Flow Past a Sphere
Lecture 48 - Stokes Flow Past a Sphere - The Drag Force
Lecture 49 - Surface Tension and Its Implications in Mircrofluidics
Lecture 50 - Equilibrium of a Droplet
Lecture 51 - Equilibrium of a Droplet (Continued...)
Lecture 52 - Capillary Rise
Lecture 53 - Capillary Filling Dynamics
Lecture 54 - Capillary Filling Dynamics (Continued...)
Lecture 55 - Capillary Filling Dynamics (Continued...)
Lecture 56 - Capillary Filling Dynamics (Continued...)
Lecture 57 - Factors affecting Capillary and Wetting
Lecture 58 - Electrowetting
Lecture 59 - Slip Boundary Condition
Lecture 60 - Apparent Slip
Lecture 61 - Thin Film Flows
Lecture 62 - Thin Film Flows (Continued...)
Lecture 63 - Electrokinetics and Electric Double Layer
Lecture 64 - Equilibrium within Electrical Double Layer Poisson Boltzmann model
Lecture 65 - Poisson - Nernst - Plank Model
Lecture 66 - Maxwell Stress and Electroosmosis
Lecture 67 - Electroosmosis
Lecture 68 - Electrophoresis and Streaming Potential

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NPTEL Video Course - Mechanical Engineering - NOC:Industrial Robotics: Theories for Implementation

Subject Co-ordinator - Dr. Arun Dayal Udai

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to and Industrial Robots
Lecture 2 - Anatomy of an Industrial Robot
Lecture 3 - Technical Specifications of an Industrial Robot
Lecture 4 - Classification of Robots
Lecture 5 - Fixed Installation Robots - Serial and Parallel Robots
Lecture 6 - Introduction to Industrial Controllers, Drives and Systems
Lecture 7 - DC Motors/Actuators and Drives
Lecture 8 - Stepper Motors
Lecture 9 - Brushless DC Motors/Actuators
Lecture 10 - AC Servo Motors
Lecture 11 - Introduction to Sensor and Transducers, Position Sensors
Lecture 12 - Position Sensors: Potentiometers, and Hall-effect. Velocity Sensors
Lecture 13 - Acceleration Sensors, AC Sensors (Resolvers and Synchros)
Lecture 14 - Non-contact (Inductive and Capacitive), Force/Torque Sensors
Lecture 15 - Limit Switches, Classification and Characteristics of Sensors
Lecture 16 - Degrees of Freedom and Kinematic Transformations : Translation
Lecture 17 - Pure Rotation, Arbitrary Axis Rotations, Euler Angles
Lecture 18 - Link and Joint Parameters (DH Notations), 2 and 3 DoF Robots
Lecture 19 - 3 DoF Cylindrical Robot (Spatial), SphericalWrist, Cylindrical Robot with Wrist
Lecture 20 - Forward Kinematics of 6-DoF Industrial Robot
Lecture 21 - Inverse Kinematics: 2 and 3 DoF Planar Manipulator
Lecture 22 - Spatial Robots - 3R, Cylindrical (RPP), 4-DoF SCARA Robot
Lecture 23 - Inverse Kinematics of a 6-DoF Industrial Robot
Lecture 24 - Differential Motion Analysis, Velocity, and Robot Jacobian
Lecture 25 - Jacobian (2R), Jacobian Inverse, Singularity, and Acceleration Analysis
Lecture 26 - Installing the Mechanical Arm and Test Run
Lecture 27 - Mastering an Industrial Robot
Lecture 28 - TCP Calibration using 4-Point method and External reference method
Lecture 29 - TCP Orientation Calibration using World Frame and Two-Point method

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Lecture 30 - Worksurface Calibration
Lecture 31 - Fixed Tool Calibration: External TCP and Workpiece Calibration
Lecture 32 - Base Linear Track and External Turn-Table Calibration
Lecture 33 - Link Forces and Moments
Lecture 34 - Gravity Compensation and External Forces/Torques
Lecture 35 - Kinetostatic Measures for Robot Design
Lecture 36 - Introduction to Dynamics, LE Approach, Dynamics of 1DoF System
Lecture 37 - Equation of Motion (EoM) for a Two-Link Manipulator using LE
Lecture 38 - Newton-Euler (NE) Approach
Lecture 39 - Equation of motion of a Two-Link manipulator using NE Approach
Lecture 40 - Payload and Supplementary Load Calibration
Lecture 41 - Identification Experiments
Lecture 42 - Repeatability Tests and ISO 9283:1998
Lecture 43 - Introduction to Control, Linear Control, Second Order System
Lecture 44 - Response of a Second Order Linear System
Lecture 45 - Transfer Function and State-space representation, ODE
Lecture 46 - A Robot Joint : DC Motor Model
Lecture 47 - Feedback control of a robot arm, PID Control, Gain Tuning
Lecture 48 - Workspace and Operator Safety
Lecture 49 - Industrial Robot Programming
Lecture 50 - Course Conclusion and Suggestions

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NPTEL Video Course - Mechanical Engineering - NOC:Cryogenic Hydrogen Technology

Subject Co-ordinator - Prof. Indranil Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Hydrogen Properties
Lecture 3 - Slush Hydrogen, Ortho-Para H2
Lecture 4 - Ortho-Para H2 Conversion
Lecture 5 - Deuterium Production
Lecture 6 - Hydrogen Production - 1
Lecture 7 - Hydrogen Production - 2
Lecture 8 - Hydrogen Production - 3
Lecture 9 - Hydrogen Production
Lecture 10 - Hydrogen Production
Lecture 11 - Hydrogen Production (Electrolysis)
Lecture 12 - Electrolytic Hydrogen
Lecture 13 - Electrolytic Hydrogen
Lecture 14 - SPE Water Electrolyser
Lecture 15 - Thermochemical Process
Lecture 16 - Hydrogen Storage: Overview
Lecture 17 - Compressed Hydrogen Storage
Lecture 18 - Compressed Hydrogen Storage
Lecture 19 - Overview on Hydrogen Storage
Lecture 20 - Adsorption Storage of Hydrogen
Lecture 21 - Basics of Cryogenic Liquefaction
Lecture 22 - Coefficient of Expansion
Lecture 23 - Cryogenic Liquefaction Cycles
Lecture 24 - Cryogenic Liquefaction (Continued...)
Lecture 25 - Hydrogen Liquefaction
Lecture 26 - Cryogenic Liquefaction (Continued...)
Lecture 27 - Cryogenic Liquefaction - Numerical
Lecture 28 - Cryogenic Liquefaction - Numerical
Lecture 29 - Cryogenic Liquefaction (Continued...)

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Lecture 30 - Cryogenic Liquefaction (Continued...)
Lecture 31 - Cryo Hydrogen Storage
Lecture 32 - Cryo Hydrogen Storage
Lecture 33 - Cryo Hydrogen Storage
Lecture 34 - Cryogenic Liquid Level Measurement
Lecture 35 - Flow Rate/Fluid Quality Measurement
Lecture 36 - Temperature Measurement
Lecture 37 - Application: Fuel Cell
Lecture 38 - Fuel Cell (Continued...)
Lecture 39 - Cryogenic Rocket Propulsion
Lecture 40 - Hydrogen Safety

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NPTEL Video Course - Mechanical Engineering - NOC:Industrial Hydraulics and Automation

Subject Co-ordinator - Prof. Niranjan Kumar, Prof. Ajit Kumar

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to power hydraulics
Lecture 2 - Fundamental theory of power hydraulics
Lecture 3 - Fundamental theory of power hydraulics (Continued...)
Lecture 4 - Hydraulic fluids
Lecture 5 - Hydraulic fluids (Continued...)
Lecture 6 - Introduction to hydraulic pumps
Lecture 7 - Introduction to hydraulic pumps (Continued...)
Lecture 8 - Construction, operation and application of hydraulic pumps
Lecture 9 - Construction, operation and application of hydraulic pumps (Continued...)
Lecture 10 - Construction, operation and application of hydraulic pumps (Continued...)
Lecture 11 - Performance characteristics of hydraulic pumps
Lecture 12 - Performance characteristics of hydraulic pumps (Continued...)
Lecture 13 - Performance characteristics of hydraulic pumps (Continued...)
Lecture 14 - Performance characteristics of hydraulic pumps (Continued...)
Lecture 15 - Performance characteristics of hydraulic pumps (Continued...)
Lecture 16 - Introduction to hydraulic actuators
Lecture 17 - Introduction to hydraulic actuators (Continued...)
Lecture 18 - Rotary actuators
Lecture 19 - Rotary actuators (Continued...)
Lecture 20 - Rotary actuators (Continued...)
Lecture 21 - Linear actuators
Lecture 22 - Linear actuators (Continued...)
Lecture 23 - Performance characteristics of hydraulic actuators
Lecture 24 - Performance characteristics of hydraulic actuators (Continued...)
Lecture 25 - Performance characteristics of hydraulic actuators (Continued...)
Lecture 26 - Introduction to hydraulic valves
Lecture 27 - Theory of control valves - I
Lecture 28 - Theory of control valves - I (Continued...)
Lecture 29 - Theory of control valves - II

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Lecture 30 - Theory of control valves - III
Lecture 31 - Theory of control valves - IV
Lecture 32 - Theory of control valves - IV (Continued...)
Lecture 33 - Theory of proportional valves
Lecture 34 - Theory of servo valves
Lecture 35 - Numerical on operation of control valves
Lecture 36 - Introduction to hydraulic accessories
Lecture 37 - Hydraulic accumulator
Lecture 38 - Hydraulic reservoirs
Lecture 39 - Hoses, Filters and Coolers
Lecture 40 - Performance analysis of hydraulic accumulators and hydraulic reservoirs
Lecture 41 - Hydrostatic Transmission System (HST)
Lecture 42 - Hydraulic system for industrial equipment - I
Lecture 43 - Hydraulic system for industrial equipment - I (Continued...)
Lecture 44 - Hydraulic system for industrial equipment - I (Continued...)
Lecture 45 - Hydraulic system for industrial equipment - I (Continued...)
Lecture 46 - Hydraulic system for industrial equipment - II
Lecture 47 - Hydraulic system for industrial equipment - II (Continued...)
Lecture 48 - Hydraulic system for industrial equipment - II (Continued...)
Lecture 49 - Performance evaluation of hydraulic systems
Lecture 50 - Performance evaluation of hydraulic systems (Continued...)
Lecture 51 - Introduction to control system
Lecture 52 - Introduction to control system (Continued...)
Lecture 53 - Control system analysis - I
Lecture 54 - Control system analysis - I (Continued...)
Lecture 55 - Control system analysis - I (Continued...)
Lecture 56 - Control system analysis - II
Lecture 57 - Control system analysis - II (Continued...)
Lecture 58 - Control system analysis - II (Continued...)
Lecture 59 - Digital hydraulics
Lecture 60 - Digital hydraulics (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC:COBOTS: Theory and Practice

Subject Co-ordinator - Prof. Arun Dayal Udai

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - COBOTS, Its Need and Evolution, Levels of Collaboration, Applications
Lecture 2 - Collaborative Modes, Contacts, Bio-Mechanical Limits, and ISO Standards
Lecture 3 - The Process of Risk Assessment
Lecture 4 - Evolution of Force Control, Technology Transition, and the Hardware
Lecture 5 - Constrained Motion Task and Distinguishing Features of a COBOT
Lecture 6 - DC Servo Motors, Position, Velocity and Torque Control
Lecture 7 - BLDC Motors and PMSM AC Servos
Lecture 8 - Sensors - Position, Velocity, and Acceleration Sensors
Lecture 9 - Force/Torque Sensor, Planetary Gearbox and Harmonic Drives
Lecture 10 - Industrial Field Bus, Drives and Devices, and Safe Workspaces
Lecture 11 - Degrees of Freedom, Matrix Representations, and Kinematic Transformations
Lecture 12 - Rotation Matrix, Arbitrary Axis Rotation, and Euler Angles
Lecture 13 - Robot Frames, DH Parameters, Link Transformation Matrix, and Forward Kinematics
Lecture 14 - Forward Kinematics of Industrial COBOTS
Lecture 15 - Inverse Kinematics, Analysis of 2R Planar, 3R Spatial and SCARA
Lecture 16 - Inverse Kinematic Analysis of a 6-DoF Wrist Partitioned Arm
Lecture 17 - Inverse Kinematic Analysis of UR Arms
Lecture 18 - Differential Motion Analysis: Robot Jacobian, Velocity and Acceleration Analysis
Lecture 19 - Inverse Kinematics of 7-DoF KUKA LBR iiwa Robot and Null Space
Lecture 20 - Link Forces and Moments
Lecture 21 - Gravity Compensation, and External Forces/Torques
Lecture 22 - Kinetostatic Measures for Robot Design
Lecture 23 - MATLAB Demonstrations
Lecture 24 - Introduction to Dynamics, LE Approach, Dynamics of 1 DoF System
Lecture 25 - Dynamic Equation of Motion of a Two-Link Manipulator using Lagrange-Euler (LE) Approach
Lecture 26 - Introduction to Newton-Euler (NE) and Recursive-NE Approach
Lecture 27 - Dynamic Equation of Motion of a Two-Link Manipulator using Newton-Euler (NE) Approach
Lecture 28 - Introduction to Control, Linear Control, Second Order System
Lecture 29 - Response of a Second Order Linear System

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Lecture 30 - Transfer Function and State-space representation, ODE
Lecture 31 - A Robot Joint: DC Motor Model
Lecture 32 - Feedback control of a robot arm, PID Control, Gain Tuning
Lecture 33 - External Force Control Loop and Admittance Control
Lecture 34 - MATLAB Demonstrations - Preparing the 3R Spatial Arm for Force Control
Lecture 35 - Hybrid and Stiffness Force Controller
Lecture 36 - Impedance Controller and its variants
Lecture 37 - Course Conclusion

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NPTEL Video Course - Mechanical Engineering - NOC:Applied Elasticity

Subject Co-ordinator - Prof. Soham Roychowdhury

Co-ordinating Institute - IIT - Bhubaneshwar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Tensor Algebra - I
Lecture 2 - Tensor Algebra - II
Lecture 3 - Tensor Algebra - III
Lecture 4 - Tensor Calculus - I
Lecture 5 - Tensor Calculus - II
Lecture 6 - Kinematics of Deformation - I
Lecture 7 - Kinematics of Deformation - II
Lecture 8 - Strain Measures - I
Lecture 9 - Strain Measures - II
Lecture 10 - Strain Measures - III
Lecture 11 - Stress Measures - I
Lecture 12 - Stress Measures - II
Lecture 13 - Stress Measures - III
Lecture 14 - Balance Laws - I
Lecture 15 - Balance Laws - II
Lecture 16 - Constitutive Equations - I
Lecture 17 - Constitutive Equations - II
Lecture 18 - Constitutive Equations - III
Lecture 19 - Constitutive Equations - IV
Lecture 20 - Constitutive Equations - V
Lecture 21 - Field Equations of Elasticity
Lecture 22 - Displacement Formulation
Lecture 23 - Stress Formulation
Lecture 24 - Elasticity Theorems - I
Lecture 25 - Elasticity Theorems - II
Lecture 26 - Two Dimensional Formulation
Lecture 27 - Plane Stress Formulation
Lecture 28 - Plane Strain Formulation
Lecture 29 - Anti-plane Strain and Stress Functions

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Lecture 30 - Stress Functions
Lecture 31 - Bending of Beams - I
Lecture 32 - Bending of Beams - II
Lecture 33 - Bending of Beams - III
Lecture 34 - Bending of Beams - IV
Lecture 35 - Bending of Beams - V
Lecture 36 - Torsion Problems - I
Lecture 37 - Torsion Problems - II
Lecture 38 - Torsion Problems - III
Lecture 39 - Torsion Problems - IV
Lecture 40 - Torsion Problems - V
Lecture 41 - Field Equations in Polar Coordinates
Lecture 42 - General Solutions in Polar Coordinates
Lecture 43 - Thick Cylinder Problems
Lecture 44 - Bending of Curved Beams - I
Lecture 45 - Bending of Curved Beams - II
Lecture 46 - Semi-infinite Domain Problems - I
Lecture 47 - Semi-infinite Domain Problems - II
Lecture 48 - Semi-infinite Domain Problems - III
Lecture 49 - Semi-infinite Domain Problems - IV
Lecture 50 - Semi-infinite Domain Problems - V
Lecture 51 - Semi-infinite Domain Problems - VI
Lecture 52 - Stress Concentration Problems - I
Lecture 53 - Stress Concentration Problems - II
Lecture 54 - Notch and Crack Problems
Lecture 55 - Axisymmetric Problems with Body Force
Lecture 56 - Circular Disk under Diametrical Compression
Lecture 57 - Contact Problems - I
Lecture 58 - Contact Problems - II
Lecture 59 - Thermo-elasticity - I
Lecture 60 - Thermo-elasticity - II

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Heat Transfer

Subject Co-ordinator - Prof. Somnath Roy

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Modes of Heat Transfer
Lecture 2 - Introduction to Conduction Heat Transfer
Lecture 3 - Fourierâ s Law and Thermal Conductivity
Lecture 4 - Heat Conduction Equation
Lecture 5 - Solution of One-dimensional Steady Conduction Equation
Lecture 6 - Thermal Resistance
Lecture 7 - Contact Resistance and Internal Thermal Energy Generation
Lecture 8 - Extended Surface Heat Transfer-Fins
Lecture 9 - Heat Transfer in Fins, Effectiveness and Efficiency - 1
Lecture 10 - Heat Transfer in Fins, Effectiveness and Efficiency - 2
Lecture 11 - Two-dimensional Steady Conduction - Solution by Separation of Varaibles - 1
Lecture 12 - Two-dimensional Steady Conduction - Solution by Separation of Varaibles - 2
Lecture 13 - Two-dimensional Steady Conduction - Separation of Variables and Graphical Method
Lecture 14 - Numerical Solutions of Conduction Equation - 1
Lecture 15 - Numerical Solutions of Conduction Equation - 2
Lecture 16 - Unsteady Heat Conduction - Introduction
Lecture 17 - Lumped Capacitance Model for Transient Conduction
Lecture 18 - Transient Conduction for High or Moderate Biot Number Cases
Lecture 19 - Heisler Chart for Transient Conduction Problems
Lecture 20 - Transient Conduction in Semi-infinite Bodies
Lecture 21 - Introduction to Convection Heat Transfer
Lecture 22 - Mass and Momentum Conservation Equation for a Fluid Flow
Lecture 23 - Energy Conservation Equation for a Fluid Flow
Lecture 24 - Boundary Layer Theory and Equations
Lecture 25 - Thermal Boundary Layer and Estimation of Convective Heat Transfer Coefficient
Lecture 26 - Estimation of Convective Heat Transfer Coefficient by Solving Boundary Layer Equation
Lecture 27 - Average Nuselt Number, Introduction to Turbulence
Lecture 28 - Turbulant Boundary Layer Heat Transfer Coefficient Reynolds Analogy
Lecture 29 - Convective Flow over Wedges and Curved Surfaces - Boundary Layer Separation

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Lecture 30 - Convective Heat Transfer Due to External Flow over Bluff Bodies, Heat Tarnsfer Correlations
Lecture 31 - Internal Flow through Pipes and Ducts - Heat Transfer Consideration
Lecture 32 - Variation of Mean Temperature in Internal Flows with Different Boundary Conditions
Lecture 33 - Mean Temperature and Convective Heat Transfer Coefficient Variation in Thermally Fully Developed
Lecture 34 - Determination of Convective Heat Transfer Coefficient for Fully Developed Flow
Lecture 35 - Measuring Pressure and Temperature in Convective Heat Transfer
Lecture 36 - Introduction to Natural Convection
Lecture 37 - Governing Equation for Natural Convection over Vertical Flat Plate
Lecture 38 - Mixed Convection and Nusselt Number Correlations in Natural Convection
Lecture 39 - Phase Change Heat Transfer - Pool Boling
Lecture 40 - Phase Change Heat Transfer - Flow Boiling and Condensation
Lecture 41 - Heat Exchangers and their Classifications
Lecture 42 - Direct Transfer Heat Exchangers
Lecture 43 - Parallel and Counterflow Heat Exchangers, Overall Heat Transfer Coefficient
Lecture 44 - Heat Exchanger Analysis using Log Mean Temperature Difference - 1
Lecture 45 - Heat Exchanger Analysis using Log Mean Temperature Difference - 2
Lecture 46 - Heat Exchanger Analysis - LMTD Example and Effectiveness (Îµ) and NTU
Lecture 47 - Effectiveness (Îµ) and NTU Relation for Heat Exchangers (Continued...)
Lecture 48 - Introduction to Radiation Heat Transfer
Lecture 49 - Directional and Spectral Nature of Radiation
Lecture 50 - Laws of Thermal Radiation
Lecture 51 - Black, Grey and Real Surfaces- Surface Properties for Radiation
Lecture 52 - Problems involving Emission from Small Surfaces
Lecture 53 - Introduction to View Factor
Lecture 54 - Calculation of View Factor (Continued...)
Lecture 55 - Radiation Exchange between Surfaces - Black and Gray Bodies
Lecture 56 - Radiation Exchange between Gray Surfaces
Lecture 57 - Radiation Exchange in Two Surface Enclosures
Lecture 58 - Radiation Exchange in Enclosure Networks
Lecture 59 - Introduction to Mass Transfer
Lecture 60 - Governing equations in mass transfer and heat transfer analogy

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NPTEL Video Course - Mechanical Engineering - NOC:Finite Element Method in Thermal Engineering

Subject Co-ordinator - Prof. Subhankar Sen

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to tensors
Lecture 3 - Strong form of differential equations, primary and secondary variables
Lecture 4 - Introduction to variational methods
Lecture 5 - Illustration of variational methods , variational methods of FEM
Lecture 6 - BVP, IVP and IBVP, types of finite elements
Lecture 7 - Weight and shape functions, weak form
Lecture 8 - Domain decomposition
Lecture 9 - Types of boundary conditions, IEN, ID and LM arrays in one-dimension
Lecture 10 - ID and LM arrays in two-dimensions, SDOF and multi-DOF
Lecture 11 - Galerkin weak form of Poisson equation
Lecture 12 - FDM, FVM and FEM
Lecture 13 - FDM and FVM for one-dimensional Poisson equation
Lecture 14 - FEM for one-dimensional Poisson equation
Lecture 15 - FEM using a single bar element
Lecture 16 - Isoparametric elements
Lecture 17 - Illustration for linear bar elements
Lecture 18 - Quadratic bar elements, quadrilateral elements
Lecture 19 - Gauss quadrature for bilinear quadrilateral elements
Lecture 20 - Local coordinates in 2-D, numerical examples
Lecture 21 - Implementation of boundary conditions
Lecture 22 - Implementation of CBC and RBC in 1-D and 2-D
Lecture 23 - Shape functions of linear triangular elements
Lecture 24 - GFEM solution of 2-D Poisson equation of heat conduction - Part 1
Lecture 25 - GFEM solution of 2-D Poisson equation of heat conduction - Part 2
Lecture 26 - Calculation of element level entries of linear triangular elements
Lecture 27 - Solving 2-D Poisson equation using linear triangular elements
Lecture 28 - Classification of linear equation solvers, Gauss elimination
Lecture 29 - Illustration of Thomas algorithm

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Lecture 30 - Stationary iterative methods, preconditioning, matrix-free methods
Lecture 31 - Formation of element level matrices and vectors for Parabolic PDE
Lecture 32 - Consistent mass matrix of bar and triangular elements
Lecture 33 - GFEM explicit, implicit and Crank-Nicolson solutions of parabolic PDE in 1-D
Lecture 34 - GFEM for hyperbolic PDEs; first order wave equation, skew-symmetric matrice
Lecture 35 - Galerkin discretized semi-discrete form of the second order wave equation
Lecture 36 - Weak form and fully discrete form of convection-diffusion equation
Lecture 37 - Peclet number, convection and diffusion matrices for bar elements
Lecture 38 - GFEM solution using 2-noded or linear bar elements
Lecture 39 - GFEM solution using 3-noded or quadratic bar elements
Lecture 40 - GFEM explicit solution of 1-D transient convection-diffusion equation
Lecture 41 - Implicit GFEM solution of 1-D unsteady convection-diffusion equation
Lecture 42 - Upwinding and artificial viscosity
Lecture 43 - The Petrov-Galerkin stabilization
Lecture 44 - Petrov-Galerkin weak form of steady convection-diffusion equation
Lecture 45 - Petrov-Galerkin stabilization treatment numerical example
Lecture 46 - Stable Pe limit for convection-diffusion, Navier-stokes equations of motion
Lecture 47 - Coupled and segregated formulations, LBB condition for stable solutions
Lecture 48 - Saddle point problems, inf-sup or LBB compatibility condition, stable elements
Lecture 49 - Connectivity and assembly using Q1Q0 elements for 2-D lid-driven cavity
Lecture 50 - Coupled Galerkin weak form of 2-D, steady Navier-Stokes equations of motion
Lecture 51 - Preprocessor arrays using Q1Q0 element for 2-D Navier-Stokes flow (GFEM)
Lecture 52 - Generation of Q1Q0 element level matrix terms for 2-D Navier-Stokes flow (GFEM)
Lecture 53 - Calculation of x-momentum GFEM matrix for Q1Q0 element
Lecture 54 - Calculation of y-momentum GFEM matrix for Q1Q0 element
Lecture 55 - Calculation of GFEM Stokes flow matrix for Q1Q0 element
Lecture 56 - Implementation of BCs using Q1Q0 elements for 2-D Stokes flow (GFEM)
Lecture 57 - Illustration of assembly using Q1Q0 elements for 2-D Stokes flow (GFEM)
Lecture 58 - The Petrov-Galerkin stabilized Navier-Stokes equations Q1Q1 elements - Part I
Lecture 59 - The Petrov-Galerkin stabilized Navier-Stokes equations Q1Q1 elements - Part II
Lecture 60 - The Petrov-Galerkin stabilized Navier-Stokes equations Q1Q1 elements - Part III

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NPTEL Video Course - Mechanical Engineering - NOC:Gas Turbines and Jet Engines

Subject Co-ordinator - Prof. Anirban Bhattacharya

Co-ordinating Institute - IIT Bhubaneswar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Gas Turbines
Lecture 2 - Gas Turbine Components
Lecture 3 - Working Principle of Gas Turbines
Lecture 4 - Brayton Cycle Analysis
Lecture 5 - Gas Turbine Cycle with Regeneration
Lecture 6 - Gas Turbine Cycle with Reheat
Lecture 7 - Regenerative Cycle and Reheat Cycle - Problem Solving
Lecture 8 - Combined Regenerative-Reheat Gas Turbine
Lecture 9 - Gas Turbine Cycle with Intercooling
Lecture 10 - Analysis of Intercooled Brayton Cycle
Lecture 11 - Intercooling with Regeneration
Lecture 12 - Intercooling and Regeneration - Intercooling Cycles - Problem Solving
Lecture 13 - Intercooling with Reheating
Lecture 14 - Intercooling with Regeneration and Reheating
Lecture 15 - Comparison of Ideal Gas Turbine Cycles
Lecture 16 - Real Gas Turbines - Deviation from Ideal Gases
Lecture 17 - Real Gas Turbines - Irreversibility and Isentropic Efficiency
Lecture 18 - Real Gas Turbines - Polytropic Efficiency for Compressors
Lecture 19 - Real Gas Turbines - Polytropic Efficiency for Turbines
Lecture 20 - Real Gas Turbines - Pressure Loss, Regenerator Loss, Variation of Cp and Gamma
Lecture 21 - Real Gas Turbines - Mechanical Losses, Fuel Addition, Combustion Inefficiency
Lecture 22 - Real Gas Turbines - Numerical Examples
Lecture 23 - Real Gas Turbines - Numerical Examples (Continued...)
Lecture 24 - Real Gas Turbines - Performance of Real Gas Turbines
Lecture 25 - Overview of Gas Turbines Components - Compressor
Lecture 26 - Overview of Gas Turbines Components - Combustion System
Lecture 27 - Overview of Gas Turbines Components - Combustion System (Continued...)
Lecture 28 - Gas Turbine Components - Turbine
Lecture 29 - Introduction to Jet Engines

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Lecture 30 - Turbojet Engine - Design and Working Principle
Lecture 31 - Jet Engine Diffuser
Lecture 32 - Jet Engine Nozzle
Lecture 33 - Jet Engine Nozzle - Unchoked and Choked Conditions
Lecture 34 - Jet Engine Nozzle - Numerical Problem Solving
Lecture 35 - Convergent - Divergent Nozzles
Lecture 36 - Jet Engine Performance - Thrust and Efficiency
Lecture 37 - Analysis of Turbojet Engine
Lecture 38 - Turbojet Engine Analysis (Continued...)
Lecture 39 - Turbojet Performance and Jet Engine Afterburner
Lecture 40 - Analysis of Turbojet Engine with Afterburner
Lecture 41 - Turbofan - Design and Types of Engines
Lecture 42 - Turbofan Engine - Configurations and Working Principle
Lecture 43 - Analysis of Unmixed Exhaust Turbofan Engine
Lecture 44 - Analysis of Unmixed Exhaust Turbofan Engine (Continued...)
Lecture 45 - Working Principle of Mixed Exhaust Turbofan Engine
Lecture 46 - Analysis of Mixed Exhaust Turbofan Engine
Lecture 47 - Analysis of Mixed Exhaust Turbofan Engine (Continued...)
Lecture 48 - Turbofan Engine - Performance Characteristics
Lecture 49 - Introduction to Turboprop Engines
Lecture 50 - Turboprop Engine - Working Principle and Optimum Condition
Lecture 51 - Analysis of Turboprop Engine - Numerical Examples
Lecture 52 - Analysis of Turboprop Engine (Continued...)
Lecture 53 - Comparison of Jet Engines
Lecture 54 - Introduction to Ramjet Engines
Lecture 55 - Analysis of Ramjet Engines
Lecture 56 - Analysis of Ramjet Engine - Problem Solving
Lecture 57 - Analysis of Ramjet Engine - Problem Solving (Continued...)
Lecture 58 - Scramjet Engines
Lecture 59 - Pulsejet and Pulse Detonation Engines
Lecture 60 - Comparison, Summary and Outlook

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NPTEL Video Course - Mechanical Engineering - NOC:Computer Integrated Manufacturing: From Concept to Implemer

Subject Co-ordinator - Prof. Sankha Deb

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computer Integration Manufacturing
Lecture 2 - Definition and Scope of CIM
Lecture 3 - Evolution of CIM
Lecture 4 - The Manufacturing System and Role of Computers in CAD/CAM and CIM
Lecture 5 - Benefits of CIM
Lecture 6 - Networking and Data Communications - Part 1
Lecture 7 - Networking and Data Communications - Part 2
Lecture 8 - Database Management System - Part 1
Lecture 9 - Database Management System - Part 2
Lecture 10 - Standards for Communicating Between Systems
Lecture 11 - Product Cycle and Introduction to CAD
Lecture 12 - Different Approaches to CAD based Geometric Modeling: Wireframe and Surface modeling
Lecture 13 - Different Approaches to CAD based Geometric Modeling: Solid modeling, feature based modeling, pa
Lecture 14 - Hands-on demonstration on basic part modelling using CAD software
Lecture 15 - Hands-on demonstration on modelling of a mechanical parts assembly using CAD software
Lecture 16 - Introduction to Computer-Aided Manufacturing
Lecture 17 - Computer Numerical Control - Part 1
Lecture 18 - Computer Numerical Control - Part 2
Lecture 19 - Industrial robots
Lecture 20 - Automated Production Lines and Assembly Systems
Lecture 21 - Basic concepts for CNC Part Programming
Lecture 22 - CNC part programming using CAD/CAM
Lecture 23 - Robot programming
Lecture 24 - Hands-on demonstration on Robot programming
Lecture 25 - Industrial Robotics Application Case-studies
Lecture 26 - Introduction to Programmable Logic Controllers
Lecture 27 - Input devices used with PLC
Lecture 28 - Output devices used with PLC
Lecture 29 - PLC Architecture

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Lecture 30 - Programming of PLC with Examples
Lecture 31 - Introduction to Material Handling Technologies
Lecture 32 - Material transport systems
Lecture 33 - Storage systems
Lecture 34 - Analysis of Material transport systems
Lecture 35 - Analysis of Storage Systems
Lecture 36 - Introduction to concept of Group Technology
Lecture 37 - Cellular Manufacturing and other applications of Group Technology
Lecture 38 - Quantitative analysis in cellular manufacturing - Part 1
Lecture 39 - Quantitative analysis in cellular manufacturing - Part 2
Lecture 40 - Flexible Manufacturing Cells and Systems
Lecture 41 - Introduction to process planning
Lecture 42 - Computer Aided Process Planning - Part 1
Lecture 43 - Computer Aided Process Planning - Part 2
Lecture 44 - AI/ML applications in Process Planning - Part 1
Lecture 45 - AI/ML applications in Process Planning - Part 2
Lecture 46 - Introduction to Production Planning and Control and Aggregate production planning and MPS
Lecture 47 - Material Requirements Planning
Lecture 48 - Capacity Planning
Lecture 49 - Shop floor control
Lecture 50 - Inventory control and Manufacturing Resource Planning
Lecture 51 - Introduction to DFMA and Design for Manufacturing - Part 1
Lecture 52 - Design for Manufacturing - Part 2
Lecture 53 - Product Design for Manual Assembly
Lecture 54 - Design for Assembly Analysis
Lecture 55 - Product Design for Automatic Assembly and Robot Assembly
Lecture 56 - Industry 40

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NPTEL Video Course - Mechanical Engineering - Advanced Gas Dynamics

Subject Co-ordinator - Dr. Rinku Mukherjee

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Gas Dynamics & Review of Basic Thermodynamics
Lecture 2 - Review of Basic Thermodynamics Continued
Lecture 3 - An introduction to Normal Shocks
Lecture 4 - The Mach Number and Compressible Flow
Lecture 5 - The relation of physical properties across a normal shock
Lecture 6 - Normal Shock in a duct
Lecture 7 - Example Problems in Normal Shocks
Lecture 8 - An introduction to Oblique Shocks
Lecture 9 - The relation of physical properties across an oblique shock
Lecture 10 - Example Problems in Oblique Shocks
Lecture 11 - Pressure - Deflection relationship of Shocks
Lecture 12 - An introduction to Expansion waves
Lecture 13 - Area - Mach Relationship
Lecture 14 - Unsteady Shock Waves
Lecture 15 - The Shock Tube
Lecture 16 - A review of wave propagation
Lecture 17 - Wave propagation
Lecture 18 - Finite Wave Theory
Lecture 19 - The Shock Tube
Lecture 20 - The Method of Characteristics
Lecture 21 - Application of The Method of Characteristics
Lecture 22 - Application of The Method of Characteristics
Lecture 23 - Flow over a Wavy wall
Lecture 24 - Subsonic Flow over a Wavy wall
Lecture 25 - Supersonic Flow over a Wavy wall
Lecture 26 - Supersonic Flow past a 3D Cone
Lecture 27 - Quasi 2D Flow - I
Lecture 28 - Quasi 2D Flow - II
Lecture 29 - Similarity Rules and Transformed Coordinate System

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Lecture 30 - Critical Mach Number and Thin Airfoil Theory
Lecture 31 - Example Problem using Thin Airfoil Theory
Lecture 32 - Example Problems - 1
Lecture 33 - Example Problems - 2
Lecture 34 - Example Problems - 3
Lecture 35 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 36 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 37 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 38 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 39 - Supersonic Flow past a 3D Cone at an angle of attack
Lecture 40 - Supersonic Flow past a 3D Bluff Body at an angle of attack

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NPTEL Video Course - Mechanical Engineering - Design and Optimization of Energy systems

Subject Co-ordinator - Prof. C. Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization
Lecture 2 - System Design and Analysis
Lecture 3 - Workable system
Lecture 4 - System simulation
Lecture 5 - Information flow diagrams
Lecture 6 - Successive substitution method
Lecture 7 - Successive substitution method (Continued.)
Lecture 8 - Successive substitution method and Newton-Raphson method
Lecture 9 - Newton-Raphson method (Continued.)
Lecture 10 - Convergence characteristics of Newton-Raphson method
Lecture 11 - Newton-Raphson method for multiple variables
Lecture 12 - Solution of system of linear equations
Lecture 13 - Introduction to Curve fitting
Lecture 14 - Example for Lagrange interpolation
Lecture 15 - Lagrange interpolation (Continued.)
Lecture 16 - Best fit
Lecture 17 - Least Square Regression
Lecture 18 - Least Square Regression (Continued.)
Lecture 19 - Least Square Regression (Continued.)
Lecture 20 - Non-linear Regression (Gauss - Newton Algorithm)
Lecture 21 - Optimization- Basic ideas
Lecture 22 - Properties of objective function and cardinal ideas in optimization
Lecture 23 - Unconstrained optimization
Lecture 24 - Constrained optimization problems
Lecture 25 - Mathematical proof of the Lagrange multiplier method
Lecture 26 - Test for Maxima / Minima
Lecture 27 - Handling in-equality constraints
Lecture 28 - Kuhn-Tucker conditions (Continued.)
Lecture 29 - Uni-modal function and search methods

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Lecture 30 - Dichotomous search
Lecture 31 - Fibonacci search method
Lecture 32 - Reduction ratio of Fibonacci search method
Lecture 33 - Introduction to multi-variable optimization
Lecture 34 - The Conjugate gradient method
Lecture 35 - The Conjugate gradient method (Continued.)
Lecture 36 - Linear programming
Lecture 37 - Dynamic programming
Lecture 38 - Genetic Algorithms
Lecture 39 - Genetic Algorithms (Continued.)
Lecture 40 - Simulated Annealing and Summary

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NPTEL Video Course - Mechanical Engineering - Engineering Fracture Mechanics

Subject Co-ordinator - Prof. K. Ramesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - EFM Course Outline
Lecture 2 - Spectacular Failures
Lecture 3 - Lessons from Spectacular Failures
Lecture 4 - LEFM and EPFM
Lecture 5 - Fracture Mechanics is Holistic
Lecture 6 - Fatigue Crack Growth Model
Lecture 7 - Crack Growth and Fracture Mechanisms
Lecture 8 - Elastic Strain Energy
Lecture 9 - Fracture Strength by Griffith
Lecture 10 - Energy Release Rate
Lecture 11 - Utility of Energy Release Rate
Lecture 12 - Pop-in Phenomenon
Lecture 13 - Displacement and Stress Formulations
Lecture 14 - Forms of Stress Functions
Lecture 15 - Airyâ s Stress Function for Mode-I
Lecture 16 - Westergaard Solution of Stress Field for Mode-I
Lecture 17 - Displacement Field for Mode-I
Lecture 18 - Relation between KI and GI
Lecture 19 - Stress Field in Mode-II
Lecture 20 - Generalised Westergaard Approach
Lecture 21 - Williamâ s Eigen Function Approach
Lecture 22 - Multi-parameter Stress Field Equations
Lecture 23 - Validation of Multi-parameter Field Equations
Lecture 24 - Discussion Session - I
Lecture 25 - Evaluation of SIF for Various Geometries
Lecture 26 - SIF for Embedded Cracks
Lecture 27 - SIF for Surface Cracks
Lecture 28 - Modeling of Plastic Deformation
Lecture 29 - Irwinâ s Model

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Lecture 30 - Dugdale Model
Lecture 31 - Fracture Toughness Testing
Lecture 32 - Plane Strain Fracture Toughness Testing
Lecture 33 - Plane Stress Fracture Toughness Testing
Lecture 34 - Paris Law and Sigmoidal Curve
Lecture 35 - Crack Closure
Lecture 36 - Crack Growth Models
Lecture 37 - J-Integral
Lecture 38 - HRR Field and CTOD
Lecture 39 - FAD and Mixed Mode Fracture
Lecture 40 - Crack Arrest and Repair Methodologies
Lecture 41 - Discussion Session - II

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NPTEL Video Course - Mechanical Engineering - Experimental Stress Analysis

Subject Co-ordinator - Prof. K. Ramesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Experimental Stress Analysis
Lecture 2 - Optical Methods Work as Optical Computers
Lecture 3 - Stress, Strain and Displacement Fields
Lecture 4 - Physical Principle of Strain Gauges, Photoelasticity and MoirÃ©
Lecture 5 - Introduction to MoirÃ©, Brittle Coatings and Holography
Lecture 6 - Hologram Interferometry, Speckle Methods
Lecture 7 - Introduction to Shearography, TSA, DIC and Caustics
Lecture 8 - Fringe Patterns â Richness of Qualitative Information
Lecture 9 - Multi-Scale Analysis in Experimental Mechanics
Lecture 10 - Selection of an Experimental Technique
Lecture 11 - Introduction to Transmission Photoelasticity
Lecture 12 - Ordinary and Extraordinary Rays
Lecture 13 - Light Ellipse, Passage of Light Through a Crystal Plate
Lecture 14 - Retardation Plates, Stress-optic Law
Lecture 15 - Plane Polariscope
Lecture 16 - Jones Calculus
Lecture 17 - Circular Polariscope
Lecture 18 - Determination of Photoelastic Parameters at an Arbitrary Point
Lecture 19 - Tardyâ s Method of Compensation
Lecture 20 - Calibration of Photo elastic Materials
Lecture 21 - Fringe Thinning Methodologies
Lecture 22 - Fringe Ordering in Photoelasticity
Lecture 23 - Miscellaneous Topics in Transmission Photoelasticity
Lecture 24 - Three Dimensional Photoelasticity
Lecture 25 - Overview of Digital Photoelasticity
Lecture 26 - Introduction to Photoelastic Coatings
Lecture 27 - Correction Factors for Photoelastic Coatings
Lecture 28 - Coating Materials, Selection of Coating Thickness, Industrial Application of Photoelastic Coatir
Lecture 29 - Calibration of Photoelastic Coatings, Introduction to Brittle Coatings

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Lecture 30 - Analysis of Brittle Coatings
Lecture 31 - Introduction to Strain Gauges
Lecture 32 - Strain Sensitivity of a Strain Gauge, Bridge Sensitivity, Rosettes
Lecture 33 - Strain Gauge Alloys, Carriers and Adhesives
Lecture 34 - Performance of Strain Gauge System
Lecture 35 - Temperature Compensation, Two-wire and Three-wire Circuits
Lecture 36 - Strain Gauge Selection
Lecture 37 - Bonding of a Strain Gauge
Lecture 38 - Soldering, Accounting for Transverse Sensitivity Effects
Lecture 39 - Correction Factors for Special Applications
Lecture 40 - Special Gauges
Lecture 41 - Questions and Answers

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NPTEL Video Course - Mechanical Engineering - Rocket Propulsion

Subject Co-ordinator - Prof. K. Ramamurthi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Motion in Space
Lecture 3 - Rotational Frame of Reference and Orbital Velocities
Lecture 4 - Velocity Requirements
Lecture 5 - Theory of Rocket Propulsion
Lecture 6 - Rocket Equation and Staging of Rockets
Lecture 7 - Review of Rocket Principles; Propulsion Efficiency
Lecture 8 - Examples Illustrating Theory of Rocket Propulsion and Introduction to Nozzles
Lecture 9 - Theory of Nozzles
Lecture 10 - Nozzle Shape
Lecture 11 - Area Ratio of Nozzles; Under-expansion and Over-expansion
Lecture 12 - Characteristic Velocity and Thrust Coefficient
Lecture 13 - Divergence Loss in Conical Nozzles and the Bell Nozzle
Lecture 14 - Unconventional Nozzles and Problems in Nozzles
Lecture 15 - Criterion for Choice of Chemical Propellants
Lecture 16 - Choice of Fuel-Rich Propellants
Lecture 17 - Performance Prediction Analysis
Lecture 18 - Dissociation of Products of Combustion
Lecture 19 - Shifting Equilibrium and Frozen Flow in Nozzles
Lecture 20 - Factors Influencing Choice of Chemical Propellants
Lecture 21 - Low Energy Liquid Propellants and Hybrid Propellants
Lecture 22 - Introduction to Solid Propellant Rockets
Lecture 23 - Burn Rate of Solid Propellants and Equilibrium Pressure in Solid Propellant Rockets
Lecture 24 - Design Aspects of Solid Propellant Rockets
Lecture 25 - Burning Surface Area of Solid Propellant Grains
Lecture 26 - Ignition of Solid Propellant Rockets
Lecture 27 - Review of Solid Propellant Rockets
Lecture 28 - Feed Systems for Liquid Propellant Rockets
Lecture 29 - Feed System Cycles for Pump Fed Liquid Propellant Rockets

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Lecture 30 - Analysis of Gas Generator and Staged Combustion Cycles and Introduction to Injectors
Lecture 31 - Injectors, Cooling of Chamber and Mixture Ratio Distribution
Lecture 32 - Efficiencies due to Mixture Ratio Distribution and Incomplete Vaporization
Lecture 33 - Pumps and Turbines; Propellant Feed System at Zero â gâ • Conditions
Lecture 34 - Review of Liquid Bi-propellant Rockets and Introduction to Mono-propellant Rockets
Lecture 35 - Introduction to Hybrid Rockets and a Simple Illustration of Combustion Instability in Liquid Pro
Lecture 36 - Combustion Instability in Solid Propellant and Liquid Propellant Rockets â Bulk and Wave Modes
Lecture 37 - Wave modes of Oscillation
Lecture 38 - Mechanisms Causing Instabilities and Strategies for Avoiding Combustion Instability
Lecture 39 - Electric and Magnetic Fields and the Electrostatic Thruster
Lecture 40 - Electrical Thrusters
Lecture 41 - Advances in Rocket Propulsion

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NPTEL Video Course - Mechanical Engineering - Advanced Finite Elements Analysis

Subject Co-ordinator - Dr. R. Krishnakumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Advanced Finite Elements Analysis
Lecture 2 - Advanced Finite Elements Analysis
Lecture 3 - Advanced Finite Elements Analysis
Lecture 4 - Advanced Finite Elements Analysis
Lecture 5 - Advanced Finite Elements Analysis
Lecture 6 - Advanced Finite Elements Analysis
Lecture 7 - Advanced Finite Elements Analysis
Lecture 8 - Advanced Finite Elements Analysis
Lecture 9 - Advanced Finite Elements Analysis
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Lecture 25 - Advanced Finite Elements Analysis
Lecture 26 - Advanced Finite Elements Analysis
Lecture 27 - Advanced Finite Elements Analysis
Lecture 28 - Advanced Finite Elements Analysis
Lecture 29 - Advanced Finite Elements Analysis

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Lecture 30 - Advanced Finite Elements Analysis

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NPTEL Video Course - Mechanical Engineering - Advanced Operations Research

Subject Co-ordinator - Prof. G. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Linear Programming
Lecture 2 - Revised Simplex Algorithm
Lecture 3 - Simplex Method for Bounded Variables
Lecture 4 - One Dimensional Cutting Stock Problem
Lecture 5 - One Dimensional Cutting Stock Problem (Continued.)
Lecture 6 - Dantzig-Wolfe Decomposition Algorithm
Lecture 7 - Dantzig-Wolfe Decomposition Algorithm Primal-Dual Algorithm
Lecture 8 - Primal-Dual Algorithm
Lecture 9 - Goal Programming-Formulations
Lecture 10 - Goal Programming Solutions Complexity of Simplex Algorithm
Lecture 11 - Complexity of Simplex Algorithm (Continued.) Integer Programming
Lecture 12 - Integer Programming-Formulations
Lecture 13 - Solving Zero-One Problems
Lecture 14 - Solving Zero-One Problems (Continued.)
Lecture 15 - Branch And Bond Algorithm For Integer Programming
Lecture 16 - Cutting Plane Algorithm
Lecture 17 - All Integer Primal Algorithm
Lecture 18 - All Integer Dual Algorithm
Lecture 19 - Network Models
Lecture 20 - Shortest Path Problem
Lecture 21 - Successive Shortest Path Problem
Lecture 22 - Maximum Flow Problem
Lecture 23 - Minimum Cost Flow Problem
Lecture 24 - Traveling Salesman Problem (TSP)
Lecture 25 - Branch and Bound Algorithms for TSP
Lecture 26 - Heuristics for TSP
Lecture 27 - Heuristics for TSP (Continued.)
Lecture 28 - Chinese Postman Problem
Lecture 29 - Vehicle Routeing Problem

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Lecture 30 - Queueing Models
Lecture 31 - Single Server Queueing Models
Lecture 32 - Multiple Server Queueing Models
Lecture 33 - Game Theory
Lecture 34 - Critical Path Method
Lecture 35 - Quadratic Programming
Lecture 36 - Integer Programming (Continued.)
Lecture 37 - All Integer Dual Algorithm
Lecture 38 - Mixed Integer Linear Programming
Lecture 39 - Benders Partitioning Algorithm

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NPTEL Video Course - Mechanical Engineering - Fundamentals of Operations Research

Subject Co-ordinator - Prof. G. Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Linear Programming Formulations
Lecture 2 - Linear Programming Formulations (Continued...)
Lecture 3 - Linear Programming Solutions- Graphical Methods
Lecture 4 - Linear Programming Solutions - Simplex Algorithm
Lecture 5 - Simplex Algorithm-Minimization Problems
Lecture 6 - Simplex Algorithm - Initialization and Iteration
Lecture 7 - Simplex Algorithm - Termination
Lecture 8 - Introduction to Duality
Lecture 9 - Primal Dual Relationships, Duality Theorems
Lecture 10 - Dual Variables and the Simplex Tables
Lecture 11 - Simplex Algorithm in Matrix Form Introduction to Sensitivity Analysis
Lecture 12 - Sensitivity Analysis Transportation Problem (Introduction)
Lecture 13 - Transportation Problem, Methods for Initial Basic Feasible Solutions
Lecture 14 - Transportation Problem-Optimal Solutions
Lecture 15 - Transportation Problem - Other Issues
Lecture 16 - Assignment Problem - Hungarian Algorithm
Lecture 17 - Assignment Problem - Other Issues Introduction to Dynamic Programming
Lecture 18 - Dynamic Programming - Examples Involving Discrete Variables
Lecture 19 - Dynamic Programming - Continuous Variables
Lecture 20 - Dynamic Programming - Examples to Solve Linear & Integer Programming Problems
Lecture 21 - Inventory Models - Deterministic Models
Lecture 22 - Inventory Models - Discount Models, Constrained Inventory Problems, Lagrangean Multipliers, Conc

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NPTEL Video Course - Mechanical Engineering - Introduction to Finite Element Method

Subject Co-ordinator - Dr. R. Krishnakumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Finite Element Method
Lecture 2 - Introduction to Finite Element Method
Lecture 3 - Introduction to Finite Element Method
Lecture 4 - Introduction to Finite Element Method
Lecture 5 - Introduction to Finite Element Method
Lecture 6 - Introduction to Finite Element Method
Lecture 7 - Introduction to Finite Element Method
Lecture 8 - Introduction to Finite Element Method
Lecture 9 - Introduction to Finite Element Method
Lecture 10 - Introduction to Finite Element Method
Lecture 11 - Introduction to Finite Element Method
Lecture 12 - Introduction to Finite Element Method
Lecture 13 - Introduction to Finite Element Method
Lecture 14 - Introduction to Finite Element Method
Lecture 15 - Introduction to Finite Element Method
Lecture 16 - Introduction to Finite Element Method
Lecture 17 - Introduction to Finite Element Method
Lecture 18 - Introduction to Finite Element Method
Lecture 19 - Introduction to Finite Element Method
Lecture 20 - Introduction to Finite Element Method
Lecture 21 - Introduction to Finite Element Method
Lecture 22 - Introduction to Finite Element Method
Lecture 23 - Introduction to Finite Element Method
Lecture 24 - Introduction to Finite Element Method
Lecture 25 - Introduction to Finite Element Method
Lecture 26 - Introduction to Finite Element Method
Lecture 27 - Introduction to Finite Element Method
Lecture 28 - Introduction to Finite Element Method
Lecture 29 - Introduction to Finite Element Method

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Lecture 30 - Introduction to Finite Element Method
Lecture 31 - Introduction to Finite Element Method
Lecture 32 - Introduction to Finite Element Method
Lecture 33 - Introduction to Finite Element Method

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NPTEL Video Course - Mechanical Engineering - Mechanical Measurements and Metrology

Subject Co-ordinator - Prof. Shunmugam M. S, Prof. S.P. Venkateshan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Study of Mechanical Measurement
Lecture 2 - Errors in Measurement
Lecture 3 - Errors in Measurement (Continued...)
Lecture 4 - Propagation of Errors
Lecture 5 - Regression Analysis
Lecture 6 - Regression Analysis (Continued...)
Lecture 7 - Design of Experiments
Lecture 8 - Design of Experiments (Continued...)
Lecture 9 - Temperature Measurement
Lecture 10 - Overview of Thermometry
Lecture 11 - Thermoelectric Thermometry
Lecture 12 - Thermoelectric Thermometry (Continued...)
Lecture 13 - Measurement of Temperature Under Various Conditions
Lecture 14 - Errors in Temperature Measurement
Lecture 15 - Measurement of Transient Temperature and Resistance Thermometry
Lecture 16 - Resistance Thermometry (Continued...)
Lecture 17 - Resistance Thermometry (Continued...) and pyrometry
Lecture 18 - pyrometry (Continued...)
Lecture 19 - pyrometry (Continued...)
Lecture 20 - Pressure Measurement (Continued...)
Lecture 21 - Pressure Measurement (Continued...)
Lecture 22 - Pressure Measurement (Continued...)
Lecture 23 - Pressure Measurement (Continued...)
Lecture 24 - Transient Response of Pressure Transducers
Lecture 25 - Transient Response of Pressure Transducers
Lecture 26 - Measurement of High Vacuum
Lecture 27 - Measurement of Fluid Velocity
Lecture 28 - Hot Wire Anemometry and Laser Doppler Velocimetry
Lecture 29 - Laser Doppler Velocimetry and Ultrasonic Methods

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Lecture 30 - Measurement of Heat Flux
Lecture 31 - Measurement of Heat Flux (Continued...)
Lecture 32 - Transient Method of Heat Flux Measurement
Lecture 33 - Measurement of Volume and Mass Flow Rate of Fluid
Lecture 34 - Flow Measuring Devices
Lecture 35 - Measurement of Stagnation and Bulk Mean Temperature
Lecture 36 - Measurement of Thermo-Physical Properties
Lecture 37 - Measurement of Thermal Conductivity
Lecture 38 - Measurement of Heat Capacity and Heating Value
Lecture 39 - Measurement of Viscosity
Lecture 40 - Measurement of Viscosity (Continued...)
Lecture 41 - Integrating Sphere and Measurement of Emissivity
Lecture 42 - Measurements of Gas Composition
Lecture 43 - Measurements of Gas Composition (Continued...)
Lecture 44 - Measurements of Gas Composition and Smoke
Lecture 45 - Measurement of Force
Lecture 46 - Force Measurement
Lecture 47 - Vibration and Acceleration Measurement
Lecture 48 - Laser Doppler Accelerometer,Speed,Torque
Lecture 49 - General Issues in Mechanical Measurement
Lecture 50 - Case Studies

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NPTEL Video Course - Mechanical Engineering - Principles of Mechanical Measurements

Subject Co-ordinator - Prof. R. Raman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles Of Mechanical Measurements
Lecture 2 - Principles Of Mechanical Measurements
Lecture 3 - Principles Of Mechanical Measurements
Lecture 4 - Principles Of Mechanical Measurements
Lecture 5 - Principles Of Mechanical Measurements
Lecture 6 - Principles Of Mechanical Measurements
Lecture 7 - Principles Of Mechanical Measurements
Lecture 8 - Principles Of Mechanical Measurements
Lecture 9 - Principles Of Mechanical Measurements
Lecture 10 - Principles of Mechanical Measurements
Lecture 11 - Principles Of Mechanical Measurements
Lecture 12 - Principles Of Mechanical Measurements
Lecture 13 - Principles Of Mechanical Measurements
Lecture 14 - Principles Of Mechanical Measurements
Lecture 15 - Principles Of Mechanical Measurements
Lecture 16 - Principles Of Mechanical Measurements
Lecture 17 - Principles Of Mechanical Measurements
Lecture 18 - Principles Of Mechanical Measurements
Lecture 19 - Principles Of Mechanical Measurements
Lecture 20 - Principles Of Mechanical Measurements
Lecture 21 - Principles Of Mechanical Measurements
Lecture 22 - Principles Of Mechanical Measurements
Lecture 23 - Principles Of Mechanical Measurements
Lecture 24 - Principles Of Mechanical Measurements
Lecture 25 - Principles Of Mechanical Measurements
Lecture 26 - Principles Of Mechanical Measurements

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NPTEL Video Course - Mechanical Engineering - Spray Theory and Applications

Subject Co-ordinator - Prof. Mahesh Panchagnula, Dr. Paul E. Sojka

Co-ordinating Institute - IIT - Madras | Purdue University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to sprays and their applications
Lecture 2 - Spatial versus Temporal Sampling
Lecture 3 - Spatial Vs Temporal Sampling example problem
Lecture 4 - Steady vs unsteady spray
Lecture 5 - Statistical measures on spray
Lecture 6 - Discussion on pdf and moments
Lecture 7 - Size velocity correlation
Lecture 8 - Discussion on Interfacial tension
Lecture 9 - Introduction to Atomizers and their design - 1
Lecture 10 - Introduction to Atomizers and their design - 2
Lecture 11 - Simple measurement techniques
Lecture 12 - Selection of atomizers
Lecture 13 - Spray measurement characteristics
Lecture 14 - Spray measurements techniques
Lecture 15 - Non-intrusive spray measurements techniques
Lecture 16 - Non-intrusive spray measurements techniques
Lecture 17 - Linear stability analysis â Introduction
Lecture 18 - Linear stability analysis- Kelvin-Helmhotz instability - 1
Lecture 19 - Linear stability analysis- Kelvin-Helmhotz instability - 2
Lecture 20 - Linear stability analysis- Kelvin-Helmhotz instability - 3
Lecture 21 - Linear stability analysis procedure
Lecture 22 - Linear stability analysis - Cylindrial jet instability - 1
Lecture 23 - Linear stability analysis - Cylindrial jet instability - 2
Lecture 24 - Linear stability analysis - Planar Liquid Sheet instability - 1
Lecture 25 - Linear stability analysis - Planar Liquid Sheet instability - 2
Lecture 26 - Design of pressure swirl atomizer - 1
Lecture 27 - Design of pressure swirl atomizer - 2
Lecture 28 - Design of pressure swirl atomizer - 3
Lecture 29 - Design of pressure swirl atomizer - 4

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Lecture 30 - Secondary atomization-Dimensionless parameters
Lecture 31 - Secondary atomization-Modes of breakup - 1
Lecture 32 - Secondary atomization-Modes of breakup - 2
Lecture 33 - Multiphase modelling
Lecture 34 - Multiphase modelling
Lecture 35 - Multiphase flow modelling basics
Lecture 36 - Multiphase modelling â Selection of model - 1
Lecture 37 - Multiphase modelling â Selection of model - 2
Lecture 38 - Multiphase modelling - Governing equations
Lecture 39 - Droplet evaporation
Lecture 40 - Droplet combustion
Lecture 41 - Spray combustion

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NPTEL Video Course - Mechanical Engineering - Conduction And Radiation

Subject Co-ordinator - Prof. C. Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of Thermal Radiation
Lecture 2 - Blackbody definition
Lecture 3 - Solid angle, spectral radiation intensity
Lecture 4 - Radiation pressure and radiation energy density
Lecture 5 - Relationship between â Iâ • and â Tâ • and Candidate blackbody distribution functions
Lecture 6 - Candidate blackbody distribution functions (Continued...)
Lecture 7 - Planck's blackbody radiation distribution function
Lecture 8 - Planck's distribution and Wien's displacement law
Lecture 9 - Universal blackbody function
Lecture 10 - Emissivity
Lecture 11 - Emissivity (Continued...)
Lecture 12 - Emissivity (Continued...)
Lecture 13 - Kirchoff law, Absorptivity
Lecture 14 - Kirchoff law, Absorptivity (Continued...)
Lecture 15 - Problems on emissivity, absorptivity
Lecture 16 - Reflectivity
Lecture 17 - Transmissivity
Lecture 18 - Problems on reflectivity and transmissivity
Lecture 19 - Radiation heat transfer between surfaces
Lecture 20 - View factor
Lecture 21 - View factor (Continued...)
Lecture 22 - View factor (Continued...)
Lecture 23 - Enclosure analysis
Lecture 24 - Enclosure analysis (Continued...)
Lecture 25 - Enclosure analysis - Gray surface
Lecture 26 - Enclosure analysis - Non gray surfaces
Lecture 27 - Radiation in participating media
Lecture 28 - Solution to the RTE
Lecture 29 - Concept of mean beam length

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Lecture 30 - Enclosure analysis in the presence of absorbing / emitting gas
Lecture 31 - Emissivities and absorptivities of Gas mixtures
Lecture 32 - Conduction - Introduction
Lecture 33 - Conduction - Energy equation
Lecture 34 - Conduction - 1D, steady state
Lecture 35 - Conduction - 1D, heat generation
Lecture 36 - Fin heat transfer - I
Lecture 37 - Fin heat transfer - II
Lecture 38 - Conduction - Cylindrical and Spherical geometries
Lecture 39 - Transient conduction
Lecture 40 - Transient conduction (Continued...)
Lecture 41 - Two dimensional steady state conduction
Lecture 42 - Analytical solution for Laplace equation
Lecture 43 - Numerical methods in conduction
Lecture 44 - Numerical methods in conduction (Continued...)
Lecture 45 - Conduction with change of phase
Lecture 46 - Conduction with change of phase (Continued...)

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NPTEL Video Course - Mechanical Engineering - Gas Dynamics and Propulsion

Subject Co-ordinator - Prof. V. Babu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction / Fundamental Ideas
Lecture 3 - Fundamental Ideas
Lecture 4 - Fundamental Ideas
Lecture 5 - Fundamental Ideas / Normal Shock Waves
Lecture 6 - Normal Shock Waves
Lecture 7 - Normal Shock Waves / Rayleigh Flow
Lecture 8 - Rayleigh Flow
Lecture 9 - Rayleigh Flow
Lecture 10 - Rayleigh Flow / Fanno Flow
Lecture 11 - Fanno Flow
Lecture 12 - Fanno Flow
Lecture 13 - Fanno Flow / Quasi One Dimensional Flows
Lecture 14 - Quasi One Dimensional Flows
Lecture 15 - Quasi One Dimensional Flows
Lecture 16 - Quasi One Dimensional Flows
Lecture 17 - Quasi One Dimensional Flows
Lecture 18 - Quasi One Dimensional Flows
Lecture 19 - Quasi One Dimensional Flows
Lecture 20 - Oblique Shock Waves
Lecture 21 - Oblique Shock Waves
Lecture 22 - Oblique Shock Waves
Lecture 23 - Oblique Shock Waves / Prandtl Meyer Waves
Lecture 24 - Prandtl Meyer Waves
Lecture 25 - Prandtl Meyer Waves
Lecture 26 - Propulsion - an Introduction
Lecture 27 - Components of the Gas Turbine Engine
Lecture 28 - Components of the Gas Turbine Engine
Lecture 29 - Components of the Gas Turbine Engine

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Lecture 30 - Components of the Gas Turbine Engine
Lecture 31 - Components of the Gas Turbine Engine / Thermodynamic Analysis of the Engine
Lecture 32 - Thermodynamic Analysis of the Engine
Lecture 33 - Thermodynamic Analysis of the Engine
Lecture 34 - Calculations for Thrust and Fuel Consumption
Lecture 35 - Calculations for Thrust and Fuel Consumption
Lecture 36 - Calculations for Thrust and Fuel Consumption / Emerging Trends
Lecture 37 - Emerging Trends / Ramjets
Lecture 38 - Ramjets
Lecture 39 - Ramjets / Scramjets
Lecture 40 - Scramjets

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NPTEL Video Course - Mechanical Engineering - Microfluidics

Subject Co-ordinator - Dr. Ashis Kumar Sen

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Scaling
Lecture 2 - Scaling
Lecture 3 - Micro-scale fluid mechanics
Lecture 4 - Micro-scale fluid mechanics (Continued...)
Lecture 5 - Micro-scale fluid mechanics (Continued...)
Lecture 6 - Micro-scale fluid mechanics (Continued...)
Lecture 7 - Micro-scale fluid mechanics (Continued...)
Lecture 8 - Micro-scale fluid mechanics (Continued...)
Lecture 9 - Micro-scale fluid mechanics (Continued...)
Lecture 10 - Micro-scale fluid mechanics (Continued...)
Lecture 11 - Capillary Flows
Lecture 12 - Capillary Flows (Continued...)
Lecture 13 - Capillary Flows and Electrokinetics
Lecture 14 - Electrokinetics
Lecture 15 - Electrokinetics (Continued...)
Lecture 16 - Electrokinetics (Continued...)
Lecture 17 - Electrokinetics (Continued...)
Lecture 18 - Electrokinetics (Continued...)
Lecture 19 - Electrokinetics (Continued...)
Lecture 20 - Electrokinetics and Magnetophoresis
Lecture 21 - Microfabrication Techniques
Lecture 22 - Microfabrication Techniques (Continued...)
Lecture 23 - Microfabrication Techniques (Continued...)
Lecture 24 - Microfabrication Techniques (Continued...)
Lecture 25 - Microfabrication Techniques (Continued...)
Lecture 26 - Microfabrication Techniques (Continued...)
Lecture 27 - Microfabrication Techniques (Continued...)
Lecture 28 - Microfabrication Techniques (Continued...)
Lecture 29 - Micropump

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Lecture 30 - Micropump (Continued...)
Lecture 31 - Microvalve
Lecture 32 - Microvalve (Continued...)
Lecture 33 - Microvalve (Continued...)
Lecture 34 - Micro Flow Sensor and Micro mixers
Lecture 35 - Micro mixers
Lecture 36 - Micro mixers (Continued...)
Lecture 37 - Micro droplets
Lecture 38 - Micro reactors (Continued...)
Lecture 39 - Micro needles and Microparticle separation
Lecture 40 - Few applications of microfluidics
Lecture 41 - Lab Demo

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NPTEL Video Course - Mechanical Engineering - Convective Heat Transfer

Subject Co-ordinator - Dr. Arvind Pattamatta, Prof. Ajit K. Kolar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to convective heat transfer - Part 1
Lecture 2 - Introduction to convective heat transfer - Part 2
Lecture 3 - Continuity Equation
Lecture 4 - Momentum and Energy Equations
Lecture 5 - Energy Equation
Lecture 6 - Reynolds Transport Theorem
Lecture 7 - Entrophy Generation and streamfunction-vorticity formulation
Lecture 8 - Couette flow - Part 1
Lecture 9 - Couette flow - Part 2
Lecture 10 - Couette flow - Part 3
Lecture 11 - Boundary layer approximation
Lecture 12 - Laminar External flow past flat plate (Blasius Similarity Solution)
Lecture 13 - Numerical solution to the Blasius equation and similarity solution to heat transfer
Lecture 14 - Pohlhausen similarity solution and flows including pressure gradient (Falkner-Skan)
Lecture 15 - Falkner skan solutions for heat transfer
Lecture 16 - Similarity solution for flow and heat transfer with transpiration at walls
Lecture 17 - Thermal boundary layer in high speed flows
Lecture 18 - Approximate(Integral) methods for laminar external flow and heat transfer
Lecture 19 - Integral method for laminar external thermal boundary layer over isothermal surface
Lecture 20 - Integral method for flows with pressure gradient (von Karman-Pohlhausen method)
Lecture 21 - Integral method with pressure gradient
Lecture 22 - Heat transfer across a circular cylinder
Lecture 23 - Duhamel's method for varying surface temperature
Lecture 24 - Laminar External heat transfer with non uniform surface temperature
Lecture 25 - Laminar internal forced convection - fundamentals
Lecture 26 - Hydrodynamically and thermally fully developed internal laminar flows
Lecture 27 - Fully developed laminar internal flow and heat transfer
Lecture 28 - Shooting method for fully developed heat transfer and thermal entry length problem
Lecture 29 - Thermal entry length problem with plug velocity profile

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Lecture 30 - Extended Graetz problem for parabolic velocity profile
Lecture 31 - Extended Graetz problem
Lecture 32 - Extended Graetz problem with wall flux boundary condition
Lecture 33 - Approximate method for laminar internal flows
Lecture 34 - Integral method for thermal entry length problem
Lecture 35 - Introduction to Natural Convection Heat Transfer
Lecture 36 - Similarity Solution in Natural Convection for Vertical isothermal Plate - Part 1
Lecture 37 - Similarity Solution in Natural Convection for Vertical isothermal Plate - Part 2
Lecture 38 - Similarity Solution in Natural Convection for Vertical isoflux Plate
Lecture 39 - Approximate Method in Natural Convection Heat Transfer
Lecture 40 - Natural Convection in Other Configurations
Lecture 41 - Turbulent Convective Heat Transfer
Lecture 42 - Turbulent Convective Heat Transfer
Lecture 43 - Analogies in Turbulent Convective Heat Transfer - Part 1
Lecture 44 - Analogies in Turbulent Convective Heat Transfer - Part 2

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NPTEL Video Course - Mechanical Engineering - Introduction to Explosions and Explosion Safety

Subject Co-ordinator - Prof. K. Ramamurthi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Loud Bang and Disruption
Lecture 2 - Blast Wave in an Explosion
Lecture 3 - Typical Examples of Explosions and Classification
Lecture 4 - Shock Hugoniot and Rayleigh Line
Lecture 5 - Properties behind a Constant Velocity Shock
Lecture 6 - Blast waves
Lecture 7 - Blast waves
Lecture 8 - Blast Waves
Lecture 9 - Blast Waves
Lecture 10 - Blast Waves
Lecture 11 - Blast Waves
Lecture 12 - Blast Waves
Lecture 13 - Energy Release in a Chemical Reaction
Lecture 14 - Energy Release
Lecture 15 - Energy Release
Lecture 16 - Rate of Energy Release
Lecture 17 - Thermal Theory of Explosion
Lecture 18 - Thermal Theory
Lecture 19 - Role of Chain Carriers in an Explosion
Lecture 20 - Combustion - I
Lecture 21 - Combustion - II
Lecture 22 - Case Histories of Explosions involving Volatile Liquids
Lecture 23 - Detonation
Lecture 24 - Structure of Detonations
Lecture 25 - Realizable States in a Detonation
Lecture 26 - One Dimensional Model of Detonation
Lecture 27 - Case Histories of Explosions involving Detonation or Quasi-Detonation
Lecture 28 - Explosions in Confined and Unconfined Geometries
Lecture 29 - Dust Explosions - I

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Lecture 30 - Dust Explosions - II
Lecture 31 - Physical Explosions
Lecture 32 - Rupture of Cryogenic Storage Vessels and Pressure Vessels
Lecture 33 - Condensed Phased Explosives Based on Hydrocarbons
Lecture 34 - Condensed Phase Explosives and their Properties
Lecture 35 - TNT Equivalence and Yield of an Explosion
Lecture 36 - Atmospheric Dispersion
Lecture 37 - Modeling Atmospheric Dispersion
Lecture 38 - Explosions Involving Atmospheric Dispersion
Lecture 39 - Quantification of Damages in an Explosion
Lecture 40 - Risk Analysis for an Explosion

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NPTEL Video Course - Mechanical Engineering - Metrology

Subject Co-ordinator - Dr. K. Sadashivappa

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Metrology
Lecture 2 - Metrology terminologies
Lecture 3 - Measurement errors
Lecture 4 - Linear measuring instruments Â 1 (Angle plate, steel rule, spring calipers)
Lecture 5 - Linear measuring instruments Â 2 (Combination set, Vernier calipers)
Lecture 6 - Linear measuring instruments Â 3 (Height gauge, Micrometers Â 1)
Lecture 7 - Linear measuring instruments Â 4 (Micrometers Â 2, Bore gauge)
Lecture 8 - Linear measuring instruments Â 5 (Dial indicators, thickness gauges, depth gauges)
Lecture 9 - Manufacturing tolerances and fits
Lecture 10 - Terminologies of limits fits and tolerances
Lecture 11 - Numerical problems on fit and tolerances
Lecture 12 - Selection of fits, Geometrical tolerances
Lecture 13 - Positional tolerances
Lecture 14 - Limit gauging - 1
Lecture 15 - Limit gauging - 2
Lecture 16 - Design of limit gauges
Lecture 17 - Measurement of straightness, flatness and squareness
Lecture 18 - Perpendicularity measurement
Lecture 19 - Basics of surface roughness
Lecture 20 - Surface finish parameters
Lecture 21 - Stylus type surface finish measuring instruments
Lecture 22 - Non-contact type surface finish measuring instruments
Lecture 23 - Screw thread production and terminology
Lecture 24 - Measurement of screw thread elements
Lecture 25 - Introduction to gears
Lecture 26 - Measurement of gear elements
Lecture 27 - Angle measurement - 1
Lecture 28 - Angle measurement - 2
Lecture 29 - Radius measurement, Contact angle measurement

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Lecture 30 - Basics of interferometry
Lecture 31 - Interferometers
Lecture 32 - Introduction to comparators, Mechanical comparators
Lecture 33 - Electrical and electronic comparators, Optical comparators
Lecture 34 - Pneumatic comparators
Lecture 35 - Geometrical tests on lathe
Lecture 36 - Geometrical tests on pillar type drilling machine
Lecture 37 - Universal measuring machine (UMM) and Coordinate measuring machine (CMM)
Lecture 38 - CMM probes and CMM software
Lecture 39 - Feature measurement using CMM, Laser vision
Lecture 40 - In-process gauging and control
Lecture 41 - Stage position metrology
Lecture 42 - Micro and Nano stages, Nano technology instrumentation
Lecture 43 - Optical system design
Lecture 44 - Complex opto- mechanical assemblies, Metrology testing and certification services

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Mechanics Statics and Dynamics

Subject Co-ordinator - Prof. Mahesh Panchagnula

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Newton's laws
Lecture 3 - Equilibrium
Lecture 4 - Example 1 - Statics
Lecture 5 - Example 2 - Rigid Body Systems
Lecture 6 - Example 3 - Rigid Body Systems
Lecture 7 - Structural Systems with rigid bodies
Lecture 8 - Types of 1-D Structural Elements
Lecture 9 - Axial members
Lecture 10 - Analysis of the truss system
Lecture 11 - Stability of Structural systems
Lecture 12 - Beams - Example 1
Lecture 13 - Beams - BMD and SFD
Lecture 14 - Beams - Loading, Shear and Bending Moment Relations
Lecture 15 - Static Friction
Lecture 16 - Friction - Solving Problems
Lecture 17 - Particle Kinematics - 1
Lecture 18 - Particle Kinematics - 2 (Example)
Lecture 19 - Particle Kinematics - Curvilinear Coordinates
Lecture 20 - Rigid Body Kinematics
Lecture 21 - Rotational Motion (Example 1)
Lecture 22 - Rotational Motion (Example 2)
Lecture 23 - Dynamics (Introduction)
Lecture 24 - Dynamics - Example 1
Lecture 25 - Dynamics - Example 2
Lecture 26 - Dynamics - Example 3
Lecture 27 - Dynamics - Example 4
Lecture 28 - Center of Percussion - Example
Lecture 29 - Impulse / Momentum - Example 1

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Lecture 30 - Impulse / Momentum - Example 2
Lecture 31 - Impulse / Momentum - Example 3
Lecture 32 - Impulse / Momentum - Example 4
Lecture 33 - Work Energy Methods - Example 1
Lecture 34 - Work Energy Methods - Example 2
Lecture 35 - Work Energy Methods - Example 3

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NPTEL Video Course - Mechanical Engineering - NOC:Foundation of Computational Fluid Dynamics

Subject Co-ordinator - Dr.S.Vengadesan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Week 1 - Module-1
Week 1 - Module-2
Week 1 - Module-3
Week 1 - Module-4
Week 1 - Module-5
Week 2 - Module-1
Week 2 - Module-2
Week 2 - Module-3
Week 2 - Module-4
Week 2 - Module-5
Week 3 - Module-1
Week 3 - Module-2
Week 3 - Module-3
Week 3 - Module-4
Week 3 - Module-5
Week 4 - Module-1
Week 4 - Module-2
Week 4 - Module-3
Week 4 - Module-4
Week 4 - Module-5
Week 5 - Module-1
Week 5 - Module-2
Week 5 - Module-3
Week 5 - Module-4
Week 5 - Module-5
Week 5 - Module-6
Week 6 - Module-1
Week 6 - Module-2 - Part 1
Week 6 - Module-2 - Part 2

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Week 6 - Module-3
Week 6 - Module-4
Week 6 - Module-5
Week 7 - Module-1
Week 7 - Module-2
Week 7 - Module-3
Week 7 - Module-4
Week 7 - Module-5
Week 8 - Module-1
Week 8 - Module-2
Week 8 - Module-3
Week 8 - Module-4
Week 8 - Module-5
Week 8 - Module-6
Conclusion

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Boundary Layers

Subject Co-ordinator - Dr. Rinku Mukherjee

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of fundamentals of fluid mechanics - I
Lecture 2 - Review of fundamentals of fluid mechanics - II
Lecture 3 - Concept of a Boundary Layer (BL) - I
Lecture 4 - Concept of a Boundary Layer (BL) - II
Lecture 5 - Concepts of BL thickness (?)
Lecture 6 - Concepts of BL displacement thickness (?*) and BL momentum thickness (?)
Lecture 7 - Control Volume approach to derive expressions for ?* over a flat plate
Lecture 8 - Control Volume approach to derive expressions for ? over a flat plate
Lecture 9 - Concept of wall friction
Lecture 10 - Concept of friction drag
Lecture 11 - Skin Friction Coefficient - I
Lecture 12 - Skin Friction Coefficient - II
Lecture 13 - Derivation of Prandtls Laminar BL Equations - I
Lecture 14 - Derivation of Prandtls Laminar BL Equations - II
Lecture 15 - Derivation of Prandtls Laminar BL Equations - III
Lecture 16 - Derivation of Prandtls Laminar BL Equations - IV
Lecture 17 - Similarity Solutions to the BL Equations Applied to a Flat Plate - I
Lecture 18 - Similarity Solutions to the BL Equations Applied to a Flat Plate - II
Lecture 19 - Similarity Solutions to the BL Equations Applied to a Flat Plate - III
Lecture 20 - Runge-Kutta Method to Numerically Solve the BL Equations Applied to a Flat Plate
Lecture 21 - Description of the Numerical Code to Solve the BL Equations Applied to a Flat Plate
Lecture 22 - Similarity Solutions to the BL Equations (other than flat plate) - I
Lecture 23 - Similarity Solutions to the BL Equations (other than flat plate) - II
Lecture 24 - Similarity Solutions to the BL Equations (other than flat plate) - III
Lecture 25 - Similarity Solutions to the BL Equations (other than flat plate) - IV
Lecture 26 - Description of the Numerical Code to Solve the BL Equations (other than flat plate)
Lecture 27 - The Energy Equation - I
Lecture 28 - The Energy Equation - II
Lecture 29 - Similarity Solutions to Thermal BL - I

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Lecture 30 - Similarity Solutions to Thermal BL - II
Lecture 31 - Similarity Solutions to Thermal BL - III
Lecture 32 - BL Separation with Pressure-Gradient - I
Lecture 33 - BL Separation with Pressure Gradient - II
Lecture 34 - Effect of Prandtl Number in Thermal BL - I
Lecture 35 - Effect of Prandtl Number in Thermal BL - II
Lecture 36 - Effect of Prandtl Number in Thermal BL - III
Lecture 37 - Effect of Dissipation in Thermal BL - I
Lecture 38 - Effect of Dissipation in Thermal BL - II
Lecture 39 - Effect of Dissipation in Thermal BL - III
Lecture 40 - Similarity Solutions to Thermal BL - An Overview

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Gas Dynamics

Subject Co-ordinator - Prof.A. Sameen

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basics of Thermodynamics
Lecture 3 - Tutorial 1
Lecture 4 - Control Volume Approach
Lecture 5 - Conservation Equations
Lecture 6 - Tutorial 2
Lecture 7 - Energy Equation
Lecture 8 - Concept of stagnation
Lecture 9 - Discussion on stagnation
Lecture 10 - Velocity of sound
Lecture 11 - Discussion on velocity of sound and mach number
Lecture 12 - Wave propagation
Lecture 13 - Mach wave
Lecture 14 - Mach number relations
Lecture 15 - Variable Area Adiabatic flow
Lecture 16 - Variable Area Adiabatic flow (Continued...)
Lecture 17 - * reference quantities and their relations
Lecture 18 - Importance of stagnation temperature in relation to v
Lecture 19 - Discussion on variable area adiabaic flow and * reference quantities
Lecture 20 - Gas tables
Lecture 21 - Converging nozzle
Lecture 22 - Condition of choked flow and associated properties
Lecture 23 - Area ratio and pressure ratio in converging nozzles
Lecture 24 - Discussion on converging nozzles
Lecture 25 - Converging - Diverging (C-D) nozzles
Lecture 26 - More on C-D nozzles
Lecture 27 - Discussion on C-D nozzles - 1
Lecture 28 - Discussion on C-D nozzles - 2
Lecture 29 - Examples and applications of flow through C-D nozzles

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Lecture 30 - Introduction to normal shocks
Lecture 31 - Normal shock relations - 1
Lecture 32 - Normal shock relations - 2
Lecture 33 - Rankine-Hugoniot equation
Lecture 34 - Discussion on Normal Shocks - 1
Lecture 35 - Discussion on Normal Shocks - 2
Lecture 36 - Normal shocks in C-D nozzles
Lecture 37 - Normal shocks in C-D nozzles (Continued...)
Lecture 38 - Moving Normal Shocks
Lecture 39 - Discussion on moving normal shocks
Lecture 40 - Oblique shocks
Lecture 41 - Oblique shock relations
Lecture 42 - Discussion on oblique shocks
Lecture 43 - Reflection of oblique shocks
Lecture 44 - Discussion on reflection of oblique shocks
Lecture 45 - Prandtl-Meyer flow
Lecture 46 - Prandtl-Meyer flow (Continued...)
Lecture 47 - Discussion on Prandtl-Meyer expansion
Lecture 48 - Shock Polar diagram and Prandtl-Meyer relation for Oblique shocks

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NPTEL Video Course - Mechanical Engineering - NOC:Experimental Stress Analysis:An Overview

Subject Co-ordinator - Prof. K. Ramesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Stress Analysis Â Analytical and Numerical Approaches
Lecture 2 - Introduction to Stress Analysis - Experimental Approaches
Lecture 3 - Optical Methods Work as Optical Computers
Lecture 4 - Basic information provided by various experimental methods
Lecture 5 - Visual Appreciation of Field Information - Part 1
Lecture 6 - Visual Appreciation of Field Information - Part 2
Lecture 7 - Visual Appreciation of Field Information - Part 3
Lecture 8 - Visual Appreciation of Field Information - Part 4
Lecture 9 - Visual Appreciation of Field Information - Part 5
Lecture 10 - Completeness of a Numerical Solution
Lecture 11 - Principle of Strain Gauges
Lecture 12 - Overview of Strain Gauge Measurements
Lecture 13 - Elegance of Photoelasticity
Lecture 14 - Introduction to Photoelasticity
Lecture 15 - Different Polariscopes
Lecture 16 - Principles of MoirÃ©
Lecture 17 - Introduction to MoirÃ©
Lecture 18 - Introduction to Brittle Coatings
Lecture 19 - Introduction to Holography
Lecture 20 - Introduction to Hologram Interferometry
Lecture 21 - Introduction to Double exposure hologram interferometry
Lecture 22 - Introduction to Speckle Methods
Lecture 23 - Introduction to Speckle Interferometry Techniques
Lecture 24 - Introduction to TSA and DIC
Lecture 25 - Introduction to Caustics
Lecture 26 - Introduction to Coherent Gradient Sensor
Lecture 27 - Naming of Experimental Methods
Lecture 28 - Fringe Patterns - Richness of Qualitative Information
Lecture 29 - Key technologies that have influenced Experimental Mechanics

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Lecture 30 - Multiscale analysis and trends in experimental mechanics
Lecture 31 - Selection of an experimental technique - Part 1
Lecture 32 - Selection of an experimental technique - Part 2

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NPTEL Video Course - Mechanical Engineering - NOC:Fluid Dynamics and Turbomachines

Subject Co-ordinator - Prof. Dhiman Chatterjee, Prof. Shamit Bakshi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fluid Flow
Lecture 2 - Flow field, Stresses on fluid element, Newtonian fluid
Lecture 3 - Non Newtonian fluid, Classification of flow, Analysis of flow
Lecture 4 - Tutorial
Lecture 5 - Lecture 1 - Integral analysis, Control volume, Generalised conservation equation
Lecture 6 - Lecture 2 - Mass and linear momentum conservation in CV
Lecture 7 - Lecture 3 - Angular momentum conservation, Non-inertial frame of reference
Lecture 8 - Lecture 4 - Tutorial
Lecture 9 - Lecture 1 - Differential Analysis
Lecture 10 - Lecture 2 - Navier-Stokes equation for 2D incompressible flow
Lecture 11 - Lecture 3 - Vorticity, Stream function, Bernoulli's equation
Lecture 12 - Lecture 4 - Tutorial
Lecture 13 - Lecture 1 - External flows, Laminar and Turbulent Boundary Layer
Lecture 14 - Lecture 2 - Differential analysis of boundary layer, Blassius equation
Lecture 15 - Lecture 3 - Boundary Layer flow with pressure gradient, Flow separation
Lecture 16 - Lecture 4 - Internal flow, Pipe friction
Lecture 17 - Lecture 1 - Basic Thermodynamics
Lecture 18 - Lecture 2 - Turbomachines
Lecture 19 - Lecture 3 - Dimensional Analysis
Lecture 20 - Lecture 4 - Tutorial
Lecture 21 - Lecture 1 - Representation of Turbomachines and Definition of velocity
Lecture 22 - Lecture 2 - Euler's energy equation
Lecture 23 - Lecture 3 - Real fluid flow and efficiency of turbomachine
Lecture 24 - Lecture 4 - Tutorial
Lecture 25 - Lecture 1 - Pumps
Lecture 26 - Lecture 2 - Pumping Systems
Lecture 27 - Lecture 3 - Hydraulic Turbines
Lecture 28 - Lecture 4 - Hydraulic Turbines
Lecture 29 - Lecture 5 - Cavitation in Hydroturbomachines

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Lecture 30 - Lecture 6 - Tutorial
Lecture 31 - Lecture 1 - Introduction to compressible flow
Lecture 32 - Lecture 2 - Steam and Gas Turbine
Lecture 33 - Lecture 3 - Steam and Gas Turbine
Lecture 34 - Lecture 4 - Tutorial

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NPTEL Video Course - Mechanical Engineering - NOC:Micro and Nano Scale Energy Transport

Subject Co-ordinator - Dr. Arvind Pattamatta

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview to Micro/Nanoscale energy transport - Part 1
Lecture 2 - Overview to Micro/Nanoscale energy transport - Part 2
Lecture 3 - Some applications of Micro/Nanoscale energy transport
Lecture 4 - Continuum heat transfer and its limitation
Lecture 5 - Energy carriers at Micro/Nanoscale and their attributes
Lecture 6 - Microscopic contributes to Internal energy of a systems
Lecture 7 - Fundamentals of Quantum mechanics - Part 1
Lecture 8 - Fundamentals of Quantum mechanics - Part 2
Lecture 9 - Fundamentals of Quantum mechanics - Part 3
Lecture 10 - Fundamentals of Quantum mechanics - Part 4
Lecture 11 - Fundamentals of Quantum mechanics - Part 5
Lecture 12 - Fundamentals of solid state physics - Part 1
Lecture 13 - Fundamentals of solid state physics - Part 2
Lecture 14 - Fundamentals of solid state physics - Part 3
Lecture 15 - Fundamentals of solid state physics - Part 4
Lecture 16 - Fundamentals of statistical thermodynamics - Part 1
Lecture 17 - Fundamentals of statistical thermodynamics - Part 2
Lecture 18 - Fundamentals of statistical thermodynamics - Part 3
Lecture 19 - Fundamentals of statistical thermodynamics - Part 4
Lecture 20 - Kinetic theory of energy carriers - Part 1
Lecture 21 - Kinetic theory of energy carriers - Part 2
Lecture 22 - Non-equilibrium energy transport at Nanoscales
Lecture 23 - Boltzmann Transport Equation under the relaxation time approximation
Lecture 24 - Derivation of Continuum laws from Boltzmann Transport Equation - Part 1
Lecture 25 - Derivation of Continuum laws from Boltzmann Transport Equation - Part 2
Lecture 26 - Derivation of Continuum laws from Boltzmann Transport Equation - Part 3
Lecture 27 - Nanoscale Energy transport in a Thin Film - Part 1
Lecture 28 - Nanoscale Energy transport in a Thin Film - Part 2
Lecture 29 - Nanoscale Energy transport in a Thin Film - Part 3

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Lecture 30 - Gas flow and Heat transport in Microchannels - Part 1
Lecture 31 - Gas flow and Heat transport in Microchannels - Part 2
Lecture 32 - Single phase liquid flow and Heat transport in Microchannels - Part 1
Lecture 33 - Single phase liquid flow and Heat transport in Microchannels - Part 2
Lecture 34 - Fundamentals of Electro kinetics in Microchannels Part1
Lecture 35 - Fundamentals of Electro kinetics in Microchannels Part2
Lecture 36 - Fundamentals of Electro kinetics in Microchannels Part3
Lecture 37 - Two phase Heat transfer in Microchannels - Part 1
Lecture 38 - Two phase Heat transfer in Microchannels - Part 2
Lecture 39 - Nano fluid Heat transfer - Part 1
Lecture 40 - Nano fluid Heat transfer - Part 2
Lecture 41 - Measurement techniques in Micro and Nanoscale Heat transfer - Part 1
Lecture 42 - Measurement techniques in Micro and Nanoscale Heat transfer - Part 2

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NPTEL Video Course - Mechanical Engineering - NOC:Electron Diffraction and Imaging

Subject Co-ordinator - Prof. Sundararaman M

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - 1D-2D-3D lattice
Lecture 2 - Stereographic projection - 1
Lecture 3 - Stereographic Projection - 2
Lecture 4 - Symmetry in 1-D crystals
Lecture 5 - Symmetry in 2-D crystals
Lecture 6 - Symmetry in 3-D crystals
Lecture 7 - Understanding IUCr tables
Lecture 8 - Symmetry in 3-D Crystals
Lecture 9 - Reciprocal lattice
Lecture 10 - Directions Planes and zone axes
Lecture 11 - Interplanar distances and angles
Lecture 12 - Diffraction - 1
Lecture 13 - Diffraction - 2
Lecture 14 - Diffraction - Structure and Shape Factor
Lecture 15 - Transformation of Indices
Lecture 16 - Microscope - 1
Lecture 17 - Microscope - 2
Lecture 18 - Kikuchi Diffraction
Lecture 19 - Double Diffraction and CBED
Lecture 20 - CBED and Precession Electron Diffraction
Lecture 21 - Indexing Diffraction Pattern
Lecture 22 - Correlation of Diffraction Spots to Microstructure
Lecture 23 - 3-Index to 4-Index System
Lecture 24 - Kinematical and Dynamical Theory of Diffraction and Imaging
Lecture 25 - Contrast from Planar Defects
Lecture 26 - Contrast from Strain Fields
Lecture 27 - Atomic Scattering Factor
Lecture 28 - Coherence
Lecture 29 - Lens Aberrations

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Lecture 30 - Phase Contrast Microscopy - 1
Lecture 31 - Phase Contrast Microscopy - 2
Lecture 32 - Phase Contrast Microscopy - 3
Lecture 33 - STEM
Lecture 34 - ELES and EDS
Lecture 35 - Recent trends
Lecture 36 - Energy dispersive Spectroscopy
Lecture 37 - Revision - 1
Lecture 38 - Revision - 2
Lecture 39 - Revision of Recent trends in Microscopy
Lecture 40 - Crystallography Revision

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NPTEL Video Course - Mechanical Engineering - NOC:Acoustic and Noise Control

Subject Co-ordinator - Prof. Abijith Sarkar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1 - Introduction - 1
Lecture 2 - Module 1 - Introduction - 2
Lecture 3 - Module 2 - Governing Equation - 1
Lecture 4 - Module 2 - Governing Equation - 2
Lecture 5 - Module 3 - Plane Wave - 1
Lecture 6 - Module 3 - Plane Wave - 2
Lecture 7 - Module 4 - Reflection Of Plane Waves - 1
Lecture 8 - Module 4 - Reflection Of Plane Waves - 2
Lecture 9 - Module 5 - Frequence Analysis - 1
Lecture 10 - Module 5 - Frequence Analysis - 2
Lecture 11 - Module 6 - Harmonic Plane Waves
Lecture 12 - Module 7 - Travelling And Standing Waves
Lecture 13 - Module 8 - Acoustic Mode Shapes, Reflection
Lecture 14 - Module 9 - Plane Waves
Lecture 15 - Module 10 - Flexural Waves, evanescent Waves
Lecture 16 - Module 11 - Near Field Acoustic Waves
Lecture 17 - Module 12 - cuton Waves in duct
Lecture 18 - Module 13 - Power Calculation
Lecture 19 - Module 14 - Decibel Scale
Lecture 20 - Module 15 - Db Arithmetic
Lecture 21 - Module 16 - Sound Power Level
Lecture 22 - Module 17 - Human factors in Acoustic Engineering
Lecture 23 - Module 18 - Microphone
Lecture 24 - Module 19 - Acoustic Measurements
Lecture 25 - Module 20 - Muffler Analysis
Lecture 26 - Module 21 - Transfer Matrix Method
Lecture 27 - Module 22 - Electro Mechanical Analogies - Part 1
Lecture 28 - Module 23 - Electro Mechanical Analogies Simple Example
Lecture 29 - Module 24 - Electro Mechanical Analogies Example

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Lecture 30 - Module 25 - Helmholtz Resonator
Lecture 31 - Module 26 - Source Impedance
Lecture 32 - Module 27 - Insertion Loss
Lecture 33 - Module 28 - Analysis Of Industrial Mufflers
Lecture 34 - Module 29 - Spherical Waves
Lecture 35 - Module 30 - Monopole and Dipole
Lecture 36 - Module 31 - Inhomogeneous Wave Equation
Lecture 37 - Module 32 - Green's Function
Lecture 38 - Module 33 - Kirchoff Helmholtz Integral Equation
Lecture 39 - Tutorial 1
Lecture 40 - Tutorial 2
Lecture 41 - Tutorial 3
Lecture 42 - Tutorial 4

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NPTEL Video Course - Mechanical Engineering - NOC:Steel Quality - Role of Secondary Refining and Continuous C

Subject Co-ordinator - Prof. Santanu Kr. Ray

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Steel Quality
Lecture 2 - Control of Residuals and Impact on Quality
Lecture 3 - Non-Metallic Inclusions
Lecture 4 - Evaluation of Residuals and Inclusions
Lecture 5 - Cleanliness Requirements for Different applications
Lecture 6 - Limitation of Primary Steelmaking and Importance of secondary Refining
Lecture 7 - Deoxidation
Lecture 8 - Prevention of Slag carryover
Lecture 9 - Desulphurisation
Lecture 10 - Degassing
Lecture 11 - Secondary Refining Processes
Lecture 12 - Injection of Calcium
Lecture 13 - Different Routes and Temperature Control
Lecture 14 - Decarburisation
Lecture 15 - Cleanliness Measures in Ladle and Tundish
Lecture 16 - Cleanliness Measures in Mould
Lecture 17 - Nature and Distribution of Entrapments in Casting
Lecture 18 - Genesis of Entrapment
Lecture 19 - Effect of Vertical vis-a-vis Curved Mould
Lecture 20 - Quality of Cast Product
Lecture 21 - Role of Concast Process, Caster Design and Steel Grade
Lecture 22 - Primary Cooling in Caster Mould
Lecture 23 - Heat Transfer in Mould
Lecture 24 - Role of Mould Oscillation
Lecture 25 - Cast Structure and Dendrite Size
Lecture 26 - Role of Chemistry - Part I
Lecture 27 - Role of Chemistry - Part II
Lecture 28 - Role of Segregation - Part I
Lecture 29 - Role of Segregation - Part II

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Lecture 30 - Deleterious Effect of Phosphorus
Lecture 31 - Strength of Solidifying Strand
Lecture 32 - Brittle Zone Near Solidus
Lecture 33 - Strength and Toughness of Solid Shell
Lecture 34 - Role of Chemistry on Solidification Behaviour
Lecture 35 - Sticking vis-a-vis Depression Behaviour
Lecture 36 - Role of Chemistry on Bulging or Depression Tendency - Part I
Lecture 37 - Role of Chemistry on Bulging or Depression Tendency - Part II
Lecture 38 - Effect of Cast Grain Size
Lecture 39 - Brittle Temperature Regions
Lecture 40 - Typical Cracks and Defects - Part I
Lecture 41 - Typical Cracks and Defects - Part II
Lecture 42 - Remedial Measures to Control Defects - Part I
Lecture 43 - Remedial Measures to Control Defects - Part II
Lecture 44 - Remedial Measures to Control Defects - Part III
Lecture 45 - Grade - Specific Casting Parameters - Part I
Lecture 46 - Grade - Specific Casting Parameters - Part II
Lecture 47 - Identification of Genesis of Quality Problems Through Metallographic Investigation - Part I
Lecture 48 - Identification of Genesis of Quality Problems Through Metallographic Investigation - Part II
Lecture 49 - Identification of Genesis of Quality Problems Through Metallographic Investigation - Part III

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NPTEL Video Course - Mechanical Engineering - NOC:X-ray Crystallography and Diffraction

Subject Co-ordinator - Prof. Ranjit Kumar Ray

Co-ordinating Institute - IIEST - Shibpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Geometry of Crystals
Lecture 2 - Geometry of Crystals (Continued...)
Lecture 3 - Tutorial-1
Lecture 4 - Reciprocal Lattice
Lecture 5 - Stereographic Projection
Lecture 6 - Tutorial-2
Lecture 7 - Point Groups and Space Groups
Lecture 8 - Point Groups and Space Groups (Continued...)
Lecture 9 - Tutorial-3
Lecture 10 - Point Groups and Space Groups (Continued...)
Lecture 11 - Basics of X-Rays
Lecture 12 - Production and Detection of X-Rays
Lecture 13 - Production and Detection of X-Rays (Continued...)
Lecture 14 - Principles of X-Ray Diffraction
Lecture 15 - X-Ray Diffraction Methods
Lecture 16 - Debye Sherrer Camera
Lecture 17 - Diffractometer Measurements
Lecture 18 - Tutorial-4
Lecture 19 - Intensity of Diffracted Beams
Lecture 20 - Intensity of Diffracted Beams (Continued...)
Lecture 21 - Determination of Crystal Structures
Lecture 22 - Precise Lattice Parameter Determination
Lecture 23 - XRD - Lab Demonstration
Lecture 24 - Discussion - Based on Forum Queries - 1
Lecture 25 - Phase Diagram Determination
Lecture 26 - Ordered Disordered Transformation
Lecture 27 - Ordered Disordered Transformation (Continued...)
Lecture 28 - Qualitative Phase Analysis
Lecture 29 - Quantitative Phase Analysis - 1

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Lecture 30 - Precise Lattice Parameter Determination - 1
Lecture 31 - Chemical Analysis by X-Ray Flourescence
Lecture 32 - Chemical Analysis by X-Ray Absorption
Lecture 33 - Effect of Crystallite Size on Diffracted X-Ray Intensity
Lecture 34 - Texture Determination by XRD
Lecture 35 - Particle Size Determination by XRD
Lecture 36 - Effect of Crystallite Size on Diffracted X-Ray Intensity
Lecture 37 - Determination of Single Crystal Orientation by X-Rays
Lecture 38 - Stress Analysis by X-Rays
Lecture 39 - Factors Contributing to Peak Broadening
Lecture 40 - Residual Stress Measurement by X-Rays

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NPTEL Video Course - Mechanical Engineering - NOC:Transport Phenomena in Materials

Subject Co-ordinator - Dr. G. Phanikumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Subscript Notation - Part 1
Lecture 2 - Subscript Notation - Part 2
Lecture 3 - Coordinate Rotation
Lecture 4 - Introduction to Tensors
Lecture 5 - Symmetry of Properties
Lecture 6 - Material Derivative
Lecture 7 - Planar Flows
Lecture 8 - Reynolds Transport Theorem
Lecture 9 - Derivation of Navier-Stokes equation
Lecture 10 - Navier Stokes equations - Part 2
Lecture 11 - Flow problem statements
Lecture 12 - Simple cases in fluid flow : rectangular coordinate system
Lecture 13 - Simple cases in fluid flow : cylindrical coordinate system
Lecture 14 - Pipe flow and porous medium
Lecture 15 - Simple cases in fluid flow : spherical coordinate system
Lecture 16 - Friction factors and correlations
Lecture 17 - Energy Transport
Lecture 18 - Conduction cases - Steady state
Lecture 19 - Conduction cases - Transient state
Lecture 20 - Convective heat transfer
Lecture 21 - Mass Transfer Overview
Lecture 22 - Chemical Equilibrium
Lecture 23 - Reaction Equilibrium
Lecture 24 - Species Balance Equation
Lecture 25 - Solute Transfer Modelling - Part 1
Lecture 26 - Solute Transfer Modelling - Part 2
Lecture 27 - Solute Segregation Profile - Part 1
Lecture 28 - Solute Segregation Profile - Part 2
Lecture 29 - Problem Statements

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Lecture 30 - Diffusion in Solid State
Lecture 31 - Transient Solute Diffusion in Solid State
Lecture 32 - Mass Transfer in Fluids
Lecture 33 - Similarity Across Transport Phenomena

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NPTEL Video Course - Mechanical Engineering - NOC:Experimental Stress Analysis - An Overview

Subject Co-ordinator - Prof. K. Ramesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Experimental Stress Analysis
Lecture 2 - Optical Methods Work as Optical Computers
Lecture 3 - Stress, Strain and Displacement Fields
Lecture 4 - Completeness of a numerical solution
Lecture 5 - Fringe Patterns - Richness of Qualitative Information
Lecture 6 - Multi-Scale Analysis in Experimental Mechanics
Lecture 7 - Selection of an Experimental Technique
Lecture 8 - Introduction to Transmission Photoelasticity
Lecture 9 - Ordinary and Extraordinary Rays
Lecture 10 - Light Ellipse, Passage of Light Through a Crystal Plate
Lecture 11 - Retardation Plates, Stress-optic Law
Lecture 12 - Plane Polariscope
Lecture 13 - Jones Calculus
Lecture 14 - Circular Polariscope
Lecture 15 - Determination of Photoelastic Parameters at an Arbitrary Point
Lecture 16 - Tardyâ s Method of Compensation
Lecture 17 - Calibration of Photoelastic Materials
Lecture 18 - Fringe Thinning Methodologies
Lecture 19 - Fringe Ordering in Photoelasticity
Lecture 20 - Miscellaneous Topics in Transmission Photoelasticity
Lecture 21 - Three Dimensional Photoelasticity
Lecture 22 - Overview of Digital Photoelasticity
Lecture 23 - Introduction to Photoelastic Coatings
Lecture 24 - Correction Factors for Photoelastic Coatings
Lecture 25 - Coating Materials, Selection of Coating Thickness, Industrial Application of Photoelastic Coatir
Lecture 26 - Calibration of Photoelastic Coatings, Introduction to Brittle Coatings
Lecture 27 - Analysis of Brittle Coatings
Lecture 28 - Introduction to Strain Gauges
Lecture 29 - Strain Sensitivity of a Strain Gauge, Bridge Sensitivity, Rosettes

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Lecture 30 - Strain Gauge Alloys, Carriers and Adhesives
Lecture 31 - Performance of Strain Gauge System
Lecture 32 - Temperature Compensation, Two-wire and Three-wire Circuits
Lecture 33 - Strain Gauge Selection
Lecture 34 - Bonding of a Strain Gauge
Lecture 35 - Soldering, Accounting for Transverse Sensitivity Effects
Lecture 36 - Correction Factors for Special Applications
Lecture 37 - Special Gauges

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanics of Human Movement

Subject Co-ordinator - Prof. Sujatha Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Terminologies
Lecture 2 - Skeletal System
Lecture 3 - Axial and Appendicular Skeleton
Lecture 4 - Bones in the Human Body
Lecture 5 - Types of Joints
Lecture 6 - Movements about Joints
Lecture 7 - Levers in the Human Body
Lecture 8 - Skeletal Muscles: Functions
Lecture 9 - Skeletal Muscles: Structure - Part I
Lecture 10 - Skeletal Muscles: Structure - Part II
Lecture 11 - Mechanics and Modeling of Muscles
Lecture 12 - Muscle Action - Part I
Lecture 13 - Muscle Action - Part II
Lecture 14 - Principles of Statics
Lecture 15 - Static Analysis of Elbow - Part I
Lecture 16 - Static Analysis of Elbow - Part II
Lecture 17 - Static Analysis of Shoulder - Part I
Lecture 18 - Static Analysis of Shoulder - Part II
Lecture 19 - Static Analysis of Spine - Part I
Lecture 20 - Static Analysis of Spine - Part II
Lecture 21 - Static Analysis of Spine - Part III
Lecture 22 - Static Analysis of Hip - Part I
Lecture 23 - Static Analysis of Hip - Part II
Lecture 24 - Static Analysis of the Knee
Lecture 25 - Static Analysis of the Knee and Ankle
Lecture 26 - Kinetics: Linear Motion - Part I
Lecture 27 - Kinetics: Linear Motion - Part II
Lecture 28 - Kinetics: Linear Motion - Part III
Lecture 29 - Kinetics: Angular Motion - Part I

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Lecture 30 - Kinetics: Angular Motion - Part II
Lecture 31 - Kinetics: Angular Motion - Part III
Lecture 32 - Kinetics: Angular Motion - Part IV
Lecture 33 - Kinetics of Arm Swinging during Walking
Lecture 34 - Inverse Dynamics Analysis
Lecture 35 - Biomechanics of Balance - Part I
Lecture 36 - Biomechanics of Balance - Part II
Lecture 37 - Biomechanics of Balance - Part III
Lecture 38 - Human Gait
Lecture 39 - Human Gait Terminologies
Lecture 40 - Characteristics of Normal Gait - Part I
Lecture 41 - Characteristics of Normal Gait - Part II
Lecture 42 - Characteristics of Normal Gait - Part III
Lecture 43 - Pathological Gait - Part I
Lecture 44 - Pathological Gait - Part II
Lecture 45 - Pathological Gait - Part III
Lecture 46 - Introduction to Assistive Devices for Mobility
Lecture 47 - Design Considerations: Prosthetic Foot
Lecture 48 - Design Considerations: Prosthesis and Orthosis
Lecture 49 - Design Considerations: Prosthetic Knee
Lecture 50 - Journey of Standing Wheelchair Development

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NPTEL Video Course - Mechanical Engineering - NOC:Design for Quality, Manufacturing and Assembly

Subject Co-ordinator - Prof. Palaniappaan Ramu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to DfX
Lecture 2 - Introduction to Quality
Lecture 3 - Introduction to Robustness
Lecture 4 - Introduction to Six Sigma Concept
Lecture 5 - Recap and clarifications of basic concepts
Lecture 6 - Review of Six Sigma and Quality Loss Function (QLF)
Lecture 7 - Types of QLF and SN Ratio
Lecture 8 - Linking Quality and Robustness
Lecture 9 - Design for Six Sigma - Stages, Design of Experiments
Lecture 10 - Introduction To Design Of Experiments
Lecture 11 - Need for DoE and basic DoE methods
Lecture 12 - Factorial Design
Lecture 13 - Orthogonal Array- L4 and L8 example
Lecture 14 - Setting up an Orthogonal Array
Lecture 15 - Confounding OA and Resolution Table
Lecture 16 - Confounding Logic and Randomization of Experiments
Lecture 17 - Paper Helicopter Case Study - Part I
Lecture 18 - Paper Helicopter Case Study - Part II
Lecture 19 - Introduction To Injection Molding Process, Materials, Terminologies Related To Plastic Parts and
Lecture 20 - Estimation of Mold Cost for Injection Molding (Dixon and Poli's Method)
Lecture 21 - Estimation of Mold Cost for Injection Molding (Dixon and Poli's Method) (Continued...)
Lecture 22 - Mold Cost Estimation - Tutorial
Lecture 23 - Design for Additive Manufacturing
Lecture 24 - Demo
Lecture 25 - Introduction to Sustainable Development and Sustainability Indicators - Part 1
Lecture 26 - Introduction to Sustainable Development and Sustainability Indicators - Part 2
Lecture 27 - Introduction to design process
Lecture 28 - Accounting for manufacturability and assembly in design - An overview
Lecture 29 - DfMA in product design

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Lecture 30 - General design guidelines for manual assembly
Lecture 31 - Systematic DFA methodology
Lecture 32 - Alpha symmetry, Beta symmetry
Lecture 33 - Quantification of part size and thickness
Lecture 34 - Systematic DFA Case study - controller assembly
Lecture 35 - DFA examples and discussion
Lecture 36 - Xerox Producibility Index (XPI)
Lecture 37 - High Speed and Robotic Assembly
Lecture 38 - Sheet Metal Working
Lecture 39 - Overview of DoE Workflow
Lecture 40 - DFA Software
Lecture 41 - DFM Software and Case Studies

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NPTEL Video Course - Mechanical Engineering - NOC:Surrogates and Approximations in Engineering Design

Subject Co-ordinator - Prof. Palaniappaan Ramu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview and Motivation of Course
Lecture 2 - Basic Optimization Problem Formulation
Lecture 3 - Problem Formulation Example
Lecture 4 - Calculus related to Optimization
Lecture 5 - The big picture - Overview
Lecture 6 - Introduction to DOE - 1
Lecture 7 - Introduction to DOE - 2
Lecture 8 - Types of DOE - 1
Lecture 9 - Types of DOE - 2 and some examples
Lecture 10 - Introduction to surrogate modeling
Lecture 11 - Types of surrogate - Polynomial models
Lecture 12 - Radial basis function - 1
Lecture 13 - Radial basis function - 2
Lecture 14 - Kriging - 1
Lecture 15 - Kriging - 2
Lecture 16 - Metamodels for Safe and Efficient Automotive Structures
Lecture 17 - Exploration and Exploitation in Surrogates
Lecture 18 - Errors Based Exploration
Lecture 19 - Ensemble of Surrogates

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NPTEL Video Course - Mechanical Engineering - NOC:Steel Quality: Role of Secondary Refining and Continuous Ca

Subject Co-ordinator - Prof. Santanu Kr. Ray

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concept of Steel Quality
Lecture 2 - Typical Examples of Surface Defects
Lecture 3 - Origin of Common Quality Problems
Lecture 4 - Present Scenario on Quality Demands
Lecture 5 - Control of Residuals and Impact on Quality
Lecture 6 - Non-Metallic Inclusions
Lecture 7 - Evaluation of Residuals and Inclusions
Lecture 8 - Cleanliness Requirements for Different applications
Lecture 9 - Limitation of Primary Steelmaking and Importance of secondary Refining
Lecture 10 - Deoxidation
Lecture 11 - Prevention of Slag carryover
Lecture 12 - Desulphurisation
Lecture 13 - Degassing
Lecture 14 - Secondary Refining Processes
Lecture 15 - Injection of Calcium
Lecture 16 - Decarburisation
Lecture 17 - Cleanliness Measures in Ladle and Tundish
Lecture 18 - Cleanliness Measures in Mould
Lecture 19 - Different Routes and Temperature Control
Lecture 20 - Nature and Distribution of Entrapments in Casting
Lecture 21 - Sources of Exogenous Entrapments
Lecture 22 - Effect of Vertical vis-a-vis Curved Mould
Lecture 23 - Quality of Cast Product
Lecture 24 - Role of Concast Process, Caster Design and Steel Grade
Lecture 25 - Primary Cooling in Caster Mould
Lecture 26 - Heat Transfer in Mould
Lecture 27 - Cast Structure and Dendrite Size
Lecture 28 - Role of Mould Oscillation
Lecture 29 - Role of Chemistry - Part I

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Lecture 30 - Role of Chemistry - Part II
Lecture 31 - Role of Segregation - Part I
Lecture 32 - Role of Segregation - Part II
Lecture 33 - Deleterious Effect of Phosphorus
Lecture 34 - Strength of Solidifying Strand
Lecture 35 - Brittle Zone Near Solidus
Lecture 36 - Strength and Toughness of Solid Shell
Lecture 37 - Role of Chemistry on Solidification Behaviour
Lecture 38 - Sticking vis-a-vis Depression Behaviour
Lecture 39 - Role of Chemistry on Bulging or Depression Tendency - Part I
Lecture 40 - Role of Chemistry on Bulging or Depression Tendency - Part II
Lecture 41 - Effect of Cast Grain Size
Lecture 42 - Brittle Temperature Regions
Lecture 43 - Role of Secondary Cooling - Part 1
Lecture 44 - Role of Secondary Cooling - Part 2
Lecture 45 - Typical Cracks and Defects - Part I
Lecture 46 - Typical Cracks and Defects - Part II
Lecture 47 - Remedial Measures to Control Defects - Part I
Lecture 48 - Remedial Measures to Control Defects - Part II
Lecture 49 - Remedial Measures to Control Defects - Part III
Lecture 50 - Grade - Specific Casting Parameters - Part I
Lecture 51 - Grade - Specific Casting Parameters - Part II
Lecture 52 - Identification of Genesis of Quality Problems Through Metallographic Investigation - Part I
Lecture 53 - Identification of Genesis of Quality Problems Through Metallographic Investigation - Part II
Lecture 54 - Identification of Genesis of Quality Problems Through Metallographic Investigation - Part III
Lecture 55 - Some Examples of Quality Problems

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NPTEL Video Course - Mechanical Engineering - Theory of Mechanism

Subject Co-ordinator - Prof. Sujatha Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Kinematics Fundamentals-I
Lecture 2 - Links, Pairs, Kinematic Chains; Planar Mobility Criterion
Lecture 3 - Mobility of Mechanisms, Grubler's Criterion and Applications
Lecture 4 - Inversions, Grashof Criterion, Kinematic equivalence
Lecture 5 - Linkage Synthesis Classification, 2-position Motion Generation
Lecture 6 - Driver dyad, Quick-return synthesis - I
Lecture 7 - Quick-return synthesis - II, 3-position Motion Generation
Lecture 8 - Specified fixed pivots, Path generation
Lecture 9 - Function generation
Lecture 10 - Function generation using relative poles
Lecture 11 - Structural Error, and Chebyshev Spacing
Lecture 12 - Chebyshev Spacing
Lecture 13 - Analytical Linkage Synthesis-I
Lecture 14 - Analytical Linkage Synthesis-II
Lecture 15 - Four-bar Position Analysis, Dyad or Standard Form Synthesis
Lecture 16 - Dyad Form Synthesis
Lecture 17 - Dyad Form Synthesis
Lecture 18 - Dyad Form Synthesis
Lecture 19 - Dyad Form Synthesis
Lecture 20 - Coupler Curves - I
Lecture 21 - Coupler Curves - II, Fixed and Moving Centrodes
Lecture 22 - Coupler Curves - III, Symmetrical Coupler Curves
Lecture 23 - Roberts-Chebyshev Theorem
Lecture 24 - Cognates
Lecture 25 - Velocity Analysis
Lecture 26 - Velocity Analysis
Lecture 27 - Velocity Analysis
Lecture 28 - Auxiliary Point Method
Lecture 29 - Velocity and Acceleration Analysis

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Lecture 30 - Acceleration Analysis
Lecture 31 - Acceleration Analysis
Lecture 32 - Force Analysis of Mechanisms, Mechanical Advantage
Lecture 33 - Force Analysis of Mechanisms - II
Lecture 34 - Balancing of Mechanisms using Counterweights
Lecture 35 - Balancing of Mechanisms using Springs
Lecture 36 - Spatial Mechanisms
Lecture 37 - Introduction to the Kinematics of Spatial Mechanisms

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Mechanics

Subject Co-ordinator - Prof. K. Ramesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Mechanics - I
Lecture 2 - Introduction to Engineering Mechanics - II
Lecture 3 - Force Systems - I
Lecture 4 - Force Systems - II
Lecture 5 - Equilibrium of Rigid bodies - I
Lecture 6 - Equilibrium of Rigid bodies - II
Lecture 7 - Trusses - I
Lecture 8 - Trusses - II
Lecture 9 - Trusses - III
Lecture 10 - Beams - I
Lecture 11 - Beams - II
Lecture 12 - Beams - III
Lecture 13 - Beams - IV
Lecture 14 - Virtual Work - I
Lecture 15 - Virtual Work - II
Lecture 16 - Energy Relations
Lecture 17 - Review Before Quiz - I
Lecture 18 - Friction - I
Lecture 19 - Friction - II
Lecture 20 - Friction - III
Lecture 21 - Particle Dynamics
Lecture 22 - Circular Motion
Lecture 23 - Absolute Motion
Lecture 24 - Relative Motion - I
Lecture 25 - Relative Motion - II
Lecture 26 - Relative Motion - III and Instantaneous Center
Lecture 27 - Rotating frame of reference I - Velocity
Lecture 28 - Rotating frame of reference II - Acceleration
Lecture 29 - Rotating frame of reference III - Choice of rotating frame of reference

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Lecture 30 - RFR- IV Crank and slotted bar
Lecture 31 - RFR-V Understanding Coriolis Acceleration
Lecture 32 - Kinetics - I
Lecture 33 - Kinetics - II
Lecture 34 - Kinetics - III
Lecture 35 - 3D Kinematics - I
Lecture 36 - 3D Kinematics - II
Lecture 37 - 3D Kinematics - III

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NPTEL Video Course - Mechanical Engineering - NOC:Foundations of Computational Materials Modelling

Subject Co-ordinator - Dr.Narasimhan Swaminathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Some applications of MD simulations
Lecture 3 - Introduction to Bravais lattices and constructing simple crystals with MATLAB
Lecture 4 - Introduction to symmetry - 1
Lecture 5 - Symmetry Elements - 1
Lecture 6 - Symmetry elements - 2
Lecture 7 - Plane groups and their Hermann-Maugin (HM) symbols
Lecture 8 - Glide reflection; Examples of writing point group symbols; Wyckoff positions
Lecture 9 - Generating 2D crystal with MATLAB using Bilbao crystallography website
Lecture 10 - Symmetry of space groups
Lecture 11 - Hernann maugin symbols of space groups
Lecture 12 - Translational symmetry operators
Lecture 13 - The Space groups
Lecture 14 - Generation of crystals
Lecture 15 - Generation of monoclinic lattice
Lecture 16 - Introduction to Statistical Mechanica - 1
Lecture 17 - Introduction to Statistical Mechanica - 2
Lecture 18 - Introduction to Statistical Mechanics - 3
Lecture 19 - Statistical mechanics - 1
Lecture 20 - Statistical mechanics - 2
Lecture 21 - Basic introduction to mechanics
Lecture 22 - Introduction to phase space
Lecture 23 - Introduction to phase average and time average
Lecture 24 - Canonical ensemble; Partition function
Lecture 25 - Basic introduction to MD
Lecture 26 - Input script for LAMMPS - 1
Lecture 27 - Input script for LAMMPS - 2
Lecture 28 - Input script for LAMMPS - 3
Lecture 29 - Input script for LAMMPS - 4

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Lecture 30 - LAMMPS exercises - 1
Lecture 31 - LAMMPS exercises - 2
Lecture 32 - LAMMPS exercises - 3
Lecture 33 - LAMMPS exercises - 4
Lecture 34 - LAMMPS exercises - 5

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Combustion for Propulsion

Subject Co-ordinator - Prof. S Varunkumar, Prof. H S Mukunda

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Combustion processes in ICE and Gas turbine engines
Lecture 3 - Combustion in solid and liquid rocket motors
Lecture 4 - Equilibrium
Lecture 5 - Chemical kinetics, Equilibrium vs rate controlled
Lecture 6 - Demonstration of NASA-CEA
Lecture 7 - Premixed and diffusion flames
Lecture 8 - Premixed and diffusion flames
Lecture 9 - Quenching, flammability and other limit phenomena
Lecture 10 - Conservation equations
Lecture 11 - Integral Analysis of flame
Lecture 12 - Solid propellant combustion
Lecture 13 - Erosive burning
Lecture 14 - Instability in solid rockets
Lecture 15 - Analysis of p-t traces - Part II
Lecture 16 - Statistical representation of composite propellants in HeQu1D - geometry and thermochemistry
Lecture 17 - HeQu1D model - Parameter estimation
Lecture 18 - Effects of Al - extended HeQu1D model
Lecture 19 - Instability in solid rockets - II
Lecture 20 - Tutorial
Lecture 21 - Liquid propellant rockets - Part I
Lecture 22 - Liquid propellant rockets - Part II
Lecture 23 - Combustion in liquid rockets
Lecture 24 - Instabilities in liquid rockets and gas turbine after burners
Lecture 25 - CFD modeling aspects - Fundamentals
Lecture 26 - CFD modeling aspects - Modeling appraches
Lecture 27 - Effect of turbulence on flames
Lecture 28 - Scramjets - Part I
Lecture 29 - Scramjets - Part II

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Lecture 30 - Summary - Premixed flames
Lecture 31 - Summary - Non-premixed flames
Lecture 32 - Summary - Solid rocket propulsion
Lecture 33 - Additional Insights

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NPTEL Video Course - Mechanical Engineering - NOC:Basics of Materials Engineering

Subject Co-ordinator - Prof. Ratna Kumar Annabattula

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Material Property Landscape
Lecture 3 - Crystal Structure-1 (Platonic Solids)
Lecture 4 - Crystal Structure-2 (Unit Cell, Lattice, Crystal)
Lecture 5 - Crystal Structure-3 (Bravais lattice, Symmetry in Crystals)
Lecture 6 - Crystal Structure-4 (Miller Indices for Crystallographic Points and Directions)
Lecture 7 - Crystal Structure-5 (Miller-Brvais Indices, Linear and Planar Density)
Lecture 8 - Crystal Structure-6 (Planar desnity, Close-Packed Structures, Stacking Faults)
Lecture 9 - Crystal Structure-7 (Single Crystal and Polycrystalline Materials)
Lecture 10 - Crystal Structure-8 (X-Ray Diffraction and Determination of Structure)
Lecture 11 - Defects in Crystalline Materials-1 (Types of Crystalline Defects)
Lecture 12 - Defects in Crystalline Materials-1 (Point Defects)
Lecture 13 - Defects in Crystalline Materials-1 (Equilibrium Concentration of Vacancies)
Lecture 14 - Defects in Crystalline Materials-1 (Theoretical Shear Strength)
Lecture 15 - Defects in Crystalline Materials-2 (Effect of Point Defects)
Lecture 16 - Defects in Crystalline Materials-2 (Point Defects and Solid Solutions)
Lecture 17 - Defects in Crystalline Materials-3 (Line Defects, Types of Dislocations and their Characteristic
Lecture 18 - Defects in Crystalline Materials-4 (Slip Systems, Burger's Vector and Dislocation Motion)
Lecture 19 - Defects in Crystalline Materials-4 (Slip in Single Crystals and Resolved Shear Stress)
Lecture 20 - Defects in Crystalline Materials-5 (Different Stages of Slip in Single Crystla Materials)
Lecture 21 - Defects in Crystalline Materials-5 (Geometry and Slip, Stress Field Around a Dislocation and Def
Lecture 22 - Defects in Crystalline Materials-6 (Twinning, Interfacial Defects and Volume Defects)
Lecture 23 - Defects in Crystalline Materials-6 (Strengthening Mechanisms)
Lecture 24 - Defects in Crystalline Materials-7 (Plastic deformation in polycrystalline materials, Softening
Lecture 25 - Mechanical Properties of Materials (Concept of Stress Tensor)
Lecture 26 - Mechanical Properties (Tension Test-Elastic Deformation)
Lecture 27 - Mechanical Properties (Tension Test - Plastic Deformation)
Lecture 28 - Mechanical Properties (Tension Test - Plastic Deformation)
Lecture 29 - Mechanical Properties (Hardness Test)

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Lecture 30 - Static Failure Theories (Introduction, Definition of Failure)
Lecture 31 - Static Failure Theories (General form of failure theory, Stress tensor, Principal stress)
Lecture 32 - Static Failure Theories (Distortion Energy Theory)
Lecture 33 - Static Failure Theories (Maximum Shear Stress Theory)
Lecture 34 - Static Failure Theories (Design Problems)
Lecture 35 - Static Failure Theories (Failure of Brittle Materials)
Lecture 36 - Static Failure Theories (Coulomb-Mohr and Modified Coulomb-Mohr)
Lecture 37 - Static Failure Theories (Notches and Stress Concentration)
Lecture 38 - Introduction to Fracture Mechanics, Griffith's Analysis of a Cracked Body
Lecture 39 - Fracture Mechanics (Energy Release Rate)
Lecture 40 - Fracture Mechanics (Crack Resistance, Stress Intensity Factor, Fracture Toughness)
Lecture 41 - Fatigue Failure of Materials (Introduction, Historical Events, S-N Diagram)
Lecture 42 - Fatigue Failure of Materials (S-N Diagram, Types of Time Varying Loads)
Lecture 43 - Fatigue Failure of Materials (High Cycle Fatigue, Low Cycle Fatigue, Stress Ratio, Amplitude Rat
Lecture 44 - Fatigue Failure of Materials (Rotating Beam Bending Test, Estimated S-N diagram)
Lecture 45 - Fatigue Failure Theories (Fatigue strength correction factors)
Lecture 46 - Problems on Fatigue Failure-1 (S-N diagram and Corrected endurance strength)
Lecture 47 - Fatigue Failure of Materials (Features of Fatigue Failure; Factor of Safety in Life and Stress)
Lecture 48 - Fatigue Failure of Materials (Effect of Mean Stress)
Lecture 49 - Fatigue Failure of Materials (Multiaxial Fatigue and Variable Amplitude Loading)
Lecture 50 - Fatigue Failure of Materials (Fatigue Stress Concentration Factor)
Lecture 51 - Fatigue Failure of Materials (Fatigue Crack Growth, Paris' law)
Lecture 52 - Problems on Fatigue Failure-2 (Effect of mean stress, Fatigue crack growth)
Lecture 53 - Problems on Fatigue Failure-3 (Effect of Notch, Multiaxial Loading)
Lecture 54 - Phase Diagrams (Introduction)
Lecture 55 - Phase Diagrams (Language of Phase Diagrams, Types of Binary Phase Alloys)
Lecture 56 - Phase Diagrams (Tie line, Lever Rule, Indentifcation of compositions and weight fractions in two
Lecture 57 - Phase Diagrams (Type 1
Lecture 58 - Phase Diagrams (Conguent Melting Alloys, Type II Alloys, Eutectic Reaction)
Lecture 59 - Phase Diagrams (Type III Alloys with Partial Solubility in Solid State)
Lecture 60 - Phase Diagrams (Conguent melting alloys, Peritectic Reaction, Monotectic Reaction)
Lecture 61 - Phase Diagrams (Allotropy, Eutectoid and Peritectoid Reactions)
Lecture 62 - Phase Diagrams (Iron-Iron Carbide Phase Diagram)
Lecture 63 - Kinetics of Phase Transformations (Homogeneous Nucleation)
Lecture 64 - Kinetics of Phase Transformations (Heterogeneous Nucleation)
Lecture 65 - Isothermal Transformation Diagram
Lecture 66 - Martensite Transformation, C-C-T Diagram
Lecture 67 - Heat Treatment of Steels (Annealing and Normalizing)

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NPTEL Video Course - Mechanical Engineering - NOC:Computational Fluid Dynamics using Finite Volume Method

Subject Co-ordinator - Prof. Kameswararao Anupindi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of governing equations
Lecture 2 - Review of governing equations
Lecture 3 - Review of governing equations
Lecture 4 - Review of governing equations
Lecture 5 - Review of governing equations
Lecture 6 - Review of governing equations
Lecture 7 - Overview of Numerical Methods
Lecture 8 - Overview of Numerical Methods
Lecture 9 - Overview of Numerical Methods
Lecture 10 - Finite Volume Method for Diffusion Equation
Lecture 11 - Finite Volume Method for Diffusion Equation
Lecture 12 - Finite Volume Method for Diffusion Equation
Lecture 13 - Finite Volume Method for Diffusion Equation
Lecture 14 - Finite Volume Method for Diffusion Equation
Lecture 15 - Finite Volume Method for Diffusion Equation
Lecture 16 - Finite Volume Method for Diffusion Equation
Lecture 17 - Finite Volume Method for Diffusion Equation
Lecture 18 - Finite Volume Method for Diffusion Equation
Lecture 19 - Finite Volume Method for Diffusion Equation
Lecture 20 - Finite Volume Method for Diffusion Equation
Lecture 21 - Finite Volume Method for Diffusion Equation
Lecture 22 - Finite Volume Method for Diffusion Equation
Lecture 23 - Finite Volume Method for Diffusion Equation
Lecture 24 - Finite Volume Method for Diffusion Equation
Lecture 25 - Finite Volume Method for Diffusion Equation
Lecture 26 - Finite Volume Method for Diffusion Equation
Lecture 27 - Finite Volume Method for Diffusion Equation
Lecture 28 - Finite Volume Method for Diffusion Equation
Lecture 29 - Finite Volume Method for Convection and Diffusion

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Lecture 30 - Finite Volume Method for Convection and Diffusion
Lecture 31 - Finite Volume Method for Convection and Diffusion
Lecture 32 - Finite Volume Method for Convection and Diffusion
Lecture 33 - Finite Volume Method for Convection and Diffusion
Lecture 34 - Finite Volume Method for Convection-diffusion and fluid flow calculations
Lecture 35 - Finite Volume Method for Fluid Flow Calculations
Lecture 36 - Finite Volume Method for Fluid Flow Calculations
Lecture 37 - Finite Volume Method for Fluid Flow Calculations
Lecture 38 - Finite Volume Method for Fluid Flow Calculations
Lecture 39 - Finite Volume Method for Fluid Flow Calculations
Lecture 40 - Finite Volume Method for Fluid Flow Calculations
Lecture 41 - Finite Volume Method for Fluid Flow Calculations
Lecture 42 - Finite Volume Method for Fluid Flow Calculations

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NPTEL Video Course - Mechanical Engineering - NOC:Wheeled Mobile Robots

Subject Co-ordinator - Prof. Asokan Thondiyath, Prof. Santhakumar Mohan

Co-ordinating Institute - IIT - Madras, IIT - Palakkad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mobile Robots and Manipulators
Lecture 2 - Introduction to Locomotion and Types of Locomotion
Lecture 3 - Introduction to Mobile Robot Kinematics
Lecture 4 - Degree of Maneuverability and Types of Wheels
Lecture 5 - Kinematic Simulation of a Mobile Robot (Land-based)
Lecture 6 - Kinematic Simulation and Motion Animation of a Mobile Robot (Land-based)
Lecture 7 - A Generalized Wheel (Kinematic) Model
Lecture 8 - Examples related to the Generalized Wheel (Kinematic) Model
Lecture 9 - Holonomic and Non-holonomic Mobile Robots
Lecture 10 - Kinematic Simulation of Wheeled Mobile Robots - Part 1
Lecture 11 - Kinematic Simulation of Wheeled Mobile Robots - Part 2
Lecture 12 - Kinematic Simulation of Wheeled Mobile Robots - Part 3
Lecture 13 - Mobile Robot Dynamics - Part 1
Lecture 14 - Mobile Robot Dynamics - Part 2
Lecture 15 - Equation of Motion and Dynamic Simulation of a Mobile Robot
Lecture 16 - Dynamic Models of Wheeled Mobile Robots with Wheel Configurations
Lecture 17 - Kinematic and Dynamic Models of a Mobile base with Four-Independent Steerable Power Wheels
Lecture 18 - Sensing and Perception
Lecture 19 - Sensors and Sensing
Lecture 20 - Commonly used sensors - 1
Lecture 21 - Commonly used sensors - 2
Lecture 22 - Commonly used sensors - 3
Lecture 23 - Sensor Errors and Error modelling
Lecture 24 - Mobile Robot Localisation
Lecture 25 - Map based Localisation
Lecture 26 - Markov Localisation
Lecture 27 - Kalman Filter Localisation
Lecture 28 - SLAM
Lecture 29 - Mobile Robot Navigation

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Lecture 30 - Path Planning: Graph Construction
Lecture 31 - Graph Search Methods
Lecture 32 - Path Planning and Obstacle avoidance
Lecture 33 - Introduction to Motion Control of Mobile Robots - Part 1
Lecture 34 - Introduction to Motion Control of Mobile Robots - Part 2
Lecture 35 - Kinematic control of Land-based Mobile Robots
Lecture 36 - Simulation of Land-based Mobile Robots along with Kinematic Control - Part 1
Lecture 37 - Simulation of Land-based Mobile Robots along with Kinematic Control - Part 2
Lecture 38 - Simulation of Land-based Mobile Robots along with Kinematic Control - Part 3
Lecture 39 - Dynamic Control of Mobile Robots
Lecture 40 - Cascaded or Back-stepping Control of Mobile Robots
Lecture 41 - Modern Robotics and Challenges
Lecture 42 - Multiple Mobile Robotic Systems
Lecture 43 - Autonomous Mobile Robots and Mobile Manipulators
Lecture 44 - Legged and Hybrid Robots
Lecture 45 - Underwater and Aerial Robots
Lecture 46 - Healthcare Robots

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Combustion

Subject Co-ordinator - Prof. V. Raghavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fuel and their properties - Part 1
Lecture 2 - Fuel and their properties - Part 2 - Gaseous and Liquid fuels
Lecture 3 - Fuel and their properties - Part 3 - Liquid and Solid fuels
Lecture 4 - Review of basic thermodynamics of ideal gas mixtures - Part 1
Lecture 5 - Review of basic thermodynamics of ideal gas mixtures - Part 2
Lecture 6 - Stoichiometry - Part 1
Lecture 7 - Stoichiometry - Part 2 - Worked Examples
Lecture 8 - Stoichiometry - Part 3 - Worked Examples (Continued...)
Lecture 9 - First law and Second law of thermodynamics applied to combustion - Part 1 - Heat Calculation
Lecture 10 - First law and Second law of thermodynamics applied to combustion - Part 2 - Enthalpy Calculation
Lecture 11 - First law and Second law of thermodynamics applied to combustion - Part 3 - Calculation of flame
Lecture 12 - First law and Second law of thermodynamics applied to combustion - Part 4 - Chemical equilibrium
Lecture 13 - First law and Second law of thermodynamics applied to combustion - Part 5 - Chemical equilibrium
Lecture 14 - First law and Second law of thermodynamics applied to combustion - Part 6 - Worked examples
Lecture 15 - First law and Second law of thermodynamics applied to combustion - Part 7 - Worked examples (Con
Lecture 16 - Mass transfer basics - Part 1 - Fundamentals
Lecture 17 - Mass transfer basics - Part 2 - Calculation of diffusion velocity
Lecture 18 - Mass transfer basics - Part 3 - Steady evaporation (The Stefan Problem)
Lecture 19 - Mass transfer basics - Part 4 - Steady evaporation of liquid droplet and Worked examples
Lecture 20 - Fundamentals of combustion kinetics - Part 1 - Global and elementary reactions
Lecture 21 - Fundamentals of combustion kinetics - Part 2 - Reaction rates and equilibrium constant
Lecture 22 - Fundamentals of combustion kinetics - Part 3 - Steady state and partial equilibrium approximatio
Lecture 23 - Fundamentals of combustion kinetics - Part 4 - Worked examples
Lecture 24 - Governing equations for reacting flow - Part 1 - Continuity, momentum and species conservation e
Lecture 25 - Governing equations for reacting flow - Part 2 - The energy equation
Lecture 26 - Governing equations for reacting flow - Part 3 - Estimation of thermo-physical properties and co
Lecture 27 - Governing equations for reacting flow - Part 4 - Control of combustion phenomena and simplified
Lecture 28 - Governing equations for reacting flow - Part 5 - Conserved scalars and mixture fraction approach
Lecture 29 - Characteristics of combustion flame and detonation - Part 1

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Lecture 30 - Characteristics of combustion flame and detonation - Part 2
Lecture 31 - Characteristics of combustion flame and detonation - Part 3 - Rankine-Hugoniot relation
Lecture 32 - Characteristics of combustion flame and detonation - Part 4 - Estimation of detonation velocity
Lecture 33 - Laminar Premixed Flames - Part 1 - Laminar flame propagation
Lecture 34 - Laminar Premixed Flames - Part 2 - Laminar flame speed variation and Structure of premixed flame
Lecture 35 - Laminar Premixed Flames - Part 3 - Flammability limits and Premixed flame theory
Lecture 36 - Laminar Premixed Flames - Part 4 - Estimation of laminar flame speed
Lecture 37 - Laminar Premixed Flames - Part 5 - Ignition of premixed mixture (Semenov's Analysis)
Lecture 38 - Laminar Premixed Flames - Part 6 - Piloted ignition and Flame quenching
Lecture 39 - Laminar Premixed Flames - Part 7 - Premixed flame stability
Lecture 40 - Laminar Premixed Flames - Part 8 - Stability Maps and Worked examples
Lecture 41 - Laminar Diffusion Flames - Part 1 - Theory of gas jets
Lecture 42 - Laminar Diffusion Flames - Part 2 - Analysis of gas jets and jet diffusion flames
Lecture 43 - Laminar Diffusion Flames - Part 3 - Diffusion flame characteristics and flame structure
Lecture 44 - Laminar Diffusion Flames - Part 4 - Diffusion flame structure and Flame regimes
Lecture 45 - Laminar Diffusion Flames - Part 5 - Diffusion flame regimes and Flame height correlations
Lecture 46 - Laminar Diffusion Flames - Part 6 - Diffusion flame control
Lecture 47 - Laminar Diffusion Flames - Part 7 - Diffusion flame configurations (coflow, crossflow and oppose
Lecture 48 - Laminar Diffusion Flames - Part 8 - Diffusion flame stability and Worked examples
Lecture 49 - Turbulent Flames - Part 1 - Characteristics of turbulence
Lecture 50 - Turbulent Flames - Part 2 - Turbulent length scales and turbulent stresses
Lecture 51 - Turbulent Flames - Part 3 - Axisymmetric turbulent jet
Lecture 52 - Turbulent Flames - Part 4 - Turbulent premixed flames and flame regimes
Lecture 53 - Turbulent Flames - Part 5 - Turbulent diffusion flames
Lecture 54 - Droplet evaporation and combustion - Part 1 - Steady evaporation of liquid droplet
Lecture 55 - Droplet evaporation and combustion - Part 2 - Equilibrium under steady evaporation of liquid dro
Lecture 56 - Droplet evaporation and combustion - Part 3 - Droplet combustion (simplified analysis)
Lecture 57 - Droplet evaporation and combustion - Part 4 - Species and temperature profiles
Lecture 58 - Droplet evaporation and combustion - Part 5 - Evaluation of mass burning rate and worked example
Lecture 59 - Combustion of carbon particle - Part 1 - Coal combustion
Lecture 60 - Combustion of carbon particle - Part 2 - One film model
Lecture 61 - Combustion of carbon particle - Part 3 - Two film model and worked examples

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NPTEL Video Course - Mechanical Engineering - NOC:Oil Hydraulics and Pneumatics

Subject Co-ordinator - Prof. Somashekhar S

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Learning Objectives, Course Content and References
Lecture 2 - Merits and Demerits of Fluid Power, Power Transmission Method
Lecture 3 - Brief History, Application Areas, Major Divisions of Fluid Power System
Lecture 4 - Introduction to Oil Hydraulics and its Basic Components
Lecture 5 - Introduction to Pneumatic and its Basic Components, Applications-Stationary and Mobile
Lecture 6 - Typical Application of Fluid Power System, Status and Development
Lecture 7 - Pascal's law and its application-Hydraulic jack, Hydraulic brake and Numerical
Lecture 8 - Pressure Intensifier, Numericals, Air-to-Hydraulic Booster and Bernoulli equation
Lecture 9 - Applications of Bernoulli equation-Venturi,Torricelli's theorem, Siphon, Continuity equation and
Lecture 10 - Introduction to Fluid Power Symbols, Hydraulic lines and Color Coding
Lecture 11 - Symbols for Functional Units, Hydraulic Pumps, Hydraulic Motors, Cylinders, Air Compressors, Pne
Lecture 12 - Symbols for Filters, Check Valves, DCVs, Spool Actuation methods, PCV, Miscellaneous, Port Confi
Lecture 13 - Introduction to Hydraulic Pumps, Facts and Figures, Classifications
Lecture 14 - Positive Displacement pump and pumping theory
Lecture 15 - Ideal pump, pump losses, efficiency curve, Constructional features and Operations of External Ge
Lecture 16 - Construction features and operations of Internal Gear Pump, Gerotor Pump and Screw Pump
Lecture 17 - Numericals on Gear Pump, Tree Structure of Vane Pump
Lecture 18 - Vane Pump, Pumping theory, Construction and Operation of Unbalanced Vane Pump, Vane loading and
Lecture 19 - Variable Displacement Pressure Compensated Vane Pump, Balance Vane Pump, Kinematic Inversion of
Lecture 20 - Piston pump, Pumping theory, Constructional features and Operations of Hand Pump-Single acting,
Lecture 21 - Axial Piston Pump- Construction and Operating principles of Bent axis and Swash plate type pump
Lecture 22 - Radial Piston Pumps- Construction and Operation, Pump failure and Cavitations, Important paramet
Lecture 23 - Pneumatic Control System-Introduction, Air preparation-Primary and Secondary Air Treatment
Lecture 24 - Pneumatic Power Source- Compressor, Classification, Air Receiver and Control Methods
Lecture 25 - Reciprocating Type Air Compressor-Single and Multi-stage Piston Pump, PV Diagram and Work Done
Lecture 26 - Construction and Operation of Two-stage Reciprocating type Air Compressor, Diaphragm Type Air Co
Lecture 27 - Energy Loss and Cost Break Down in Air Preparation Process, Pressure Drop and its Effect
Lecture 28 - What causes Pressure Drop ?, Minimising Pressure Drop, Air Distribution System- Sizing of Pipes,
Lecture 29 - Pressure drop Predictions using Various Empirical Formulae and Nomogram, Best Practices for Comp

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Lecture 30 - Need for Air Dryer, Analysis of Moisture Removal from Air, Typical Air Drying Methods, Basic Typ
Lecture 31 - Construction and Operation of Refrigerated Air dyers, Absorption Dryer, Adsorption Dryer, Membra
Lecture 32 - Directional Control Valves
Lecture 33 - Directional Control Valves
Lecture 34 - Directional Control Valves
Lecture 35 - Directional Control Valves
Lecture 36 - Directional Control Valves
Lecture 37 - Pressure Control Valves
Lecture 38 - Pressure Control Valves
Lecture 39 - Pressure Control Valves
Lecture 40 - Flow Control Valves
Lecture 41 - Flow Control Valves
Lecture 42 - Flow Control Valves
Lecture 43 - Estimation of leakage through spool and housing bore and Numericals on DCV, PCV and FCV
Lecture 44 - Estimation of leakage through spool and housing bore and Numericals on DCV, PCV and FCV
Lecture 45 - Hydraulic Motors
Lecture 46 - Hydraulic Motors
Lecture 47 - Hydraulic Motors
Lecture 48 - Hydraulic Motors
Lecture 49 - Hydraulic Motors
Lecture 50 - Hydraulic Motors
Lecture 51 - Hydraulic Cylinders
Lecture 52 - Hydraulic Cylinders
Lecture 53 - Hydraulic Cylinders
Lecture 54 - Hydraulic Cylinders
Lecture 55 - Hydraulic Cylinders
Lecture 56 - Numericals on Fluid Power Actuators
Lecture 57 - Numericals on Fluid Power Actuators
Lecture 58 - Subsystems: Hydraulic Reservoir, Coolers and Filters
Lecture 59 - Subsystems: Hydraulic Reservoir, Coolers and Filters
Lecture 60 - Subsystems: Hydraulic Reservoir, Coolers and Filters
Lecture 61 - Subsystems: Hydraulic Fluids, Conduits and Simple Numericals
Lecture 62 - Subsystems: Hydraulic Fluids, Conduits and Simple Numericals
Lecture 63 - Subsystems: Hydraulic Fluids, Conduits and Simple Numericals
Lecture 64 - Subsystems: Hydraulic accumulators, Classifications, Applications, Accumulator physics, Maintena
Lecture 65 - Subsystems: Hydraulic accumulators, Classifications, Applications, Accumulator physics, Maintena
Lecture 66 - Subsystems: Hydraulic accumulators, Classifications, Applications, Accumulator physics, Maintena
Lecture 67 - Oil Hydraulic Circuits: Design and Analysis
Lecture 68 - Oil Hydraulic Circuits: Design and Analysis

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Lecture 69 - Oil Hydraulic Circuits: Design and Analysis
Lecture 70 - Task Based Selection and Analysis of Oil Hydraulic Circuits
Lecture 71 - Task Based Selection and Analysis of Oil Hydraulic Circuits
Lecture 72 - Task Based Selection and Analysis of Oil Hydraulic Circuits
Lecture 73 - Task Based Selection and Analysis of Oil Hydraulic Circuits
Lecture 74 - Pneumatic Circuits: Design and Analysis
Lecture 75 - Pneumatic Circuits: Design and Analysis
Lecture 76 - Pneumatic Circuits: Design and Analysis
Lecture 77 - Pneumatic Circuits: Design and Analysis of Multiple Actuators
Lecture 78 - Pneumatic Circuits: Design and Analysis of Multiple Actuators
Lecture 79 - Pneumatic Circuits: Design and Analysis of Multiple Actuators
Lecture 80 - Pump-controlled Hydraulic Systems
Lecture 81 - Pump-controlled Hydraulic Systems
Lecture 82 - Pump-controlled Hydraulic Systems
Lecture 83 - Hydrostatic Transmissions
Lecture 84 - Hydrostatic Transmissions
Lecture 85 - Hydrostatic Transmissions
Lecture 86 - Proportional Valve Technology
Lecture 87 - Proportional Valve Technology
Lecture 88 - Proportional Valve Technology
Lecture 89 - Electro Hydraulic Servo Valve (EHSV)
Lecture 90 - Electro Hydraulic Servo Valve (EHSV)
Lecture 91 - Electro Hydraulic Servo Valve (EHSV)
Lecture 92 - Electro-Hydraulic Actuator (EHA)
Lecture 93 - Electro-Hydraulic Actuator (EHA)
Lecture 94 - Modeling and Simulation in Hydraulic Components
Lecture 95 - Modeling and Simulation in Hydraulic Components
Lecture 96 - Modeling and Simulation in Hydraulic Components

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NPTEL Video Course - Mechanical Engineering - Introduction to Turbomachines

Subject Co-ordinator - Prof. Babu Viswanathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic Theroy of Turbomachines - Part 1
Lecture 3 - Basic Theroy of Turbomachines - Part 2
Lecture 4 - Basic Theroy of Turbomachines - Part 3
Lecture 5 - Basic Theroy of Turbomachines - Part 4
Lecture 6 - Basic Theroy of Turbomachines - Part 5
Lecture 7 - Basic Theroy of Turbomachines - Part 6
Lecture 8 - Hydro Turbomachines - Centrifugal pumps - Part 1
Lecture 9 - Hydro Turbomachines - Centrifugal pumps - Part 2
Lecture 10 - Hydro Turbomachines - Centrifugal pumps - Part 3
Lecture 11 - Hydro Turbomachines - Centrifugal pumps - Part 4
Lecture 12 - Hydro Turbomachines - Francis turbine - Part 1
Lecture 13 - Hydro Turbomachines - Francis turbine - Part 2
Lecture 14 - Hydro Turbomachines - Kaplan turbine
Lecture 15 - Hydro Turbomachines - Pelton turbine
Lecture 16 - Positive Displacement Pumps - Gear pump
Lecture 17 - Thermal Turbomachines - Introduction
Lecture 18 - Thermal Turbomachines - Gas turbines
Lecture 19 - Thermal Turbomachines - Steam Turbines
Lecture 20 - Thermal Turbomachines - Part 1
Lecture 21 - Thermal Turbomachines - Part 2

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanics and Control of Robotic Manipulators

Subject Co-ordinator - Prof. Santhakumar Mohan

Co-ordinating Institute - IIT - Palakkad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to robot mechanics
Lecture 3 - Introduction to forward and inverse kinematics
Lecture 4 - Description of position and orientation
Lecture 5 - Transformation matrix
Lecture 6 - Compound rotations - Part 1
Lecture 7 - Compound rotations - Part 2
Lecture 8 - Kinematic parameters
Lecture 9 - DH parameters
Lecture 10 - DH representation
Lecture 11 - Frame arrangement and examples - Part 1
Lecture 12 - Examples related to frame arrangement
Lecture 13 - Frame arrangement and examples - Part 2
Lecture 14 - Forward and inverse kinematics of robotic manipulators
Lecture 15 - Examples related to inverse kinematics
Lecture 16 - Inverse kinematic solution based on numerical methods
Lecture 17 - Forward kinematic solution using Matlab
Lecture 18 - Inverse kinematic solution based on numerical methods using Matlab
Lecture 19 - Introduction to differential kinematics
Lecture 20 - Velocity propogation model for serial manipulators and Jacobian matrix
Lecture 21 - Velocity propogation model using Matlab
Lecture 22 - Manipulator Statics and Workspace singularities
Lecture 23 - Introduction to robot dynamics and Lagrange-Euler method
Lecture 24 - Newton-Euler method
Lecture 25 - Equation of motion in state-space form
Lecture 26 - Dynamic model derivation using Newton-Euler method in Matlab
Lecture 27 - Dynamic model derivation using Lagrange-Euler method in Matlab
Lecture 28 - Dynamic simulation of serial manipulators using Matlab
Lecture 29 - Introduction to trajectory generation

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Lecture 30 - Trajectory generation using smooth functions
Lecture 31 - Trajectory generation schemes for serial manipulators
Lecture 32 - Trajectory generation using Matlab - Part 1
Lecture 33 - Trajectory generation using Matlab - Part 2
Lecture 34 - Trajectory generation for serial manipulators using matlab
Lecture 35 - Trajectory generation for serial manipulators with workspace using matlab
Lecture 36 - Introduction to robot motion control
Lecture 37 - Types of robot manipulator control and concerns
Lecture 38 - Kinematic control
Lecture 39 - Matlab simulation on kinematic control
Lecture 40 - Dynamic control
Lecture 41 - Simulations related to dynamic control schemes using Matlab - Part 1
Lecture 42 - Cascaded control design
Lecture 43 - Simulations related to dynamic control schemes using Matlab - Part 2
Lecture 44 - Simulations related to dynamic control schemes using Matlab - Part 3
Lecture 45 - Kinematic and dynamic models of a mobile robot using DH approach

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NPTEL Video Course - Mechanical Engineering - Inverse Methods in Heat Transfer

Subject Co-ordinator - Prof. C.Balaji, Prof.S. Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to inverse problems
Lecture 2 - Fermi estimation
Lecture 3 - Forward/Direct and Inverse problems
Lecture 4 - Key drivers for studying inverse methods in engineering
Lecture 5 - Formulation for inverse problems
Lecture 6 - Statistical tools for estimation
Lecture 7 - Statistical description of errors
Lecture 8 - Well-posed and ill-posed problems
Lecture 9 - Probability and Statistics Brief overview - I
Lecture 10 - Probability and Statistics Brief overview - II
Lecture 11 - Gaussian distribution
Lecture 12 - Gaussian distribution (Continued...), and Maximum Likelihood Estimation (MLE)
Lecture 13 - Linear least square regression
Lecture 14 - Linear least square regression (Continued...)
Lecture 15 - Alternatives to Linear least square
Lecture 16 - Polynomial regression
Lecture 17 - Inverse problems in transient conduction - I
Lecture 18 - Inverse problems in transient conduction - II
Lecture 19 - Non-linear regression
Lecture 20 - Gauss-Newton algorithm (GNA)
Lecture 21 - Gauss-Newton algorithm (GNA) Example
Lecture 22 - Levenberg-Marquardt algorithm (LMA)
Lecture 23 - Tikhonov regularization
Lecture 24 - Jacobian and its calculation
Lecture 25 - Bayesian methods
Lecture 26 - Bayesian methods (Continued...)
Lecture 27 - Metropolis-Hastings algorithm (MH) and Markov Chain Monte Carlo Methods (MCMC)
Lecture 28 - Introduction to machine learning in heat transfer
Lecture 29 - Overview of machine learning

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Lecture 30 - Calculation in a neural network model
Lecture 31 - Gradient Descent method
Lecture 32 - Gradient Descent method (Continued...)
Lecture 33 - Back propagation
Lecture 34 - Neural network as a surrogate forward model
Lecture 35 - PINN for an inverse problem
Lecture 36 - PINN for an inverse problem (Continued...)
Lecture 37 - Inverse methods in heat transfer - Summary

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NPTEL Video Course - Mechanical Engineering - Engineering Thermodynamics

Subject Co-ordinator - Prof. Babu Viswanathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course outline
Lecture 2 - Introduction - Part 1
Lecture 3 - Introduction - Part 2
Lecture 4 - Basic concepts - Part 1
Lecture 5 - Basic concepts - Part 2
Lecture 6 - Basic concepts - Part 3
Lecture 7 - Basic concepts - Part 4
Lecture 8 - Basic concepts - Part 5
Lecture 9 - Work and Heat - Part 1
Lecture 10 - Work and Heat - Part 2
Lecture 11 - Work and Heat - Part 3
Lecture 12 - First law of thermodynamics
Lecture 13 - Pure substances
Lecture 14 - Ideal gases and ideal gas mixtures
Lecture 15 - Two-phase mixtures - Part 1
Lecture 16 - Two-phase mixtures - Part 2
Lecture 17 - First law analysis of systems - Part 1
Lecture 18 - First law analysis of systems - Part 2
Lecture 19 - First law analysis of systems - Part 3
Lecture 20 - First law analysis of systems - Part 4
Lecture 21 - First law of thermodynamics for a control colume
Lecture 22 - Control volume analysis of steady flow devices - Part 1
Lecture 23 - Control volume analysis of steady flow devices - Part 2
Lecture 24 - Control volume analysis of steady flow devices - Part 3
Lecture 25 - Unsteady analysis
Lecture 26 - Second law of Thermodynamics - Part 1
Lecture 27 - Second law of Thermodynamics - Part 2
Lecture 28 - Second law of Thermodynamics - Part 3
Lecture 29 - Second law of Thermodynamics - Part 4

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Lecture 30 - Second law of Thermodynamics - Part 5
Lecture 31 - Entropy - Part 1
Lecture 32 - Entropy - Part 2
Lecture 33 - Entropy - Part 3
Lecture 34 - Entropy - Part 4
Lecture 35 - Entropy - Part 5
Lecture 36 - Entropy - Part 6
Lecture 37 - Thermodynamic cycles - Part 1
Lecture 38 - Thermodynamic cycles - Part 2

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NPTEL Video Course - Mechanical Engineering - Applied Mechanics - Fluid Mechanics Laboratory

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Free and Forced Vortices - I
Lecture 2 - Free and Forced Vortices - II
Lecture 3 - Impact of Jet on hemispherical shell
Lecture 4 - Impact of Jet on horizontal flat plate
Lecture 5 - Pressure Distribution on a Circular Cylinder
Lecture 6 - Verification of Bernoullis Theorem
Lecture 7 - Visualization of potential flows
Lecture 8 - Visualization of vortex shredding
Lecture 9 - Wake Velocity Measurement for flow over a Circular Cylinder

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NPTEL Video Course - Mechanical Engineering - NOC:Interfacial Fluid Mechanics

Subject Co-ordinator - Prof. Harish N Dixit

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Non-dimensional numbers in interfacial flows
Lecture 2 - Integral form of governing equations
Lecture 3 - Boundary (Jump) conditions at a fluid-fluid interface (no surface tension)
Lecture 4 - On surface tension and interfacial energy
Lecture 5 - Introduction to surface tension effects
Lecture 6 - Boundary (Jump) conditions at a fluid-fluid interface (with surface tension) - Part 1
Lecture 7 - Boundary (Jump) conditions at a fluid-fluid interface (with surface tension) - Part 2
Lecture 8 - Summary of equations
Lecture 9 - Capillary statics shape of meniscus - Part 1
Lecture 10 - Capillary statics shape of meniscus - Part 2
Lecture 11 - Shape of static meniscus-Energy minimisation - Part 1
Lecture 12 - Calculus of variations (a primer): Euler-Lagrange equations
Lecture 13 - Shape of static meniscus-Energy minimisation - Part 2
Lecture 14 - Method of Lagrange multipliers
Lecture 15 - On wetting and shape of a drop
Lecture 16 - The Young's Equation: Partial wetting
Lecture 17 - Variational approach to the Young-Laplace equation - Part 1
Lecture 18 - Variational approach to the Young-Laplace equation - Part 2
Lecture 19 - Shape of a puddle - large/heavy drops
Lecture 20 - Wetting on rough and textured surface - Part 1
Lecture 21 - Wetting on rough and textured surface - Part 2
Lecture 22 - Wetting on rough and textured surface - Part 3
Lecture 23 - Law of capillary rise
Lecture 24 - Dynamics of capillary rise
Lecture 25 - Dynamics of capillary rise: Analysis of regimes
Lecture 26 - Forced wetting and coating flows
Lecture 27 - More on coating and Landau-Levich equation
Lecture 28 - Lubrication approximation and thin films
Lecture 29 - Free surface flows and interface conditions

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Lecture 30 - Uniform flow down an incline
Lecture 31 - Shape of a falling jet
Lecture 32 - A quick tour of stability analysis
Lecture 33 - Rayleigh-Plateau instability - Part 1
Lecture 34 - Rayleigh-Plateau instability - Part 2
Lecture 35 - Rayleigh-Plateau instability - Part 3
Lecture 36 - Rupture of thin films - Part 1
Lecture 37 - Rupture of thin films - Part 2
Lecture 38 - Rupture of thin films - Effect of van der Waals force
Lecture 39 - Rupture of thin films - Part 3
Lecture 40 - Rupture of thin films - Part 4
Lecture 41 - Benard-Marangoni Instability - Part 1
Lecture 42 - Benard-Marangoni Instability - Part 2
Lecture 43 - Benard-Marangoni Instability - Part 3
Lecture 44 - Benard-Marangoni Instability - Part 4
Lecture 45 - Kelvin helmholtz instability - Part 1
Lecture 46 - Kelvin helmholtz instability - Part 2
Lecture 47 - Kelvin helmholtz instability - Part 3
Lecture 48 - Kelvin helmholtz instability - Part 4
Lecture 49 - Contact angle hysterisis
Lecture 50 - Thin film down an incline-a contact line problem - Part 1
Lecture 51 - Thin film down an incline-a contact line problem - Part 2
Lecture 52 - Local flow near a moving contact line
Lecture 53 - Modelling of moving contact line

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NPTEL Video Course - Mechanical Engineering - Applied Thermodynamics

Subject Co-ordinator - Dr. Babu Viswanathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Entropy change of a control volume - Part 1
Lecture 3 - Entropy change of a control volume - Part 2
Lecture 4 - Entropy change of a control volume - Part 3
Lecture 5 - Work interaction of internally reversible steady flow processes
Lecture 6 - Exergy - Part 1
Lecture 7 - Exergy - Part 2
Lecture 8 - Exergy - Part 3
Lecture 9 - Exergy - Part 4
Lecture 10 - Exergy - Part 5
Lecture 11 - Thermodynamic cycles - Rankine cycle - Part 1
Lecture 12 - Thermodynamic cycles - Rankine cycle - Part 2
Lecture 13 - Thermodynamic cycles - Rankine cycle - Part 3
Lecture 14 - Thermodynamic cycles - Air standard Brayton cycle - Part 1
Lecture 15 - Thermodynamic cycles - Air standard Brayton cycle - Part 2
Lecture 16 - Thermodynamic cycles - Air standard Brayton cycle - Part 3
Lecture 17 - Thermodynamic cycles - Air standard Brayton cycle - Part 4
Lecture 18 - Thermodynamic cycles - Air standard Brayton cycle - Part 5
Lecture 19 - Thermodynamic cycles - Air standard Otto cycle
Lecture 20 - Thermodynamic cycles - Air standard Diesel cycle - Part 1
Lecture 21 - Thermodynamic cycles - Air standard Diesel cycle - Part 2
Lecture 22 - Thermodynamic cycles - Vapor compression refrigeration cycle
Lecture 23 - Psychrometry - Part 1
Lecture 24 - Psychrometry - Part 2
Lecture 25 - Psychrometry - Part 3
Lecture 26 - Psychrometry - Part 4
Lecture 27 - Psychrometry - Part 5
Lecture 28 - Psychrometry - Part 6
Lecture 29 - Psychrometry - Part 7

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Lecture 30 - Combustion thermodynamics - Part 1
Lecture 31 - Combustion thermodynamics - Part 2
Lecture 32 - Combustion Thermodynamics - Part 3
Lecture 33 - Combustion thermodynamics - Part 4
Lecture 34 - Compressible flow through nozzles - Part 1
Lecture 35 - Compressible flow through nozzles - Part 2
Lecture 36 - Compressible flow through nozzles - Part 3
Lecture 37 - Compressible flow through nozzles - Part 4
Lecture 38 - Compressible flow through nozzles - Part 5
Lecture 39 - Compressible flow through nozzles - Part 6
Lecture 40 - Compressible flow through nozzles - Part 7
Lecture 41 - Compressible flow through nozzles - Part 8
Lecture 42 - Compressible flow through nozzles - Part 9
Lecture 43 - Compressible flow through nozzles - Part 10
Lecture 44 - Compressible flow through nozzles - Part 11
Lecture 45 - Compressible flow through nozzles - Part 12

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NPTEL Video Course - Mechanical Engineering - Heat Transfer (Prof .Dr.C. Balaji)

Subject Co-ordinator - Prof .Dr.C. Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Heat Transfer
Lecture 2 - Introduction to Heat Transfer - Practical examples
Lecture 3 - Introduction to Heat Transfer - Rate laws Conduction
Lecture 4 - Introduction to Heat Transfer - Rate laws Convection
Lecture 5 - Introduction to Heat Transfer - Rate laws Radiation
Lecture 6 - Radiation Heat Transfer
Lecture 7 - Radiation Laws
Lecture 8 - Universal Black Body Curve
Lecture 9 - Properties of Real Surfaces
Lecture 10 - Properties of Real Surfaces (Continued...)
Lecture 11 - Kirchoff's Law and example problems
Lecture 12 - Radiosity Irradiation Method and Viewfactors
Lecture 13 - Viewfactor Algebra
Lecture 14 - Conduction
Lecture 15 - Conduction: Steady state conduction equation
Lecture 16 - Conduction in composite wall
Lecture 17 - Conduction in cylinder
Lecture 18 - Crtical Radius of Insulation
Lecture 19 - Conduction with heat generation
Lecture 20 - Variable Thermal Conductivity and example problems
Lecture 21 - Fin heat transfer
Lecture 22 - Fin heat transfer continued
Lecture 23 - Fin heat transfer continued
Lecture 24 - Unsteady Heat Conduction
Lecture 25 - Unsteady Heat Conduction (Continued...)
Lecture 26 - Lumped capacitance Method
Lecture 27 - Unsteady Heat Conduction (Continued...)
Lecture 28 - Method of Separation of variables
Lecture 29 - Conduction Analytical solution

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Lecture 30 - Conduction Numerical solution
Lecture 31 - Introduction to convection
Lecture 32 - Governing Equations for Convection
Lecture 33 - Energy equation
Lecture 34 - Convection - Boundary layer theory
Lecture 35 - Convection - Integral momentum equation
Lecture 36 - Solution to Integral Energy equation
Lecture 37 - Internal Flow - Flow inside pipes and ducts
Lecture 38 - Internal Flow - Turbulent heat transfer
Lecture 39 - Natural Convection
Lecture 40 - Heat Exchangers - 1
Lecture 41 - Heat Exchangers - 2

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NPTEL Video Course - Mechanical Engineering - NOC:Inverse Methods in Heat Transfer

Subject Co-ordinator - Prof. Balaji Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Inverse Methods in Heat Transfer Course
Lecture 2 - Inverse Problems - Definition, History and Applications
Lecture 3 - The inverse problem solving process
Lecture 4 - Review of Basic Heat Transfer for this course
Lecture 5 - Introduction to Week - 2
Lecture 6 - Introduction to Linear Regression for Inverse Problems
Lecture 7 - Example Application of Linear regression for an inverse conduction problem
Lecture 8 - Goodness of Fit and Coefficient of Determination
Lecture 9 - Linear Regression with Quadratic Model
Lecture 10 - Summary of Week - 2
Lecture 11 - Introduction to Week - 3
Lecture 12 - Introduction to Normal Equations for linear models
Lecture 13 - Normal Equations for linear models (Continued...)
Lecture 14 - Parity Plots
Lecture 15 - Programming Inverse Methods using Normal Equations
Lecture 16 - Variants on the Linear Model for inverse problems
Lecture 17 - Summary of Week - 3
Lecture 18 - The General Inverse Methods Process
Lecture 19 - Simple nonlinear inverse problem - Transient Heat transfer
Lecture 20 - Review of required calculus results
Lecture 21 - Gradient Descent Algorithm
Lecture 22 - Gradient Descent - Simple Example
Lecture 23 - Gradient Descent for Nonlinear Inverse Problem - Theory
Lecture 24 - Gradient Descent for Nonlinear Inverse Problem - Coding Example
Lecture 25 - Newton Algorithm for a System of Equations
Lecture 26 - Gauss Newton Algorithm - Derivation and Code
Lecture 27 - Overfitting and Regularization for Linear Models
Lecture 28 - Tikhonov Regularization and Levenberg-Marquardt - Theory
Lecture 29 - Tikhonov and Levenberg-Marquardt - Example Code

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Lecture 30 - Introduction to Probability for Inverse Methods
Lecture 31 - Sum and Product Rules of Probability
Lecture 32 - Bayes Theorem - Simple Examples
Lecture 33 - Independence and Expectation
Lecture 34 - Variance and Covariance
Lecture 35 - Gaussian distribution and the standard normal table
Lecture 36 - Maximum Likelihood Estimate
Lecture 37 - MLE, MAP estimates
Lecture 38 - Introduction to Bayesian Methods for Inverse Problems
Lecture 39 - Offline Bayesian Estimation
Lecture 40 - Offline Bayesian Estimation - MATLAB Demo
Lecture 41 - MHMCMC for Inverse Problems
Lecture 42 - MHMCMC for Inverse Problems - MATLAB Demo
Lecture 43 - Why Machine Learning in Inverse Heat Transfer ?
Lecture 44 - Overview of AI and ML
Lecture 45 - Supervised Machine Learning as an Inverse Problem
Lecture 46 - Introduction to Week 9 - From Linear Models to Neural Networks
Lecture 47 - Gradient Descent - Batch, Stochastic and Mini Batch
Lecture 48 - Logistic Regression - The Forward Model
Lecture 49 - Logistic Regression - Binary Entropy Cost Function and Gradient
Lecture 50 - Multiclass Classification
Lecture 51 - Linear Separability and Neural Networks
Lecture 52 - Introduction to Week 10 - XOR and Deeper networks
Lecture 53 - Forward pass through a simple neural network
Lecture 54 - Backprop in a scalar chain
Lecture 55 - Backprop in a MLP
Lecture 56 - Introduction to Week 11 - ANNs as Surrogate models
Lecture 57 - Physics Informed Neural Networks - Introduction
Lecture 58 - Physics Informed Neural Networks - an intuitive explanation
Lecture 59 - Physics Informed Neural Networks - BC incorporation
Lecture 60 - PINNs for inverse problems
Lecture 61 - Introduction to Week 12 - Sensitivity Analysis
Lecture 62 - Code Examples of Logistic Regression - OR and AND gates
Lecture 63 - Code Example of shallow neural network - XOR gate
Lecture 64 - Code walkthrough for PINNs in Burgers equation
Lecture 65 - Formulation of a PINN based inverse problem in unsteady conduction
Lecture 66 - Formulation of a surrogate model based inverse solution in unsteady conduction
Lecture 67 - Summary of course

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NPTEL Video Course - Mechanical Engineering - NOC:Sustainable Energy Technology

Subject Co-ordinator - Dr. Sayak Banerjee

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Fundamental Concepts - Part 1
Lecture 2 - Introduction and Fundamental Concepts - Part 2
Lecture 3 - Energy Scenario in Modern World - Part 1
Lecture 4 - Energy Scenario in Modern World - Part 2
Lecture 5 - Macro Trends in Energy Use - World and India - Part 1
Lecture 6 - Macro Trends in Energy Use - World and India - Part 2
Lecture 7 - Impact of Fossil fuels - Part 1
Lecture 8 - Impact of Fossil fuels - Part 2
Lecture 9 - Fossil Fuels and Climate Change - Part 1
Lecture 10 - Fossil Fuels and Climate Change - Part 2
Lecture 11 - Continual of previous lecture and Overview of Renewable energy Technology - Part 1
Lecture 12 - Continual of previous lecture and Overview of Renewable energy Technology - Part 2
Lecture 13 - Numerical examples - Part 1
Lecture 14 - Numerical examples - Part 2
Lecture 15 - Renewable Energy Contributions - Part 1
Lecture 16 - Renewable Energy Contributions - Part 2
Lecture 17 - Hydro Power - Part 1
Lecture 18 - Hydro Power - Part 2
Lecture 19 - The Fundamentals of various Turbine working principle - Part 1
Lecture 20 - The Fundamentals of various Turbine working principle - Part 2
Lecture 21 - Hydroturbine Selection Principle
Lecture 22 - Pumped Hydro Storage
Lecture 23 - Worked Out Examples of HydroPower
Lecture 24 - Introduction to Wind Energy - Part 1
Lecture 25 - Introduction to Wind Energy - Part 2
Lecture 26 - Wind Speed and Power Analysis - Part 1
Lecture 27 - Wind Speed and Power Analysis - Part 2
Lecture 28 - Design of Wind Turbine - Part 1
Lecture 29 - Design of Wind Turbine - Part 2

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Lecture 30 - Wind Turbine Parts and Performance - Part 1
Lecture 31 - Wind Turbine Parts and Performance - Part 2
Lecture 32 - Wind farms, Offshore Wind Turbines and Numerical Examples in Wind Energy - Part 1
Lecture 33 - Wind farms, Offshore Wind Turbines and Numerical Examples in Wind Energy - Part 2
Lecture 34 - Introduction to Solar Energy - Part 1
Lecture 35 - Introduction to Solar Energy - Part 2
Lecture 36 - Solar Thermal Energy Systems - Part 1
Lecture 37 - Solar Thermal Energy Systems - Part 2
Lecture 38 - Solar Water Heaters - Part 1
Lecture 39 - Solar Water Heaters - Part 2
Lecture 40 - Concentrated Solar Thermal Power (CSP)
Lecture 41 - Introduction to Solar Photovoltaic Systems - Part 1
Lecture 42 - Introduction to Solar Photovoltaic Systems - Part 2
Lecture 43 - Solar Photovoltaic Technology - Part 1
Lecture 44 - Solar Photovoltaic Technology - Part 2
Lecture 45 - Doping of a Semiconductor - Part 1
Lecture 46 - Doping of a Semiconductor - Part 2
Lecture 47 - Structure of a Solar Cell and its Electrical Properties - Part 1
Lecture 48 - Structure of a Solar Cell and its Electrical Properties - Part 2
Lecture 49 - Solar Cell Efficiency - Part 1
Lecture 50 - Solar Cell Efficiency - Part 2
Lecture 51 - Types of solar cells - Part 1
Lecture 52 - Types of solar cells - Part 2
Lecture 53 - Bioenergy and Biofuels - Part 1
Lecture 54 - Bioenergy and Biofuels - Part 2
Lecture 55 - Biofuel Feedstocks
Lecture 56 - Bioenergy Technology and Sustainability - Part 1
Lecture 57 - Bioenergy Technology and Sustainability - Part 2
Lecture 58 - Production Technologies for Bioethanol, Biodiesel and Biogas
Lecture 59 - Introduction of Geothermal Energy
Lecture 60 - Different types of Geothermal power systems
Lecture 61 - Characteristics of electricity demand and the technology is developed to respond the energy dema
Lecture 62 - Continuation of Enegry demand and adaptation of renewable energies
Lecture 63 - Introduction of Energy storage system
Lecture 64 - Major parameters of energy storage technology
Lecture 65 - Mechanical Energy Storage Technologies
Lecture 66 - Compressed Air Energy Storage System
Lecture 67 - Flywheel Based Energy Storage System - Part 1
Lecture 68 - Flywheel Based Energy Storage System - Part 2

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Lecture 69 - Energy Storage System Through Capacitor
Lecture 70 - Electrolytic Capacitor
Lecture 71 - Super Capacitor
Lecture 72 - Electrochemical Energy Storage Systems
Lecture 73 - Performance Characteristics of Battery
Lecture 74 - Types of Rechargeable Batteries - Part 1
Lecture 75 - Types of Rechargeable Batteries - Part 2
Lecture 76 - Thermal Energy Storage Systems - Part 1
Lecture 77 - Thermal Energy Storage Systems - Part 2
Lecture 78 - Storage of Coolness and Synoptic View of Energy Storage Technology
Lecture 79 - Storage Needs for the Grid
Lecture 80 - Energy Storage Types
Lecture 81 - Trends in Energy Storage Types and their Characteristics
Lecture 82 - Analysis of Growth in Energy Storage-focussed on Pumped Hydro Storage, Flywheels and Li-ion batt
Lecture 83 - Fuel Cells and Hydrogen Energy Economy
Lecture 84 - Hydrogen production and storage technologies
Lecture 85 - Hydrogen storage technologies
Lecture 86 - Fuel cell technology
Lecture 87 - Fuel cell types
Lecture 88 - Carbon Capture and Storage (CCS) technologies - Part 1
Lecture 89 - Carbon Capture and Storage (CCS) technologies - Part 2

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NPTEL Video Course - Mechanical Engineering - NOC:Strength of Materials - IITM

Subject Co-ordinator - Prof. K. Ramesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Strength of Materials - 1
Lecture 2 - Introduction to Strength of Materials - 2
Lecture 3 - Stress Component is Scalar
Lecture 4 - Stress Vector
Lecture 5 - Stress Tensor
Lecture 6 - Equilibrium Conditions
Lecture 7 - Mohr's Circle
Lecture 8 - Proof of Mohr's Circle
Lecture 9 - Principal Stresses
Lecture 10 - Octahedral and Deviatoric Stresses and Principal Directions
Lecture 11 - Free Surfaces
Lecture 12 - Photoelasticity
Lecture 13 - Strain
Lecture 14 - State of Strain
Lecture 15 - Strain Measurement
Lecture 16 - Tension Test
Lecture 17 - Stress Strain Relations
Lecture 18 - Interrelations between Elastic Constants
Lecture 19 - Thermal Strain
Lecture 20 - Torsion 1 - Thought and Physical Experiments
Lecture 21 - Torsion 2 - Mathematical Development
Lecture 22 - Torsion 3 - Problem solving, Hollow shaft
Lecture 23 - Bending 1 - Euler-Bernoulli Hypothesis
Lecture 24 - Bending 2 - Flexure Formula
Lecture 25 - Bending 3 - Engineering Analysis of Beams
Lecture 26 - Bending 4 - Shear Stress in Beams
Lecture 27 - Bending 5 - Composite Beams
Lecture 28 - Bending 6 - Shear in I Beams and Shear Centre
Lecture 29 - Bending 7 - Unsymmetrical Bending and Combined Loading

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Lecture 30 - Review 1
Lecture 31 - Deflection 1 - Moment-Curvature and Load Deflection
Lecture 32 - Deflection 2 - Moment-Area Method
Lecture 33 - Deflection 3 - Method of Superposition and Energy Method
Lecture 34 - Deflection 4 - Fictitious Load Method
Lecture 35 - Theories of Failure 1 - Overview
Lecture 36 - Theories of Failure 2 - Yield surfaces, Mohr's Theory and Failure in Combined Loading
Lecture 37 - Stability 1 - Governing Equations, Fixed-free and Pinned-pinned
Lecture 38 - Stability 2 - Fixed-pinned, Fixed-fixed
Lecture 39 - Review 2

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Thermodynamics

Subject Co-ordinator - Prof. V. Raghavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course outline
Lecture 2 - Introduction - Part 1
Lecture 3 - Introduction - Part 2
Lecture 4 - Basic concepts - Part 1
Lecture 5 - Basic concepts - Part 2
Lecture 6 - Basic concepts - Part 3
Lecture 7 - Basic concepts - Part 4
Lecture 8 - Basic concepts - Part 5
Lecture 9 - Tutorial 1 - Basic concepts, pressure and temperature measurements - Part 1
Lecture 10 - Tutorial 1 - Basic concepts, pressure and temperature measurements - Part 2
Lecture 11 - Tutorial 1 - Basic concepts, pressure and temperature measurements - Part 3
Lecture 12 - Work and Heat - Part 1
Lecture 13 - Work and Heat - Part 2
Lecture 14 - Work and Heat - Part 3
Lecture 15 - Tutorial 2 - Work and heat transfer examples - Part 1
Lecture 16 - Tutorial 2 - Work and heat transfer examples - Part 2
Lecture 17 - Tutorial 2 - Work and heat transfer examples - Part 3
Lecture 18 - First law of thermodynamics
Lecture 19 - Pure substances
Lecture 20 - Ideal gases and ideal gas mixtures
Lecture 21 - Two-phase mixtures - Part 1
Lecture 22 - Two-phase mixtures - Part 2
Lecture 23 - First law analysis of systems - Part 1
Lecture 24 - First law analysis of systems - Part 2
Lecture 25 - First law analysis of systems - Part 3
Lecture 26 - First law analysis of systems - Part 4
Lecture 27 - Tutorial 3 - First law analysis of system - Part 1
Lecture 28 - Tutorial 3 - First law analysis of system - Part 2
Lecture 29 - Tutorial 3 - First law analysis of system - Part 3

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Lecture 30 - Tutorial 4 - Systems involving ideal gas mixtures - Part 1
Lecture 31 - Tutorial 4 - Systems involving ideal gas mixtures - Part 2
Lecture 32 - Tutorial 4 - Systems involving ideal gas mixtures - Part 3
Lecture 33 - Tutorial 5 - Systems involving Steam and R134a using table - Part 1
Lecture 34 - Tutorial 5 - Systems involving Steam and R134a using table - Part 2
Lecture 35 - Tutorial 5 - Systems involving Steam and R134a using table - Part 3
Lecture 36 - Tutorial 5 - Systems involving Steam and R134a using table - Part 4
Lecture 37 - Tutorial 5 - Systems involving Steam and R134a using table - Part 5
Lecture 38 - Tutorial 5 - Systems involving Steam and R134a using table - Part 6
Lecture 39 - First law of thermodynamics for a control colume
Lecture 40 - Control volume analysis of steady flow devices - Part 1
Lecture 41 - Control volume analysis of steady flow devices - Part 2
Lecture 42 - Control volume analysis of steady flow devices - Part 3
Lecture 43 - Unsteady analysis
Lecture 44 - Tutorial 6 - First law for control volumes
Lecture 45 - Second law of Thermodynamics - Part 1
Lecture 46 - Second law of Thermodynamics - Part 2
Lecture 47 - Second law of Thermodynamics - Part 3
Lecture 48 - Second law of Thermodynamics - Part 4
Lecture 49 - Second law of Thermodynamics - Part 5
Lecture 50 - Tutorial 7 - Second law of thermodynamics - Part 1
Lecture 51 - Tutorial 7 - Second law of thermodynamics - Part 2
Lecture 52 - Tutorial 7 - Second law of thermodynamics - Part 3
Lecture 53 - Tutorial 7 - Second law of thermodynamics - Part 4
Lecture 54 - Tutorial 7 - Second law of thermodynamics - Part 5
Lecture 55 - Entropy - Part 1
Lecture 56 - Entropy - Part 2
Lecture 57 - Entropy - Part 3
Lecture 58 - Entropy - Part 4
Lecture 59 - Entropy - Part 5
Lecture 60 - Entropy - Part 6
Lecture 61 - Tutorial 8 - Entropy - Part 1
Lecture 62 - Tutorial 8 - Entropy - Part 2
Lecture 63 - Tutorial 8 - Entropy - Part 3
Lecture 64 - Tutorial 8 - Entropy - Part 4
Lecture 65 - Tutorial 8 - Entropy - Part 5
Lecture 66 - Thermodynamic cycles - Part 1
Lecture 67 - Thermodynamic cycles - Part 2
Lecture 68 - Tutorial 9 - Thermodynamic cycles - Part 1

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Lecture 69 - Tutorial 9 - Thermodynamic cycles - Part 2
Lecture 70 - Tutorial 9 - Thermodynamic cycles - Part 3

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NPTEL Video Course - Mechanical Engineering - NOC:Theory of Fire Propagation (Fire Dynamics)

Subject Co-ordinator - Prof. V. Raghavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Fire - Part 1
Lecture 2 - Basics of Fire - Part 2
Lecture 3 - Basics of Fire - Part 3
Lecture 4 - Basics of Fire - Part 4
Lecture 5 - Basics of Fire - Part 5
Lecture 6 - Basics of Fire - Part 6
Lecture 7 - Basics of Fire - Part 7
Lecture 8 - Basics of Fire - Part 8
Lecture 9 - Basics of Fire - Part 9
Lecture 10 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 1
Lecture 11 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 2
Lecture 12 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 3
Lecture 13 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 4
Lecture 14 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 5
Lecture 15 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 6
Lecture 16 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 7
Lecture 17 - Review of thermo-chemistry, chemical equilibrium and kinetics - Part 8
Lecture 18 - Review of Premixed and Diffusion Flames - Part 1
Lecture 19 - Review of Premixed and Diffusion Flames - Part 2
Lecture 20 - Review of Premixed and Diffusion Flames - Part 3
Lecture 21 - Review of Premixed and Diffusion Flames - Part 4
Lecture 22 - Review of Premixed and Diffusion Flames - Part 5
Lecture 23 - Review of Premixed and Diffusion Flames - Part 6
Lecture 24 - Review of Premixed and Diffusion Flames - Part 7
Lecture 25 - Review of Premixed and Diffusion Flames - Part 8
Lecture 26 - Burning of Liquid Fuels- Part 1
Lecture 27 - Burning of Liquid Fuels- Part 2
Lecture 28 - Burning of Liquid Fuels- Part 3
Lecture 29 - Burning of Liquid Fuels- Part 4

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Lecture 30 - Burning of Liquid Fuels- Part 5
Lecture 31 - Burning of Liquid Fuels- Part 6
Lecture 32 - Burning of Liquid Fuels- Part 7
Lecture 33 - Burning of Liquid Fuels- Part 8
Lecture 34 - Burning of Solid Fuels - Part 1
Lecture 35 - Burning of Solid Fuels - Part 2
Lecture 36 - Burning of Solid Fuels - Part 3
Lecture 37 - Burning of Solid Fuels - Part 4
Lecture 38 - Burning of Solid Fuels - Part 5
Lecture 39 - Burning of Solid Fuels - Part 6
Lecture 40 - Burning of Solid Fuels - Part 7
Lecture 41 - Analysis of Fire Plumes - Part 1
Lecture 42 - Analysis of Fire Plumes - Part 2
Lecture 43 - Analysis of Fire Plumes - Part 3
Lecture 44 - Analysis of Fire Plumes - Part 4
Lecture 45 - Analysis of Fire Plumes - Part 5
Lecture 46 - Analysis of Fire Plumes - Part 6
Lecture 47 - Enclosure Fires - Part 1
Lecture 48 - Enclosure Fires - Part 2
Lecture 49 - Enclosure Fires - Part 3
Lecture 50 - Enclosure Fires - Part 4
Lecture 51 - Enclosure Fires - Part 5
Lecture 52 - Enclosure Fires - Part 6
Lecture 53 - Enclosure Fires - Part 7
Lecture 54 - Introduction to dust ignition, dust explosion and forest fires - Part 1
Lecture 55 - Introduction to dust ignition, dust explosion and forest fires - Part 2
Lecture 56 - Introduction to dust ignition, dust explosion and forest fires - Part 3
Lecture 57 - Introduction to dust ignition, dust explosion and forest fires - Part 4
Lecture 58 - Introduction to dust ignition, dust explosion and forest fires - Part 5
Lecture 59 - Fire safety aspects - Part 1
Lecture 60 - Fire safety aspects - Part 2
Lecture 61 - Fire safety aspects - Part 3

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NPTEL Video Course - Mechanical Engineering - Data-Driven Models for Unsteady Fluid Flow

Subject Co-ordinator - Prof. Aditya G. Nair

Co-ordinating Institute - University of Nevada, Reno

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Data-driven models for unsteady fluid flows: Course overview
Lecture 2 - Data generation techniques for fluid flows
Lecture 3 - Dimensionality reduction of fluid flows
Lecture 4 - Reduced-order modeling of fluid flows
Lecture 5 - Turbulence modeling

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NPTEL Video Course - Mechanical Engineering - NOC:Applied Thermodynamics (2024)

Subject Co-ordinator - Prof. V. Raghavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Entropy change of a control volume - Part 1
Lecture 3 - Entropy change of a control volume - Part 2
Lecture 4 - Entropy change of a control volume - Part 3
Lecture 5 - Work interaction of internally reversible steady flow processes
Lecture 6 - Tutorial 1 - Entropy change of a control volume - Part 1
Lecture 7 - Tutorial 1 - Entropy change of a control volume - Part 2
Lecture 8 - Tutorial 2 - Entropy change of a control volume - Part 3
Lecture 9 - Tutorial 2 - Entropy change of a control volume - Part 4
Lecture 10 - Tutorial 2 - Entropy change of a control volume - Part 5
Lecture 11 - Tutorial 3 - Entropy change of a control volume, Work interaction of internally reversible - Par
Lecture 12 - Tutorial 3 - Entropy change of a control volume, Work interaction of internally reversible - Par
Lecture 13 - Tutorial 3 - Entropy change of a control volume, Work interaction of internally reversible - Par
Lecture 14 - Exergy - Part 1
Lecture 15 - Exergy - Part 2
Lecture 16 - Exergy - Part 3
Lecture 17 - Exergy - Part 4
Lecture 18 - Exergy - Part 5
Lecture 19 - Tutorial 4 - Exergy transfer and exergy change of a system - Part 1
Lecture 20 - Tutorial 4 - Exergy transfer and exergy change of a system - Part 2
Lecture 21 - Tutorial 5 - Exergy transfer and exergy change of a system - Part 3
Lecture 22 - Tutorial 5 - Exergy transfer and exergy change of a system - Part 4
Lecture 23 - Tutorial 5 - Exergy transfer and exergy change of a system - Part 5
Lecture 24 - Tutorial 6 - Exergy transfer and exergy change of a control volume - Part 1
Lecture 25 - Tutorial 6 - Exergy transfer and exergy change of a control volume - Part 2
Lecture 26 - Tutorial 6 - Exergy transfer and exergy change of a control volume - Part 3
Lecture 27 - Thermodynamic cycles - Rankine cycle - Part 1
Lecture 28 - Thermodynamic cycles - Rankine cycle - Part 2
Lecture 29 - Thermodynamic cycles - Rankine cycle - Part 3

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Lecture 30 - Thermodynamic cycles - Air standard Brayton cycle - Part 1
Lecture 31 - Thermodynamic cycles - Air standard Brayton cycle - Part 2
Lecture 32 - Thermodynamic cycles - Air standard Brayton cycle - Part 3
Lecture 33 - Thermodynamic cycles - Air standard Brayton cycle - Part 4
Lecture 34 - Thermodynamic cycles - Air standard Brayton cycle - Part 5
Lecture 35 - Thermodynamic cycles - Air standard Otto cycle
Lecture 36 - Thermodynamic cycles - Air standard Diesel cycle - Part 1
Lecture 37 - Thermodynamic cycles - Air standard Diesel cycle - Part 2
Lecture 38 - Thermodynamic cycles - Vapor compression refrigeration cycle
Lecture 39 - Psychrometry - Part 1
Lecture 40 - Psychrometry - Part 2
Lecture 41 - Psychrometry - Part 3
Lecture 42 - Psychrometry - Part 4
Lecture 43 - Psychrometry - Part 5
Lecture 44 - Psychrometry - Part 6
Lecture 45 - Psychrometry - Part 7
Lecture 46 - Tutorial 7 - Psychometry and Air conditioning processes - Part 1
Lecture 47 - Tutorial 7 - Psychometry and Air conditioning processes - Part 2
Lecture 48 - Tutorial 8 - Psychometry and Air conditioning processes - Part 3
Lecture 49 - Tutorial 8 - Psychometry and Air conditioning processes - Part 4
Lecture 50 - Combustion Thermodynamics - Part 1
Lecture 51 - Combustion Thermodynamics - Part 2
Lecture 52 - Combustion Thermodynamics - Part 3
Lecture 53 - Combustion Thermodynamics - Part 4
Lecture 54 - Tutorial 9 - Stoichiometry - Part 1
Lecture 55 - Tutorial 9 - Stoichiometry - Part 2
Lecture 56 - Tutorial 10 - Heat and temperature calculations in combustion - Part 1
Lecture 57 - Tutorial 10 - Heat and temperature calculations in combustion - Part 2
Lecture 58 - Tutorial 10 - Heat and temperature calculations in combustion - Part 3
Lecture 59 - Tutorial 10 - Heat and temperature calculations in combustion - Part 4
Lecture 60 - Tutorial 10 - Heat and temperature calculations in combustion - Part 5
Lecture 61 - Compressible flow through nozzles - Part 1
Lecture 62 - Compressible flow through nozzles - Part 2
Lecture 63 - Compressible flow through nozzles - Part 3
Lecture 64 - Compressible flow through nozzles - Part 4
Lecture 65 - Compressible flow through nozzles - Part 5
Lecture 66 - Compressible flow through nozzles - Part 6
Lecture 67 - Compressible flow through nozzles - Part 7
Lecture 68 - Compressible flow through nozzles - Part 8

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Lecture 69 - Compressible flow through nozzles - Part 9
Lecture 70 - Compressible flow through nozzles - Part 10
Lecture 71 - Compressible flow through nozzles - Part 11
Lecture 72 - Compressible flow through nozzles - Part 12

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NPTEL Video Course - Mechanical Engineering - NOC:Design of Mechanical Transmission Systems

Subject Co-ordinator - Prof. Ramkumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction, Evaluation, and Application of Gearbox
Lecture 2 - Machine Tool Gearbox: GP, Step Ratio, Preferred Numbers, Structural Formula and Rules of Optimum
Lecture 3 - Machine Tool Gearbox: Ray Diagram Construction
Lecture 4 - Machine Tool Gearbox: Kinematic Diagram Construction
Lecture 5 - Machine Tool Gearbox: Centre Distance and Teeth Calculation
Lecture 6 - Machine Tool Gearbox: Problem Solving
Lecture 7 - Automobile Gearbox: General Engine Operation and Transmission Types
Lecture 8 - Automobile Gearbox: Saw Tooth Diagram and Design Procedure for Gearbox
Lecture 9 - Automobile Gearbox: Problem Solving and Tyre Specification
Lecture 10 - Automobile Gearbox: Basic Transmission Types and Kinematic Diagram
Lecture 11 - Automobile Gearbox: Gear Failures and Material Selection
Lecture 12 - Automobile Gearbox: Module Calculation Concept - Part I
Lecture 13 - Automobile Gearbox: Module Calculation Concept - Part II
Lecture 14 - Automobile Gearbox: Shaft Design, Lubrication Selection and Method
Lecture 15 - Automobile Gearbox: Bearing Selection and Gearbox Losses
Lecture 16 - Brake: Introduction, Working Principle and Types
Lecture 17 - Brake: Torque Requirement for Drum Brake Systems
Lecture 18 - Brake: Problem Solving
Lecture 19 - Brake: Torque Requirement for Disc Brake Systems
Lecture 20 - Brake: Static and Dynamic Analysis
Lecture 21 - Brake: Dynamic Analysis - Brake Force Distribution and Optimum
Lecture 22 - Brake: Problem Solving
Lecture 23 - Brake: Braking Efficiency and Distance and Brake Factor
Lecture 24 - Brake: Problem Solving and Friction Materials
Lecture 25 - Brake: Thermal Analysis and Braking Conditions
Lecture 26 - Brake: Energy and Power, Braking Power Absorbed by Lining and Drum/Disc
Lecture 27 - Brake: Single Stop Braking and Repeated Braking - Temperature Analysis
Lecture 28 - Brake: Thermal Analysis Problem Solving
Lecture 29 - Clutch: Types and Working Method

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Lecture 30 - Clutch: Torque Transmitting Capacity - Uniform Pressure and Wear Theories
Lecture 31 - Clutch: Multiple Discs and Cone Clutches, Problem Solving
Lecture 32 - Clutch: Centrifugal Clutch
Lecture 33 - Clutch: Dynamic Analysis
Lecture 34 - Clutch: Dynamic Analysis Problem Solving

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NPTEL Video Course - Mechanical Engineering - NOC:Turbulence Modeling

Subject Co-ordinator - Prof. Vagesh D. Narasimhamurthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to turbulence
Lecture 2 - Statistical Analysis: An approach of modelling turbulence - I
Lecture 3 - Statistical Analysis: An approach of modelling turbulence - II
Lecture 4 - Statistical Analysis and Cartesian tensors - I
Lecture 5 - Statistical Analysis and Cartesian tensors - II
Lecture 6 - Navier Stokes: the governing equations - 1
Lecture 7 - Navier Stokes: the governing equations - 2
Lecture 8 - RANS equations I - 1
Lecture 9 - RANS equations I - 2
Lecture 10 - RANS equations II - 1
Lecture 11 - RANS equations II - 2
Lecture 12 - Reynold's stress: governing equations - I
Lecture 13 - Reynold's stress: governing equations - II
Lecture 14 - Statistical Stationarity and Homogenity in Plane Couttee Flows - I
Lecture 15 - Statistical Stationarity and Homogenity in Plane Couttee Flows - II
Lecture 16 - Pressure-strain-rate and redistribution of turbulence in flows - I
Lecture 17 - Pressure-strain-rate and redistribution of turbulence in flows - II
Lecture 18 - Turbulence Kinetic Energy and it's dissipation rate - I
Lecture 19 - Turbulence Kinetic Energy and it's dissipation rate - II
Lecture 20 - Production rate of TKE and Mean TKE - I
Lecture 21 - Production rate of TKE and Mean TKE - II
Lecture 22 - Turbulent Boundary Layer: Order of Magnitude analysis - I
Lecture 23 - Turbulent Boundary Layer: Order of Magnitude analysis - II
Lecture 24 - Inner and Outer TBL: Order of magnitude analysis - I
Lecture 25 - Inner and Outer TBL: Order of magnitude analysis - II
Lecture 26 - Inner layer equation, constant stress layer, and inner velocity scaling - I
Lecture 27 - Inner layer equation, constant stress layer, and inner velocity scaling - II
Lecture 28 - Reynold's Averaged Navier-Stokes (RANS) models - I
Lecture 29 - Reynold's Averaged Navier-Stokes (RANS) models - II

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Lecture 30 - Different approaches to solve turbulence closure problem - I
Lecture 31 - Different approaches to solve turbulence closure problem - II
Lecture 32 - Modelling of turbulent kinetic energy (k): production, destruction, and dissipation rate - I
Lecture 33 - Modelling of turbulent kinetic energy (k): production, destruction, and dissipation rate - II
Lecture 34 - Standard k-? model and the model constants - I
Lecture 35 - Standard k-? model and the model constants - II
Lecture 36 - Standard k-? model, RNG k-? model, and Prandltâ s one equation model - I
Lecture 37 - Standard k-? model, RNG k-? model, and Prandltâ s one equation model - II
Lecture 38 - New model k- ? and model constants - I
Lecture 39 - New model k- ? and model constants - II
Lecture 40 - Introduciton to wall-functions - I
Lecture 41 - Introduciton to wall-functions - II
Lecture 42 - Introduction to wall-resolved simulations - I
Lecture 43 - Introduction to wall-resolved simulations - II
Lecture 44 - Damping functions for LRN - I
Lecture 45 - Damping functions for LRN - II
Lecture 46 - Boundary and Initial conditions for RANS simulations - I
Lecture 47 - Boundary and Initial conditions for RANS simulations - II
Lecture 48 - Realizability constraints in eddy-viscoscity models - I
Lecture 49 - Realizability constraints in eddy-viscoscity models - II
Lecture 50 - Correctors for eddy-viscoscity models - I
Lecture 51 - Correctors for eddy-viscoscity models - II
Lecture 52 - Reynoldâ s Stress Modelling (RSM): governing equations - I
Lecture 53 - Reynoldâ s Stress Modelling (RSM): governing equations - II
Lecture 54 - Dissipation rate and Pressure-Strain rate modelling for RSM - I
Lecture 55 - Dissipation rate and Pressure-Strain rate modelling for RSM - II
Lecture 56 - Pressure-Strain rate modelling for RSM - I
Lecture 57 - Pressure-Strain rate modelling for RSM - II
Lecture 58 - Pressure-Strain rate modelling and wall corrections for RSM - I
Lecture 59 - Pressure-Strain rate modelling and wall corrections for RSM - II
Lecture 60 - Introduction to Eddy Resolved Models - I
Lecture 61 - Introduction to Eddy Resolved Models - II
Lecture 62 - Introduction to Direct Numerical Simulations (DNS) - I
Lecture 63 - Introduction to Direct Numerical Simulations (DNS) - II
Lecture 64 - Introduction to Large Eddy Simulations (LES) Filtering operation and SGS stresses - I
Lecture 65 - Introduction to Large Eddy Simulations (LES) Filtering operation and SGS stresses - II
Lecture 66 - Large Eddy Simulations: Filtered Navier-Stokes Equations - I
Lecture 67 - Large Eddy Simulations: Filtered Navier-Stokes Equations - II
Lecture 68 - Large Eddy Simulations: Filters and its types - I

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Lecture 69 - Large Eddy Simulations: Filters and its types - II
Lecture 70 - Large Eddy Simulations: Smagorinsky model - I
Lecture 71 - Large Eddy Simulations: Smagorinsky model - II
Lecture 72 - LES: Dynamic Smagorinsky model and Scale similarity models - I
Lecture 73 - LES: Dynamic Smagorinsky model and Scale similarity models - II
Lecture 74 - Numerics in LES and Hybrid models

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing of Turbines (Gas, Steam, Hydro and Wind)

Subject Co-ordinator - Prof. Sunny Zafar

Co-ordinating Institute - IIT - Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Introduction to the Course
Lecture 1 - Introduction to Turbines
Lecture 2 - Need of Turbines
Lecture 3 - General Specifications and Design Philosophy of Turbines
Lecture 4 - Manufacturing Concepts and Classification of Engineering Materials
Lecture 5 - Manufacturing Processes and Manufacturability
Lecture 6 - Materials vs Manufacturing Processes
Lecture 7 - Material Selection, Precision and Materology in Turbines
Lecture 8 - Introduction to Gas Turbines
Lecture 9 - Manufacturing of Gas Turbines - I
Lecture 10 - Manufacturing of Gas Turbines - II
Lecture 11 - Manufacturing of Gas Turbines - III
Lecture 12 - Manufacturing of Gas Turbines - IV
Lecture 13 - Manufacturing of Gas Turbines - V
Lecture 14 - Finishing Process for Gas Turbine Blades
Lecture 15 - Thermal Barrier Coatings for Gas Turbine Blades
Lecture 16 - Manufacturing Processes for TBCs
Lecture 17 - Material Reuirements for Steam Turbine Blades
Lecture 18 - Investment Casting Process for Steam Turbines
Lecture 19 - Deformation and Machining Processes for Steam Turbines
Lecture 20 - Laster Metal Direct Fabrication and Welding Process for Steam Turbines
Lecture 21 - Material Selection Challenges for Hydroturbines
Lecture 22 - Casting Processes for Hydro turbines
Lecture 23 - Forging and Welding Processes for Hydro Turbines
Lecture 24 - Machining Processes for Hydro Turbines
Lecture 25 - Coatings for Hydro Turbines
Lecture 26 - Material Selection for Wind Turbines - I
Lecture 27 - Material Selection for Wind Turbines - II
Lecture 28 - Material Selection for Wind Turbines - III

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Lecture 29 - Material Selection for Wind Turbines - IV
Lecture 30 - Material Selection for Wind Turbines - V
Lecture 31 - Manufacturing of Glass Fibers
Lecture 32 - Manufacturing of Carbon Fibers
Lecture 33 - Hand-Lay up and Spray-Up Process
Lecture 34 - Vaccum Bag Molding Process
Lecture 35 - Resin Transfer Molding
Lecture 36 - Vacuum Infusion Processing
Lecture 37 - Coatings for Wind Turbines - I
Lecture 38 - Coatings for Wind Turbines - II
Lecture 39 - Damage Prevention, Repair, Quality Assurance and Testing
Lecture 40 - Summary of Turbines

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Fluid Mechanics

Subject Co-ordinator - Prof. Anubhab Roy

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - An introduction to tensors - I
Lecture 3 - An introduction to tensors - II
Lecture 4 - An introduction to tensors - III
Lecture 5 - Fluid kinematics - I : Flow visualization
Lecture 6 - Fluid kinematics - II : Flow visualization
Lecture 7 - Fluid kinematics - III : Flow visualization
Lecture 8 - Fluid kinematics - IV : Fluid deformation
Lecture 9 - Fluid kinematics - V : Fluid deformation
Lecture 10 - Fluid kinematics - VI : Fluid deformation and Stress tensor
Lecture 11 - Conservation laws - I : Mass
Lecture 12 - Conservation laws - II : Momentum
Lecture 13 - Conservation laws - III : Momentum
Lecture 14 - Conservation laws - IV : Momentum conservation and Boundary conditions
Lecture 15 - Vorticity dynamics - I
Lecture 16 - Vorticity dynamics - II
Lecture 17 - Vorticity dynamics - III
Lecture 18 - Irrotational flow - I : Bernoulli's theorem and Potential flows
Lecture 19 - Irrotational flow - II : Two-dimensional potential flows
Lecture 20 - Irrotational flow - III : Potential flow past a circular cylinder
Lecture 21 - Irrotational flow - IV : Potential flow past a rotating circular cylinder
Lecture 22 - Irrotational flow - V : Translating rigid body in an inviscid flow
Lecture 23 - Irrotational flow - VI : Dâ Alembertâ s paradox and Kuttaâ Joukowski theorem
Lecture 24 - Irrotational flow - VII : Added mass and Kutta condition
Lecture 25 - Viscous laminar steady flows - I : Introduction
Lecture 26 - Viscous laminar steady flows - II : 2D fully developed planer flows
Lecture 27 - Viscous laminar steady flows - III : 2D fully developed planer flows
Lecture 28 - Viscous laminar steady flows - IV : Hagen-Poiseuille flow
Lecture 29 - Viscous laminar unsteady flows - I : Stokes first problem

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Lecture 30 - Viscous laminar unsteady flows - II : Stokes first problem
Lecture 31 - Viscous laminar unsteady flows - III : Stokes second problem
Lecture 32 - Boundary layer theory - I : Introduction
Lecture 33 - Boundary layer theory - II : Prandtl's boundary layer theory
Lecture 34 - Boundary layer theory - III : Prandtl's boundary layer theory
Lecture 35 - Boundary layer theory - IV : Blasius similarity solutions
Lecture 36 - Boundary layer theory - V : Blasius similarity solutions and Drag calculation
Lecture 37 - Boundary layer theory - VI : Drag calculation and Falkner-Skan equation
Lecture 38 - Boundary layer theory - VII : Von KÃ¡rmÃ¡n momentum integral equation and Drag calculation
Lecture 39 - Boundary layer theory - VIII : Boundary layer separation
Lecture 40 - Boundary layer theory - IX : External flows without surfaces
Lecture 41 - Introduction to hydrodynamic instability - I
Lecture 42 - Introduction to hydrodynamic instability - II

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NPTEL Video Course - Mechanical Engineering - NOC:Microrobotics

Subject Co-ordinator - Prof. I. A. Palani

Co-ordinating Institute - IIT - Indore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Micro Robotics Overview
Lecture 2 - Scaling Laws for Designing Micro Robots
Lecture 3 - Scaling Laws of Microrobots - 1
Lecture 4 - Scaling Laws of Microrobots - 2
Lecture 5 - Scaling Laws of Microrobots - 3
Lecture 6 - MicroMechanics System Design (Design of Microrobots) - 1
Lecture 7 - MicroMechanics System Design (Design of Microrobots) - 2
Lecture 8 - MicroMechanics System Design (Design of Microrobots) - 3
Lecture 9 - MicroMechanics System Design (Design of Microrobots) - 4
Lecture 10 - MicroMechanics System Design (Design of Microrobots) - 5
Lecture 11 - MicroMechanics System Design (Micro-Fabrication of Micro Robots) - 1
Lecture 12 - MicroMechanics System Design (Micro-Fabrication of Micro Robots) - 2
Lecture 13 - MicroMechanics System Design (Micro-Fabrication of Micro Robots) - 3
Lecture 14 - MicroMechanics System Design (Micro-Fabrication of Micro Robots) - 4
Lecture 15 - MicroMechanics System Design (Micro-Fabrication of Micro Robots) - 5
Lecture 16 - Microactuation and Micromanipulation - 1
Lecture 17 - Microactuation and Micromanipulation - 2
Lecture 18 - Microactuation and Micromanipulation - 3
Lecture 19 - Microactuation and Micromanipulation - 4
Lecture 20 - Microactuation and Micromanipulation - 5
Lecture 21 - Microactuation and Micromanipulation - 6
Lecture 22 - Microactuation and Micromanipulation - 7
Lecture 23 - Microactuation and Micromanipulation - 8
Lecture 24 - Microactuation and Micromanipulation - 9
Lecture 25 - Microactuation and Micromanipulation - 10
Lecture 26 - Micro Sensors and Micro Transducers - 1
Lecture 27 - Micro Sensors and Micro Transducers - 2
Lecture 28 - Micro Sensors and Micro Transducers - 3
Lecture 29 - Micro Sensors and Micro Transducers - 4

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Lecture 30 - Micro Sensors and Micro Transducers - 5
Lecture 31 - Micro Sensors and Micro Transducers - 6
Lecture 32 - Micro Sensors and Micro Transducers - 7
Lecture 33 - Micro Sensors and Micro Transducers - 8
Lecture 34 - Micro Sensors and Micro Transducers - 9
Lecture 35 - Micro Sensors and Micro Transducers - 10
Lecture 36 - Microsystems for Microrobots (Actuators) - 1
Lecture 37 - Microsystems for Microrobots (Actuators) - 2
Lecture 38 - Microsystems for Microrobots (Actuators) - 3
Lecture 39 - Microsystems for Microrobots (Actuators) - 4
Lecture 40 - Microsystems for Microrobots (Actuators) - 5
Lecture 41 - Microsystems for Microrobots (Manipulation) - 1
Lecture 42 - Microsystems for Microrobots (Manipulation) - 2
Lecture 43 - Microsystems for Microrobots (Manipulation) - 3
Lecture 44 - Microsystems for Microrobots (Manipulation) - 4
Lecture 45 - Microsystems for Microrobots (Manipulation) - 5
Lecture 46 - Microsystem for Microrobotics (Integrated approach) - 1
Lecture 47 - Microsystem for Microrobotics (Integrated approach) - 2
Lecture 48 - Microsystem for Microrobotics (Integrated approach) - 3
Lecture 49 - Microsystem for Microrobotics (Integrated approach) - 4
Lecture 50 - Microsystem for Microrobotics (Integrated approach) - 5
Lecture 51 - Bio Inspired Micro Robots (Propulsion and Locomotion) - 1
Lecture 52 - Bio Inspired Micro Robots (Propulsion and Locomotion) - 2
Lecture 53 - Bio Inspired Micro Robots (Propulsion and Locomotion) - 3
Lecture 54 - Bio Inspired Micro Robots (Propulsion and Locomotion) - 4
Lecture 55 - Bio Inspired Micro Robots (Propulsion and Locomotion) - 5
Lecture 56 - Bio Inspired Micro Robots (Integrated Approach) - 1
Lecture 57 - Bio Inspired Micro Robots (Integrated Approach) - 2
Lecture 58 - Bio Inspired Micro Robots (Integrated Approach) - 3
Lecture 59 - Bio Inspired Micro Robots (Integrated Approach) - 4
Lecture 60 - Bio Inspired Micro Robots (Integrated Approach) - 5

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NPTEL Video Course - Mechanical Engineering - NOC:Microhydrodynamics

Subject Co-ordinator - Prof. Anubhab Roy

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microhydrodynamics
Lecture 2 - Introduction to Tensors - Part 1
Lecture 3 - Introduction to Tensors - Part 2
Lecture 4 - Stokes Flow
Lecture 5 - Stokes Flow (Continued...)
Lecture 6 - Solution of Stokes flow equations - 1
Lecture 7 - Solution of Stokes flow equations - 2
Lecture 8 - Integral theorems in Stokes flow - 1 (Minimum Energy Dissipation theorem)
Lecture 9 - Integral theorems in Stokes flow - 2 Lorentz reciprocal theorem
Lecture 10 - Velocity field due to a rotating sphere in Stokes flow - Part 1
Lecture 11 - Velocity field due to a rotating sphere in Stokes flow - Part 2
Lecture 12 - Solution of a translating sphere in Stokes flow - Part 1
Lecture 13 - Solution of a translating sphere in Stokes flow - Part 2
Lecture 14 - Solution of a translating sphere in Stokes flow - Part 3
Lecture 15 - Faxen's laws - I
Lecture 16 - Faxen's laws - II
Lecture 17 - Stokes flow of a single particle in a simple shear flow - I
Lecture 18 - Stokes flow of a single particle in a simple shear flow - II
Lecture 19 - Stokes flow of a single particle in a simple shear flow - III
Lecture 20 - Einstein's effective viscosity for a dilute suspension - I
Lecture 21 - Einstein's effective viscosity for a dilute suspension - II
Lecture 22 - Boundary integral method - I
Lecture 23 - Boundary integral method - II
Lecture 24 - Boundary integral method - III
Lecture 25 - Stokes paradox
Lecture 26 - Slender body theory - I
Lecture 27 - Slender body theory - II
Lecture 28 - Slender body theory - III
Lecture 29 - Slender body theory - IV

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Lecture 30 - Slender body theory - V
Lecture 31 - Slender body theory - VI
Lecture 32 - Resistance and Mobility Matrices - I
Lecture 33 - Resistance and Mobility Matrices - II
Lecture 34 - Effect of inertia in low Reynolds number flows - I
Lecture 35 - Effect of inertia in low Reynolds number flows - II
Lecture 36 - Unsteady Stokes equation - I
Lecture 37 - Unsteady Stokes equation - II
Lecture 38 - Maxey-Riley-Gattignol equation - I
Lecture 39 - Maxey-Riley-Gattignol equation - II
Lecture 40 - Effect of finite Stokes number
Lecture 41 - Qulatative effects of fluid inertia
Lecture 42 - Inertial migration of spheres in a channel flow
Lecture 43 - Langevin equation - I
Lecture 44 - Langevin equation - II
Lecture 45 - Langevin equation - III
Lecture 46 - Langevin equation - IV
Lecture 47 - Hydrodynamic interactions - I: Method of reflections
Lecture 48 - Hydrodynamic interactions - II: Method of reflections
Lecture 49 - Hydrodynamic interactions - III: Lubrication theory
Lecture 50 - Hydrodynamic interactions - IV: Lubrication theory
Lecture 51 - Modelling dense suspensions - I
Lecture 52 - Modelling dense suspensions - II

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NPTEL Video Course - Mechanical Engineering - NOC:Foundations of Continuum Mechanics

Subject Co-ordinator - Prof. Gaurav Bhutani

Co-ordinating Institute - IIT Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Tensors
Lecture 3 - Summation Convention (Einstein Notation)
Lecture 4 - Kronecker Delta
Lecture 5 - Tutorial - Week 1
Lecture 6 - Permutation Symbol
Lecture 7 - Vector Operations
Lecture 8 - Tensor Operations
Lecture 9 - More on Indcial Notation
Lecture 10 - Tutorial - Week 2
Lecture 11 - Matrices and Determinants
Lecture 12 - Tensor Transformation - Part 1
Lecture 13 - Tensor Transformation - Part 2
Lecture 14 - Isotropy and Invariance
Lecture 15 - Tutorial - Week 3
Lecture 16 - Principal Values and Directions - Part 1
Lecture 17 - Principal Values and Directions - Part 2
Lecture 18 - Tensor Calculus - Part 1
Lecture 19 - Tensor Calculus - Part 2
Lecture 20 - Tutorial - Week 4
Lecture 21 - Cauchy Stress Principle
Lecture 22 - Cauchy Stress Formula
Lecture 23 - Cauchy Stress Tensor
Lecture 24 - Local Equilibrium Equations
Lecture 25 - Tutorial - Week 5
Lecture 26 - Stress Transformation and Principal Values
Lecture 27 - Stress Maxima - Lagrange Multiplier Method
Lecture 28 - Stress Maxima - Lagrange Multiplier Method
Lecture 29 - Plane Stress, Deviatoric Stress and Octahedral Shear Stress

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Lecture 30 - Tutorial - Week 6
Lecture 31 - Deformation and Configurations
Lecture 32 - Material and Spatial Coordinates
Lecture 33 - Lagrangian and Eulerian Description
Lecture 34 - Material Derivative
Lecture 35 - Tutorial - Week 7
Lecture 36 - Deformation Gradient Tensor
Lecture 37 - Finite Strain Tensors
Lecture 38 - Infinitesimal Deformation Theory
Lecture 39 - Strain Tensor and Plane Strain
Lecture 40 - Tutorial - Week 8
Lecture 41 - Rotations and Compatibility
Lecture 42 - Finite Deformations
Lecture 43 - Velocity Gradient
Lecture 44 - Strain Rate and Rate of Rotation
Lecture 45 - Tutorial - Week 9
Lecture 46 - Material Derivative of Elements
Lecture 47 - Reynolds Transport Theorem and Conservation of Mass
Lecture 48 - Momentum Equations
Lecture 49 - Lagrangian Form of Momentum Equations
Lecture 50 - Energy Equation and Tutorial - Week 10
Lecture 51 - Introduction to Constitutive Modelling - Part 1
Lecture 52 - Introduction to Constitutive Modelling - Part 2
Lecture 53 - Elasticity
Lecture 54 - Viscous and Viscoelastic Materials
Lecture 55 - Plasticity
Lecture 56 - Tutorial - Constitutive Modelling
Lecture 57 - Application - Linear Fluids
Lecture 58 - Navier-Stokes Equation
Lecture 59 - Fluid Flow Problem
Lecture 60 - Summary

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NPTEL Video Course - Mechanical Engineering - NOC:Autotronics

Subject Co-ordinator - Prof. Palani Iyamperumal Anand

Co-ordinating Institute - IIT Indore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Automotive Instrumentation: Introduction to Autotronics systems
Lecture 2 - Automotive Instrumentation: Representation of Autotronics systems
Lecture 3 - Automotive Instrumentation: Control Startergies and interfacing systems
Lecture 4 - Automotive Instrumentation: Electronic in Automotive Systems - Part 1
Lecture 5 - Automotive Instrumentation: Electronic in Automotive Systems - Part 2
Lecture 6 - Automotive Instrumentation: Elements for Automotive instruments
Lecture 7 - Automotive Instrumentation: Display devices
Lecture 8 - Automotive Instrumentation: Ignition System elements
Lecture 9 - Automotive Instrumentation: Devices for Ignition system
Lecture 10 - Automotive Instrumentation: Digital Ignition systems
Lecture 11 - Automotive Actuators and Transmission systems: Automotive Actuators
Lecture 12 - Automotive Actuators and Transmission systems: Fluid power actuators
Lecture 13 - Automotive Actuators and Transmission systems: Automotive Rotatory actuator
Lecture 14 - Automotive Actuators and Transmission systems: Motors for automotive systems
Lecture 15 - Automotive Actuators and Transmission systems: Lab demosnstration on motor controls
Lecture 16 - Automotive actuators and Transmission Systems: Drive Mechanism
Lecture 17 - Automotive actuators and Transmission Systems: Motors drives
Lecture 18 - Automotive actuators and Transmission Systems: ABS and EUI
Lecture 19 - Automotive actuators and Transmission Systems: EGR and Dampers
Lecture 20 - Introduction to Pneumatic system design
Lecture 21 - Automotive Actuators and Transmission systems: Transmission Mechatronics and Classification of H
Lecture 22 - Automotive Actuators and Transmission systems: Modeling of Transmission Mechatronics systems in
Lecture 23 - Automotive Actuators and Transmission systems: Electrical Variable Transmission and compound Spl
Lecture 24 - Automotive Actuators and Transmission systems: 4 wheel and 2 Wheel Drives in Hybrid Vehicles
Lecture 25 - Automotive Actuators and Transmission systems: Intelligent Braking system
Lecture 26 - Automotive sensors and MEMS systems: Automotive Sensors and MEMS systems
Lecture 27 - Automotive sensors and MEMS systems: Electromagnetic sensors, optical sensors, combustion knock
Lecture 28 - Automotive sensors and MEMS systems: optical sensors, combustion knock sensors
Lecture 29 - Automotive sensors and MEMS systems: Combustion knock sensors

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Lecture 30 - Pnuemtic and Hydraulic Simulation - 2
Lecture 31 - Automotive sensors and MEMS systems: Variable resisitance type sensor
Lecture 32 - Automotive sensors and MEMS systems: Rider height control sensor
Lecture 33 - Automotive sensors and MEMS systems: Tyre pressure sensor
Lecture 34 - Automotive sensors and MEMS systems: Rider height control sensor
Lecture 35 - Demonstration of Automotive sensors
Lecture 36 - Automotive Sensor and MEMS system: Thermal Sensors and its configuration
Lecture 37 - Automotive Sensor and MEMS system: Exhaust gas oxygen sensor
Lecture 38 - Automotive Sensor and MEMS system: Flex fuel sensor and its charecteristics
Lecture 39 - Automotive Sensor and MEMS system: Piezo Electric sensor and accelerometer
Lecture 40 - Automotive Sensor and MEMS system: Piezoelectric knock and TENG sensor
Lecture 41 - Vehicular Control System: Micro Computers in Automotive Control and Autosar
Lecture 42 - Vehicular Control System: Vehicle Control system, Fuel Flow Control
Lecture 43 - Vehicular Control System: Control for fuel systems
Lecture 44 - Vehicular Control System: Open loop and Closed loop system in Engine Control, Acceleration enric
Lecture 45 - Vehicular Control System: EGR Control, Varible Valve Timing Control, Turbo charging, Direct fuel
Lecture 46 - Automotive Vehicular Control system: Series parallel split hybrid and feedback based supervisory
Lecture 47 - Automotive Vehicular Control system: Series parallel split hybrid and feedback based supervisory
Lecture 48 - Automotive Vehicle Control: ABS and Advanced ABS
Lecture 49 - Automotive Vehiular Control system: Antilock braking system (ABS) Control, Automatic transmissio
Lecture 50 - Pneumatic and hydraulic basics circuits
Lecture 51 - Automatic System Diagnostics: Circuit testing, Six step approach
Lecture 52 - Automatic System Diagnostics: Noise diagnostics, Source of engine noise
Lecture 53 - Automatic System Diagnostics: Engine analysis and emission testing
Lecture 54 - Automatic System Diagnostics: Sensor for Automotive Diagnostics
Lecture 55 - Electropneumatic Demonstration with PLC
Lecture 56 - Automotive System Diagnostics: Ignition system Diagnostics
Lecture 57 - Automotive System Diagnostics: Engine Management fault finding, sensor fusion network
Lecture 58 - Automotive System Diagnostics: Intermittent Fault diagnostics in automotive system, categories o
Lecture 59 - Automotive System Diagnostics: Signal analysis and feature extraction in fault diagnostics
Lecture 60 - Tribo electric Nano generator for automotive Diagnostics

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Refrigeration Systems

Subject Co-ordinator - Prof. Jahar Sarkar

Co-ordinating Institute - IIT (BHU) Varanasi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Ideal Vapor Compression Cycle
Lecture 3 - Effect of Operation Parameter
Lecture 4 - Suction State for Maximum COP
Lecture 5 - Exergy Analysis Basics
Lecture 6 - Exergy Analysis of Vapor Compression Cycle
Lecture 7 - Transcritical Vapor Compression Cycle
Lecture 8 - Refrigeration Cycle with Internal Heat Exchanger
Lecture 9 - Refrigeration Cycle with expansion Turbine
Lecture 10 - Refrigeration Cycle with Flash Gas Bypass
Lecture 11 - Two stage Compression with Intercooling
Lecture 12 - Two stage Compression with Flash Gas removal
Lecture 13 - Two stage Compression with Flash Gas Intercooling
Lecture 14 - Multi Evaporator Refrigeration System - 1
Lecture 15 - Multi Evaporator Refrigeration System - 2
Lecture 16 - Cascade Refrigeration System - 1
Lecture 17 - Cascade Refrigeration System - 2
Lecture 18 - Refrigeration Cycle with Parallel Compression Economization
Lecture 19 - Refrigeration Cycle with Integrated Subcooling
Lecture 20 - Refrigeration Cycle with Dedicated Subcooling
Lecture 21 - Numerical for Lectuer 1 to Lectuer 20
Lecture 22 - Refrigerant Classification
Lecture 23 - Refrigerant Designation
Lecture 24 - Refrigerant Properties
Lecture 25 - Refrigerant Safety and Environment
Lecture 26 - Secondary Refrigerant and Libricant
Lecture 27 - Condenser Classification
Lecture 28 - Condenser Heat Transfer
Lecture 29 - Evaporator Classification

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Lecture 30 - Evaporator Heat Transfer
Lecture 31 - Other Heat Exchangers
Lecture 32 - Refrigerant Compressor
Lecture 33 - Rotary Compressors
Lecture 34 - Centrifugal Compressor
Lecture 35 - Expansion valves
Lecture 36 - Capillary Tube
Lecture 37 - Other System Components
Lecture 38 - System Control
Lecture 39 - System Simulation
Lecture 40 - Refrigeration System Design
Lecture 41 - Experiment and Measurement
Lecture 42 - Air Refrigeration Cycle
Lecture 43 - Vortex Tube Refrigeration
Lecture 44 - Absorption Refrigeration Cycle
Lecture 45 - Adsorption Refrigeration Cycle
Lecture 46 - Vapor Compression Refrigeration Cycle with Vortex Tube - 1
Lecture 47 - Vapor Compression Refrigeration Cycle with Vortex Tube - 2
Lecture 48 - Ejector
Lecture 49 - Steam Ejector Refrigeration
Lecture 50 - Ejector Refrigeration Cycle - Part 1
Lecture 51 - Ejector Refrigeration Cycle - Part 2
Lecture 52 - Vapor Compression Refrigeration Cycle with Two phase Ejector
Lecture 53 - Vapor Compression Refrigeration Cycle with Single Phase Ejector
Lecture 54 - Thermoelectric Refrigeration System
Lecture 55 - Components and Meterials of TEC
Lecture 56 - Performance Analysis of TEC
Lecture 57 - Parametric Study of Thermoelectric Cooler
Lecture 58 - Modifications in TEC
Lecture 59 - Magnetic Refrigeration System
Lecture 60 - Other Vapor Compression Cycle Modifications
Lecture 61 - Concluding Remarks

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NPTEL Video Course - Mechanical Engineering - Advanced Manufacturing Processes

Subject Co-ordinator - Dr. A.K. Sharma

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Manufacturing and Manufacturing Systems
Lecture 2 - Manufacturing Trends and Challenges
Lecture 3 - Manufacturing Aspects, Selection and Classification
Lecture 4 - Description and Taxonomy of the Mfg. Processes
Lecture 5 - Metal Casting basics, Gating and Risering design
Lecture 6 - Evaporative Pattern Casting Process (EPC)
Lecture 7 - Continuous, Permanent mold, Centrifugal and Pressure Die Casting
Lecture 8 - Hybrid EPC Processes and Vacuum EPC Process
Lecture 9 - Set-up of VEPC and Investment Casting Processes
Lecture 10 - Ceramic Shell Investment Casting Process
Lecture 11 - Shell Molding Process
Lecture 12 - Abrasive Flow Machining
Lecture 13 - Mechanism of Material Removal in AFM and Variant processes in AFM
Lecture 14 - Abrasive Jet Machining (AJM)
Lecture 15 - Water Jet and Abrasive Water Jet Machining
Lecture 16 - Ultrasonic Machining Process (USM)
Lecture 17 - Mechanism, Processes Variants and applications of USM
Lecture 18 - Micro USM and advances in USM
Lecture 19 - Electric Discharge Machining (EDM) Process
Lecture 20 - Die-Sinker EDM and Wire Cut Electric Discharge Machining (WEDM)
Lecture 21 - Variant Processes in EDM
Lecture 22 - Electro Chemical Discharge Machining (ECDM)
Lecture 23 - Laser Beam Machining (LBM)
Lecture 24 - Equipment and Process Parameters in LBM
Lecture 25 - Electrochemical Machining (ECM)
Lecture 26 - ECM Kinematics and Tool Design
Lecture 27 - The Subsystems in ECM, advantages and applications
Lecture 28 - Variant Processes in ECM
Lecture 29 - Electron Beam, Plasma Beam and Ion Beam Machining

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Lecture 30 - Submerged Arc Welding (SAW)
Lecture 31 - Resistance Welding Process
Lecture 32 - Solid State Welding processes
Lecture 33 - Friction Welding process
Lecture 34 - Electron Beam and Plasma Welding Processes
Lecture 35 - Laser Beam welding and Diffusion welding processes
Lecture 36 - High Energy Rate Forming Processes
Lecture 37 - Rapid Prototyping Technology (RPT)
Lecture 38 - Rapid Manufacturing, applications and advancements
Lecture 39 - Microwave Processing of Materials
Lecture 40 - Applications and new trends in Microwave Material Processing

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NPTEL Video Course - Mechanical Engineering - Computational Fluid Dynamics (Dr. K.M. Singh)

Subject Co-ordinator - Dr. K.M. Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction
Lecture 2 - CFD
Lecture 3 - Conservation Laws and Mathematical Preliminaries
Lecture 4 - Mass Conservation
Lecture 5 - Momentum Equation
Lecture 6 - Momentum Equation
Lecture 7 - Navier-Stokes Equation and its Simplified Forms
Lecture 8 - Energy and Scalar Transport Equations
Lecture 9 - Scalar Transport, Mathematical Classification and Boundary Conditions
Lecture 10 - Finite Difference Method
Lecture 11 - Finite Difference Approximation of First Order Derivatives
Lecture 12 - Finite Difference Approximation of Second Order Derivatives - 1
Lecture 13 - Finite Difference Approximation of Second Order Derivatives - 2
Lecture 14 - Approximation of Mixed Derivatives and Multi-Dimensional F.D. Formulae
Lecture 15 - Implementation of Boundary Conditions and Finite Difference Algebraic System
Lecture 16 - Applications of FDM to Scalar Transport Problems - 1
Lecture 17 - Applications of FDM to Scalar Transport Problems - 2
Lecture 18 - Application of FDM to Advection-Diffusion and Computer Implementation Aspects
Lecture 19 - Computer Implementation of FDM for Steady State Heat Diffusion Problems - 1
Lecture 20 - Computer Implementation of FDM for Steady State Heat Diffusion Problems - 2
Lecture 21 - Computer Implementation of FDM for Steady State Heat Diffusion Problems - 3
Lecture 22 - Solution of Discrete Algebraic Systems
Lecture 23 - Direct and Basic Iterative Methods for Linear Systems
Lecture 24 - Accelerated Iterative Methods for Linear Systems
Lecture 25 - Two Level and Multi-Level Methods for First Order IVPs - 1
Lecture 26 - Two Level and Multi-Level Methods for First Order IVPs - 2
Lecture 27 - Application to Unsteady Transport Problems
Lecture 28 - Introduction to Finite Volume Method
Lecture 29 - Finite Volume Interpolation Schemes

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Lecture 30 - Application of FVM to Scalar Transport
Lecture 31 - Introduction to Finite Element Method
Lecture 32 - Finite Element Shape Functions and Numerical Integration - 1
Lecture 33 - Finite Element Shape Functions and Numerical Integration - 2
Lecture 34 - Application of FEM to Scalar Transport
Lecture 35 - Special Features of Navier-Stokes Equations
Lecture 36 - Time Integration Techniques for Navier-Stokes Equations
Lecture 37 - Implicit Pressure Correction Methods
Lecture 38 - SIMPLEC, SIMPLER and Fractional Step Methods
Lecture 39 - Turbulent Flows
Lecture 40 - Reynolds Averaging and RANS Simulation Models
Lecture 41 - RANS Turbulence Models and Large Eddy Simulation
Lecture 42 - Introduction to Grid Generation
Lecture 43 - Aspects of Practical CFD Analysis

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NPTEL Video Course - Mechanical Engineering - Metal Casting

Subject Co-ordinator - Dr. D. B. Karunakar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Overview of different casting processes - 1
Lecture 3 - Overview of different casting processes - 2
Lecture 4 - Overview of different casting processes - 3
Lecture 5 - Terminology and Tools of Sand Moulding
Lecture 6 - Moulding Sands and Design - 1
Lecture 7 - Moulding Sands and Design - 2
Lecture 8 - Moulding Sands Properties
Lecture 9 - Moulding Sand Properties Testing
Lecture 10 - Cores and Core Sands
Lecture 11 - Patterns and Allowances
Lecture 12 - Steps Involved in Making a Sand Casting
Lecture 13 - Design of Risering System - 1
Lecture 14 - Design of Risering System - 2
Lecture 15 - Design of Risering System - 3
Lecture 16 - Design of Risering System - 4
Lecture 17 - Design of Risering System - 5
Lecture 18 - Design of Gating System - 1
Lecture 19 - Design of Gating System - 2
Lecture 20 - Sand Casting Defects - 1
Lecture 21 - Sand Casting Defects - 2
Lecture 22 - Melting Furnaces and Practice
Lecture 23 - Treatment of Molten Metal
Lecture 24 - Fluidity of Molten Metal
Lecture 25 - Solidification
Lecture 26 - Cast Irons and Steels
Lecture 27 - Aluminum and Magnesium Cast Alloys
Lecture 28 - Copper, Zinc and Titanium Cast Alloys
Lecture 29 - Die Casting Process - I

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Lecture 30 - Die Casting Process - II
Lecture 31 - Investment Casting Process - I
Lecture 32 - Investment Casting Process - II
Lecture 33 - Continuous Casting Process
Lecture 34 - Centrifugal Casting Process
Lecture 35 - Evaporative Pattern Casting and Plaster Moulding
Lecture 36 - Vacuum Sealed Moulding and Squeeze Casting
Lecture 37 - Shakeout, Fettling and Finishing
Lecture 38 - Inspection, Testing and Quality Control
Lecture 39 - Design Consideration and Economics
Lecture 40 - Environment, Health and Safety Aspects

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NPTEL Video Course - Mechanical Engineering - Processing of non metals

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Engineering Materials and Processing Techniques
Lecture 2 - Properties of Non-Metals
Lecture 3 - Glass Structure and Properties
Lecture 4 - Glass Processing - I
Lecture 5 - Glass Processing - II
Lecture 6 - Ceramics - I
Lecture 7 - Ceramics - II
Lecture 8 - Ceramic Powder Preparation
Lecture 9 - Ceramic Powder Preparation â I
Lecture 10 - Processing of Ceramic Parts ? Pressing
Lecture 11 - Processing of Ceramic Parts â II
Lecture 12 - Ceramics
Lecture 13 - Thermoplastics and Thermosets
Lecture 14 - Processing of Plastics
Lecture 15 - Extrusion of Plastics
Lecture 16 - Transfer Molding and Compression Molding
Lecture 17 - Injection Molding
Lecture 18 - Thermoforming
Lecture 19 - Rotational Molding and Blow Molding
Lecture 20 - Composite Materials
Lecture 21 - Composite Materials
Lecture 22 - Processing of Polymer Matrix Composites
Lecture 23 - Hand Lay-up and Spray Lay-up
Lecture 24 - Pultrusion
Lecture 25 - Compression Molding
Lecture 26 - Filament Winding
Lecture 27 - Injection Molding-1
Lecture 28 - Pre-pregging and Sheet Molding Compounds
Lecture 29 - Resin Transfer Molding and Autoclave Molding

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Lecture 30 - Ceramic Matrix Composites
Lecture 31 - Ceramic Matrix Composites
Lecture 32 - Powder Processing
Lecture 33 - Chemical Vapour Infiltration
Lecture 34 - Ceramic Matrix Composites
Lecture 35 - Ceramic Matrix Composites
Lecture 36 - Drilling of Polymer Matrix Composites
Lecture 37 - Hole Making Techniques for Polymer Matrix Composites
Lecture 38 - Joining of Polymer Matrix Composites
Lecture 39 - Microwave Joining of Polymer Matrix Composites
Lecture 40 - Research Tools for Secondary Processing

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NPTEL Video Course - Mechanical Engineering - Vibration control

Subject Co-ordinator - Dr. S. P. Harsha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Vibrations for Simple Mechanical Systems
Lecture 2 - Introduction to Damping in Free and Force Vibrations
Lecture 3 - Free and Forced Vibrations of Two Degree of Systems
Lecture 4 - Multi Degree of Freedom Systems
Lecture 5 - Reduction at source - 1
Lecture 6 - Reduction at source - 2
Lecture 7 - Reduction at source - 3
Lecture 8 - Feedback Control System - 1
Lecture 9 - Shunt Damping
Lecture 10 - Vibration Isolation - 1
Lecture 11 - Vibration Isolation - 2
Lecture 12 - Vibration Isolation - 3
Lecture 13 - Source Classification
Lecture 14 - Self Excitation Vibration
Lecture 15 - Flow Induction Vibration
Lecture 16 - Field Balancing of Rigid / Flexible Rotors
Lecture 17 - Damping
Lecture 18 - Damping
Lecture 19 - Numerical Problems
Lecture 20 - Design Sensitivity - I
Lecture 21 - Design Specification
Lecture 22 - Design for Enhanced Material Damping
Lecture 23 - Basics of Passive Vibration Control
Lecture 24 - Design of Absorber
Lecture 25 - Shock Absorber
Lecture 26 - Isolators with Stiffness and Damping
Lecture 27 - Basics of Active Vibration Control
Lecture 28 - Piezoelectric Material - I
Lecture 29 - Piezoelectric Material - II

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Lecture 30 - Piezoelectric Accelerometers
Lecture 31 - Electro-rheological (ER) Fluids
Lecture 32 - Magneto-rheological (MR) Fluids
Lecture 33 - Magneto and Electrostrictive Materials
Lecture 34 - Shape Memory Alloy
Lecture 35 - Electro-Magnetics
Lecture 36 - Numerical Problems
Lecture 37 - Basics of Vibration Measurement System
Lecture 38 - Data Acquisition
Lecture 39 - Fourier Transformation
Lecture 40 - Filters

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NPTEL Video Course - Mechanical Engineering - Welding Engineering

Subject Co-ordinator - Dr. D.K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Welding Engineering
Lecture 2 - Classification of Welding Processes - I
Lecture 3 - Classification of Welding Processes - II
Lecture 4 - Sources of Heat and Protection of Weld pool
Lecture 5 - Protection of Weld Pool
Lecture 6 - Introduction
Lecture 7 - Fundamentals of Arc Initiation
Lecture 8 - Arc Maintenance & Arc Characteristics
Lecture 9 - Arc Forces
Lecture 10 - Arc Efficiency
Lecture 11 - Melting Rate in Different Welding Processes
Lecture 12 - Types of power sources and their characteristics - I
Lecture 13 - Types of power sources and their characteristics - II
Lecture 14 - SMAW - I
Lecture 15 - SMAW - II
Lecture 16 - GTAW - I
Lecture 17 - GTAW - II
Lecture 18 - PAW & SAW
Lecture 19 - SAW
Lecture 20 - GMAW
Lecture 21 - Brazing, Soldering & Braze Welding
Lecture 22 - Braze welding and Electroslag welding
Lecture 23 - Weld Thermal Cycle
Lecture 24 - Effect of WTC and Cooling rate in welding
Lecture 25 - Cooling rate
Lecture 26 - Peak temperature & Solidification rate
Lecture 27 - Residual stress - I
Lecture 28 - Residual stress - II
Lecture 29 - Introduction

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Lecture 30 - Type of joints and welds
Lecture 31 - Edge preparation
Lecture 32 - Design for static and fatigue loading
Lecture 33 - Fatigue fracture of weld joints - I
Lecture 34 - Fatigue fracture of weld joints - II
Lecture 35 - Introduction-
Lecture 36 - DT & NDT
Lecture 37 - Understanding Weldability
Lecture 38 - Reactions in weldment
Lecture 39 - Weldability of Al alloys
Lecture 40 - Failure analysis and prevention

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NPTEL Video Course - Mechanical Engineering - Industrial Engineering

Subject Co-ordinator - Prof. P.K. Jain, Dr. Pradeep Kumar, Dr. Inderdeep Singh, Dr. D.K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Production Planning and Control
Lecture 2 - Product Design and Development
Lecture 3 - Statistical Process Control - Part I
Lecture 4 - Statistical Process Control - Part II
Lecture 5 - Statistical Process Control - Part III
Lecture 6 - Productivity
Lecture 7 - Factors Affecting the Productivity
Lecture 8 - Improving the Productivity Introduction to Work Study
Lecture 9 - Work Study Human Component and Method Study
Lecture 10 - Recording Techniques for Method Study - Part I
Lecture 11 - Recording Techniques for Method Study - Part II
Lecture 12 - Recording Techniques Critical Examination
Lecture 13 - Principles of Motion Economy
Lecture 14 - Work Measurement Time Study - Part I
Lecture 15 - Work Measurement Time Study - Part II
Lecture 16 - Performance Rating Allowances
Lecture 17 - Work Measurement
Lecture 18 - PMT System Standard Data Method
Lecture 19 - Ergonomics
Lecture 20 - Metabolism and Organization at Work
Lecture 21 - Working Conditions Lights Vibrations
Lecture 22 - Materials Management - Part I
Lecture 23 - Materials Management - Part II
Lecture 24 - Materials Requirement Planning
Lecture 25 - Sales Forecasting - Part I
Lecture 26 - Sales Forecasting - Part II
Lecture 27 - Capacity Planning - Part I
Lecture 28 - Capacity Planning - Part II
Lecture 29 - Network Analysis - Part I

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Lecture 30 - Network Analysis - Part II
Lecture 31 - Facility Design Part - Part I
Lecture 32 - Facility Design Part - Part II
Lecture 33 - Facility Design Part - Part III
Lecture 34 - Facility Design Part - Part IV
Lecture 35 - Product Design Development
Lecture 36 - Materials Handling
Lecture 37 - Quality Concepts
Lecture 38 - Value Engineering
Lecture 39 - Reliability
Lecture 40 - Industrial Safety

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NPTEL Video Course - Mechanical Engineering - Manufacturing Processes I

Subject Co-ordinator - Dr. D.B. Karunakar, Dr. Inderdeep Singh. Dr. D.K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Powder Metallurgy - Part I
Lecture 2 - Powder Metallurgy - Part II
Lecture 3 - Powder Metallurgy - Part III
Lecture 4 - Metal Forming - Fundamentals
Lecture 5 - Forging
Lecture 6 - Swaging and Wire Drawing
Lecture 7 - Sheet Metal Operations - Part I
Lecture 8 - Sheet Metal Operations - Part II
Lecture 9 - Sheet Metal Operations - Part III
Lecture 10 - Sheet Metal Working - Presses
Lecture 11 - Sheet Metal Working - Equipment
Lecture 12 - High Energy Rate Forming Processes
Lecture 13 - Machining Fundamentals
Lecture 14 - Machining - Part I
Lecture 15 - Machining - Part II
Lecture 16 - Machining - Part III
Lecture 17 - Metal casting - Part I
Lecture 18 - Metal casting - Part II
Lecture 19 - Metal Casting - Part III
Lecture 20 - Metal Casting - Part IV
Lecture 21 - Metal Casting - Part V
Lecture 22 - Metal Casting - Part VI
Lecture 23 - Metal Casting - Part VII
Lecture 24 - Metal Casting - Part VIII
Lecture 25 - Metal Casting - Part IX
Lecture 26 - Metal Casting - Part X
Lecture 27 - Introduction
Lecture 28 - Welding Process Classification
Lecture 29 - Brazing Soldering Braze Welding

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Lecture 30 - Arc Welding Power Source - Part I
Lecture 31 - Arc Welding Power Source - Part II
Lecture 32 - Shielded Metal Arc Welding - Part I
Lecture 33 - Shielded Metal Arc Welding - Part II
Lecture 34 - Submerged Arc Welding
Lecture 35 - Gas Metal Arc Welding - Part I
Lecture 36 - Gas Metal Arc Welding - Part II
Lecture 37 - Tungsten Inert Gas Welding - Part I
Lecture 38 - Tungsten Inert Gas Welding - Part II
Lecture 39 - Resistance Welding Process
Lecture 40 - Reaction in Weld Region Welding Defects

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NPTEL Video Course - Mechanical Engineering - Strength of Materials

Subject Co-ordinator - Dr. S.P. Harsha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solid Mechanics
Lecture 2 - Strength of Materials
Lecture 3 - Strength of Materials
Lecture 4 - Solid Mechanics
Lecture 5 - Strength of Materials
Lecture 6 - Strength of Materials
Lecture 7 - Strength of Materials
Lecture 8 - Strength of Materials
Lecture 9 - Strength of Materials
Lecture 10 - Strength of Materials
Lecture 11 - Strength of Materials
Lecture 12 - Strength of Materials
Lecture 13 - Strength of Materials
Lecture 14 - Strength of Materials
Lecture 15 - Strength of Materials
Lecture 16 - Strength of Materials
Lecture 17 - Strength of Materials
Lecture 18 - Strength of Materials
Lecture 19 - Strength of Materials
Lecture 20 - Strength of Materials
Lecture 21 - Strength of Materials
Lecture 22 - Strength of Materials
Lecture 23 - Strength of Materials
Lecture 24 - Strength of Materials
Lecture 25 - Strength of Materials
Lecture 26 - Strength of Materials
Lecture 27 - Strength of Materials
Lecture 28 - Strength of Materials
Lecture 29 - Strength of Materials

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Lecture 30 - Strength of Materials
Lecture 31 - Strength of Materials
Lecture 32 - Strength of Materials
Lecture 33 - Strength of Materials
Lecture 34 - Strength of Materials
Lecture 35 - Strength of Materials
Lecture 36 - Strength of Materials
Lecture 37 - Strength of Materials
Lecture 38 - Strength of Materials
Lecture 39 - Strength of Materials
Lecture 40 - Strength of Materials

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NPTEL Video Course - Mechanical Engineering - NOC:Two Phase Flow and Heat Transfer

Subject Co-ordinator - Dr. Arup Kumar Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Flow Regimes
Lecture 3 - Homogeneous Model
Lecture 4 - Drift Flux Model
Lecture 5 - (Missing Lecture)
Lecture 6 - Dispersed Flow
Lecture 7 - Slug Flow
Lecture 8 - Annular Flow
Lecture 9 - Droplet Annular and Stratified Flow
Lecture 10 - Measurement of Void Fraction
Lecture 11 - Signal Analysis
Lecture 12 - Two Fluid and Population Balance Model
Lecture 13 - Interface Tracking
Lecture 14 - Lattice Boltzmann Method
Lecture 15 - Smoothed Particle Hydrodynamics
Lecture 16 - Molecular Perspective of Two Phase Flow
Lecture 17 - Boiling Heat Transfer
Lecture 18 - Condensation
Lecture 19 - Solid-Liquid Flow
Lecture 20 - Gas-Solid Flow

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NPTEL Video Course - Mechanical Engineering - NOC:Refrigeration and Air-Conditioning

Subject Co-ordinator - Prof. Ravi Kumar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Recapitulation of Thermodynamics
Lecture 2 - Introduction to Refrigeration
Lecture 3 - Air Refrigeration Cycle
Lecture 4 - Aircraft Refrigeration Cycles - 1
Lecture 5 - Aircraft Refrigeration Cycles - 2
Lecture 6 - Aircraft Refrigeration Cycles - 3
Lecture 7 - Vapour Compression Cycle - 1
Lecture 8 - Vapour Compression Cycle - 2
Lecture 9 - P-h Charts
Lecture 10 - Actual Vapour Compression Cycle - 1
Lecture 11 - Actual Vapour Compression Cycle - 2
Lecture 12 - Compound Compression with Intercooling - 1
Lecture 13 - Compound Compression with Intercooling - 2
Lecture 14 - Multiple Evaporator and Cascade System
Lecture 15 - Problem Solving - 1
Lecture 16 - Refrigerants - 1
Lecture 17 - Refrigerants - 2
Lecture 18 - Vpour Absorption Systems - 1
Lecture 19 - Vpour Absorption Systems - 2
Lecture 20 - Vpour Absorption Systems - 3
Lecture 21 - Introduction to Air-conditioning
Lecture 22 - Properties of Moist Air
Lecture 23 - Psychrometric Chart
Lecture 24 - Psychrometric Processes - 1
Lecture 25 - Psychrometric Processes - 2
Lecture 26 - Psychrometric Processes - 3
Lecture 27 - Infiltration
Lecture 28 - Design Conditions
Lecture 29 - Cooling Load - 1

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Lecture 30 - Cooling Load - 2
Lecture 31 - Cooling Load - 3
Lecture 32 - Air Distribution System - 1
Lecture 33 - Air Distribution System - 2
Lecture 34 - Problem Solving - 2
Lecture 35 - Air-Conditioning Systems
Lecture 36 - Human Physiology
Lecture 37 - Thermal Comfort
Lecture 38 - Indoor Environmental Health - 1
Lecture 39 - Indoor Environmental Health - 2
Lecture 40 - Problem Solving - 3

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NPTEL Video Course - Mechanical Engineering - NOC:Engineering Economic Analysis

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Economy, Physical and Economic Environment, Phases in Engg. process
Lecture 2 - Some economic concepts, Value and utility, Interest and Interest rate, Time value of money
Lecture 3 - Interest formulas
Lecture 4 - Interest formulas for discrete compounding and discrete payments
Lecture 5 - Interest formulas for discrete compounding and discrete payments
Lecture 6 - Problem solving on discrete compounding, discrete payment
Lecture 7 - Interest formulas for Uniform gradient series
Lecture 8 - Interest formulas for geometric gradient series
Lecture 9 - Compounding frequency of Interest
Lecture 10 - Problem solving on frequency compounding of interest and gradient series factors
Lecture 11 - Economic equivalence
Lecture 12 - Equivalence calculations involving cash flows
Lecture 13 - Methods of comparison of alternatives
Lecture 14 - comparison of alternatives
Lecture 15 - Problem solving on equivalence and comparison of alternatives
Lecture 16 - Replacement analysis
Lecture 17 - Proper treatment of sunk cost in replacement
Lecture 18 - Replacement because of improved efficiency, inadequacy, demand etc.
Lecture 19 - Problem solving on replacement analysis
Lecture 20 - Economic life of the asset
Lecture 21 - Depreciation
Lecture 22 - Basic depreciation methods
Lecture 23 - Depreciation
Lecture 24 - Modified accelerated cost recovery system (MACRS) method of depreciation, Depletion
Lecture 25 - Depreciation
Lecture 26 - Problem solving based on Depreciation and Depletion
Lecture 27 - Elements of cost
Lecture 28 - Breakeven analysis, Effect of fixed and variable cost on BEP.
Lecture 29 - Economic order quantity

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Lecture 30 - Problem solving based on Breakeven analysis and EOQ
Lecture 31 - Cost estimation
Lecture 32 - cost estimating relationships
Lecture 33 - Introduction to decision under risk Criteria for decision under risk
Lecture 34 - Expected value decision making under risk
Lecture 35 - Expected variance decision making under risk
Lecture 36 - Problem solving based on decision under risk
Lecture 37 - Income taxes
Lecture 38 - Effect of method of depreciation on income taxes
Lecture 39 - After tax economic analysis
Lecture 40 - Problem solving based on Income tax analysis

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NPTEL Video Course - Mechanical Engineering - NOC:Convective Heat Transfer

Subject Co-ordinator - Dr. Arup Kumar Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Balance of Total Energy
Lecture 3 - Different Forms of Thermal Energy Equation
Lecture 4 - Thermal Boundary Layer
Lecture 5 - Forced Convection
Lecture 6 - Forced Convection
Lecture 7 - Forced Convection over a Flat Plate
Lecture 8 - Natural Convection
Lecture 9 - Natural Convection
Lecture 10 - Tutorial
Lecture 11 - Forced Convection in Ducts
Lecture 12 - Thermally Developed Slug Flow in a Duct
Lecture 13 - Thermally and Hydrodynamically Developed Flow
Lecture 14 - Thermally and Hydrodynamically Developed Flow
Lecture 15 - Thermal Entrance Region
Lecture 16 - Thermal Entrance Region
Lecture 17 - Rayleigh Benard Convection
Lecture 18 - Heat Transfer with Phase Change
Lecture 19 - Mass Transfer
Lecture 20 - Tutorial

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Mechanical Vibration

Subject Co-ordinator - Prof. Anil Kumar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lesson 1 - Introduction
Lecture 2 - Lesson 2 - Addition of two harmonic motions and beat phenomenon
Lecture 3 - Lesson 3 - Fourier series and harmonic analysis
Lecture 4 - Lesson 4 - Vibration analysis procedure
Lecture 5 - Lesson 5 - Numerical problems
Lecture 6 - Lesson 1 - Undamped free vibration
Lecture 7 - Lesson 2 - Energy method
Lecture 8 - Lesson 3 - Damped free vibration
Lecture 9 - Lesson 4 - Viscous damped systems and logarithmic decrement
Lecture 10 - Lesson 5 - Coulomb damping
Lecture 11 - Lesson 1 - Harmonic excitations
Lecture 12 - Lesson 2 - Magnification factor and frequency response curve
Lecture 13 - Lesson 3 - Rotating unbalance
Lecture 14 - Lesson 4 - Excitation of the support
Lecture 15 - Lesson 5 - Energy input and dissipation by viscous damping
Lecture 16 - Lesson 1 - Coulomb damping and equivalent viscous damping
Lecture 17 - Lesson 2 - Structural damping and equivalent viscous damping
Lecture 18 - Lesson 3 - Vibration isolation and force transmissibility
Lecture 19 - Lesson 4 - Motion transmissibility
Lecture 20 - Lesson 5 - Numerical problems
Lecture 21 - Lesson 1 - Transducers and vibration pickup
Lecture 22 - Lesson 2 - Vibrometer
Lecture 23 - Lesson 3 - Accelerometer
Lecture 24 - Lesson 4 - Velocity pickup or Velometer
Lecture 25 - Lesson 5 - Phase distortion and frequency measurement
Lecture 26 - Lesson 1 - Undamped free vibration
Lecture 27 - Lesson 2 - Principal modes of vibration
Lecture 28 - Lesson 3 - Combined rectilinear and angular modes
Lecture 29 - Lesson 4 - Damped free vibration

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Lecture 30 - Lesson 5 - Undamped forced vibration with harmonic excitation
Lecture 31 - Lesson 1 - Undamped dynamic vibration absorber
Lecture 32 - Lesson 2 - Tuned absorber
Lecture 33 - Lesson 3 - Numerical problems
Lecture 34 - Lesson 4 - Damped dynamic vibration absorber
Lecture 35 - Lesson 5 - Optimally tuned vibration absorber
Lecture 36 - Lesson 1 - Undamped free vibration
Lecture 37 - Lesson 2 - Eigen values and eigen vectors
Lecture 38 - Lesson 3 - Flexibility influence coefficients
Lecture 39 - Lesson 4 - Stiffness influence coefficients
Lecture 40 - Lesson 5 - Static and dynamic coupling

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NPTEL Video Course - Mechanical Engineering - NOC:Joining Technologies for Metals

Subject Co-ordinator - Prof. Dheerendra Kumar Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Manufacturing and Joining
Lecture 2 - Fundamental mechanisms of Joining
Lecture 3 - Classification of Joining Processes
Lecture 4 - Heat Generation in Welding
Lecture 5 - Protection of Weld Metal
Lecture 6 - Principle of Fusion Welding Processes: Gas Welding
Lecture 7 - Fundamentals of Welding
Lecture 8 - Physics of Welding Arc
Lecture 9 - Shielded Metal Arc Welding
Lecture 10 - Gas Tungsten Arc Welding
Lecture 11 - Newer variants of Gas tungsten arc welding
Lecture 12 - Gas metal arc welding
Lecture 13 - Submerged arc welding
Lecture 14 - Electro-slag and Electro-gas welding
Lecture 15 - Laser beam welding
Lecture 16 - Brazing
Lecture 17 - Soldering and braze welding
Lecture 18 - Fundamentals of resistance welding
Lecture 19 - Resistance welding processes: spot and seam welding
Lecture 20 - Flash butt welding
Lecture 21 - Adhesive joining
Lecture 22 - Weld bonding
Lecture 23 - Solid state joining technologies: Fundamentals
Lecture 24 - Ultrasonic welding
Lecture 25 - Diffusion welding
Lecture 26 - Explosive welding
Lecture 27 - Magnetic pulse welding
Lecture 28 - Weld thermal cycle
Lecture 29 - Heat affected zone and weld thermal cycle - I

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Lecture 30 - Heat affected zone and weld thermal cycle - II
Lecture 31 - Solidification of weld metal
Lecture 32 - Metallurgical transformations in weld and heat affected zone of steels
Lecture 33 - Residual Stresses in Weld Joints
Lecture 34 - Solidification cracking and their control
Lecture 35 - Cracking of Welded Joints II - Cold Cracks
Lecture 36 - Understanding Weldability Introduction - I
Lecture 37 - Understanding Weldability Introduction - II
Lecture 38 - Metal Properties and Weldability - I
Lecture 39 - Metal Properties and Weldability - II
Lecture 40 - Weldability of Work Hardenable Metals
Lecture 41 - Weldability of Work Hardenable and Precipitation Strengthened Metals
Lecture 42 - Weldability of Precipitation Strengthened Metals
Lecture 43 - Weldability of Metals Strengthened by Grain Refinement and Transformation Hardening
Lecture 44 - Weldability of Transformation Hardening Metals
Lecture 45 - Weldability of Metals - Combination of Strengthening Mechanisms
Lecture 46 - Weldability Consideration
Lecture 47 - Weldability of Carbon and Alloy Steel - I
Lecture 48 - Weldability of Carbon and Alloy Steel - II
Lecture 49 - Weldability of Carbon and Alloy Steel - III
Lecture 50 - Weldability of Low Carbon Steel and Mild Steel
Lecture 51 - Weldability of Medium Carbon Steel and High Carbon Steel
Lecture 52 - Weldability of High Strength Low Alloy Steels
Lecture 53 - Weldability of HTLA Steel - I
Lecture 54 - Weldability of HTLA Steel - II
Lecture 55 - Weldability of Cr-Mo Steel - I
Lecture 56 - Weldability of Cr-Mo Steel - II
Lecture 57 - Weldability of Pre-coated Steel - I
Lecture 58 - Weldability of Pre-coated Steel - II
Lecture 59 - Weldability of Stainless Steel - I
Lecture 60 - Weldability of Stainless Steel - II

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NPTEL Video Course - Mechanical Engineering - NOC:Modelling and Simulation of Dynamic Systems

Subject Co-ordinator - Prof. Pushparaj Mani Pathak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Modelling
Lecture 2 - Examples of models
Lecture 3 - Modeling of Dynamic Systems
Lecture 4 - Introduction to Simulation
Lecture 5 - MATLAB as a Simulation tool
Lecture 6 - Bond graphs modelling
Lecture 7 - Bond graph model and causality
Lecture 8 - Generation of System Equations
Lecture 9 - Methods of Drawing bond graph models - Mechanical Systems
Lecture 10 - Methods of Drawing bond graph models - Electrical Systems
Lecture 11 - Basic System Models - Mechanical Systems
Lecture 12 - Basic System Models - Electrical Systems
Lecture 13 - Basic System Models - Hydraulic Systems
Lecture 14 - Basic System Models - Pneumatic Systems
Lecture 15 - Basic System Models - Thermal Systems
Lecture 16 - System Models
Lecture 17 - System Model of Combined Rotary and Translatory Systems
Lecture 18 - System Model of Electro Mechanical Systems
Lecture 19 - System Model of Hydro Mechanical Systems
Lecture 20 - System Models of Robots
Lecture 21 - Dynamic response of the 1st order system
Lecture 22 - Dynamic response of 2nd order system
Lecture 23 - Performance measures for 2nd order system
Lecture 24 - System Transfer functions
Lecture 25 - Transfer Function of 1st and 2nd Order System
Lecture 26 - Block Diagram Algebra
Lecture 27 - Signal Flow Graphs
Lecture 28 - State Variable Formulation
Lecture 29 - Frequency Response

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Lecture 30 - Bode Plot
Lecture 31 - Simulation using SIMULINK
Lecture 32 - Simulation of simple and compound pendulums
Lecture 33 - Simulation of planar mechanisms
Lecture 34 - Simulation of wheeled mobile robots
Lecture 35 - Validation and Verification of Simulation Models
Lecture 36 - Parameter estimation methods
Lecture 37 - Parameter estimation examples
Lecture 38 - System identifications
Lecture 39 - Introduction to Optimization
Lecture 40 - Optimization with modeling of engineering problems

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NPTEL Video Course - Mechanical Engineering - NOC:Principles of Casting Technology

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Casting Technology
Lecture 2 - Mechanism of solidification
Lecture 3 - Solidification of Pure Metals and Alloys
Lecture 4 - Freeze Wave Mechanism and Solidification Time
Lecture 5 - Problem Solving on Solidification
Lecture 6 - Technology of pattern making
Lecture 7 - Allowances in pattern making
Lecture 8 - Moulding sands and its ingredients
Lecture 9 - Testing of molding sands
Lecture 10 - Sand preparation for casting
Lecture 11 - Technology of mould making
Lecture 12 - Technology of core making
Lecture 13 - Special sand moulding process
Lecture 14 - Organic binders
Lecture 15 - Special moulding process
Lecture 16 - Introduction of gating design
Lecture 17 - Types of gate
Lecture 18 - Pouring time calculation
Lecture 19 - Aspiration effects in gating system
Lecture 20 - Problem solving on gating design
Lecture 21 - Solidification analysis
Lecture 22 - Risering methods
Lecture 23 - Shape factor
Lecture 24 - Feeding and Chills effect
Lecture 25 - Problem related to riser design
Lecture 26 - Special casting process - 1
Lecture 27 - Special casting process - 2
Lecture 28 - Special casting process - 3
Lecture 29 - Technology of melting

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Lecture 30 - Melting practices
Lecture 31 - Melting and Casting of cast metal
Lecture 32 - Melting practice for gray iron
Lecture 33 - Melting practice for Malleable iron and S.G iron
Lecture 34 - Casting of steel and alloy steel
Lecture 35 - Casting practices for non-ferrous metals and alloys
Lecture 36 - Fettling of castings
Lecture 37 - Heat treatment of castings
Lecture 38 - Heat treatment practices for cast iron and non-ferrous metals and alloys
Lecture 39 - Casting defects
Lecture 40 - Diagnostics of casting defects

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NPTEL Video Course - Mechanical Engineering - NOC:Steam and Gas Power Systems

Subject Co-ordinator - Prof. Ravi Kumar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Thermodynamics
Lecture 2 - Rankine Cycle
Lecture 3 - Performance of Rankine Cycle
Lecture 4 - Binary vapour cycle and co-generation
Lecture 5 - Problem Solving (Rankine Cycle)
Lecture 6 - Steam Generators
Lecture 7 - Fire Tube Boilers
Lecture 8 - Water Tube Boilers
Lecture 9 - Boiler Mountings and Accessories
Lecture 10 - High Pressure Boilers (Part-1)
Lecture 11 - High Pressure Boilers (Part-2)
Lecture 12 - Draught
Lecture 13 - Performance of Boiler
Lecture 14 - Combustion of Fuel
Lecture 15 - Combustion of Fuel (Problem Solving)
Lecture 16 - Boiler Trial
Lecture 17 - Nozzles and Diffusers - Momentum and Continuity Equations
Lecture 18 - Nozzles and Diffusers - Efficiency and Critical Pressure
Lecture 19 - Nozzles and Diffusers - General Relationships and Supersaturated Flow
Lecture 20 - Problem Solving (Nozzles and diffusers)
Lecture 21 - Steam Turbine
Lecture 22 - Compounding of Steam Turbine
Lecture 23 - Impulse Steam Turbine
Lecture 24 - Impulse Steam Turbine Performance
Lecture 25 - Problem solving (Impulse Steam Turbine)
Lecture 26 - Impulse Reaction Steam Turbine
Lecture 27 - Impulse Reaction Steam Turbine Performance
Lecture 28 - Energy Losses in Steam Turbine
Lecture 29 - Condensers

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Lecture 30 - Problem Solving (Steam Turbine)
Lecture 31 - Gas turbine cycle
Lecture 32 - Gas Turbine cycle Performance Evaluations
Lecture 33 - Gas Turbine cycle - Modifications
Lecture 34 - Problem Solving (Gas Turbine Cycle)
Lecture 35 - Centrifugal Compressors
Lecture 36 - Centrifugal Compressors Characteristics
Lecture 37 - Axial Flow Compressor
Lecture 38 - Axial Flow Compressor Characteristics
Lecture 39 - Jet Propulsion
Lecture 40 - Problem Solving

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NPTEL Video Course - Mechanical Engineering - NOC:Product Design and Development

Subject Co-ordinator - Prof. Indradeep Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to product design and development
Lecture 2 - Product life-cycle
Lecture 3 - Product policy of an organization and selection of profitable products
Lecture 4 - Product design
Lecture 5 - Product design steps and product analysis
Lecture 6 - Value engineering concepts
Lecture 7 - Problem Identification and VEJP
Lecture 8 - Function analysis
Lecture 9 - Functional analysis system technique
Lecture 10 - Case study on value engineering
Lecture 11 - Quality function deployment
Lecture 12 - Computer aided design
Lecture 13 - Rubust design
Lecture 14 - Design for X
Lecture 15 - Ergonomics in product design
Lecture 16 - DFMA guidelines
Lecture 17 - Product design for manual assembly
Lecture 18 - Design guidelines for different processes
Lecture 19 - Rapid prototyping
Lecture 20 - Rapid prototyping processes

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Manufacturing Processes

Subject Co-ordinator - Dr. D. K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Manufacturing
Lecture 2 - Fundamental Approaches of Manufacturing
Lecture 3 - Manufacturing Process Specific Advantages and Limitations
Lecture 4 - Material and Manufacturing Processes
Lecture 5 - Classification of Manufacturing Processes
Lecture 6 - Selection of Manufacturing Processes
Lecture 7 - Applications of Manufacturing Processes
Lecture 8 - Effect of Manufacturing Processes on Mechanical Properties
Lecture 9 - Break Even Analysis in Manufacturing Processes
Lecture 10 - Casting
Lecture 11 - Steps of Casting Processes
Lecture 12 - Casting
Lecture 13 - The Pattern Allowances - I
Lecture 14 - The Pattern Allowances - II
Lecture 15 - Casting
Lecture 16 - Sand Moulding - II
Lecture 17 - Casting
Lecture 18 - Casting
Lecture 19 - Casting
Lecture 20 - Casting
Lecture 21 - Casting
Lecture 22 - Casting
Lecture 23 - Casting
Lecture 24 - Casting
Lecture 25 - Metal Working Processes
Lecture 26 - Metal Working Processes
Lecture 27 - Metal Working Processes
Lecture 28 - Metal Working Processes
Lecture 29 - Metal Working Processes

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Lecture 30 - Metal Working Processes
Lecture 31 - Sheet Metal Operations
Lecture 32 - Metal Working Processes
Lecture 33 - Metal Working Processes
Lecture 34 - Metal Working Processes
Lecture 35 - Material Removal Processes
Lecture 36 - Material Removal Processes
Lecture 37 - Material Removal Processes
Lecture 38 - Material Removal Processes
Lecture 39 - Material Removal Processes
Lecture 40 - Material Removal Processes
Lecture 41 - Material Removal Processes
Lecture 42 - Material removal processes
Lecture 43 - Material removal processes
Lecture 44 - Material removal Processes
Lecture 45 - Material removal Processes
Lecture 46 - Material removal processes
Lecture 47 - Joining of metals
Lecture 48 - Joining of metals
Lecture 49 - Joining of metals
Lecture 50 - Brazing, soldering and weldability
Lecture 51 - Weldability and welding defects
Lecture 52 - Heat treatment
Lecture 53 - Heat treatment
Lecture 54 - Heat treatment
Lecture 55 - Heat treatment
Lecture 56 - Heat treatment
Lecture 57 - Improving surface properties
Lecture 58 - Improving surface properties
Lecture 59 - Improving surface properties
Lecture 60 - Improving surface properties

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NPTEL Video Course - Mechanical Engineering - NOC:Modelling and Simulation of Discrete Event System

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Simulation
Lecture 2 - Concept of System, Model and Simulation
Lecture 3 - Time advance mechanism, Components of a simulation model
Lecture 4 - Program organization and logic, Steps in a simulation study
Lecture 5 - Simulation examples
Lecture 6 - Statistical Models in Simulation
Lecture 7 - Input probability distribution functions for discrete systems
Lecture 8 - Continuous distribution functions
Lecture 9 - Continuous distribution functions and empirical distribution functions
Lecture 10 - Problem solving on statistical models in simulation
Lecture 11 - Characteristics of a queueing system
Lecture 12 - Performance measures of queueing system
Lecture 13 - Analysis of a single server queueing system
Lecture 14 - Simulation of a single server queueing system
Lecture 15 - Computer representation of simulation of single server queuing system
Lecture 16 - Generation of Random Numbers
Lecture 17 - Issues and Challenges in Congruential Generators
Lecture 18 - Testing of random numbers
Lecture 19 - Generation of Random Variates
Lecture 20 - Problem Solving on Random Number and Random Variate Generation
Lecture 21 - Input modeling
Lecture 22 - Input modeling
Lecture 23 - Input modeling
Lecture 24 - Input modeling
Lecture 25 - Problem Solving on input modeling
Lecture 26 - Output analysis of a single system
Lecture 27 - Obtaining a specified precision
Lecture 28 - Comparison of alternative system configurations
Lecture 29 - Confidence Intervals for comparing more than two systems

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Lecture 30 - Problem Solving on output analysis of single and alternative systems
Lecture 31 - Introduction to simulation of manufacturing and material handling system
Lecture 32 - Issues in material handling system
Lecture 33 - Modeling of system randomness
Lecture 34 - Verification of simulation models
Lecture 35 - Model validity and credibility
Lecture 36 - Problem solving and case studies on simulation of manufacturing system
Lecture 37 - Introduction to Monte Carlo Simulation
Lecture 38 - Inventory Control Simulation using Monte Carlo Technique
Lecture 39 - In this lecture, Monte Carlo technique was used to solve inventory system problems
Lecture 40 - Problem solving on Monte Carlo Simulation

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NPTEL Video Course - Mechanical Engineering - NOC:Processing of Polymers and Polymer Composites

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to course
Lecture 2 - Engineering materials and processing techniques
Lecture 3 - Thermoplastics and thermosets
Lecture 4 - Processing of polymers
Lecture 5 - Thermoforming processes
Lecture 6 - Extrusion - I
Lecture 7 - Extrusion - II
Lecture 8 - Compression molding
Lecture 9 - Injection molding - I
Lecture 10 - injection molding - II
Lecture 11 - Transfer molding
Lecture 12 - Rotational molding
Lecture 13 - Blow molding
Lecture 14 - Composite materials
Lecture 15 - Classification of composite materials
Lecture 16 - Processing of polymer composites
Lecture 17 - Hand lay-up
Lecture 18 - Spray lay-up
Lecture 19 - Compression molding
Lecture 20 - Injection molding
Lecture 21 - Reaction injection molding
Lecture 22 - Autoclave molding
Lecture 23 - Resin transfer molding
Lecture 24 - Filament winding
Lecture 25 - Pultrusion process
Lecture 26 - Sheet molding
Lecture 27 - Pre-pregging and challenges in primary processing of composites
Lecture 28 - Secondary processing of polymer composites
Lecture 29 - Joining of polymer composites

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Lecture 30 - Adhesive joining
Lecture 31 - Mechanical joining
Lecture 32 - Microwave joining
Lecture 33 - Induction and resistance welding
Lecture 34 - Drilling of polymer matrix composites - I
Lecture 35 - Drilling of polymer matrix composites - II
Lecture 36 - Methods to prevent drilling induced damage
Lecture 37 - Non-conventional drilling
Lecture 38 - Process simulation of secondary processing
Lecture 39 - Intelligent drilling of polymer matrix composites
Lecture 40 - Web based tools for polymer matrix composites

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NPTEL Video Course - Mechanical Engineering - NOC:Operations Management

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Operations Management
Lecture 2 - Operations Management
Lecture 3 - Operations Management
Lecture 4 - Types of Production Systems
Lecture 5 - Operations Strategy
Lecture 6 - Product Life-Cycle
Lecture 7 - Value Engineering Concepts
Lecture 8 - Design for X (DFX)
Lecture 9 - Ergonomics in Product Design
Lecture 10 - Rapid Prototyping
Lecture 11 - Sales Forecasting
Lecture 12 - Forecasting System
Lecture 13 - Qualitative Methods of Forecasting
Lecture 14 - Quantitative Methods - I
Lecture 15 - Quantitative Methods - II
Lecture 16 - Facility Planning
Lecture 17 - Factors Affecting Plant Location
Lecture 18 - Plant Location
Lecture 19 - Location Evaluation Methods - I
Lecture 20 - Location Evaluation Methods - II
Lecture 21 - Facility Layout and Planning - I
Lecture 22 - Facility Layout and Planning - II
Lecture 23 - Factors Influencing Plant Layout
Lecture 24 - Material Flow Patterns
Lecture 25 - Tools and Techniques used For Plant Layout Planning
Lecture 26 - Production Planning and Control
Lecture 27 - Process Planning
Lecture 28 - Aggregate Production Planning
Lecture 29 - Capacity Planning

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Lecture 30 - Capacity Planning
Lecture 31 - Project Scheduling
Lecture 32 - Network Diagrams
Lecture 33 - Critical Path Method
Lecture 34 - Critical Path Method
Lecture 35 - Critical Path Method
Lecture 36 - Program Evaluation and Review Technique (PERT)
Lecture 37 - PERT Problems - I
Lecture 38 - PERT Problems - II
Lecture 39 - Time Cost Trade Off (Crashing)
Lecture 40 - Project Network
Lecture 41 - Production Control
Lecture 42 - Sequencing
Lecture 43 - Sequencing Problems - I
Lecture 44 - Sequencing Problems - II
Lecture 45 - Master Production Scheduling (MPS)
Lecture 46 - Concept of Quality
Lecture 47 - Total Quality Management (TQM)
Lecture 48 - Total Productive Maintenance
Lecture 49 - Statistical Quality Control (SQC)
Lecture 50 - Six Sigma
Lecture 51 - Materials Management
Lecture 52 - Inventory Control
Lecture 53 - Economic Order Quantity (EOQ) Models
Lecture 54 - Economic Order Quantity (EOQ)
Lecture 55 - Production Quantity Model
Lecture 56 - Just In time (JIT)
Lecture 57 - Kanban System
Lecture 58 - Materials Requirement Planning (MRP) - I
Lecture 59 - Materials Requirement Planning (MRP) - II
Lecture 60 - Enterprise Resource Planning (ERP)

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NPTEL Video Course - Mechanical Engineering - NOC:Theory of Production Processes

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Theory and Practics of Casting
Lecture 2 - Theory of Solidification
Lecture 3 - Solidification of pure metals and alloys
Lecture 4 - Factors affecting solidification process
Lecture 5 - Fluidity of liquid metals
Lecture 6 - Technology of patternmaking
Lecture 7 - Patternmaking
Lecture 8 - Molding sand ingredients and sand testing methods
Lecture 9 - Sand molding methods
Lecture 10 - Coremaking
Lecture 11 - Gating system design
Lecture 12 - Gating system design
Lecture 13 - Introduction to riser design
Lecture 14 - Risering methods
Lecture 15 - Problem solving on gating design and risering methods
Lecture 16 - Theory of melting
Lecture 17 - Melting and production of Iron castings
Lecture 18 - Production of steel and non-ferrous castings
Lecture 19 - Casting design considerations
Lecture 20 - Casting defects
Lecture 21 - Concept of stress and strain, Elastic and plastic behavior
Lecture 22 - State of stress in two and three dimensions, Mohrâ s circle
Lecture 23 - Description of strain at a point
Lecture 24 - Mean and deviator stresses, Elastic stress strain relationships
Lecture 25 - Theory of plasticity
Lecture 26 - Yield criteria for ductile materials
Lecture 27 - Flow rules, Plastic stress strain relationships
Lecture 28 - Classification of metal working processes
Lecture 29 - Mechanics of metal working

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Lecture 30 - Temperature in metalworking
Lecture 31 - Rolling process
Lecture 32 - Analysis of rolling operation
Lecture 33 - Introduction to forging Process
Lecture 34 - Analysis of forging process
Lecture 35 - Problem solving on rolling and forging processes
Lecture 36 - Extrusion process
Lecture 37 - Drawing of rods, tubes and wires
Lecture 38 - Analysis of drawing operation
Lecture 39 - Sheet metal operations
Lecture 40 - Metal Forming Defects
Lecture 41 - Classification of joining processes
Lecture 42 - Heat flow in welding
Lecture 43 - Metallurgy of fusion welds
Lecture 44 - Heat affected zone in welding
Lecture 45 - Heat treatment processes in welding
Lecture 46 - Principle of shield arc welding processes
Lecture 47 - Principle of gas shield arc welding processes
Lecture 48 - Principle of Resistance welding
Lecture 49 - Principle of Solid State Welding Processes
Lecture 50 - Brazing, soldering and adhesive bonding
Lecture 51 - Residual stresses in welding
Lecture 52 - Methods of controlling residual stresses in welding
Lecture 53 - Welding Distortion
Lecture 54 - Control of welding distortion
Lecture 55 - Preheat and postweld heat treatment of weldments
Lecture 56 - Weldability of metals
Lecture 57 - Weldability of steels
Lecture 58 - Weldability of cast iron
Lecture 59 - Weldability of non-ferrous materials
Lecture 60 - Welding defects

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NPTEL Video Course - Mechanical Engineering - NOC:Automatic Control

Subject Co-ordinator - Dr. Anil Kumar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition and Types
Lecture 2 - Performance Specifications
Lecture 3 - Design Process
Lecture 4 - Block Diagrams
Lecture 5 - Laplace Transform and Transfer Function
Lecture 6 - Translational Mechanical System
Lecture 7 - Rotational Mechanical System
Lecture 8 - Electrical System
Lecture 9 - Linearization of Nonlinear Systems
Lecture 10 - Numerical Problems
Lecture 11 - Poles and Zeros
Lecture 12 - First Order System
Lecture 13 - Second Order System
Lecture 14 - Underdamped Second Order System - I
Lecture 15 - Underdamped Second Order System - II
Lecture 16 - Definition of Stability
Lecture 17 - Routh-Hurwitz Criterion
Lecture 18 - Routh-Hurwitz Criterion- Special Cases
Lecture 19 - Steady State Errors
Lecture 20 - Static Error Constants
Lecture 21 - Define Root Locus
Lecture 22 - Sketching of Root Locus - I
Lecture 23 - Sketching of Root Locus - II
Lecture 24 - Sketching of Root Locus - III
Lecture 25 - Numerical Examples and Second Order Approximation
Lecture 26 - PI Controller Design
Lecture 27 - PD Controller Design
Lecture 28 - PID Controller Design
Lecture 29 - Lag Compensation

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Lecture 30 - Lead and Lag-Lead Compensation
Lecture 31 - State Space Representation
Lecture 32 - Converting a Transfer Function to State Space
Lecture 33 - Converting From State Space to Transfer Function
Lecture 34 - Controller Design
Lecture 35 - Controller Design and Controllability
Lecture 36 - Transfer Function, Poles, Zeros, Response
Lecture 37 - Steady State Error, Root Locus
Lecture 38 - Design Via Root Locus, Compensation - I
Lecture 39 - Design Via Root Locus, Compensation - II
Lecture 40 - State Space Method

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NPTEL Video Course - Mechanical Engineering - NOC:Failure Analysis and Prevention

Subject Co-ordinator - Dr. D. K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Need and scope of failure analysis and prevention
Lecture 2 - Introduction: Engineering disasters and understanding failures
Lecture 3 - Fundamental sources of failures: Deficient design - I
Lecture 4 - Fundamental sources of failures: Deficient design - II
Lecture 5 - Fundamental sources of failures: Deficient design III and upgrading of a part
Lecture 6 - Fundamental sources of failures: Imperfections in base metals
Lecture 7 - Fundamental sources of failures: Improper Manufacturing - I
Lecture 8 - Fundamental sources of failures: Improper Manufacturing - II
Lecture 9 - Fundamental sources of failures: Improper Manufacturing - III
Lecture 10 - Fundamental sources of failures: Improper Manufacturing - IV and improper service conditions
Lecture 11 - Fundamental sources of failures: Poor assembly, service and maintenance
Lecture 12 - Industrial engineering tool for failure analysis: Pareto diagram
Lecture 13 - Industrial engineering tool for failure analysis: Fishbone diagram and FMEA
Lecture 14 - Industrial engineering tool for failure analysis: FMEA
Lecture 15 - Industrial engineering tool for failure analysis: Fault tree analysis
Lecture 16 - Industrial engineering tool for failure analysis: Reliability - I
Lecture 17 - Industrial engineering tool for failure analysis: Reliability - II
Lecture 18 - General procedure of failure analysis: Steps
Lecture 19 - General procedure of failure analysis: Background information collection
Lecture 20 - General procedure of failure analysis: Preliminary examination
Lecture 21 - General procedure of failure analysis: NDT for failure analysis
Lecture 22 - General procedure of failure analysis: Destructive testing
Lecture 23 - General procedure of FA: DT, selection, preservation, cleaning and sectioning of samples
Lecture 24 - General procedure of failure analysis: Macroscopy of fracture surfaces - I
Lecture 25 - General procedure of failure analysis: Macroscopy of fracture surfaces - II
Lecture 26 - General procedure of failure analysis: Macroscopy of fracture surfaces - III
Lecture 27 - General procedure of failure analysis: Macroscopy of fracture surfaces - IV
Lecture 28 - General procedure of failure analysis: Microscopy of fracture surfaces
Lecture 29 - General procedure of failure analysis: Metallography of failed components

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Lecture 30 - General procedure of failure analysis: Determination of type of fracture - I
Lecture 31 - General procedure of failure analysis: Determination of type of fracture - II
Lecture 32 - General procedure of FA: Determination of type of fracture III and chemical analysis
Lecture 33 - General procedure of failure analysis: Application of fracture mechanics - I
Lecture 34 - General procedure of failure analysis: Application of fracture mechanics - II
Lecture 35 - General procedure of FA: Simulated test service conditions and analysis of evidences
Lecture 36 - General procedure of failure analysis: Question for analysis
Lecture 37 - General procedure of FA: Reporting failure analysis and failure analysis of welded joint
Lecture 38 - General procedure of failure analysis: Failure analysis of weld joint
Lecture 39 - General procedure of failure analysis: Examples of failure analysis
Lecture 40 - General procedure of failure analysis: Embrittlement of steels
Lecture 41 - Failure Analysis of Casting: Common Causes
Lecture 42 - Failure Analysis of Casting: Cast Iron Sluice Valve
Lecture 43 - Failure Analysis of Casting: Basics of Al-Si Alloys
Lecture 44 - Failure Analysis of Casting: Al Alloy Casting
Lecture 45 - Failure Analysis of Casting: Steel Casting
Lecture 46 - Failure Analysis of Forming: Forming Related Issues
Lecture 47 - Failure Analysis of Forming: Rolling Related Issues
Lecture 48 - Failure Analysis of Forming: Defects in Formed Components
Lecture 49 - Failure Analysis of Forming: High Strength Steel
Lecture 50 - Failure Analysis of Forming: High Strength Steel Weld Joints
Lecture 51 - Failure Analysis of Gear: Material, Manufacturing and Surface Condition - I
Lecture 52 - Failure Analysis of Gear: Material, Manufacturing and Surface Condition - II
Lecture 53 - Failure Analysis of Steel: Improper Heat Treatment
Lecture 54 - Failure Analysis of Steel: Improper Case Hardening Treatment
Lecture 55 - Failure Analysis of PH Aluminium Alloy: Improper Heat Treatment
Lecture 56 - Failure Analysis of Weld Joints: Common Causes of Weld Joint Failure
Lecture 57 - Failure Analysis of Weld Joints: Carbon Steel
Lecture 58 - Failure Analysis of Weld Joints: Cracking of Steel Weld Joints
Lecture 59 - Failure Analysis of Weld Joints: Austenitic Stainless Steel Weld Joints
Lecture 60 - Failure Analysis of Weld Joints: Dissimilar Steel Weld Joints

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanical Measurement System

Subject Co-ordinator - Prof. Ravi Kumar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts of measurement
Lecture 2 - Functional elements of instruments
Lecture 3 - Classification of measuring instruments
Lecture 4 - Methods of correction for interfering and modifying inputs
Lecture 5 - Static characteristics of measuring instruments - 1
Lecture 6 - Static characteristics of measuring instruments - 2
Lecture 7 - Loading effect and Impedance matching
Lecture 8 - Statistical analysis
Lecture 9 - Chi-square test
Lecture 10 - Least square method
Lecture 11 - Uncertainty analysis
Lecture 12 - Problem solving - 1
Lecture 13 - Generalized model of a measuring system
Lecture 14 - Zero and first order system
Lecture 15 - First order system - step response
Lecture 16 - First order system - ramp response
Lecture 17 - First order system - impulse response
Lecture 18 - First order system - frequency response
Lecture 19 - Second order system - step response - 1
Lecture 20 - Second order system - step response - 2
Lecture 21 - Second order system - ramp response
Lecture 22 - Second order system - impulse and frequency response
Lecture 23 - Higher order systems
Lecture 24 - Compensation
Lecture 25 - Transducers - 1
Lecture 26 - Transducers - 2
Lecture 27 - Flow measurement - 1
Lecture 28 - Flow measurement - 2
Lecture 29 - Temperature measurement - 1

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Lecture 30 - Temperature measurement - 2
Lecture 31 - Strain gauges
Lecture 32 - Piezoelectric transducers
Lecture 33 - Pressure measurement
Lecture 34 - Force and torque measurement
Lecture 35 - Displacement and acceleration measurement
Lecture 36 - Sound measurement
Lecture 37 - Thermophysical properties measurement
Lecture 38 - Flow visualization
Lecture 39 - Air pollution sampling and measurement
Lecture 40 - Problem solving - 2

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Surface Engineering: Mechanisms, Processes

Subject Co-ordinator - Dr. D. K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and need of surface engineering
Lecture 2 - Surface/sub-surface regions and properties of importance for surface engineering
Lecture 3 - Surface properties and their modification
Lecture 4 - Classification of surface modification techniques - I
Lecture 5 - Classification of surface modification techniques - II
Lecture 6 - Comparison of surface modification techniques and scope of surface engineering
Lecture 7 - Scope of surface engineering - I
Lecture 8 - Surface properties for wear and friction resistance - I
Lecture 9 - Surface properties for wear and friction resistance - II
Lecture 10 - Surface properties for wear and friction resistance - III
Lecture 11 - Issues and application of surface modification
Lecture 12 - Surface damage
Lecture 13 - Surface damage
Lecture 14 - Surface damage
Lecture 15 - Surface damage
Lecture 16 - Surface damage
Lecture 17 - Surface damage
Lecture 18 - Surface damage
Lecture 19 - Surface damage
Lecture 20 - Surface damage
Lecture 21 - Properties and mode of wear
Lecture 22 - Metal systems
Lecture 23 - Thermal barrier coatings
Lecture 24 - Functionally graded materials and other materials
Lecture 25 - Surface modification techniques
Lecture 26 - Surface modification techniques
Lecture 27 - Surface modification techniques
Lecture 28 - Surface modification techniques
Lecture 29 - Surface modification techniques

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Lecture 30 - Surface modification techniques
Lecture 31 - Surface modification techniques
Lecture 32 - Surface modification techniques
Lecture 33 - Surface modification techniques
Lecture 34 - Surface modification techniques
Lecture 35 - Surface modification techniques
Lecture 36 - Surface modification techniques
Lecture 37 - Surface modification techniques
Lecture 38 - Surface modification techniques
Lecture 39 - Surface modification techniques
Lecture 40 - Surface modification techniques
Lecture 41 - Surface modification techniques
Lecture 42 - Surface modification techniques
Lecture 43 - Surface modification techniques
Lecture 44 - Surface modification techniques
Lecture 45 - Surface modification techniques
Lecture 46 - Surface modification techniques
Lecture 47 - Surface modification techniques
Lecture 48 - Surface modification techniques
Lecture 49 - Surface modification techniques
Lecture 50 - Surface modification techniques
Lecture 51 - Surface modification techniques
Lecture 52 - Surface modification techniques
Lecture 53 - Surface modification techniques
Lecture 54 - Surface modification techniques
Lecture 55 - Characterization of modified surfaces
Lecture 56 - Characterization of modified surfaces
Lecture 57 - Characterization of modified surfaces
Lecture 58 - Characterization of modified surfaces
Lecture 59 - Characterization of modified surfaces
Lecture 60 - Characterization of modified surfaces

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NPTEL Video Course - Mechanical Engineering - NOC:Work System Design

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Work System Design
Lecture 2 - Introduction and Concept of Productivity
Lecture 3 - Measurement of Productivity
Lecture 4 - Productivity Measures
Lecture 5 - Productivity Measurement Models
Lecture 6 - Factors Influencing Productivity
Lecture 7 - Causes of Low Productivity
Lecture 8 - Productivity Improvement Technique
Lecture 9 - Numerical Problems on Productivity
Lecture 10 - Case Study on Productivity
Lecture 11 - Work Study
Lecture 12 - Steps Involved in Work Study
Lecture 13 - Concept of Work Content
Lecture 14 - Techniques of Work Study
Lecture 15 - Human Aspects of Work Study
Lecture 16 - Method Study
Lecture 17 - Method Study
Lecture 18 - Method Study
Lecture 19 - Operation Process Charts
Lecture 20 - Operation Process Charts
Lecture 21 - Flow Process Charts
Lecture 22 - Flow Process Charts
Lecture 23 - Two-Handed-Process Charts
Lecture 24 - Multiple Activity Charts
Lecture 25 - Flow Diagrams
Lecture 26 - String Diagrams
Lecture 27 - Principles of Motion Economy
Lecture 28 - Micro-Motion Study
Lecture 29 - Therbligs

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Lecture 30 - SIMO Charts
Lecture 31 - Memo-Motion Study
Lecture 32 - Cycle Graph and Chronocycle Graph
Lecture 33 - Critical Examination Techniques
Lecture 34 - Development and Selection of New Method
Lecture 35 - Installation and Maintenance of Improved Methods
Lecture 36 - Work Measurement
Lecture 37 - Techniques of Work Measurement
Lecture 38 - Steps Involved in Time Study
Lecture 39 - Steps and Equipment of Time Study
Lecture 40 - Performance Rating
Lecture 41 - Performance Rating
Lecture 42 - Allowances in Time Study
Lecture 43 - Computation of Standard Time - I
Lecture 44 - Computation of Standard Time - II
Lecture 45 - Work Measurement
Lecture 46 - Work Sampling
Lecture 47 - Procedure of Work Sampling
Lecture 48 - Work Sampling
Lecture 49 - Introduction to Synthetic Data and PMTS
Lecture 50 - Introduction to MTM and MOST
Lecture 51 - Ergonomics
Lecture 52 - Industrial Ergonomics
Lecture 53 - Ergonomics
Lecture 54 - Man-Machine System - 1
Lecture 55 - Man-Machine System - 2
Lecture 56 - Case Study
Lecture 57 - Case Study
Lecture 58 - Case Study
Lecture 59 - Case Study
Lecture 60 - Case Study

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NPTEL Video Course - Mechanical Engineering - NOC:Principles of Metal Forming Technology

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Metal Forming Technology
Lecture 2 - Classification of Metal Working Processes
Lecture 3 - Behavior of Materials
Lecture 4 - Failure of Materials
Lecture 5 - Concept of stress and strain
Lecture 6 - Description of stress
Lecture 7 - State of stress in three dimension
Lecture 8 - Description of strain
Lecture 9 - Hydrostatic and deviator components of stress and strain
Lecture 10 - Elastic stress strain relationships
Lecture 11 - Introduction to theory of plasticity and flow curve
Lecture 12 - True stress and true strain
Lecture 13 - Yield criteria for ductile materials
Lecture 14 - Yield locus, Octahedral shear stress and strain
Lecture 15 - Plastic stress strain relationships
Lecture 16 - Measures of yielding and ductility in tensile testing
Lecture 17 - Instability in tension
Lecture 18 - Strain rate effects on flow properties
Lecture 19 - Temperature effects on flow properties
Lecture 20 - Influence of various parameters on flow properties
Lecture 21 - Classification of metal working processes
Lecture 22 - Mechanics of metalworking and analysis methods
Lecture 23 - Determination of flow stresses in metal working
Lecture 24 - Hot working and cold working
Lecture 25 - Metallurgical considerations in metal forming
Lecture 26 - Introduction and classification of forging processes
Lecture 27 - Equipments used in forging
Lecture 28 - Forging in plane strain
Lecture 29 - Introduction and classification of rolling processes

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Lecture 30 - Analysis of rolling load calculations
Lecture 31 - Defects in rolled and forged products
Lecture 32 - Introduction and classification of extrusion processes
Lecture 33 - Analysis of extrusion processes
Lecture 34 - Extrusion of tubes and pipes, extrusion defect
Lecture 35 - Introduction to rod and wire drawing
Lecture 36 - Analysis of wire drawing and tube drawing processes
Lecture 37 - Sheet metal operations - I
Lecture 38 - Sheet metal operations - II
Lecture 39 - Powder metallurgy forming - I
Lecture 40 - Powder metallurgy forming - II

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NPTEL Video Course - Mechanical Engineering - NOC:Radiative Heat Transfer

Subject Co-ordinator - Prof. Ankit Bansal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fundamentals of Radiation
Lecture 3 - Basic Laws of Thermal Radiation
Lecture 4 - Properties of Plane Surfaces
Lecture 5 - Radiative Properties of Materials
Lecture 6 - View Factor
Lecture 7 - Hottel Crossed String Method
Lecture 8 - Inside Sphere and Monte Carlo Method
Lecture 9 - Radiative Heat Exchange Between Black Surfaces
Lecture 10 - Radiative Heat Exchange Between Gray Diffuse Surfaces
Lecture 11 - Network Analogy
Lecture 12 - Solution Methods for Governing Integral Equations
Lecture 13 - Radiative Heat Exchange between Partially Specular Gray Surfaces
Lecture 14 - Non-Gray Surfaces
Lecture 15 - Radiative Heat Transfer in the Presence of Conduction/Convection
Lecture 16 - Radiative Transfer in Participating Media
Lecture 17 - Equation of Radiative Transfer
Lecture 18 - Solution of Radiative Transfer Equation
Lecture 19 - Radiative Heat Transfer in Cylindrical Media
Lecture 20 - Approximate Methods-I
Lecture 21 - Approximate Methods-II
Lecture 22 - The Method of Spherical Harmonics (PN Approximation) - I
Lecture 23 - The Method of Spherical Harmonics (PN Approximation) - II
Lecture 24 - Discrete Ordinate Method (DOM)
Lecture 25 - Zone Method
Lecture 26 - Exchange Areas
Lecture 27 - Monte Carlo Method for Thermal Radiation - I
Lecture 28 - Monte Carlo Method for Thermal Radiation - II
Lecture 29 - Radiative Properties of Gases

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Lecture 30 - Atomic and Molecular Spectra
Lecture 31 - Line Radiation
Lecture 32 - Spectral Modelling
Lecture 33 - Wide Band Models
Lecture 34 - WSGG Model
Lecture 35 - k-Distribution Model
Lecture 36 - Radiative Properties of Particulate Media
Lecture 37 - Combustion and Flame
Lecture 38 - Solar and Atmospheric Radiation
Lecture 39 - Concentrated Solar Collector
Lecture 40 - Experimental Methods

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NPTEL Video Course - Mechanical Engineering - NOC:Weldability of Metals

Subject Co-ordinator - Dr. D. K. Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Weldability
Lecture 2 - Understanding Weldability
Lecture 3 - Metal Properties and Weldability - I
Lecture 4 - Metal Properties and Weldability - II
Lecture 5 - Weldability of Work Hardenable Metals
Lecture 6 - Weldability of Work Hardenable and Precipitation Strengthened Metals
Lecture 7 - Weldability of Precipitation Strengthened Metals
Lecture 8 - Weldability of Metals Strengthened by Grain Refinement, dispersion Hardening and Transformation H
Lecture 9 - Weldability of Transformation Hardening Metals
Lecture 10 - Weldability of Metals
Lecture 11 - Weldability Consideration
Lecture 12 - Weldability of Carbon and Alloy Steel - I
Lecture 13 - Weldability of Carbon and Alloy Steel - II
Lecture 14 - Weldability of Carbon and Alloy Steel - III
Lecture 15 - Weldability of Low Carbon Steel and Mild Steel
Lecture 16 - Weldability of Medium Carbon Steel and High Carbon Steel
Lecture 17 - Weldability of Carbon and Welding Processes - I
Lecture 18 - Weldability of Carbon and Welding Processes - II
Lecture 19 - Weldability of Carbon Steel and Welding Processes - III
Lecture 20 - Weldability of Carbon Steel and Radiation Welding and Thermal Cutting
Lecture 21 - Weldability of High Strength Low Alloy Steels
Lecture 22 - Weldability of Q&T Steels - I
Lecture 23 - Weldability of Q&T Steels - II
Lecture 24 - Weldability of Q&T Steels - III
Lecture 25 - Weldability of Q&T Steels - IV
Lecture 26 - Weldability of HTLA Steel - I
Lecture 27 - Weldability of HTLA Steel - II
Lecture 28 - Weldability of Cr-Mo Steel - I
Lecture 29 - Weldability of Cr-Mo Steel - II

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Lecture 30 - Weldability of Cr-Mo Steel - III
Lecture 31 - Weldability of Pre-Coated Steel - I
Lecture 32 - Weldability of Pre-Coated Steel - II
Lecture 33 - Weldability of Stainless Steel - I
Lecture 34 - Weldability of Stainless Steel - II
Lecture 35 - Weldability of Martensitic Stainless Steel - I
Lecture 36 - Weldability of Martensitic Stainless Steel - II
Lecture 37 - Weldability of Ferritic Stainless Steel - I
Lecture 38 - Weldability of Austenitic Stainless Steel - I
Lecture 39 - Weldability of Austenitic Stainless Steel - II
Lecture 40 - Weldability of PH Stainless Steel

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NPTEL Video Course - Mechanical Engineering - NOC:Manufacturing Guidelines for Product Design

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Product Design
Lecture 2 - Introduction of Manufacturing Processes
Lecture 3 - Manufacturing Processes
Lecture 4 - Manufacturing Processes
Lecture 5 - Process Capabilities
Lecture 6 - Engineering Materials
Lecture 7 - Properties of materials
Lecture 8 - Selection of materials - I
Lecture 9 - Selection of materials - II
Lecture 10 - Applications of Engineering Material
Lecture 11 - Robust design
Lecture 12 - Design for X
Lecture 13 - Product Design for Manual Assembly
Lecture 14 - DFMA Guidelines
Lecture 15 - Ergonomics in Product Design
Lecture 16 - Selection of processes - I
Lecture 17 - Selection of processes - II
Lecture 18 - Process Capabilities.
Lecture 19 - Design Guidelines for Sand Casting
Lecture 20 - Design Guidelines for Die Casting
Lecture 21 - Product Design Guidelines
Lecture 22 - Design Guidelines for Extrusion and Injection Molding
Lecture 23 - Design Guidelines for Sheet Metal Working
Lecture 24 - Design Guidelines for Machining
Lecture 25 - Design Guidelines for Powder Metal Processing
Lecture 26 - Assembly Processes
Lecture 27 - Adhesive Joining
Lecture 28 - Design Guidelines for Mechanical Fasteners
Lecture 29 - Design Guidelines for Welding

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Lecture 30 - Design guidelines
Lecture 31 - Induction Welding
Lecture 32 - Ultrasonic Welding
Lecture 33 - Vibration and Spin Welding
Lecture 34 - Microwave Joining
Lecture 35 - Hole making
Lecture 36 - Design for Environment
Lecture 37 - Design for Environment
Lecture 38 - Product Architecture
Lecture 39 - Rapid Prototyping
Lecture 40 - Product Design

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NPTEL Video Course - Mechanical Engineering - NOC:Inspection and Quality Control in Manufacturing

Subject Co-ordinator - Prof. Kaushik Pal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Need of Inspection
Lecture 3 - Destructive Inspection - I
Lecture 4 - Destructive Inspection - II
Lecture 5 - Testing of Composite Materials
Lecture 6 - Nondestructive Inspection - Visual Inspection
Lecture 7 - Dye Penetrant Inspection
Lecture 8 - Magnetic Particle Inspection
Lecture 9 - Eddy Current Inspection
Lecture 10 - Ultrasonic Inspection
Lecture 11 - Acoustic Emission Inspection
Lecture 12 - Radiography Inspection
Lecture 13 - Leak Testing
Lecture 14 - Thermographic Nondestructive Testing
Lecture 15 - Advanced Nondestructive Testing Techniques, NDT Standards, Safety in NDT
Lecture 16 - Engineering Metrology - Linear Measurement
Lecture 17 - Angular Measurement and Measurement of Surface Finish
Lecture 18 - Screw Thread Metrology
Lecture 19 - Gear Measurement
Lecture 20 - Miscellaneous Measurements

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NPTEL Video Course - Mechanical Engineering - NOC:Financial Mathematics

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Financial Mathematics
Lecture 2 - Important Mathematical Functions and its Characteristics
Lecture 3 - Progressions and Series, Growth and Decay Curves
Lecture 4 - Statistical Measures
Lecture 5 - Problem Solving on Mathematical Functions and Statistical Measures
Lecture 6 - Interest and Interest Rate, Time Value of Money
Lecture 7 - Simple Discount, Focal Date and Equation of Value
Lecture 8 - Introduction to Bank Discount
Lecture 9 - Introduction to Compound Interest
Lecture 10 - Problem Solving on Simple Interest and Bank Discount
Lecture 11 - Introduction to Discrete Compounding and Discrete Payments
Lecture 12 - Equal Payment Series and Gradient Series Factors
Lecture 13 - Geometric Gradient Series Factors
Lecture 14 - Annuities Due and Annuities Deferred
Lecture 15 - Problem Solving on Compounding Factors
Lecture 16 - Compounding Frequency of Interest
Lecture 17 - Interest Factors for Continuous Compounding
Lecture 18 - Introduction to Economic Equivalence
Lecture 19 - Principles of Equivalence
Lecture 20 - Problem Solving on Compounding Frequency and Economic Equivalence
Lecture 21 - Methods of Comparison of Alternatives
Lecture 22 - Payback Period
Lecture 23 - Capitalized Equivalent and Capital Recovery with Return
Lecture 24 - Project Balance
Lecture 25 - Problem Solving on Alternatives Comparison and Project Balance
Lecture 26 - Analysis of Credit and Loans
Lecture 27 - Assessing Interest and Structured Payments in Loans
Lecture 28 - Introduction to Cost of Credit and Amortization
Lecture 29 - Analysis of Amortization Schedule

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Lecture 30 - Graduated Payment Mortgage, Sinking Funds
Lecture 31 - Introduction to Depreciation and Depletion
Lecture 32 - Types of Depreciation
Lecture 33 - Tax Depreciation Methods
Lecture 34 - SOD and UOP Method of Depreciation, Depletion
Lecture 35 - Problem Solving on Depreciation and Depletion
Lecture 36 - Introduction to Break-Even Analysis
Lecture 37 - Analysis of Break-Even Time and Dual Break-Even Points
Lecture 38 - Economic Order Quantity
Lecture 39 - Introduction to Leverage
Lecture 40 - Financial Leverage and Total Leverage
Lecture 41 - Introduction to Stocks
Lecture 42 - Stock Valuation
Lecture 43 - Two Stage Dividend Growth and Preferred Stocks
Lecture 44 - Introduction to Bonds
Lecture 45 - Bond Premium and Discount, Bond Purchase
Lecture 46 - Introduction to Mutual funds
Lecture 47 - Performance Measures
Lecture 48 - Options
Lecture 49 - Option Valuation
Lecture 50 - Introduction to Cost of Capital and Ratio Analysis
Lecture 51 - Introduction to Risk Measurement
Lecture 52 - Decision-Making Under Risk
Lecture 53 - Decision Under Uncertainty
Lecture 54 - Risk Premium, Portfolio Return and Risk
Lecture 55 - Portfolio Diversification
Lecture 56 - Introduction to Insurance, Mortality Table
Lecture 57 - Pure Endowment and Life Annuities
Lecture 58 - Introduction to Life Insurance
Lecture 59 - Types of Life Insurance Policies
Lecture 60 - Reserve Funds, Property and Casualty Insurance

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NPTEL Video Course - Mechanical Engineering - NOC:Product Design Using Value Engineering

Subject Co-ordinator - Dr. Inderdeep Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Product Design and Development
Lecture 2 - Product Design Steps and Product Analysis
Lecture 3 - Profit Consideration
Lecture 4 - Value Engineering (VE) History, Concept and Definitions
Lecture 5 - Value Engineering vs Cost Cutting
Lecture 6 - Creative Thinking
Lecture 7 - Problem Identification and VEJP
Lecture 8 - Types of Product Functions
Lecture 9 - Funtional Analysis
Lecture 10 - Functional Analysis System Technique
Lecture 11 - Function-Cost Relationship - I
Lecture 12 - Function-Cost Relationship - II
Lecture 13 - VE Applications in Product Design
Lecture 14 - Value Engineering
Lecture 15 - Value Engineering
Lecture 16 - VE Tools and Techniques - I
Lecture 17 - VE Tools and Techniques - II
Lecture 18 - VE Success Stories - I
Lecture 19 - VE Success Stories - II
Lecture 20 - Behavioral Roadblocks

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NPTEL Video Course - Mechanical Engineering - NOC:Selection of Nanomaterials for Energy Harvesting and Storag

Subject Co-ordinator - Prof. Kaushik Pal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Solar Energy Harvesting
Lecture 3 - Perovskite Solar Cells
Lecture 4 - Solar Thermal Energy
Lecture 5 - Heat Transfer Fluids
Lecture 6 - Hydrogen Energy
Lecture 7 - Hydrogen Production from Thermochemical Process
Lecture 8 - Hydrogen Production from Electrolysis
Lecture 9 - Photo-electrochemical Production of Hydrogen Using Solar Energy
Lecture 10 - Hydrogen Production from Biological Process
Lecture 11 - Nanogenerators
Lecture 12 - Triboelectric Nanogenerators
Lecture 13 - Pyroelectric Nanogenerators
Lecture 14 - Thermoelectric Nanogenerators and Electromagnetic generators
Lecture 15 - Other Energy Resources
Lecture 16 - Energy Storage
Lecture 17 - Electrochemical Energy Storage (Batteries)
Lecture 18 - Supercapacitors
Lecture 19 - Hydrogen Storage
Lecture 20 - Thermal Energy Storage

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NPTEL Video Course - Mechanical Engineering - NOC:Robotics and Control: Theory and Practice

Subject Co-ordinator - Prof. N. Sukavanam, Prof. M. Felix Orlando

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Coordinate Frames and Homogeneous Transformations - I
Lecture 3 - Coordinate Frames and Homogeneous Frames - II
Lecture 4 - Differential Transformations
Lecture 5 - Transforming Differential Changes between Coordinate Frames
Lecture 6 - Kinematic Model for Robot Manipulator
Lecture 7 - Direct Kinematics
Lecture 8 - Inverse Kinematics
Lecture 9 - Manipulator Jacobian
Lecture 10 - Manipulator Jacobian Example
Lecture 11 - Trajectory Planning
Lecture 12 - Dynamics of Manipulator
Lecture 13 - Dynamics of Manipulator (Continued...)
Lecture 14 - Manipulator Dynamics Multiple Degree of Freedom
Lecture 15 - Stability of Dynamical System
Lecture 16 - Manipulator Control
Lecture 17 - Biped Robot Basics and Flat Foot Biped Model
Lecture 18 - Biped Robot Flat Foot and Toe Foot Model
Lecture 19 - Artificial Neural Network
Lecture 20 - Neural Network based control for Robot Manipulator
Lecture 21 - Redundancy Resolution of Human Fingers in Cooperative Object Translation - I
Lecture 22 - Redundancy Resolution of Human Fingers in Cooperative Object Translation - II
Lecture 23 - Fundamentals of Robot Manipulability
Lecture 24 - Manipulability Analysis of Human Fingers in Cooperative Rotational Motion
Lecture 25 - Robotic Exoskeletons
Lecture 26 - Introduction to Robotic Hand Exoskeleton
Lecture 27 - Design and Development of a Three Finger Exoskeleton
Lecture 28 - Force Control of an Index Finger Exoskeleton
Lecture 29 - Neural Control of a Hand Exoskeleton

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Lecture 30 - Neural Control of a Hand Exoskeleton Based on Human Subjectâ s Intention
Lecture 31 - Robot Assisted Percutaneous Interventions
Lecture 32 - Experiments on Robot Assisted Percutaneous Interventions
Lecture 33 - Sliding Mode Control
Lecture 34 - Higher Order Sliding Mode Control
Lecture 35 - Smart Needles for Percutaneous Interventions - I
Lecture 36 - Smart Needles for Percutaneous Interventions - II
Lecture 37 - Flexible Link Kinematics - I
Lecture 38 - Flexible Link Kinematics - II
Lecture 39 - Model Based Control of Robot Manipulators
Lecture 40 - Simulation of Robot Manipulators

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NPTEL Video Course - Mechanical Engineering - NOC:Acoustic Metamaterials

Subject Co-ordinator - Prof. Sneha Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sound Wave Propagation in Fluid - I
Lecture 3 - Sound Wave Propagation in Fluid - II
Lecture 4 - Sound Wave Propagation in Fluid - III
Lecture 5 - Sound Propagation at Medium Boundaries - I
Lecture 6 - Sound Propagation at Medium Boundaries - II
Lecture 7 - Standing Waves and Modes
Lecture 8 - Sound Signal Analysis - I
Lecture 9 - Sound Signal Analysis - II
Lecture 10 - Principles of Noise Control
Lecture 11 - Acoustic Materials
Lecture 12 - Enclosures
Lecture 13 - Barriers
Lecture 14 - Enclosures and Barriers - Tutorial
Lecture 15 - Sound Absorbing Materials
Lecture 16 - Porous-Fibrous Sound Absorbers
Lecture 17 - Panel Sound Absorbers
Lecture 18 - Helmholtz Resonators
Lecture 19 - Tutorial on Sound Absorbers
Lecture 20 - Perforated Panel Absorbers
Lecture 21 - Microperforated Panel Absorbers - 1
Lecture 22 - Microperforated Panel Absorbers - 2
Lecture 23 - Microperforated Panel Absorbers - 3
Lecture 24 - Introduction to Acoustic Metamaterials - 1
Lecture 25 - Introduction to Acoustic Metamaterials - 2
Lecture 26 - History of Acoustic Metamaterials
Lecture 27 - Applications of Acoustic Metamaterials
Lecture 28 - Membrane Type Acoustic Metamaterials - 1
Lecture 29 - Membrane Type Acoustic Metamaterials - 2

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Lecture 30 - Membrane Type Acoustic Metamaterials - 3
Lecture 31 - Membrane Type Acoustic Metamaterials - 4
Lecture 32 - Advantages and Applications of Membrane Type AMM
Lecture 33 - Tutorial on Membrane Type AMM
Lecture 34 - Introduction to Sonic Crystals
Lecture 35 - Fundamentals of Crystals
Lecture 36 - Principle of Working of Sonic Crystals - 1
Lecture 37 - Principle of Working of Sonic Crystals - 2
Lecture 38 - Tutorial on Sonic Crystals
Lecture 39 - More on Sonic Crystals and Conclusions

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NPTEL Video Course - Mechanical Engineering - NOC:Power Plant Engineering

Subject Co-ordinator - Prof. Ravi Kumar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy Scenario and Basic Concepts
Lecture 2 - Steam Power Plant Cycle
Lecture 3 - Fossil Fuel Steam Generator - I
Lecture 4 - Fossil Fuel Steam Generator - II
Lecture 5 - Mountings and Accessories - I
Lecture 6 - Mountings and Accessories - II
Lecture 7 - Boiler Performance
Lecture 8 - Coal Properties
Lecture 9 - Coal Handling
Lecture 10 - Problem Solving - I
Lecture 11 - Burning of Fuel
Lecture 12 - Ash Handling
Lecture 13 - Feed Water Treatment
Lecture 14 - Steam Turbines
Lecture 15 - Impulse Steam Turbines
Lecture 16 - Impulse-Reaction Steam Turbines
Lecture 17 - Energy Losses in Steam Turbines
Lecture 18 - Steam Condensers
Lecture 19 - Gas Turbines
Lecture 20 - Problem Solving - II
Lecture 21 - Hydroelectric power plant
Lecture 22 - Hydro plants and forces on plates
Lecture 23 - Hydro Turbines - I
Lecture 24 - Hydro Turbines - II
Lecture 25 - Problem solving - III
Lecture 26 - Principles of nuclear energy
Lecture 27 - Nuclear power plants - I
Lecture 28 - Nuclear power plants - II
Lecture 29 - Combined operations

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Lecture 30 - Solar radiations
Lecture 31 - Solar thermal power
Lecture 32 - Wind energy
Lecture 33 - Wave and geothermal energy
Lecture 34 - Photo-voltaic conversion
Lecture 35 - Problem solving - IV
Lecture 36 - Direct energy conversion
Lecture 37 - Instrumentation in power plant
Lecture 38 - Economic of power generation
Lecture 39 - Environmental aspects of power generation
Lecture 40 - Problem solving - V

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NPTEL Video Course - Mechanical Engineering - NOC:Principles of Industrial Engineering

Subject Co-ordinator - Prof. D K Dwivedi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction
Lecture 3 - Introduction
Lecture 4 - Tool of IE and Organizational Structure
Lecture 5 - Organisational Structure
Lecture 6 - Organizational Structure
Lecture 7 - Organizational Structure
Lecture 8 - Organizational Structure
Lecture 9 - Organizational Structure
Lecture 10 - Organizational Structure and Culture
Lecture 11 - Organizational Structure
Lecture 12 - Plant Location and Layout
Lecture 13 - Plant Location and Layout
Lecture 14 - Plant Location and Layout
Lecture 15 - Plant Location and Layout
Lecture 16 - Plant Location and Layout
Lecture 17 - Plant Location and Layout
Lecture 18 - Plant Layout
Lecture 19 - Plant Layout
Lecture 20 - Plant Layout
Lecture 21 - Plant Layout
Lecture 22 - Plant Layout
Lecture 23 - Plant Layout
Lecture 24 - Organization of Facility
Lecture 25 - Organization of Facility and Material Handling
Lecture 26 - Material Handling
Lecture 27 - Production Planning and Control
Lecture 28 - Production Planning and Control
Lecture 29 - Production Planning and Control

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Lecture 30 - Production Planning and Control
Lecture 31 - Production Planning and Control
Lecture 32 - Production Planning and Control
Lecture 33 - Production Planning and Control
Lecture 34 - Production Planning and Control
Lecture 35 - Production Planning and Control
Lecture 36 - Inventory
Lecture 37 - Inventory
Lecture 38 - Inventory
Lecture 39 - Inventory
Lecture 40 - Inventory
Lecture 41 - Project Management and Network Modelling
Lecture 42 - Network Modelling
Lecture 43 - Network Analysis
Lecture 44 - Network Analysis
Lecture 45 - Network Analysis
Lecture 46 - Network Analysis
Lecture 47 - Forecasting
Lecture 48 - Forecasting
Lecture 49 - Forecasting
Lecture 50 - Forecasting
Lecture 51 - Forecasting
Lecture 52 - Forecasting
Lecture 53 - Quality Control
Lecture 54 - Quality Control
Lecture 55 - Quality Control
Lecture 56 - Quality Control
Lecture 57 - Quality Control
Lecture 58 - Quality Control
Lecture 59 - Quality Control
Lecture 60 - Productivity and Work Study

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NPTEL Video Course - Mechanical Engineering - NOC:Mechatronics

Subject Co-ordinator - Prof. Pushparaj Mani Pathak

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mechatronics System Examples
Lecture 3 - Electric Circuits and Components
Lecture 4 - Semiconductor Electronics
Lecture 5 - pplication of Transistors
Lecture 6 - Sensors Performance Terminology
Lecture 7 - Displacement, Position and Proximity Sensors - I
Lecture 8 - Displacement, Position and Proximity Sensors - II
Lecture 9 - Force, Fluid Flow Sensors
Lecture 10 - Acceleration and Vibration Measurement Sensors
Lecture 11 - Mechanical Actuation Systems
Lecture 12 - Hydraulic and Pneumatic Actuators
Lecture 13 - Electrical Actuation Systems - I
Lecture 14 - Electrical Actuation Systems - II
Lecture 15 - Data Presentation Systems
Lecture 16 - Introduction to Signal Conditioning and Op-Amp
Lecture 17 - OP-AMP As Signal Conditioner
Lecture 18 - Analogue To Digital Converters
Lecture 19 - Digital To Analogue Converters
Lecture 20 - Artificial Intelligence
Lecture 21 - Digital Circuits - I
Lecture 22 - Digital Circuits - II
Lecture 23 - Microprocessor
Lecture 24 - Microcontroller
Lecture 25 - Microcontroller Programming Example
Lecture 26 - Mechanical System Model
Lecture 27 - Electrical System Model
Lecture 28 - Fluid System Model
Lecture 29 - Dynamic Response of Systems

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Lecture 30 - Transfer Function and Frequency Response
Lecture 31 - Controllers
Lecture 32 - Digital Controllers
Lecture 33 - Program Logic Controllers
Lecture 34 - Input, output and Communication systems
Lecture 35 - Fault Finding
Lecture 36 - Project using Microcontroller - ATMEGA16
Lecture 37 - Myoelectrically Controlled Robotic Arm
Lecture 38 - ABU Robocon 2019 - Part I
Lecture 39 - ABU Robocon 2019 - Part II
Lecture 40 - Design of a Legged Robot

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NPTEL Video Course - Mechanical Engineering - NOC:Mechanics

Subject Co-ordinator - Prof. Anjani Kumar Tiwari

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course outline
Lecture 2 - Vectorial representation of forces and moments
Lecture 3 - Couple moment and reduction of a force system to a force and a couple
Lecture 4 - Examples of couple moment
Lecture 5 - Examples: moment in three dimensions
Lecture 6 - Free body diagram and support reactions
Lecture 7 - Equilibrium of rigid bodies in two and three dimensions
Lecture 8 - Examples: Equilibrium of rigid bodies in two dimensions
Lecture 9 - Examples: Equilibrium of rigid bodies in three dimensions
Lecture 10 - Examples: Beams and distributed loads
Lecture 11 - Flexible Cable
Lecture 12 - Flexible Cable, Catenary curve
Lecture 13 - Examples: Parabolic and Catenary cables
Lecture 14 - Flexible Cable: Concentrated load
Lecture 15 - Structures: Plane Trusses
Lecture 16 - Analysis of trusses: Method of joints
Lecture 17 - Analysis of trusses: Method of sections
Lecture 18 - Shear force and bending moment
Lecture 19 - Shear force and bending moment: distributed load
Lecture 20 - Principle of virtual work
Lecture 21 - Principle of virtual work: examples - I
Lecture 22 - Principle of virtual work: examples - II
Lecture 23 - Stable and unstable equilibrium
Lecture 24 - Friction
Lecture 25 - Friction: examples
Lecture 26 - Rope and belt friction
Lecture 27 - Rope and belt friction: examples
Lecture 28 - Rolling resistance
Lecture 29 - Revision: static

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Lecture 30 - Coordinate systems: Cartesian and planar polar coordinates
Lecture 31 - Coordinate systems: spherical coordinates
Lecture 32 - Coordinate systems: cylindrical coordinates
Lecture 33 - Cartesian and planar polar coordinates: examples
Lecture 34 - Spherical and cylindrical coordinates: examples
Lecture 35 - Equation of motion in different coordinate systems
Lecture 36 - Equation of motion: examples
Lecture 37 - Work energy method
Lecture 38 - Work energy method: examples
Lecture 39 - Impulse momentum relation
Lecture 40 - Variable mass
Lecture 41 - Direct central impact
Lecture 42 - Oblique central impact
Lecture 43 - Moment of inertia
Lecture 44 - Moment of inertia: examples
Lecture 45 - Moment of inertia of composite bodies
Lecture 46 - Product of inertia and principal axes of inertia
Lecture 47 - Principal axes of inertia: examples - I
Lecture 48 - Principal axes of inertia: examples - II
Lecture 49 - Harmonic oscillator: simple harmonic motion
Lecture 50 - Simple harmonic motion: examples
Lecture 51 - Damped harmonic oscillator
Lecture 52 - Translation and rotation of rigid bodies
Lecture 53 - Translation and rotation of rigid bodies: examples
Lecture 54 - Plane motion of a rigid body
Lecture 55 - Plane motion of a rigid body: work energy equation
Lecture 56 - Plane motion of a rigid body: impulse-momentum equation
Lecture 57 - Three-dimensional dynamics of rigid bodies: angular momentum
Lecture 58 - Eulerâ s equations of motion
Lecture 59 - Eulerâ s equations of motion: examples
Lecture 60 - Revision: Dynamics

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NPTEL Video Course - Mechanical Engineering - NOC:Noise Control in Mechanical Systems

Subject Co-ordinator - Prof. Sneha Singh

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Sound
Lecture 2 - Sound and Noise
Lecture 3 - Sound Wave Propagation
Lecture 4 - Harmonic Plane Waves
Lecture 5 - Sound Wave Propagation Numerical
Lecture 6 - Intensity and Power
Lecture 7 - Sound Propagation Through Medium Boundaries
Lecture 8 - Propagation Through Medium Boundaries: Numerical
Lecture 9 - Propagation Through Medium Boundaries: Oblique Incidence
Lecture 10 - Radiation From Common Acoustical Sources - 1
Lecture 11 - Radiation From Common Acoustical Sources - 2
Lecture 12 - Radiation Numerical Problems
Lecture 13 - Time domain analysis of sound signals
Lecture 14 - Time Domain Analysis of sound signals : Numerical
Lecture 15 - Frequency domain analysis of sound signals - 1
Lecture 16 - Octave and one third octave bands
Lecture 17 - Spectrum analysis : Numerical
Lecture 18 - Introduction to human hearing
Lecture 19 - Sound Quality
Lecture 20 - Noise and human health
Lecture 21 - Noise and human health : Numerical
Lecture 22 - Noise regulations and guidelines - 1
Lecture 23 - Noise regulations and guidelines - 2
Lecture 24 - Equipment for noise control engineering - 1
Lecture 25 - Equipment for noise control engineering - 2
Lecture 26 - Considerations in acoustical measurements
Lecture 27 - Noise measurement and instrumentation : Numerical
Lecture 28 - Principles of noise control
Lecture 29 - Noise criteria

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Lecture 30 - Active noise control - 1
Lecture 31 - Active noise control - 2
Lecture 32 - Passive noise control and acoustic materials
Lecture 33 - Sound barriers
Lecture 34 - Acoustic enclosures
Lecture 35 - Sound barriers and enclosures : Numerical
Lecture 36 - Sound absorbers
Lecture 37 - Porous fibrous sound absorbers
Lecture 38 - Sound absorbers : Numerical
Lecture 39 - Panel sound absorbers
Lecture 40 - Helmholtz resonators
Lecture 41 - Numerical Problems on Resonators
Lecture 42 - Perforated Panel Sound Absorbers
Lecture 43 - Micro Perforated Panel Sound Absorbers - 1
Lecture 44 - Micro Perforated Panel Sound Absorbers - 2
Lecture 45 - Perforated and Micro Perforated Panel Sound Absorbers Numerical
Lecture 46 - Acoustic Metamaterials
Lecture 47 - Space Coiling Acoustic Metamaterial - 1
Lecture 48 - Space Coiling Acoustic Metamaterial - 2
Lecture 49 - Sonic Crystals - 1
Lecture 50 - Sonic Crystals - 2
Lecture 51 - Sonic Crystals - 3
Lecture 52 - Acoustic Metamaterials Numerical Problems
Lecture 53 - Noise in Mechanical Systems - 1
Lecture 54 - Noise in Mechanical Systems - 2
Lecture 55 - Noise in Mechanical Systems - 3
Lecture 56 - Case Studies of Noise in Mechanical Systems - 1
Lecture 57 - Case Studies of Noise in Mechanical Systems - 2
Lecture 58 - Case Studies of Noise in Mechanical Systems - 3
Lecture 59 - Case study of HVAC system and Conclusion

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NPTEL Video Course - Mechanical Engineering - NOC:Material Processing (Metallurgical Aspects): Fundamental ar

Subject Co-ordinator - Prof. Dheerendra Kumar Dwivedi

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Materials Processing: Scope
Lecture 2 - Materials Processing: Introduction
Lecture 3 - Materials Processing: Metal Forming and Plasticity
Lecture 4 - Materials Processing: Plasticity and Structure
Lecture 5 - Materials Processing: Cold and Hot working
Lecture 6 - Materials Processing: Recovery and Recrystallization
Lecture 7 - Metal forming: Rolling
Lecture 8 - Metal forming: Forging
Lecture 9 - Metal forming: Extrusion
Lecture 10 - Metal forming: Wire Drawing
Lecture 11 - Sheet Metal Operations: Fundamentals
Lecture 12 - Sheet Metal Operations: Drawing
Lecture 13 - Press for metal forming - I
Lecture 14 - Press for metal forming - II
Lecture 15 - Additional metal forming processes
Lecture 16 - Advances in Metal Forming
Lecture 17 - Die, Die-set and Die materials for metal forming
Lecture 18 - Sheet metal forming: Stock Layout-Nesting
Lecture 19 - Metallurgy and metal forming
Lecture 20 - Heat treatment in metal forming
Lecture 21 - Joining of metals: Fundamentals - I
Lecture 22 - Joining of metals: Fundamentals - II
Lecture 23 - Joining of metals: Fundamentals - III
Lecture 24 - Welding of metals: Fundamentals - IV
Lecture 25 - Welding of metals: Metal Characteristics
Lecture 26 - Welding of metals: Arc welding - I
Lecture 27 - Welding of metals: Arc welding - II
Lecture 28 - Welding of metals: Arc welding processes - I
Lecture 29 - Welding of metals: Arc welding processes - II

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Lecture 30 - Welding of metals: Arc welding processes - III
Lecture 31 - Welding of metals: Heat affected zone of TH metals
Lecture 32 - Welding of metals: Heat affected zone of WH and PH metals
Lecture 33 - Welding of metals: Solid state joining process - I
Lecture 34 - Welding of metals: Solid state joining process - II
Lecture 35 - Welding of metals: SSJ and RSW
Lecture 36 - Welding of metals: Welding metallurgy - I
Lecture 37 - Welding of metals: Welding metallurgy - II
Lecture 38 - Welding of metals: Dissimilar metal welding
Lecture 39 - Welding of metals: Hybrid joining
Lecture 40 - Welding of metals: Improving weld joint properties - I
Lecture 41 - Welding of metals: Improving weld joint properties - II
Lecture 42 - Metal casting: Overview
Lecture 43 - Metal casting: Pattern and Mould
Lecture 44 - Metal casting: Moulding
Lecture 45 - Metal casting: Casting processes
Lecture 46 - Metal casting: Quality of casting
Lecture 47 - Metal casting: Casting defects
Lecture 48 - Metal casting: Metallurgical issues of casting
Lecture 49 - Metal casting: Die casting and Sand mould casting comparison
Lecture 50 - Metal casting: Improving the performance of casting
Lecture 51 - Metal casting: Heat treatment of castings
Lecture 52 - Powder Metallurgy: Scope
Lecture 53 - Powder Metallurgy: Powder characteristics
Lecture 54 - Powder Metallurgy: Steps of manufacturing
Lecture 55 - Practical and Lab Demonstration: Pattern making, moulding and casting
Lecture 56 - Practical and Lab Demonstration: Shielded metal arc welding of steel-microstructure and mechanic
Lecture 57 - Practical and Lab Demonstration: Controlling microstructure by heat treatment, TIG re-melting ar
Lecture 58 - Practical and Lab Demonstration: Gas welding and gas cutting of steel-characteristics of cut edg
Lecture 59 - Practical and Lab Demonstration: GTAW of similar and dissimilar steels
Lecture 60 - Practical and Lab Demonstration: Friction stir welding

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NPTEL Video Course - Mechanical Engineering - Micro and Smart Systems

Subject Co-ordinator - Dr. K.J. Vinoy, Prof. S. Gopalakrishnan, Prof. K.N. Bhat, Prof. G.K. Anathasuresh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Glimpses of Microsystems
Lecture 2 - Smart Materials and Systems
Lecture 3 - Microsensors
Lecture 4 - Microactuators
Lecture 5 - Microsystems
Lecture 6 - Smart systems Application and Structural Health Monitoring
Lecture 7 - Microfabrication Technologies
Lecture 8 - Thin-film Materials and their Deposition
Lecture 9 - Approaches for Pattern Transfer
Lecture 10 - Surface Micromachining of Microstructures
Lecture 11 - Bulk Micromachining of Microsystems
Lecture 12 - Extended Approaches for Working Microsystems
Lecture 13 - Non-conventional Approaches for Microsystems
Lecture 14 - Packaging of Microsystems
Lecture 15 - Deformation Strains and Stresses
Lecture 16 - Microdevice Suspensions
Lecture 17 - Residual Stress and Stress Gradients
Lecture 18 - Torsion and Twist
Lecture 19 - Vibrations of Microsystems Devices
Lecture 20 - Vibrations of Microsystems Devices
Lecture 21 - Micromachined Gyroscopes
Lecture 22 - Modelling of Coupled Electrostatic Microsystems
Lecture 23 - Coupled Electrothermal-elastic Modelling
Lecture 24 - Modelling of Microsystems
Lecture 25 - Finite Element Method and Microsystems
Lecture 26 - Theoretical Basis for the Finite Element Method
Lecture 27 - Energy Theorems and Weak Form of the Governing Equation
Lecture 28 - Finite Element Equation Development and Shape Functions
Lecture 29 - Isoparametric FE Formulation and some Examples

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Lecture 30 - Finite Element for Structures with Piezoelectric Materials
Lecture 31 - Semiconductor Device Physics
Lecture 32 - BJT and MOSFET Characteristics and Op-Amps
Lecture 33 - Op-Amp Circuits and Signal conditioning for Microsystems Devices
Lecture 34 - Control and Microsystems
Lecture 35 - Vibration Control of a Beam
Lecture 36 - Signal Conditioning Circuits and Integration of Microsystems and Microelectronics
Lecture 37 - Pressure Sensor Design Concepts, Processing, and Packaging
Lecture 38 - Pressure Sensor Design Concepts, Processing, and Packaging
Lecture 39 - Pressure Sensor Design Concepts, Processing, and Packaging
Lecture 40 - Capacitive Micro-accelerometer

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NPTEL Video Course - Mechanical Engineering - NOC:Variational Methods in Mechanics

Subject Co-ordinator - Prof. G.K. Anathasuresh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Classification of optimization problems and the place of Calculus of Variations in it - Part I
Lecture 2 - Classification of optimization problems and the place of Calculus of Variations in it - Part II
Lecture 3 - Genesis of Calculus of Variations - Part I
Lecture 4 - Genesis of Calculus of Variations - Part II
Lecture 5 - Formulation of Calculus of Variations problems in geometry and mechanics and design - Part I
Lecture 6 - Formulation of Calculus of Variations problems in geometry and mechanics and design - Part II
Lecture 7 - Unconstrained minimization in one and many variables - Part I
Lecture 8 - Unconstrained minimization in one and many variables - Part II
Lecture 9 - Constrained minimization KKT conditions - Part I
Lecture 10 - Constrained minimization KKT conditions - Part II
Lecture 11 - Sufficient conditions for constrained minimization - Part I
Lecture 12 - Sufficient conditions for constrained minimization - Part II
Lecture 13 - Mathematical preliminaries function, functional, metrics and metric space, norm and vector space
Lecture 14 - Mathematical preliminaries function, functional, metrics and metric space, norm and vector space
Lecture 15 - Function spaces and Gateaux variation
Lecture 16 - First variation of a functional Freche?t differential and variational derivative
Lecture 17 - Fundamental lemma of calculus of variations and Euler Lagrange equations - Part I
Lecture 18 - Fundamental lemma of calculus of variations and Euler Lagrange equations - Part II
Lecture 19 - Extension of Euler-Lagrange equations to multiple derivatives
Lecture 20 - Extension of Euler-Lagrange equations to multiple functions in a functional
Lecture 21 - Global Constraints in calculus of variations - Part I
Lecture 22 - Global Constraints in calculus of variations - Part II
Lecture 23 - Local (finite subsidiary) constrains in calculus of variations - Part I
Lecture 24 - Local (finite subsidiary) constrains in calculus of variations - Part II
Lecture 25 - Size optimization of a bar for maximum stiffness for given volume - Part I
Lecture 26 - Size optimization of a bar for maximum stiffness for given volume - Part II
Lecture 27 - Size optimization of a bar for maximum stiffness for given volume - Part III
Lecture 28 - Calculus of variations in functionals involving two and three independent variables - Part I
Lecture 29 - Calculus of variations in functionals involving two and three independent variables - Part II

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Lecture 30 - General variation of a functional, transversality conditions. Broken extremals, Wierstrass-Erdma
Lecture 31 - General variation of a functional, transversality conditions. Broken extremals, Wierstrass-Erdma
Lecture 32 - Variational (energy) methods in statics; principles of minimum potential energy and virtual work
Lecture 33 - General framework of optimal structural designs - Part I
Lecture 34 - General framework of optimal structural designs - Part II
Lecture 35 - Optimal structural design of bars and beams using the optimality criteria method
Lecture 36 - Invariants of Euler-Lagrange equations and canonical forms
Lecture 37 - NoetherÂ s theorem
Lecture 38 - Minimum characterization of Sturm-Liouville problems
Lecture 39 - Rayleigh quotient for natural frequencies and mode shapes of elastic systems
Lecture 40 - Stability analysis and buckling using calculus of variations
Lecture 41 - Strongest (most stable) column
Lecture 42 - Dynamic compliance optimization
Lecture 43 - Electro-thermal-elastic structural optimization
Lecture 44 - Formulating the extremization problem starting from the differential equation, self-adjointness

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NPTEL Video Course - Mechanical Engineering - NOC:Compliant Mechanisms: Principles and Design

Subject Co-ordinator - Prof. G. K. Ananthasuresh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Spirit of compliant design
Lecture 3 - A glimpse of applications
Lecture 4 - Mobility and degrees of freedom in compliant mechanisms
Lecture 5 - MaxwellÂ s rule and GrÃ¼blerÂ s formula
Lecture 6 - Using compatibility and force equilibrium matrices to identify degrees of freedom and states of s
Lecture 7 - Empirical formula for flexure joints
Lecture 8 - Types of elastic pairs (flexures)
Lecture 9 - Linear finite element analysis of compliant mechanisms with beam elements
Lecture 10 - A compliant mechanism kit
Lecture 11 - Linear and nonlinear finite element analyses using continuum elements
Lecture 12 - Subtleties in finite element analysis: geometric nonlinearity and contact
Lecture 13 - Deformation of a cantilever under a tip-load, using elliptic integrals
Lecture 14 - Elliptic integrals and their use in elastica analysis
Lecture 15 - Frisch-FayÂ s approach to large deformation of beam
Lecture 16 - Burns-CrossleyÂ s kinematic model
Lecture 17 - Howell-MidhaÂ s elastic model
Lecture 18 - Putting together the pseudo rigid-body model
Lecture 19 - Modeling a partially compliant mechanism
Lecture 20 - Kinematic coefficients of a four-bar linkage with and without springs
Lecture 21 - Solving equations of PRB modeling and comparing with finite element analysis
Lecture 22 - Loop-closure equations for PRB models of compliant mechanisms
Lecture 23 - Burmester theory for compliant mechanisms
Lecture 24 - PRB-based Synthesis Examples
Lecture 25 - Structural optimization approach
Lecture 26 - Early works on design for compliance
Lecture 27 - Design for deflection of trusses
Lecture 28 - Design for deflection of beams and frames
Lecture 29 - Design of elastic continua for desired deflection

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Lecture 30 - Continuum element-based topology optimization of compliant mechanisms
Lecture 31 - YinSyn; synthesis of nonlinear responses with compliant mechanisms
Lecture 32 - Five different formulations for compliant mechanism design and some benchmark problems
Lecture 33 - Distributed compliance
Lecture 34 - How to achieve distributed compliance
Lecture 35 - Shape optimization
Lecture 36 - Cam-flexure clamp-case-study
Lecture 37 - SL model for compliant mechanisms
Lecture 38 - Feasibility maps for compliant mechanisms
Lecture 39 - Selection of compliant mechanisms for given user-specifications
Lecture 40 - Two case-studies using feasibility maps technique
Lecture 41 - SML model for compliant mechanisms for dynamic response
Lecture 42 - Re-design of compliant mechanisms; Matlab and Java codes
Lecture 43 - Non-dimensional analysis of beams
Lecture 44 - Deformation index and slenderness ratio of compliant mechanisms
Lecture 45 - Kinetoelastostatic maps
Lecture 46 - Designing with kinetoelastic maps
Lecture 47 - Non-dimensinalization of stress, frequency, and other measures
Lecture 48 - Designing compliant suspensions using kinetoelastic maps
Lecture 49 - Instant centre method for designing compliant mechanisms
Lecture 50 - Stiffness and compliance ellipsoids
Lecture 51 - Building block method of designing compliant mechanisms
Lecture 52 - Comparative analysis of different methods for designing compliant mechanisms
Lecture 53 - Aspects of Mechanical advantage of compliant mechanisms
Lecture 54 - Mechanical advantage of rigid-body and compliant mechanisms
Lecture 55 - Bistability in elastic systems
Lecture 56 - Analysis of bistable arches
Lecture 57 - Compliant mechanisms with bistable arches
Lecture 58 - Static balancing and zero-free-length springs
Lecture 59 - Static balance of a compliant mechanism using a linkage
Lecture 60 - Static balancing method for compliant mechanisms
Lecture 61 - A catalogue of compliant mechanisms
Lecture 62 - Compliant suspension mechanism in microsystems (MEMS)
Lecture 63 - Micromechanical signal processors using compliant mechanisms
Lecture 64 - A few special concepts of compliant mechanisms
Lecture 65 - Materials and prototyping of compliant mechanisms
Lecture 66 - Summary of the course
Lecture 67 - Micromachined accelerometers with Displacement-amplifying Compliant Mechanisms (DaCMs)
Lecture 68 - Miniature compliant mechanisms as cell-manipulation tools

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Lecture 69 - Micro-newton force sensor
Lecture 70 - Compliant tissue cutting mechanism
Lecture 71 - A compliant pipe-crawling robots
Lecture 72 - A compliant easy-chair for the elderly

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NPTEL Video Course - Mechanical Engineering - NOC:Heat Transfer and Combustion in Multiphase Systems

Subject Co-ordinator - Prof. Saptarshi Basu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Multiphase
Lecture 2 - Thermodynamics of Multiphase systems
Lecture 3 - Thermodynamics of Interface - I
Lecture 4 - Thermodynamics of Interface - II
Lecture 5 - Interfacial phenomena key concepts - I
Lecture 6 - Interfacial phenomena key concepts - II
Lecture 7 - Interfacial heat and mass transfer - I - Interfacial mass, momentum and energy balance, Surface t
Lecture 8 - Interfacial heat and mass transfer - II - Interfacial dynamics, Instabilities of the interface
Lecture 9 - Interfacial heat and mass transfer - III - Evaporation from thin films
Lecture 10 - Governing equations and interfacial conditions
Lecture 11 - Governing equations
Lecture 12 - Governing equations
Lecture 13 - Governing equations
Lecture 14 - Interface shapes
Lecture 15 - Transport processes at interface with key concepts - I
Lecture 16 - Transport processes at interface with key concepts - II
Lecture 17 - Interfacial transport
Lecture 18 - Interfacial transport including dynamic behavior
Lecture 19 - Interface behavior
Lecture 20 - Heat transfer and evaporation in droplets
Lecture 21 - Droplet vaporization models - I
Lecture 22 - Droplet vaporization models - II
Lecture 23 - Droplet vaporization dynamics - I
Lecture 24 - Droplet vaporization dynamics - II
Lecture 25 - Droplet liquid phase transport
Lecture 26 - Comprehensive droplet vaporization model and correlations - I
Lecture 27 - Comprehensive droplet vaporization model and correlations - II
Lecture 28 - Comparison of droplet vaporization models
Lecture 29 - Species transport in droplet

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Lecture 30 - Heat transfer and transport processes in sessile droplets
Lecture 31 - Introduction to atomization
Lecture 32 - Atomization principles and governing parameters
Lecture 33 - Spray / droplet breakup models Â I (TAB model)
Lecture 34 - Spray / droplet breakup models Â II (WAVE model)
Lecture 35 - Droplet combustion - I
Lecture 36 - Droplet combustion - II
Lecture 37 - Regimes in spray combustion
Lecture 38 - Boiling - I
Lecture 39 - Boiling - II (Bubble dynamics)
Lecture 40 - Boiling - II (Bubble dynamics and critical heat flux)

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NPTEL Video Course - Mechanical Engineering - NOC:Convective Heat Transfer (2018)

Subject Co-ordinator - Prof. Saptarshi Basu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to convective heat transfer
Lecture 2 - Governing equations I - Momentum Conservation
Lecture 3 - Governing equations II - Energy Conservation
Lecture 4 - Introduction to external forced convection
Lecture 5 - Scaling Analysis - Momentum
Lecture 6 - Scaling Analysis - Energy I
Lecture 7 - Scaling Analysis - Energy II
Lecture 8 - Similarity solution - Momentum
Lecture 9 - Similarity solution - Energy
Lecture 10 - Integral solutions - Momentum
Lecture 11 - Integral solutions - Energy
Lecture 12 - Suction and Blowing
Lecture 13 - Falkner-Skan solution
Lecture 14 - Arbitrary Wall temperature
Lecture 15 - Internal forced convection - Developing flow
Lecture 16 - Hydrodynamic fully developed flow
Lecture 17 - Mean temperature in fully developed flow
Lecture 18 - Uniform heat flux
Lecture 19 - Uniform wall temperature
Lecture 20 - Tube surrounded by isothermal flow
Lecture 21 - Heat transfer to fully developed flow - I
Lecture 22 - Heat transfer to fully developed flow - II
Lecture 23 - Laminar slug flow
Lecture 24 - Power law fluids
Lecture 25 - Forced convection - Tutorial I
Lecture 26 - Forced convection - Tutorial II
Lecture 27 - Forced convection - Tutorial III
Lecture 28 - Introduction to external natural convection
Lecture 29 - Scaling analysis - I

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Lecture 30 - Scaling analysis - II
Lecture 31 - Integral solution
Lecture 32 - Similarity solution
Lecture 33 - Uniform wall heat flux
Lecture 34 - Thermal stratification
Lecture 35 - Mixed convection
Lecture 36 - Internal natural convection - Scaling analysis
Lecture 37 - Heat transfer regimes
Lecture 38 - Regime III
Lecture 39 - Regime IV - Shallow enclosure limit - I
Lecture 40 - Regime IV - Shallow enclosure limit - II
Lecture 41 - Partially divided enclosures
Lecture 42 - Inclined enclosures
Lecture 43 - Natural convection - Tutorial I
Lecture 44 - Natural convection - Tutorial II
Lecture 45 - Introduction to Turbulence
Lecture 46 - Reynoldâ s Averaged Navier Stokes equation - I
Lecture 47 - Reynoldâ s Averaged Navier Stokes equation - II
Lecture 48 - Turbulent boundary layer - Viscous sub layer
Lecture 49 - Turbulent boundary layer - Fully turbulent sub layer
Lecture 50 - Heat transfer in turbulent boundary layer
Lecture 51 - Turbulent internal flow - I
Lecture 52 - Turbulent internal flow - II
Lecture 53 - Turbulent internal flow - III
Lecture 54 - K - Îµ model
Lecture 55 - Turbulence - Tutorial
Lecture 56 - Experimental techniques - Thermochromic liquid crystals
Lecture 57 - Experimental techniques - IR thermography
Lecture 58 - Droplet evaporation - Sessile I
Lecture 59 - Droplet evaporation - Sessile II
Lecture 60 - Droplet evaporation - Contact free

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NPTEL Video Course - Mechanical Engineering - NOC:A Short Lecture series on Contour Integration in the Comple

Subject Co-ordinator - Prof. Venkata Sonti

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to complex variables
Lecture 2 - Cauchy Riemann Equations
Lecture 3 - Analytic Functions
Lecture 4 - Simple definitions
Lecture 5 - Definition of sets, domains, theorem on antiderivative
Lecture 6 - Cauchy Gorsat Theorem
Lecture 7 - Implications of Cauchy Gorsat Theorem, Cauchy Integral Formula
Lecture 8 - Implications of CIF, converse of CG theorem
Lecture 9 - Examples in contour integrals, ratios of polynomials
Lecture 10 - Contour integration of sinc function
Lecture 11 - Method of path deformation
Lecture 12 - Method of path deformation (Continued...)
Lecture 13 - Infinite and finite branch cuts
Lecture 14 - Finite Branch Cut
Lecture 15 - Infinite branch cut example
Lecture 16 - Contour integration
Lecture 17 - Finite square root branch cut
Lecture 18 - Example on finite branch cut
Lecture 19 - Pole on a branch cut
Lecture 20 - L shaped branch cut
Lecture 21 - L shaped branch cut continued
Lecture 22 - Inverse Laplace Transform
Lecture 23 - Inverse Laplace Transform (Continued...)
Lecture 24 - Additional material or corrections to lectures
Lecture 25 - Summary of the total course

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NPTEL Video Course - Mechanical Engineering - NOC:Introduction to Soft Matter

Subject Co-ordinator - Prof. Aloke Kumar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Deborah number
Lecture 3 - Response of Elastic solid
Lecture 4 - Response of Viscous fluid
Lecture 5 - Viscoelastic material
Lecture 6 - Creep and stress relaxation
Lecture 7 - Creep and stress relaxation functions
Lecture 8 - Linearity
Lecture 9 - Mechanical Analogues
Lecture 10 - Tutorial
Lecture 11 - Atoms and bonds
Lecture 12 - Interatomic bonds
Lecture 13 - Polymers
Lecture 14 - Polymers (Continued...)
Lecture 15 - Polymers (Continued...)
Lecture 16 - Freely jointed model
Lecture 17 - Constitutive equations
Lecture 18 - Constitutive equations (Continued...)
Lecture 19 - Constitutive equations (Continued...)
Lecture 20 - Viscoelastic effects
Lecture 21 - Lab Session
Lecture 22 - Polymer concentrations
Lecture 23 - Lagrangian and Eulerian perspectives
Lecture 24 - Maxwell model
Lecture 25 - Maxwell model (Continued...)
Lecture 26 - Kelvin-Meyer-Voigt model
Lecture 27 - Three parameter model
Lecture 28 - Three parameter model (Continued...)
Lecture 29 - Three parameter model (Continued...)

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Lecture 30 - Jeffereyâ s model
Lecture 31 - Two Maxwell model
Lecture 32 - N-Maxwell model
Lecture 33 - N-Maxwell model (Continued...)
Lecture 34 - N-Kelvin Meyer Voigt model
Lecture 35 - Constitutive modelling
Lecture 36 - Objectivity
Lecture 37 - Objectivity
Lecture 38 - Sinusoidal oscillations
Lecture 39 - Sinusoidal oscillations (Continued...)
Lecture 40 - Sinusoidal oscillations (Continued...)
Lecture 41 - Summary
Lecture 42 - Tutorial
Lecture 43 - Tutorial (Continued...)

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NPTEL Video Course - Mechanical Engineering - NOC:Robotics: Basics and Selected Advanced Concepts

Subject Co-ordinator - Prof. Ashitava Ghosal

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Types and Classification of Robots
Lecture 2 - Main Elements of a Robot
Lecture 3 - Modelling and Analysis of Robots
Lecture 4 - Mathematical Preliminaries, Homogeneous Transformations
Lecture 5 - Elements of robot - Joints, Elements of robots - Links
Lecture 6 - Examples of D-H parameters and Link transformation matrices
Lecture 7 - Introduction, Direct Kinematics of Serial Robots
Lecture 8 - Inverse Kinematics of Serial Robots
Lecture 9 - Inverse Kinematics of Serial Robots with n < 6, Inverse Kinematics of Serial Robots with n > 6
Lecture 10 - Elimination Theory and Solution of Non-linear Equations, Inverse Kinematics of a General 6R Robo
Lecture 11 - Introduction, Loop-closure Equations
Lecture 12 - Direct Kinematics of Parallel Manipulators
Lecture 13 - Mobility of Parallel Manipulators
Lecture 14 - Inverse Kinematics of Parallel Manipulators
Lecture 15 - Direct Kinematics of Stewart Platform Manipulators
Lecture 16 - Sun tracking using 3-DOF parallel manipulator
Lecture 17 - Stewart-Gough platform-based force-torque sensor
Lecture 18 - Vibration isolation using a Stewart-Gough platform
Lecture 19 - Introduction, Linear and Angular Velocity of Links
Lecture 20 - Serial Manipulator Jacobian Matrix
Lecture 21 - Parallel Manipulator Jacobian Matrix
Lecture 22 - Singularities in Serial and Parallel Manipulators
Lecture 23 - Statics of Serial and Parallel Manipulators
Lecture 24 - Hyper-redundant robots
Lecture 25 - Redundancy resolution in human arm
Lecture 26 - Flexible robots
Lecture 27 - Introduction, Lagrangian formulation
Lecture 28 - Examples of Equations of Motion
Lecture 29 - Inverse Dynamics and Simulation of Equations of Motion

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Lecture 30 - Recursive Formulations of Dynamics of Manipulators
Lecture 31 - Motion planning
Lecture 32 - Control of a single link
Lecture 33 - Control of a multi-link serial manipulator
Lecture 34 - Control of a multi-link manipulator
Lecture 35 - Control of constrained and parallel manipulator, Cartesian control of serial manipulators
Lecture 36 - Force control of manipulators, Hybrid position/force control of manipulators
Lecture 37 - Advanced topics in non-linear control of manipulators
Lecture 38 - Wheeled Mobile Robots (WMR) on Flat Terrain
Lecture 39 - Wheeled Mobile Robots (WMR) on Uneven Terrain
Lecture 40 - Kinematics and Dynamics of WMR on Uneven Terrain
Lecture 41 - Over-Constrained Mechanism and Deployable Structures
Lecture 42 - Kinematic and Static Analysis

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NPTEL Video Course - Mechanical Engineering - NOC:Sound and Structural Vibration

Subject Co-ordinator - Prof. Venkata R. Sonti

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The longitudinal wave in vibrating spring
Lecture 2 - Harmonically excited systems
Lecture 3 - The concept of coincidence frequency
Lecture 4 - A classical problem in sound-structure interaction
Lecture 5 - Classical problem (Continued...)
Lecture 6 - Uncoupled solution to the classical problem
Lecture 7 - Uncoupled solution (Continued...).
Lecture 8 - Introduction to the coupled problem.
Lecture 9 - The coupled roots
Lecture 10 - Physical meaning of terms
Lecture 11 - Derivation of coupled roots using asymptotic method
Lecture 12 - Coupled roots derivation (Continued...)
Lecture 13 - Regions of heavy and light fluid loading
Lecture 14 - Light and heavy fluid loading (Continued...)
Lecture 15 - The coupled vibration field
Lecture 16 - The coupled acoustic field and stationary phase
Lecture 17 - The 2-D structural-acoustic waveguide
Lecture 18 - The coupled partial differential equations
Lecture 19 - Derivation of the coupled dispersion equation
Lecture 20 - A schematic of coupled waves
Lecture 21 - Derivation of coupled waves using asymptotic method
Lecture 22 - Asymptotic method (Continued...) and Maple demo
Lecture 23 - Physics of the coupled waves
Lecture 24 - Critical points
Lecture 25 - Heavy fluid loading
Lecture 26 - Summary of the rectangular waveguide
Lecture 27 - Impedance and mobility
Lecture 28 - Derivation of acoustic and vibration response
Lecture 29 - Derivation of vibro-acoustic response (Continued...)

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Lecture 30 - Derivation of vibro-acoustic response (Continued...)
Lecture 31 - Numerical example
Lecture 32 - Coupled resonance analysis using matrices
Lecture 33 - Coupled resonance analysis (Continued...)
Lecture 34 - Sound radiation from a baffled panel
Lecture 35 - Derivation of pressure response.
Lecture 36 - Radiation efficiency
Lecture 37 - Physics of volume velocity cancellation
Lecture 38 - Derivations in the frequency domain: 1-D
Lecture 39 - Physics of the vibration spectrum in 2-D
Lecture 40 - Modal character across the frequency range
Lecture 41 - Simultaneous radiation from several modes
Lecture 42 - Panel radiation model using monopoles
Lecture 43 - Physics of panel radiation using monopole model
Lecture 44 - Physics of panel radiation using monopole model (Cointinued...)
Lecture 45 - Radiation resistance derivation from Maidanikâ s work (Continued...)
Lecture 46 - Radiation resistance derivation from Maidanikâ s work (Continued...)
Lecture 47 - Radiation resistance derivation from Maidanikâ s work (Continued...)
Lecture 48 - Modal average radiation efficiency
Lecture 49 - Modal average radiation efficiency (Cointinued...)
Lecture 50 - Transmission of sound through a rigid panel with flexible mounts
Lecture 51 - Frequency dependence of sound transmission
Lecture 52 - Sound transmission through a flexible partition
Lecture 53 - Transmission loss in different situations
Lecture 54 - Cylindrical shell vibration
Lecture 55 - Behavior of uncoupled shell waves
Lecture 56 - Fluid waves in rigid-walled cylindrical shells
Lecture 57 - Wave propagation characteristics in flexible cylindrical shells carrying fluid: Fullers paper
Lecture 58 - Wave impedance of an infinite plate: fluid loading
Lecture 59 - Fluid loading in a finite plate
Lecture 60 - Summary of the entire course

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NPTEL Video Course - Mechanical Engineering - NOC:Vibrations of Plates and Shells

Subject Co-ordinator - Prof. Venkata R. Sonti

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to differential geometry
Lecture 2 - Properties of surfaces: First fundamental form
Lecture 3 - Properties of surfaces: Second fundamental form
Lecture 4 - Surfaces of revolution
Lecture 5 - Gauss Codazzi relations
Lecture 6 - Gauss Codazzi (Continued...)
Lecture 7 - Differential element length in a thin shell
Lecture 8 - Strain of a differential element
Lecture 9 - Explicit strain expressions
Lecture 10 - Love simplifications and inconsistencies Of the theory
Lecture 11 - Euler Bernoulli Beam equation using the Hamilton's Law
Lecture 12 - Euler Bernoulli Beam and Hamilton's Law (Continued...)
Lecture 13 - Beta definition, force and moment resultants
Lecture 14 - Hamilton's Law for a general shell
Lecture 15 - The Hamilton's law (Continued...)
Lecture 16 - Final Dynamical Equations and boundary conditions
Lecture 17 - Physics of each term in the dynamic equations
Lecture 18 - Physics of each term (Continued...)
Lecture 19 - The sixth equation of motion
Lecture 20 - The sixth equation of motion (Continued...)
Lecture 21 - Equations of motion for a rectangular plate using Hamilton's law
Lecture 22 - Equations of motion for a rectangular Plate (Continued...)
Lecture 23 - Rectangular plate boundary conditions
Lecture 24 - Rectangular plate equation using force balance
Lecture 25 - Modeshapes and resonances of a vibrating beam
Lecture 26 - Modeshapes and resonances of a vibrating Rectangular plate
Lecture 27 - Modeshapes and resonances of a vibrating Circular plate
Lecture 28 - Vibrating circular plate (Continued...)
Lecture 29 - Modeshapes and resonances of a vibrating Circular ring

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Lecture 30 - Details of vibrating rings
Lecture 31 - Insights into vibrations of ring
Lecture 32 - Cylindrical shell equations of motion using Force balance
Lecture 33 - Cylindrical shell: Transverse equation of motion
Lecture 34 - Orthogonality of modeshapes
Lecture 35 - Orthogonality of Modes (Continued...)
Lecture 36 - The Rayleigh Quotient
Lecture 37 - Rayleigh Quotient Example: Simply-supported beam
Lecture 38 - The Rayleigh Ritz method
Lecture 39 - The Rayleigh Ritz method applied to a Complicated system
Lecture 40 - The Lagrange Multiplier method
Lecture 41 - The penalty method
Lecture 42 - Orthogonal polynomials of RB Bhat
Lecture 43 - Rayleigh Ritz paper by RB Bhat
Lecture 44 - Numerical examples of the Rayleigh Ritz method
Lecture 45 - Numerical examples of Rayleigh Ritz method And animations
Lecture 46 - Raylegh Ritz applied to curved structures
Lecture 47 - Forced response of plates and shells
Lecture 48 - Forced response (Continued...)
Lecture 49 - Simply-supported plate response to various forces
Lecture 50 - Simply-supported plate response to various Forces (Continued...)
Lecture 51 - Simply-supported cylindrical shell response to a Point harmonic force
Lecture 52 - Cylindrical shell response (Continued...)
Lecture 53 - Cylindrical shell response (Continued...)
Lecture 54 - Cylindrical shell response to a traveling load using Only transverse modes
Lecture 55 - The Receptance method
Lecture 56 - The receptance method (Continued...)
Lecture 57 - Stiffening a cylindrical shell using rings
Lecture 58 - Stiffening of a cylindrical shell (Continued...)
Lecture 59 - Damping in structures
Lecture 60 - Loss factor and Complex Young modulus

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NPTEL Video Course - Mechanical Engineering - NOC:Dynamics and Control of Mechanical Systems

Subject Co-ordinator - Prof. Ashitava Ghosal

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Course
Lecture 2 - Position and Orientation of a Rigid Body
Lecture 3 - Homogenous Transformation
Lecture 4 - Linear and angular velocity of rigid body
Lecture 5 - Motion of Rigid Body and Particles
Lecture 6 - Introduction to multi-body systems
Lecture 7 - Joints, Degrees of Freedom and Constraints
Lecture 8 - Position, Velocity and Acceleration in Multi-body Systems
Lecture 9 - Mass and Inertia of a Rigid Body
Lecture 10 - External forces and moments
Lecture 11 - Angular momentum, Spinning tops and Gyroscopes
Lecture 12 - Free-body diagram and Equations of motion
Lecture 13 - Newton-Euler Formulation for Serial Chains
Lecture 14 - Lagrangian Formulation
Lecture 15 - Examples of Equations of Motion
Lecture 16 - Equations of Motion Using Computer Tools
Lecture 17 - Introduction and Examples of equations of motion
Lecture 18 - Inverse dynamics and Simulations of equations Of motion
Lecture 19 - Simulation using Computer Tools
Lecture 20 - Introduction and Goal of control
Lecture 21 - State Space Formulation
Lecture 22 - Solution of State Equations
Lecture 23 - Stability of Dynamical Systems
Lecture 24 - Controllability and Observability of Linear Systems
Lecture 25 - Examples of Controllability and Observability
Lecture 26 - Introduction to Classical Control
Lecture 27 - Root Locus
Lecture 28 - Frequency Domain Approach
Lecture 29 - PID Control

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Lecture 30 - Root Locus based Controller Design
Lecture 31 - State Space Design
Lecture 32 - 3 Case Studies

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NPTEL Video Course - Mechanical Engineering - NOC:Optical Methods for Solid and Fluid Mechanics

Subject Co-ordinator - Prof. Aloke Kumar, Prof. Koushik Viswanathan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Mathematical Preliminaries - I
Lecture 3 - Tensors and Deformations
Lecture 4 - Lagrangian and Eulerian Perspectives
Lecture 5 - Mathematical Preliminaries - II
Lecture 6 - Image Processing Preliminaries
Lecture 7 - Image Processing Operations
Lecture 8 - Light Matter Interaction - I
Lecture 9 - Lab Demo I: Optical Microscope
Lecture 10 - Optical System: Lenses
Lecture 11 - Lab Demo II: Lenses and Camera
Lecture 12 - Light Matter Interaction - II (Lab Demostration)
Lecture 13 - Light Matter Interaction - II (Lab Demostration)
Lecture 14 - Tracer Particles for Flow Visualisation
Lecture 15 - Particle Tracking Velocimetry
Lecture 16 - Particle Image Velocimetry - I
Lecture 17 - Particle Image Velocimetry - II
Lecture 18 - Particle Image Velocimetry - III
Lecture 19 - Particle Image Velocimetry - IV
Lecture 20 - Particle Image Velocimetry - V
Lecture 21 - Particle Image Velocimetry - VI
Lecture 22 - Schlieren and Shadowgraphy
Lecture 23 - Lab Demo III: PIV and Schlieren
Lecture 24 - Introduction to optical methods for solids
Lecture 25 - Basics of Digital Image Correlation
Lecture 26 - Iterative implementation of DIC
Lecture 27 - Example implementations
Lecture 28 - How is a DIC experiment set up ?
Lecture 29 - DIY(C)!

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Lecture 30 - Introduction to Photoelasticity
Lecture 31 - Why do we see fringes ?
Lecture 32 - How does light interact with matter ?
Lecture 33 - Origin of Birefringence
Lecture 34 - Loaded sample in a polarizer
Lecture 35 - Stress-induced birefringence
Lecture 36 - Analyses of optical paths using matrix methods
Lecture 37 - Putting it all together
Lecture 38 - What is tomography ?
Lecture 39 - Signal processing and Fourier methods
Lecture 40 - Rays and the Radon transforms
Lecture 41 - Geometric interpretations
Lecture 42 - The inverse problem: From Radon transform to 2D cross-section
Lecture 43 - Cone beams, parallel beams and the Feldkamp algorithm

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NPTEL Video Course - Mechanical Engineering - NOC:Statistical Thermodynamics for Engineers

Subject Co-ordinator - Prof. Saptarshi Basu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Statistical Thermodynamics
Lecture 2 - Basic Probability Theory and Statistics
Lecture 3 - Important Probability Distributions
Lecture 4 - Combinatorial Analysis for Statistical Thermodynamics
Lecture 5 - Basic Concepts
Lecture 6 - Macrostates and Microstates
Lecture 7 - Bose Einstein and Fermi Dirac Statistics
Lecture 8 - Entropy and the equilibrium particle distribution
Lecture 9 - Operator Theory - 1
Lecture 10 - Stirling Approximation and Lagrange Multipliers
Lecture 11 - Equilibrium particle distribution
Lecture 12 - The Dilute Limit and Concept of Molecular Partition Function
Lecture 13 - The Molecular Partition Function and its relationship with Classical Thermodynamics
Lecture 14 - Historical Survey of Quantum Mechanics
Lecture 15 - Operator Theory - 2
Lecture 16 - Operator Theory - 3
Lecture 17 - Bohr Model for the Spectrum of Atomic Hydrogen
Lecture 18 - Heuristic Introduction to the Schrodinger Equation
Lecture 19 - The postulates of Quantum Mechanics
Lecture 20 - The Steady State Schrodinger Equation: Single Particle Analysis
Lecture 21 - Coordinate System - 1
Lecture 22 - Coordinate System - 2
Lecture 23 - Coordinate System - 3
Lecture 24 - The Steady State Schrodinger Equation: Multiparticle analysis
Lecture 25 - The Particle in a Box
Lecture 26 - The Uncertainity Principle
Lecture 27 - The Pauli Exclusion and the Correspondence Principle
Lecture 28 - Problem Solving - 1
Lecture 29 - Problem Solving - 2

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Lecture 30 - The Internal Motion for a two particle system
Lecture 31 - The rotational and vibrational energy mode for a diatomic molecule
Lecture 32 - Hermite polynomials as vibrational energy mode solution
Lecture 33 - Equivalent two body model of atomic hydrogen
Lecture 34 - The Electronic Energy Mode for Atomic Hydrogen
Lecture 35 - Problem Solving - 3
Lecture 36 - The four quantum numbers and multielectron systems
Lecture 37 - Spectroscopic term symbols for multielectron atoms
Lecture 38 - Electron energies for multielectron systems
Lecture 39 - Combined energy modes for atoms and diatomic molecules
Lecture 40 - Perturbation analysis of the Schrodinger Wave equation
Lecture 41 - Selection rules
Lecture 42 - The Rotational and vibrational spectroscopy
Lecture 43 - Ro-vibrational spectroscopy (Simplex model)
Lecture 44 - Rotation vibration coupling (Complex model)
Lecture 45 - Ro-vibrational spectroscopy (Complex model)
Lecture 46 - Ro-vibronic spectroscopy
Lecture 47 - Working with Spectroscopic Schemes, Notations and Term Symbols
Lecture 48 - From Particles to assembly - I
Lecture 49 - From Particles to assembly - II
Lecture 50 - Connecting Quantum Mechanics to Classical Mechanics
Lecture 51 - The Equipartition principle and ideal gas
Lecture 52 - Thermodynamic properties of ideal monoatomic and diatomic gas
Lecture 53 - The zero of energy (rotational and vibrational)
Lecture 54 - Specific heats, Internal energy through Vibrational and Ro-vibrational energy modes
Lecture 55 - The Ro-vibrational partition function and Introduction to intersction of Radiationand Matter
Lecture 56 - Absorption and Emission of Radiation
Lecture 57 - The Rabi frequency and Beer's Law
Lecture 58 - Insights into radiative spectral transitions
Lecture 59 - Theory of Absoprtion Spectroscopy

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NPTEL Video Course - Mechanical Engineering - NOC:Fundamentals of Acoustics (2024)

Subject Co-ordinator - Prof. Venkata R. Sonti

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The vibrating spring-mass-damper system
Lecture 2 - Power calculations in a vibrating spring-mass-damper system
Lecture 3 - Wave propagation on a string
Lecture 4 - Examples of waves on strings: finite and semi-infinite cases
Lecture 5 - General solution to 1-D wave equation: physical insights
Lecture 6 - Wave solution: real notation vs complex notation
Lecture 7 - The vibrating string with a general mechanical impedance
Lecture 8 - The forced finite string with an end mass
Lecture 9 - The one-D wave solution: physical insights
Lecture 10 - Longitudinal wave propagation in a rod
Lecture 11 - Forced semi-infinite and finite rods
Lecture 12 - The derivation of the acoustic wave equation
Lecture 13 - The derivation of the acoustic wave equation (Continued...)
Lecture 14 - The derivation of the acoustic wave equation (Continued...)
Lecture 15 - The derivation of the acoustic wave equation (Continued...)
Lecture 16 - Sound propagation in piston driven semi-infinite and finite ducts
Lecture 17 - Acoustics inside a piston driven finite duct with a general end impedance
Lecture 18 - Time averaged power in a 1-D acoustic wave
Lecture 19 - The Free Space Green Function in acoustics
Lecture 20 - The Free Space Green Function (Continued...)
Lecture 21 - Various Green Functions and their uses
Lecture 22 - Derivation of the interior Kirchhoff Helmholtz Integral Equation
Lecture 23 - Derivation of the exterior Kirchhoff Helmholtz Integral Equation
Lecture 24 - Acoustic wave equation in spherical coordinates
Lecture 25 - Legendre polynomials, spherical harmonics, orthogonality relations
Lecture 26 - Spherical harmonics, Legendre polynomials and their orthogonality relations (Continued...)
Lecture 27 - Interior Neumann Green function
Lecture 28 - Exterior Neumann and Dirichlet Green functions
Lecture 29 - Pulsating sphere using the exterior Neumann Green function

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Lecture 30 - Equivalence of Neumann Green function and separation of variables solution
Lecture 31 - Sound from a pulsating sphere using boundary matching technique
Lecture 32 - Sound from a pulsating sphere using boundary matching technique (Continued...)
Lecture 33 - Sound radiation from a spherical cap on a rigid sphere using the Neumann Green function
Lecture 34 - Scattering of a plane acoustic wave from a rigid sphere
Lecture 35 - Example to show that the surface in the KHIE is notional (not actual)
Lecture 36 - The Rayleigh Integral
Lecture 37 - Sound field of an oscillating piston in a rigid baffle
Lecture 38 - Sound field of an oscillating piston in a rigid baffle (Continued...)
Lecture 39 - Physics of the sound field of an oscillating piston in a rigid baffle
Lecture 40 - Physics of the sound field of an oscillating piston in a rigid baffle (Continued...)
Lecture 41 - Physics of the sound field of the oscillating piston (cap) on a rigid sphere
Lecture 42 - The Sommerfeld radiation condition
Lecture 43 - Sound field inside a rigid walled box due to initial conditions
Lecture 44 - Sound field inside a rigid walled box due to a harmonic source
Lecture 45 - Sound field inside a rigid walled hollow cylinder due to initial conditions
Lecture 46 - Modeshape visualization inside a rigid walled cylinder
Lecture 47 - Sound field inside a rigid walled hollow cylinder due to initial conditions (Continued...)
Lecture 48 - Green function inside a rigid walled cylinder
Lecture 49 - Measures of sound
Lecture 50 - Measures of sound (Continued...)
Lecture 51 - Average mean square value of different frequency sinusoids
Lecture 52 - Frequency analysis of sounds in terms of third octave bands
Lecture 53 - Transient solution of the wave equation using Fourier series
Lecture 54 - Total soln of harmonically forced wave equation with initial conditions using Fourier series
Lecture 55 - Total soln of forced wave eqn with initial conditns using Laplace transform and Fourierseries
Lecture 56 - Branched systems, Helmholtz resonator
Lecture 57 - The radiation impedance and acoustic power
Lecture 58 - Acoustic potential, combined systems, special techniques for solving acoustic wave equation
Lecture 59 - Why do we take the real value of the solution in acoustic wave problems
Lecture 60 - Course summary - Part 1
Lecture 61 - Course summary - Part 2

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NPTEL Video Course - Mechanical Engineering - NOC:Advanced Measurement Techniques in Fluid Mechanics and Heat

Subject Co-ordinator - Prof Saptarshi Basu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fluids - 1
Lecture 2 - Introduction to Fluids - 2
Lecture 3 - Introduction to Fluids - 3
Lecture 4 - Recap and description of fluid flows
Lecture 5 - Overview of Measurements in Fluid Mechanics - 1
Lecture 6 - Overview of Measurements in Fluid Mechanics - 2
Lecture 7 - Geometric Optics - 1
Lecture 8 - Geometric Optics - 2
Lecture 9 - Imaging and Optics - 1
Lecture 10 - Imaging and Optics - 2
Lecture 11 - Imaging and Optics - 3
Lecture 12 - Imaging and Optics - 4
Lecture 13 - Imaging and Optics - 5
Lecture 14 - Imaging and Optics - 6
Lecture 15 - Imaging and Optics - 7
Lecture 16 - Introduction to Lasers
Lecture 17 - Introduction to Experimental Data Processing
Lecture 18 - Experimental Image Processing in ImageJ
Lecture 19 - Introduction to Experimental Signal Processing
Lecture 20 - Experimental Signal Processing in MATLAB
Lecture 21 - Overview of Experimental Techniques - 1
Lecture 22 - Overview of Experimental Techniques - 2
Lecture 23 - Schlieren and Shadowgraphy - 1
Lecture 24 - Schlieren and Shadowgraphy - 2
Lecture 25 - Schlieren and Shadowgraphy - 3
Lecture 26 - Schlieren and Shadowgraphy - 4
Lecture 27 - Depth from Defocus - 1
Lecture 28 - Depth from Defocus - 2
Lecture 29 - Depth from Defocus - 3

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Lecture 30 - Depth from Defocus - 4
Lecture 31 - Particle Image Velocimetry - 1
Lecture 32 - Particle Image Velocimetry - 2
Lecture 33 - Particle Image Velocimetry - 3
Lecture 34 - Particle Image Velocimetry - 4
Lecture 35 - Particle Image Velocimetry - 5
Lecture 36 - Particle Image Velocimetry - 6
Lecture 37 - Particle Image Velocimetry - 7
Lecture 38 - Micro PIV - 1
Lecture 39 - Micro PIV - 2
Lecture 40 - Micro PIV - 3
Lecture 41 - Micro PIV - 4
Lecture 42 - Laser Doppler Velocimetry - 1
Lecture 43 - Laser Doppler Velocimetry - 2
Lecture 44 - Laser Doppler Velocimetry - 3
Lecture 45 - Laser Doppler Velocimetry - 4
Lecture 46 - Phase Doppler Particle Analyzer - 1
Lecture 47 - Phase Doppler Particle Analyzer - 2
Lecture 48 - Phase Doppler Particle Analyzer - 3
Lecture 49 - Emission Spectroscopy - 1
Lecture 50 - Emission Spectroscopy - 2
Lecture 51 - Chemilumescence Measurements - 1
Lecture 52 - Chemilumescence Measurements - 2
Lecture 53 - Tunable Diode Laser Absorption Spectroscopy - 1
Lecture 54 - Tunable Diode Laser Absorption Spectroscopy - 2
Lecture 55 - Infrared Thermography - 1
Lecture 56 - Infrared Thermography - 2
Lecture 57 - Hot Wire Anemometry - 1
Lecture 58 - Hot Wire Anemometry - 2
Lecture 59 - Hot Wire Anemometry - 3
Lecture 60 - General Optics + PIV + Schlieren Demo

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NPTEL Video Course - Metallurgy and Material Science - NOC:Phase Field Modelling: The Materials Science, Math

Subject Co-ordinator - Dr. M.P. Gururajan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1
Lecture 2 - Module 1
Lecture 3 - Module 1
Lecture 4 - Module 1
Lecture 5 - Module 1
Lecture 6 - Module 2
Lecture 7 - Module 1
Lecture 8 - Module 1
Lecture 9 - Module 1
Lecture 10 - Module 1
Lecture 11 - Module 1
Lecture 12 - Module 2
Lecture 13 - Module 2
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Lecture 16 - Module 2
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Lecture 21 - Module 3
Lecture 22 - Module 3
Lecture 23 - Module 2
Lecture 24 - Module 4
Lecture 25 - Module 4
Lecture 26 - Module 4
Lecture 27 - Module 4
Lecture 28 - Module 4
Lecture 29 - Module 5

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Lecture 30 - Module 5
Lecture 31 - Module 5
Lecture 32 - Module 6
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Lecture 37 - Module 7
Lecture 38 - Module 8
Lecture 39 - Module 8
Lecture 40 - Module 8
Lecture 41 - Module 8
Lecture 42 - Module 9
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Lecture 46 - Module 10
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Lecture 68 - Module 14

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Lecture 69 - Module 15
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Lecture 87 - Module 22

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NPTEL Video Course - Metallurgy and Material Science - NOC:Dealing with Materials Data: Collection, Analysis

Subject Co-ordinator - Dr. M.P. Gururajan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Descriptive Statistics - I
Lecture 2 - Descriptive Statistics - II
Lecture 3 - Probability and Distribution
Lecture 4 - Random variable and Expectation - I
Lecture 5 - Random variable and Expectation - II
Lecture 6 - Random variable and Expectation - III
Lecture 7 - Random variable and Expectation - IV
Lecture 8 - Module
Lecture 9 - R
Lecture 10 - R as calculator and plotter
Lecture 11 - R as calculator and plotter
Lecture 12 - Data in tabular form
Lecture 13 - Tabular data in R
Lecture 14 - Dataframe in R
Lecture 15 - R libraries for plotting
Lecture 16 - Importing and plotting data
Lecture 17 - Property charts
Lecture 18 - Introduction to R
Lecture 19 - Descriptive statistics
Lecture 20 - Presenting experimental results
Lecture 21 - Property based reports, errors, significant digits
Lecture 22 - Dealing with distributions
Lecture 23 - Grain size data
Lecture 24 - Case study
Lecture 25 - Grain size in a two phase steel
Lecture 26 - Presenting experimental results
Lecture 27 - Errors and their propagation
Lecture 28 - Fitting experimental data to distributions
Lecture 29 - Combining uncertainties

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Lecture 30 - Summary
Lecture 31 - Special Random Variables - I
Lecture 32 - Special Random Variables - II
Lecture 33 - Special Random Variables - III
Lecture 34 - Special Random Variables - IV
Lecture 35 - Special Random Variables - V
Lecture 36 - Probabilty Plots
Lecture 37 - Probability distributions
Lecture 38 - Properties of probability distributions
Lecture 39 - Bernoulli trials and binomial distributions
Lecture 40 - Atom probe technique and negative binomial distribution
Lecture 41 - Atom probe and hypergeometric distribution
Lecture 42 - Atom probe
Lecture 43 - Nucleation and Poisson distribution
Lecture 44 - Normal distribution
Lecture 45 - Normal distribution and error function
Lecture 46 - Probability scale
Lecture 47 - Sampling Distribution - I
Lecture 48 - Sampling Distribution - II
Lecture 49 - Sampling Distribution - III
Lecture 50 - Parameter Estimation - I
Lecture 51 - Parameter Estimator - II
Lecture 52 - Parameter Estimator - III
Lecture 53 - Parameter Estimator - IV
Lecture 54 - Bayesian Estimation
Lecture 55 - Log normal distribution
Lecture 56 - Lorentz/Cauchy distribution
Lecture 57 - Lifetime and exponential distributions
Lecture 58 - Distributions from statistical mechanics
Lecture 59 - Uniform distribution and summary of probability distributions
Lecture 60 - Data processing
Lecture 61 - Distribution function of a data series
Lecture 62 - Estimating mean and mean-square-deviation of data
Lecture 63 - Data with unequal weights
Lecture 64 - Robust estimates
Lecture 65 - From data to underlying distribution
Lecture 66 - Bootstrap method
Lecture 67 - Summary
Lecture 68 - Hypothesis Testing - I

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Lecture 69 - Hypothesis Testing - II
Lecture 70 - Hypothesis Testing - III
Lecture 71 - Hypothesis Testing - IV
Lecture 72 - Hypothesis Testing - V
Lecture 73 - Hypothesis Testing - VI
Lecture 74 - Graphical handling of data
Lecture 75 - Fitting and graphical handling of data
Lecture 76 - Data transformable to linear
Lecture 77 - Data of known functional form
Lecture 78 - Calibration,Fitting, Hypotheses testing
Lecture 79 - Analysis of variance
Lecture 80 - Summary
Lecture 81 - Regression Analysis - I
Lecture 82 - Regression Analysis - II
Lecture 83 - Regression Analysis - III
Lecture 84 - Regression Analysis - IV
Lecture 85 - Analysis of Variance - I
Lecture 86 - Analysis of Variance - II
Lecture 87 - Design of Experiment - I
Lecture 88 - Design of Experiment - II
Lecture 89 - Design of Experiment - III
Lecture 90 - Design of Experiment - IV
Lecture 91 - Summary of the course
Lecture 92 - Case studies
Lecture 93 - Case study 1
Lecture 94 - Case study 1
Lecture 95 - Case study 2
Lecture 96 - Case study 3
Lecture 97 - Case study 4
Lecture 98 - Case study 5
Lecture 99 - Course summary

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NPTEL Video Course - Metallurgy and Material Science - NOC:Aqueous Corrosion and its Control

Subject Co-ordinator - Prof. V. S. Raja

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course and corrosion implications
Lecture 2 - Can we predict if a metal corrodes? - Part I
Lecture 3 - Can we predict if a metal corrodes? - Part II
Lecture 4 - Can we calculate the rate of corrosion
Lecture 5 - Can we calculate the rate of corrosion
Lecture 6 - Can we calculate the corrosion rate of metals
Lecture 7 - Passivity (Continued...)
Lecture 8 - DC polarisation experiments and their relation to mixed potential theory/Evans diagram
Lecture 9 - Pourbaix diagram and electrochemical corrosion
Lecture 10 - Forms of corrosion
Lecture 11 - Forms of corrosion
Lecture 12 - Forms of corrosion
Lecture 13 - Forms of corrosion
Lecture 14 - Forms of corrosion
Lecture 15 - Forms of corrosion
Lecture 16 - Forms of corrosion
Lecture 17 - Forms of corrosion
Lecture 18 - Forms of corrosion
Lecture 19 - Forms of corrosion
Lecture 20 - Forms of corrosion
Lecture 21 - Forms of corrosion
Lecture 22 - Forms of corrosion
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Lecture 25 - Forms of corrosion
Lecture 26 - Forms of corrosion
Lecture 27 - Forms of corrosion
Lecture 28 - Forms of corrosion
Lecture 29 - Forms of corrosion

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Lecture 30 - Forms of corrosion
Lecture 31 - Forms of corrosion
Lecture 32 - Forms of corrosion
Lecture 33 - Forms of corrosion
Lecture 34 - Effective corrosion management

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NPTEL Video Course - Metallurgy and Material Science - NOC:Cathodic Protection Engineering

Subject Co-ordinator - Prof. V.S. Raja

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course and understanding corrosion
Lecture 2 - External corrosion of pipelines
Lecture 3 - Electrochemical principles
Lecture 4 - Criteria
Lecture 5 - Assessment of pipeline condition through surveys - Part I
Lecture 6 - Assessment of pipeline condition through surveys - Part II
Lecture 7 - Anode ground bed for cathodic protection
Lecture 8 - Perspectives in storage tanks and off-shore structures
Lecture 9 - Anodes
Lecture 10 - Worked out examples
Lecture 11 - Stray current corrosion and its control
Lecture 12 - Coatings and rectifier selection
Lecture 13 - Internal corrosion of oil and steel gas pipelines
Lecture 14 - Anodic protection engineering

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NPTEL Video Course - Metallurgy and Material Science - NOC:Introduction to Materials Science and Engineering

Subject Co-ordinator - Prof. Rajesh Prasad

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intoduction
Lecture 2 - Crystal geometry
Lecture 3 - Unit cell
Lecture 4 - Classification of lattices
Lecture 5 - Gaps in Bravais lattice list
Lecture 6 - Symmetry - I
Lecture 7 - Symmetry - II
Lecture 8 - Classification of lattices on the basis of symmetry
Lecture 9 - A symmetry based approach to Bravais lattices
Lecture 10 - Miller indices of directions
Lecture 11 - Miller indices for planes
Lecture 12 - Miller indices for plane and its normal in Cubic Crystal
Lecture 13 - Weiss Zone law and its applications
Lecture 14 - Inter-planar spacing
Lecture 15 - Braggâ s Law
Lecture 16 - Close-packing of hard spheres
Lecture 17 - Hexagonal Close-Packed (HCP) structure
Lecture 18 - Lattice and motif of HCP crystals
Lecture 19 - c/a ratio of an ideal HCP crystal
Lecture 20 - ABCABC stacking of close-packed spheres
Lecture 21 - Voids in close-packed structures
Lecture 22 - Solid solutions - I
Lecture 23 - Solid solutions - II
Lecture 24 - Hume-Rothery rules
Lecture 25 - Ordered and disordered solid solutions
Lecture 26 - Graphene
Lecture 27 - Structure of graphite
Lecture 28 - Structure of diamond
Lecture 29 - Carbon nanotubes (CNT)

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Lecture 30 - Buckminsterfullerene (C60)
Lecture 31 - Ionic solids
Lecture 32 - NaCl
Lecture 33 - CsCl
Lecture 34 - ZnS
Lecture 35 - BCC vs CsCl
Lecture 36 - Amorphous Solids
Lecture 37 - Polymers
Lecture 38 - Vinyl Polymers
Lecture 39 - Thermoplasts and Thermosets
Lecture 40 - Tacticity
Lecture 41 - Copolymers
Lecture 42 - Crystallinity in Polymers
Lecture 43 - Defects in Crystals
Lecture 44 - Vacancies
Lecture 45 - Edge dislocation
Lecture 46 - Edge dislocation
Lecture 47 - Characteristic vectors of a dislocation
Lecture 48 - Edge, screw and mixed dislocations
Lecture 49 - Screw dislocations
Lecture 50 - Burgers circuit
Lecture 51 - Elastic energy of a dislocation line
Lecture 52 - Burgers vector
Lecture 53 - Burgers vector of a dislocation is constant along the line
Lecture 54 - Geometrical properties of a dislocations
Lecture 55 - Dislocation cannot end abruptly in a crystal
Lecture 56 - Dislocation cannot end abruptly in a crystal
Lecture 57 - Dislocation cannot end abruptly in a crystal
Lecture 58 - Dislocation motion
Lecture 59 - 2D defects
Lecture 60 - Free surface or external surface of the crystal
Lecture 61 - Stacking faults
Lecture 62 - Twin boundary
Lecture 63 - Grain boundary
Lecture 64 - Small angle symmetric tilt boundary
Lecture 65 - Ball bearing model
Lecture 66 - Phase diagrams
Lecture 67 - Phases and components
Lecture 68 - Uses of phase diagrams

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Lecture 69 - Phases present in the system
Lecture 70 - Composition of phases present in the system
Lecture 71 - Proportion of phases present in the system
Lecture 72 - Microstructure evolution during solidification in isomorphous systems
Lecture 73 - Eutectic system
Lecture 74 - Eutectic reaction
Lecture 75 - Eutectic, hypoeutectic and hypereutectic alloys
Lecture 76 - Gibbsâ phase rule
Lecture 77 - Fe-C phase diagram
Lecture 78 - Eutectoid, hypoeutectoid and hypereutectoid steels
Lecture 79 - Microstructure of a hypoeutectoid steel
Lecture 80 - Microstructure of a hypereutectoid steel
Lecture 81 - Diffusion
Lecture 82 - Fickâ s first law
Lecture 83 - Fickâ s second law
Lecture 84 - Error function solution of Fickâ s second law
Lecture 85 - Atomic mechanisms of diffusion
Lecture 86 - Substitutional diffusion revisited
Lecture 87 - Diffusion paths
Lecture 88 - Steady and unsteady state diffusion
Lecture 89 - Phase Transformation
Lecture 90 - Nucleation
Lecture 91 - Nucleation and capillary rise
Lecture 92 - Nucleation, growth and overall transformation
Lecture 93 - Time-temperature-transformation (TTT) diagram
Lecture 94 - Homogeneus and heterogeneous nucleation
Lecture 95 - Heat treatment of steels
Lecture 96 - TTT diagram of Eutectoid Steels
Lecture 97 - Quenching and martensite
Lecture 98 - Austempering and bainite
Lecture 99 - Tempering
Lecture 100 - Residual stresses and Quench cracks
Lecture 101 - Marquenching and martempering
Lecture 102 - TTT diagram of hypoeutectoid and hypereutectoid steels
Lecture 103 - TTT diagram of alloy steel
Lecture 104 - hardenability of steels
Lecture 105 - Glass Ceramics
Lecture 106 - Tensile test
Lecture 107 - Plastic deformation and crystal structure

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Lecture 108 - Shape change
Lecture 109 - Slip
Lecture 110 - Resolved shear stress
Lecture 111 - CRSS
Lecture 112 - Schmid's law
Lecture 113 - CRSS
Lecture 114 - Why is experimental CRSS less than theoretical CRSS
Lecture 115 - Strengthening mechaniksms
Lecture 116 - Dislocation density
Lecture 117 - Frank-Read source
Lecture 118 - strain hardening
Lecture 119 - Dislocation interaction leading to strain hardening - I
Lecture 120 - Dislocation interaction leading to strain hardening - II
Lecture 121 - Solid solution hardening
Lecture 122 - Grain size hardening
Lecture 123 - Age hardening - I
Lecture 124 - Age hardening - II
Lecture 125 - Metastable precipitates
Lecture 126 - Annealing of cold-worked metals
Lecture 127 - Recovery
Lecture 128 - Recrystallization
Lecture 129 - Grain Growth
Lecture 130 - True stress and true strain
Lecture 131 - Creep
Lecture 132 - Effect of stress and temperature on creep
Lecture 133 - Creep Mechanisms
Lecture 134 - Composites
Lecture 135 - Isostrain modulus
Lecture 136 - Isostress modulus
Lecture 137 - Fracture
Lecture 138 - Ductile and Brittle Fracture
Lecture 139 - Role of crack size
Lecture 140 - Griffith's Criterion
Lecture 141 - Stress Concentration
Lecture 142 - Ductile to brittle transition
Lecture 143 - Enhancing fracture resistance
Lecture 144 - Toughening of glass
Lecture 145 - Toughening of glass
Lecture 146 - Fatigue

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Lecture 147 - Sub-Critical crack growth

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NPTEL Video Course - Metallurgy and Material Science - NOC:Crystals, Symmetry and Tensors

Subject Co-ordinator - Prof. Rajesh Prasad

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 (1a)
Lecture 2 (1b)
Lecture 3 (1c)
Lecture 4 (1d)
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Lecture 6 (2a)
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Lecture 26 (8b)
Lecture 27 (9a)
Lecture 28 (9b)
Lecture 29 (9c)

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Lecture 30 (9d)
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Lecture 92 (28d)
Lecture 93 (28e)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Corrosion-Environmental Degradation-Surface Engine

Subject Co-ordinator - Prof. (Hag) Harish Hirani

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Metallurgy and Material Science - NOC:Introduction to Crystal Elasticity and Crystal Pla

Subject Co-ordinator - Prof. Swarup bag

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Structure and properties of materials - Part I
Lecture 2 - Structure and properties of materials - Part II
Lecture 3 - Elasticity Isotropic elasticity of materials; Anisotropic elasticity - Part I
Lecture 4 - Elasticity Isotropic elasticity of materials; Anisotropic elasticity - Part II
Lecture 5 - Continuum Plasticity - I (Part A)
Lecture 6 - Continuum Plasticity - I (Part B)
Lecture 7 - Continuum Plasticity - II (Part A)
Lecture 8 - Continuum Plasticity - II (Part B)
Lecture 9 - Crystal Plasticity - I (Part A)
Lecture 10 - Crystal Plasticity - I (Part B)
Lecture 11 - Crystal Plasticity - II (Part A)
Lecture 12 - Crystal Plasticity - II (Part B)
Lecture 13 - Crystal Plasticity - II (Part C)
Lecture 14 - Hardening Mechanisms in Metals - Part I
Lecture 15 - Hardening Mechanisms in Metals - Part II
Lecture 16 - Hardening Mechanisms in Metals - Part III
Lecture 17 - Multi-Scale Approach to Materials Modelling

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NPTEL Video Course - Metallurgy and Material Science - Advanced Characterization Techniques

Subject Co-ordinator - Dr. Krishanu Biswas, Prof.N.P.Gurao

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Advanced Characterization Techniques
Lecture 2 - Advanced Characterization Techniques
Lecture 3 - Advanced Characterization Techniques
Lecture 4 - Advanced Characterization Techniques
Lecture 5 - Advanced Characterization Techniques
Lecture 6 - Advanced Characterization Techniques
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Lecture 29 - Advanced Characterization Techniques

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Lecture 30 - Advanced Characterization Techniques
Lecture 31 - Advanced Characterization Techniques
Lecture 32 - Advanced Characterization Techniques
Lecture 33 - Advanced Characterization Techniques

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NPTEL Video Course - Metallurgy and Material Science - Electroceramics

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Metallurgy and Material Science - Fuels Refractory and Furnaces

Subject Co-ordinator - Prof. Satish Ch. Koria

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy Resources and Environment
Lecture 2 - Characterization of Fuels
Lecture 3 - Characterization of Fuels
Lecture 4 - Production of Secondary Fuels
Lecture 5 - Materials Balance in Coke-making
Lecture 6 - Heat Balance and Clean Development Mechanism
Lecture 7 - Production of Secondary Fuels
Lecture 8 - Materials and Heat Balance in Gasification
Lecture 9 - Principles of combustion
Lecture 10 - Principles of combustion
Lecture 11 - Materials balance in combustion
Lecture 12 - Principles of Combustion
Lecture 13 - Flame Temperature Calculations
Lecture 14 - Refractory in Furnaces
Lecture 15 - Refractory in Furnaces
Lecture 16 - Furnace
Lecture 17 - Heat Utilization in furnaces, energy flow diagrams
Lecture 18 - Heat Utilization in furnaces, energy flow diagrams
Lecture 19 - Heat Utilization in Furnaces
Lecture 20 - Heat Utilization in Furnaces
Lecture 21 - Transport Phenomena in Furnaces
Lecture 22 - Macroscopic Energy Balance
Lecture 23 - Macroscopic Energy Balance
Lecture 24 - Macroscopic Energy Balance
Lecture 25 - Macroscopic Energy Balance
Lecture 26 - Macroscopic Energy Balance
Lecture 27 - Principles of Burner Design
Lecture 28 - Transport Phenomena in Furnaces
Lecture 29 - Transport Phenomena in Furnaces

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Lecture 30 - Transport Phenomena in Furnaces
Lecture 31 - Transport Phenomena in Furnaces
Lecture 32 - Steady Heat flows in Furnace and Heat Exchanger
Lecture 33 - Exercises on Heat Flow in Furnaces and Heat Exchangers
Lecture 34 - Exercises on Heat Flow in Furnaces and Heat Exchangers
Lecture 35 - Miscellaneous Topics
Lecture 36 - Miscellaneous Topics
Lecture 37 - Miscellaneous Topics
Lecture 38 - Miscellaneous topics
Lecture 39 - Furnace efficiency, Fuel Saving, Carbon Offset
Lecture 40 - Furnace efficiency, Fuel Saving, Carbon Offset

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NPTEL Video Course - Metallurgy and Material Science - Introduction to Biomaterials

Subject Co-ordinator - Dr. Kantesh Balani, Dr. Birkamjit Basu

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to basic concepts of Biomaterials Science; Salient properties of important material
Lecture 2 - Manufacturing and properties of metals, ceramics, polymers and composites
Lecture 3 - Concept of biocompatibility, host response, structure-property of biological cell
Lecture 4 - Structure and properties of cells, protein and cellular adaptation process
Lecture 5 - Cell-I
Lecture 6 - Cell-II
Lecture 7 - Cell Migration and Cell Division and cell death
Lecture 8 - Cell Differentiation and Cell Death
Lecture 9 - Cell Apoptosis-I
Lecture 10 - Cell Apoptosis-II
Lecture 11 - Structure and properties of Protein; cell - material interaction
Lecture 12 - Assessment of biocompatibility of biomaterials
Lecture 13 - Biological testing (hemocompatibility, tribological testing)
Lecture 14 - Structure and properties of bone as well as in vivo testing and histocompatibility assessment
Lecture 15 - Important biometallic alloys
Lecture 16 - Ti Alloy
Lecture 17 - Co-Cr-Mo alloys
Lecture 18 - Bioceramics
Lecture 19 - Processing of Bioceramics
Lecture 20 - Ceramics, Bioceramics and Glasses
Lecture 21 - Sintering and mechanical properties of ceramics
Lecture 22 - Fracture and toughening of ceramic composites
Lecture 23 - Development of based bioceramic composites for hard tissue replacement
Lecture 24 - Alternative phosphate materials, based composites with bactericidal property and glass ceramics
Lecture 25 - Electrostatic Spraying of UHMWPE-HA-CNT composites
Lecture 26 - Thin Films and Coatings
Lecture 27 - hermal Spray Coatings
Lecture 28 - Biocompatibility of plasma sprayed CNT reinforced Hydroxyapatite biocomposite coatings
Lecture 29 - Biocompatibility of Alumina and CNT reinforced Hydroxyapatite

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Lecture 30 - Glass-ceramics for dental restoration applications
Lecture 31 - Structure and properties of polymers
Lecture 32 - Biodegradable polymers (Importance)
Lecture 33 - Biodegradable polymers (Types)
Lecture 34 - Mechanisms of Bioerosion
Lecture 35 - External field and material interaction
Lecture 36 - Tissue Engineering and wound healing
Lecture 37 - Understanding Design Concepts of Bio-implants
Lecture 38 - Understanding Design Concepts of Dental-implants
Lecture 39 - Understanding Design Concepts of Orthopedic-implant

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NPTEL Video Course - Metallurgy and Material Science - Materials and Energy balance in Metallurgical Processe

Subject Co-ordinator - Prof. Satish Ch. Koria

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Course
Lecture 2 - Measurement of Quantities
Lecture 3 - Exercises on Measurement of Quantities, Introduction to Stoichiometry
Lecture 4 - Stoichiometry Concept and Exercise
Lecture 5 - Exercise on Stoichiometry and Introduction to Thermochemistry
Lecture 6 - Thermochemistry
Lecture 7 - Exercise on Thermochemistry & Frequently Asked Questions
Lecture 8 - Errors in Measurements
Lecture 9 - Basics of Materials & Energy Balance
Lecture 10 - Introduction to Mineral Beneficiation
Lecture 11 - Materials Balance in Mineral Processing and Faq
Lecture 12 - Exercises in Mineral Processing
Lecture 13 - Calcination Concepts & Exercises
Lecture 14 - Pyromet ExtractionUnit Processes
Lecture 15 - Predominance Area Diagram
Lecture 16 - Material Balance in Roasting;illustration
Lecture 17 - Heat Balance in Roasting illustration
Lecture 18 - Exersises on Roasting
Lecture 19 - Exercises on Roasting
Lecture 20 - Smelting Matte Smelting
Lecture 21 - Exercise-I Matte Smelting
Lecture 22 - Exercise-II Matte Smelting
Lecture 23 - Reduction Smelting
Lecture 24 - Lead Smelting Material Balance
Lecture 25 - Imperial Smelting Process
Lecture 26 - Introduction to Ironmaking
Lecture 27 - Coke Making
Lecture 28 - Ironmaking Fundamentals
Lecture 29 - Material & Heat Balance in Ironmaking - I

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Lecture 30 - Material & Heat Balance in Ironmaking - II
Lecture 31 - RIST Diagram - I
Lecture 32 - RIST Diagram - II
Lecture 33 - Concepts in Converting
Lecture 34 - Exercise in Converting
Lecture 35 - Additional Topics - I Melting in Cupola
Lecture 36 - Additional Topics - II Gasification
Lecture 37 - Additional Topics - III Material Balance in Gasification
Lecture 38 - Additional Topics - IV Industrial Furnaces
Lecture 39 - Energy Balance in Industrial Furnaces
Lecture 40 - Thoughts on Application of Energy Balance

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NPTEL Video Course - Metallurgy and Material Science - Optoelectronic Materials and Devices

Subject Co-ordinator - Prof. Deepak Gupta, Prof. Monica Katiyar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Conductivity of materials, Drudeâ s theory and its failures
Lecture 2 - Free electron theory
Lecture 3 - Free electron theory
Lecture 4 - Crystal structure, Reciprocal lattice I
Lecture 5 - Reciprocal lattice II, Brillouin zone and Braggâ s diffraction condition
Lecture 6 - Electrons in a crystal, Blochâ s electron
Lecture 7 - Free electron band diagrams in an empty lattice
Lecture 8 - Effect of periodic potential, Origin of band-gap through Kronig-Penny model
Lecture 9 - Electron dynamics
Lecture 10 - Conduction in relation to band diagrams
Lecture 11 - Semiconductor E-k diagrams and their material properties
Lecture 12 - Equilibrium carrier statistics in semiconductors
Lecture 13 - Equilibrium carrier statistics in semiconductors
Lecture 14 - Equilibrium carrier statistics in semiconductors
Lecture 15 - Doping in semiconductors
Lecture 16 - Equilibrium carrier statistics in semiconductors
Lecture 17 - Equilibrium carrier statistics in semiconductors
Lecture 18 - Semiconductor junctions in band-diagrams
Lecture 19 - Linear dielectric behavior
Lecture 20 - Non-linear dielectric behavior
Lecture 21 - Carrier recombination-generation - I
Lecture 22 - Carrier recombination-generation - II
Lecture 23 - R-G statistics via R-G centers
Lecture 24 - Optoelectronic materials and bandgap engineering
Lecture 25 - Optical properties of materials
Lecture 26 - Optical properties of single interfaces
Lecture 27 - Optical Properties of two interfaces
Lecture 28 - Drift
Lecture 29 - Diffusion

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Lecture 30 - Continuity Equation
Lecture 31 - Resistor and diode (p-n junction)
Lecture 32 - Fundamentals of p-n junction
Lecture 33 - Fundamentals of p-n junction (Continued...)
Lecture 34 - Solar cells
Lecture 35 - Microelectronics processing
Lecture 36 - MOS capacitor
Lecture 37 - Transistor
Lecture 38 - Organic Electronics
Lecture 39 - Organic Light Emitting Diodes
Lecture 40 - Organic Solar Cells and Organics Thin Film Transistors

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NPTEL Video Course - Metallurgy and Material Science - Steel Making

Subject Co-ordinator - Prof. Satish Ch. Koria, Prof. Dipak Mazumdar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Metallurgy and Material Science - Structure of Materials

Subject Co-ordinator - Dr. Anandh Subramaniam

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Geometry of Crystals
Lecture 3 - Geometry of Crystals
Lecture 4 - Geometry of Crystals
Lecture 5 - Geometry of Crystals
Lecture 6 - Geometry of Crystals
Lecture 7 - Geometry of Crystals
Lecture 8 - Geometry of Crystals
Lecture 9 - Geometry of Crystals
Lecture 10 - Geometry of Crystals
Lecture 11 - Geometry of Crystals
Lecture 12 - Geometry of Crystals
Lecture 13 - Miller Indices
Lecture 14 - Miller Indices (Continued...) and Crystal Structures
Lecture 15 - Crystal Structures
Lecture 16 - Crystal Structures
Lecture 17 - Crystal Structures
Lecture 18 - Crystal Structures
Lecture 19 - Crystal Structures
Lecture 20 - Crystal Structures
Lecture 21 - Crystal Structures (Continued...) and Defects in Crystals
Lecture 22 - Defects in Crystals
Lecture 23 - Defects in Crystals
Lecture 24 - Defects in Crystals
Lecture 25 - Defects in Crystals
Lecture 26 - Defects in Crystals
Lecture 27 - Defects in Crystals
Lecture 28 - Defects in Crystals
Lecture 29 - Defects in Crystals

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Lecture 30 - Diffusion in Solids
Lecture 31 - Diffusion in Solids
Lecture 32 - Phase Diagrams
Lecture 33 - Phase Diagrams
Lecture 34 - Phase Diagrams
Lecture 35 - Phase Diagrams
Lecture 36 - Phase Diagrams
Lecture 37 - Phase Transformations
Lecture 38 - Phase Transformations
Lecture 39 - Phase Transformations
Lecture 40 - Phase Transformations
Lecture 41 - Phase Transformations
Lecture 42 - Phase Transformations
Lecture 43 - Phase Transformations
Lecture 44 - Phase Transformations
Lecture 45 - Phase Transformations

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NPTEL Video Course - Metallurgy and Material Science - Environmental Degradation of Materials

Subject Co-ordinator - Dr. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Basic definition of corrosion
Lecture 2 - Forms of Degradation, Thermodynamics of corrosion
Lecture 3 - Thermodynamics of corrosion
Lecture 4 - Thermodynamics of corrosion
Lecture 5 - Thermodynamics of corrosion, Electrochemical series, Concentration cell
Lecture 6 - Reduction Potential series, Pourbaix diagram
Lecture 7 - Pourbaix diagram
Lecture 8 - Pourbaix diagram
Lecture 9 - Pourbaix diagram, Kinetics of corrosion
Lecture 10 - Kinetics of corrosion, Rate expression, Solved problems
Lecture 11 - Solved problems on the corrosion rate, Exchange current density
Lecture 12 - Exchange current density, Polarization, Activation Polarization, Tafel Equation
Lecture 13 - Activation Polarization, Concentration Polarization
Lecture 14 - Concentration Polarization, Mixed Potential Theory
Lecture 15 - Mixed Potential Theory, Explanation of corrosion events on the basis of Mixed potential theory,
Lecture 16 - Explanation of corrosion events on the basis of Mixed potential theory, Effect of impurity, Effe
Lecture 17 - Explanation of corrosion events on the basis of Mixed potential theory, Effect of area factor, C
Lecture 18 - Passivation and Mixed potential theory
Lecture 19 - Passivation and Mixed potential theory
Lecture 20 - Different corrosion protection mechanisms, electrochemical ways of protection, cathodic protecti
Lecture 21 - Cathodic and anodic protection
Lecture 22 - Anodic protection, Forms of corrosion, Factors of corrosion
Lecture 23 - Forms of corrosion, Uniform Corrosion, Galvanic corrosion
Lecture 24 - Galvanic corrosion
Lecture 25 - Crevice corrosion
Lecture 26 - Crevice corrosion, Pitting corrosion
Lecture 27 - Pitting corrosion, Intergranular corrosion
Lecture 28 - Intergranular corrosion, Dealloying
Lecture 29 - Dealloying, Erosion corrosion

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Lecture 30 - Erosion corrosion, Cavitation
Lecture 31 - Cavitation, Fretting corrosion, corrosion cracking
Lecture 32 - Stress corrosion cracking
Lecture 33 - Stress corrosion cracking
Lecture 34 - Biologically influenced corrosion, liquid metal attack
Lecture 35 - Corrosion protection, change of materials, effect of design of component
Lecture 36 - Corrosion protection, change of environment, Inhibitors, coatings
Lecture 37 - Oxidation and hot corrosion, pitting Bedworth ratio, thermodynamics of oxidation
Lecture 38 - Thermodynamics of oxidation, Ellingham diagram, oxidation kinetics and laws
Lecture 39 - Oxide structure and Oxidation
Lecture 40 - Hot corrosion, corrosion testing and failure analysis, linear polarization
Lecture 41 - Degradation of composites, polymers and ceramics, corrosion and society

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NPTEL Video Course - Metallurgy and Material Science - NOC:Phase Diagrams in Materials Science and Engineerir

Subject Co-ordinator - Dr. Krishanu Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Heterogeneous equilibrium and Free energy Formalism
Lecture 3 - Concept of Chemical Potential
Lecture 4 - Phase Rule-I
Lecture 5 - Phase Rule-II and Single Component Equilibria
Lecture 6 - Single Component Phase Diagram
Lecture 7 - Binary Phase Diagram - Isomorphous Diagram
Lecture 8 - Binary Ispmorphous System
Lecture 9 - Solidification of Isomorphous Alloys
Lecture 10 - Free Energy of Binary Isomorphous Phase Diagram
Lecture 11 - Phase Diagram of Binary Eutectic Systems Edit Lesson
Lecture 12 - Solidification of eutectic, hypo-eutectic and hyper-eutectic alloys & their morphologies - I
Lecture 13 - Solidification of eutectic, hypo-eutectic and hyper-eutectic alloys & their morphologies - II
Lecture 14 - Phase diagrams of binary eutectic two terminal solid solution
Lecture 15 - Phase diagrams of binary peritectic System - I
Lecture 16 - Phase diagrams of binary peritectic System - II
Lecture 17 - Phase diagrams of binary peritectic System with intermediate phases
Lecture 18 - Intermediate Phases
Lecture 19 - Introduction to Monotectic Phase Diagram
Lecture 20 - Microstructural Evolution of Monotectic Phase Diagram
Lecture 21 - Free Energy Composition diagrams for Monotectic systems and Syntactic phase diagram
Lecture 22 - Quasichemical theory - I
Lecture 23 - Quasichemical theory - II
Lecture 24 - Quasichemical theory Free enegy formalism
Lecture 25 - Solid state reaction
Lecture 26 - Introduction to Iron-Carbon phase diagram
Lecture 27 - Eutectoid transformation in Iron-Carbon phase diagram
Lecture 28 - Austenite to pearlite transformation in Iron-Carbon phase diagram
Lecture 29 - Hypo-eutectoid steels

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Lecture 30 - Pearlite Transformation
Lecture 31 - Martensite Transformation - I
Lecture 32 - Martensite Transformation - II
Lecture 33 - Tempering of Martensite
Lecture 34 - Bainite Transformation
Lecture 35 - TTT curves for Steel
Lecture 36 - Cast Iron - I
Lecture 37 - Cast Iron - II
Lecture 38 - Ductile Iron and Nodular Iron
Lecture 39 - Malleable Iron
Lecture 40 - Alloyed Cast Iron
Lecture 41 - Phase Diagram for different Solid State Reaction
Lecture 42 - Phase Diagram of Ceramic
Lecture 43 - Ternary Phase Diagram - I
Lecture 44 - Ternary Phase Diagram - II
Lecture 45 - Ternary Phase Diagram and Tie Line Construction - I
Lecture 46 - Ternary Phase Diagram and Tie Line Construction - II
Lecture 47 - Ternary Phase Diagram and Tie Line Construction - III
Lecture 48 - Ternary Isomorphous Phase Diagram
Lecture 49 - Ternary Three Phase Equilibria
Lecture 50 - Three Phase Equilibria in Ternary Systems - I
Lecture 51 - Three Phase Equilibria in Ternary Systems - II
Lecture 52 - Solidification Behaviour of Ternary Alloy
Lecture 53 - Three Phase Equilibria
Lecture 54 - Ternary Four Phase Equilibria - I
Lecture 55 - Ternary Four Phase Equilibria - II
Lecture 56 - Solidification Behaviour of Ternary Eutectic Alloys
Lecture 57 - Phase Diagram of Ternary Eutectic with Terminal Solid Solution
Lecture 58 - Ternary Peritectic Reaction
Lecture 59 - Quasi-peritectic Reaction
Lecture 60 - Case Studies on Ternary Phase Diagrams - I
Lecture 61 - Case Studies on Ternary Phase Diagrams - II

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of Material Processing - I

Subject Co-ordinator - Prof. Shashank Shekhar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Solidification (Casting)
Lecture 3 - Solidification (Welding)
Lecture 4 - Thermodynamics of Solidification
Lecture 5 - Kinetics of Solidification (Homogeneous)
Lecture 6 - Kinetics of Solidification (Heterogeneous)
Lecture 7 - Heat Flow
Lecture 8 - Heat Flow (Continued...)
Lecture 9 - Heat Flow (Insulating Mold Condition)
Lecture 10 - Heat Flow (Insulating Mold Condition) (Continued...)
Lecture 11 - Heat Flow (Interface Resistance Controlled Solidification)
Lecture 12 - Heat Flow (Effect of Superheat)
Lecture 13 - Heat Flow (Solidification of Alloys)
Lecture 14 - Composition Variation
Lecture 15 - Composition Variation (Continued...)
Lecture 16 - Complete and Limited Liquid Diffusion
Lecture 17 - Mixed Mode Solidification
Lecture 18 - Mixed Mode Solidification and Zone Refining
Lecture 19 - Zone Refining (Continued...)
Lecture 20 - Cellular Solidification of Single Phase Alloy
Lecture 21 - Cellular Solidification of Single Phase Alloy (Continued...)
Lecture 22 - Cellular Solidification of Single Phase Alloy (Continued...)
Lecture 23 - Plane Front Solidification of Multiphase Alloy
Lecture 24 - Plane Front Solidification of Multiphase Alloy (Continued...)
Lecture 25 - Fluid Flow Considerations
Lecture 26 - Introduction to Powder Processing
Lecture 27 - Introduction to Powder Processing (Continued...)
Lecture 28 - Powder characterization
Lecture 29 - Powder Characterization Techniques

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Lecture 30 - Powder Characterization using Surface Area
Lecture 31 - Powder Characterization using Gas Permeability Method
Lecture 32 - Powder Manufacturing
Lecture 33 - Powder Manufacturing (Continued...)
Lecture 34 - Powder Manufacturing (Continued...)
Lecture 35 - Powder Consolidation
Lecture 36 - Powder Consolidation (Continued...)
Lecture 37 - Particle Packing
Lecture 38 - Powder Compaction
Lecture 39 - Powder Compaction (Continued...)
Lecture 40 - Sintering Theory

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NPTEL Video Course - Metallurgy and Material Science - NOC:Heat Treatment and Surface Hardening - I

Subject Co-ordinator - Dr. Kallol Mondal, Prof. Sandeep Sangal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Heat Treatment and Importance of Material Tetrahedron
Lecture 2 - Case studies in reference to Material tetrahedron T/t information and processing
Lecture 3 - Few more case studies in reference to processing with T/t modification
Lecture 4 - Critical Definition and Phase Transformation Thermodynamics and Driving Force
Lecture 5 - Thermodynamics of Phase Transformation Driving force of Phase Transformation
Lecture 6 - Thermodynamics of Phase Transformation and Driving Force for Phase Transformation
Lecture 7 - Finding Value of Driving Force (?G) and Single Component (liquid-solid)
Lecture 8 - Finding Value of Driving Force (?G) and Nucleation Single Component (liquid-solid)
Lecture 9 - Nucleation Treatment Single Component (Solid-Liquid) - I
Lecture 10 - Nucleation Treatment Single Component (Solid-Liquid) - II
Lecture 11 - Solved Problem on Nucleation rate and How to determine the value of ?sl Physical Concept & Inter
Lecture 12 - How to determine the value of ?sl (Physical Concept and Interfacial Energy)
Lecture 13 - Interfacial Energy - I
Lecture 14 - Interfacial Energy - II
Lecture 15 - Heterogeneous Nucleation - I
Lecture 16 - Heterogeneous Nucleation - II
Lecture 17 - Solid - Solid Transformation and Nucleation rate - I
Lecture 18 - Solid - Solid Transformation and Nucleation rate - II
Lecture 19 - Phase Diagram and G vs X plot - I
Lecture 20 - Phase Diagram and G vs X plot - II
Lecture 21 - Phase Diagram and G vs X plot - III
Lecture 22 - Introduction to Kinetics of Phase Transformation
Lecture 23 - Variation of ?G* and r* with Undercooling
Lecture 24 - Nucleation rate - I
Lecture 25 - Nucleation Rate - II
Lecture 26 - Critical Undercooling
Lecture 27 - Maximum nucleation rate for homogeneous nucleation
Lecture 28 - Maximum nucleation rate for heterogeneous nucleation
Lecture 29 - Nucleation kinetics in solid state

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Lecture 30 - Interface controlled growth
Lecture 31 - Diffusion controlled growth
Lecture 32 - Avrami Kinetics - I
Lecture 33 - Avrami Kinetics - II
Lecture 34 - Avrami Kinetics - III
Lecture 35 - Time-Temperature-Transformation (TTT) diagram
Lecture 36 - Diffusion in Solids - I
Lecture 37 - Diffusion in Solids - II
Lecture 38 - Diffusion in Solids - III
Lecture 39 - Diffusion in Solids - IV
Lecture 40 - Applications of heat treatment

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of Material Processing - Part 2

Subject Co-ordinator - Prof. Shashank Shekhar, Prof. Jitesh J Thakkar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Metal Working
Lecture 2 - Continuum Mechanics
Lecture 3 - Stress Invariants
Lecture 4 - Strain Tensors and Mohr circle for strains
Lecture 5 - Yield Stress Criterion
Lecture 6 - Effective Stress and Strain
Lecture 7 - Work Hardening and Flow Behaviour
Lecture 8 - Effect of Strain Rate
Lecture 9 - Combined Effect of Strain, Strain Rate and Temperature
Lecture 10 - Effect of Temperature
Lecture 11 - Cold, Warm and Hot Working
Lecture 12 - Mechanics of Metal Working
Lecture 13 - Wire Drawing
Lecture 14 - Wire Drawing (Continued...)
Lecture 15 - Hodographs
Lecture 16 - Upper-Bound Analysis
Lecture 17 - Plane Strain Indentation
Lecture 18 - Strain Calculation Models and Friction
Lecture 19 - Types of Friction
Lecture 20 - Effect of Friction in Rolling
Lecture 21 - Vacuum Technology
Lecture 22 - Vacuum Technology (Continued...)
Lecture 23 - Thermal Evaporation
Lecture 24 - Thermal Evaporation (Continued...)
Lecture 25 - Thermal Evaporation (Continued...)
Lecture 26 - Plasma Physics
Lecture 27 - Plasma Physics (Continued...)
Lecture 28 - Sputtering
Lecture 29 - Sputtering (Continued...)

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Lecture 30 - Sputtering (Continued...)
Lecture 31 - Chemical Vapor Deposition
Lecture 32 - Chemical Vapor Deposition (Continued...)
Lecture 33 - Chemical Vapor Deposition (Continued...)
Lecture 34 - Chemical Vapor Deposition (Continued...)
Lecture 35 - Epitaxy, Molecular Beam Epitaxy and Atomic Layer Deposition
Lecture 36 - Adsorption and Nucleation
Lecture 37 - Thin Film Growth
Lecture 38 - Kinetics of Thin Film Growth
Lecture 39 - Thin Film Morphology- Zone Structure Model
Lecture 40 - Thin Film Characterization
Lecture 41 - Thin Film Characterization

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NPTEL Video Course - Metallurgy and Material Science - NOC:Nature and Properties of Materials - An Introducto

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Material Evolution
Lecture 2 - Bonding in Materials
Lecture 3 - Correlation between bond and physical properties
Lecture 4 - Crystal Structure
Lecture 5 - Unit Cell (Primitive and Non-primitive)
Lecture 6 - Crystal Systems and Bravais Lattices
Lecture 7 - Bravais Lattice and Symmetry in Crystals
Lecture 8 - Symmetry in Crystals
Lecture 9 - Symmetry and Correlation with the Bravais Lattice
Lecture 10 - Miller Indices (Planes and Directions)
Lecture 11 - Miller Indices - Part 2
Lecture 12 - Miller Indices - Part 3
Lecture 13 - Miller Indices and Weiss Zone Law
Lecture 14 - Structure of Metals and Alloys
Lecture 15 - Structure of Metals, Packing, Co-ordination and Interstices
Lecture 16 - Interstices, Solid Solutions and Alloys
Lecture 17 - Solid Solutions
Lecture 18 - Solid Solutions
Lecture 19 - Covalent Solids
Lecture 20 - Covalent Solids (Continued...) and Ionic Solids
Lecture 21 - Ionic Solids
Lecture 22 - Ionic solids (Continued...)
Lecture 23 - ionic Solids (Continued...)
Lecture 24 - Ionic Solids (Continued...)
Lecture 25 - Ionic Solids (Ceramics)
Lecture 26 - HCP based Structure
Lecture 27 - Structure of Non-crystalline Solids (glasses)
Lecture 28 - Structure of Non-Crystalline Solids
Lecture 29 - Structure of Non-Crystalline Solids (Polymers)

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Lecture 30 - Structure of Polymers
Lecture 31 - Structure of Polymers (Continued...)
Lecture 32 - Structure Determination (X-ray Diffraction)
Lecture 33 - X-ray Diffraction
Lecture 34 - X-ray Diffraction (Continued...)
Lecture 35 - X-ray Diffraction (Continued...)
Lecture 36 - X-ray Diffraction (Continued...)
Lecture 37 - X-ray Diffraction (Continued...)
Lecture 38 - Defects in Solids (Point Defects)
Lecture 39 - Point Defect Concentration
Lecture 40 - 2-D Defects

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NPTEL Video Course - Metallurgy and Material Science - NOC:Defects in Crystalline Solids - Part I

Subject Co-ordinator - Prof. Shashank Shekhar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Defects
Lecture 2 - Equilibrium Points Defects
Lecture 3 - Energy of Vacancy Formation
Lecture 4 - Vacancy Concentration Measurement Techniques
Lecture 5 - Self-interstitial Defects+Frenkel Defects
Lecture 6 - Schottky Defects+Extrinsic Defects
Lecture 7 - Interstitials in Iron
Lecture 8 - Defects Reaction+Kroger-Vink Notation
Lecture 9 - Defects Reaction and its Thermodynamics
Lecture 10 - Equilibrium Concentration using Defects Reaction
Lecture 11 - Examples on defect reaction
Lecture 12 - Diffusion (Interstitial Diffusion)
Lecture 13 - Non-steady state diffusion
Lecture 14 - Self-diffusion + Examples
Lecture 15 - Diffusion in substitutional alloys+Diffusion along defects
Lecture 16 - History of Dislocations
Lecture 17 - Volterra Model + Structure of Dislocations + Burger vectors
Lecture 18 - Characteristics of Dislocations
Lecture 19 - Mixed Dislocations + Dislocation Loops
Lecture 20 - Elastic Continuum Model + Strain field for screw dislocations
Lecture 21 - Stress and Strain Fields
Lecture 22 - Stress State around Edge Dislocations+Elastic Energy of Dislocations
Lecture 23 - Glide Forces on Dislocations+Line Tension on Dislocations
Lecture 24 - Climb Forces on Dislocations+Interaction Between Dislocations
Lecture 25 - Image Forces on Dislocations
Lecture 26 - Resistance to Dislocation Motion+Peierl Nebarro Valley
Lecture 27 - Slip System+Examples
Lecture 28 - Dislocations and Slips+Examples
Lecture 29 - Critical resolved Shear Stress+Examples (Continued...)

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Lecture 30 - Glide+Kinks
Lecture 31 - Cross-slip+Climb
Lecture 32 - Climb+Jogs
Lecture 33 - Examples on Jogs+Dislocation Intersection
Lecture 34 - Dislocation Intersection and step characteristics+Superjogs
Lecture 35 - Strain and strain-rate due to dislocation motion+Velocity of dislocations+Observation of disloca
Lecture 36 - Observation of dislocation (Continued...) + Dislocation Dynamics
Lecture 37 - Dislocations in FCC+Partial dislocations
Lecture 38 - Partial dislocations (Continued...) +Stacking Fault
Lecture 39 - Thompson's Tetrahedron+Examples
Lecture 40 - Dislocations in BCC+Asymmetry of Slip

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NPTEL Video Course - Metallurgy and Material Science - NOC:Corrosion - Part I

Subject Co-ordinator - Dr. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to corrosion - I
Lecture 2 - Introduction to corrosion - II
Lecture 3 - Types and forms of corrosion
Lecture 4 - Uniform and Galvanic corrosion
Lecture 5 - Crevice and Pitting corrosion
Lecture 6 - Forms of corrosion
Lecture 7 - Electrochemical Nature of Corrosion and its Thermodynamics
Lecture 8 - Thermodynamics aspects of corrosion - I
Lecture 9 - Thermodynamics aspects of corrosion - II
Lecture 10 - Thermodynamics aspects ofcorrosion - III
Lecture 11 - Relation Between Free Energy and Equilibrium Constant
Lecture 12 - Derivation of Nernst Equation
Lecture 13 - Standard Reduction Potential Series for Pure Metals
Lecture 14 - Reduction Potentials in Acidic and Neutral Solutions
Lecture 15 - Nernst equation in terms of pH
Lecture 16 - Limitations of Standard Reduction Potential Series of Pure Metals
Lecture 17 - Concentration Cell Formation and Galvanic Series
Lecture 18 - Examples of Concentration cell and Spontaneity of Corrosion Process
Lecture 19 - Spontaneity of Corrosion Process and Introduction to Pourbaix Diagram
Lecture 20 - Construction of Pourbaix Diagram
Lecture 21 - Construction of Pourbaix diagram for Ni-H2O system - I
Lecture 22 - Construction of Pourbaix diagram for Ni-H2O system - II
Lecture 23 - Construction of Pourbaix diagram for Ni-H2O system - III
Lecture 24 - Pourbaix diagram of Ni-H2O and AI-H2O
Lecture 25 - Inferences from Pourbaix diagram of Fe-H2O and AI-H2O
Lecture 26 - Estimation of Corrosion Rate - I
Lecture 27 - Estimation of Corrosion Rate - II
Lecture 28 - Estimation of Corrosion Rate - III
Lecture 29 - Exchange Current Density

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Lecture 30 - Exchange Current Density and Standard Hydrogen Electrode
Lecture 31 - Electrical Double Layer and Polarization
Lecture 32 - Correlation between Current Density and Overvoltage
Lecture 33 - Introduction to Buttler-Volmer Equation
Lecture 34 - Derivation of Tafel Equation
Lecture 35 - Tafel Plot and Activation Polarization
Lecture 36 - Activation polarization, concentration polarization and total polarization
Lecture 37 - Summary of concentration polarization (CP) and introduction to mixed potential theory - I
Lecture 38 - Mixed potential theory - II
Lecture 39 - Understanding of mixed potential theory through the case studies and events of corrosion - I
Lecture 40 - Understanding of mixed potential theory through the case studies and events of corrosion - II
Lecture 41 - Understanding of mixed potential theory through the case studies and events of corrosion - III

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NPTEL Video Course - Metallurgy and Material Science - NOC:Solar Photovoltaics: Principles, Technologies and

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Solar Energy
Lecture 2 - Solar Radiation
Lecture 3 - Atmospheric Effects on Solar Radiation
Lecture 4 - Effect of Location on Time
Lecture 5 - Sun-Earth Angular Relations
Lecture 6 - Solar Radiation Measurements
Lecture 7 - Introduction to Band Theory
Lecture 8 - Semiconductor Basics - I
Lecture 9 - Semiconductor Basics - II
Lecture 10 - Electrical Properties of Semiconductors
Lecture 11 - Carrier Transport
Lecture 12 - Carrier Transport, Generation and Recombination
Lecture 13 - Recombinaton-Generation statistics
Lecture 14 - Recombinaton-Generation statistics (Continued...)
Lecture 15 - Recombinaton-Generation statistics (Continued...)
Lecture 16 - P-N Junction basics
Lecture 17 - P-N Junction Characterisitics
Lecture 18 - P-N Junction
Lecture 19 - P-N Junction Analysis (Dark)
Lecture 20 - P-N Junction Analysis (Dark)
Lecture 21 - P-N Junction Analysis (Light)
Lecture 22 - P-N Junction Analysis (Light)
Lecture 23 - P-N Junction Analysis (Light)
Lecture 24 - P-N Junction Analysis (Light)
Lecture 25 - Solar Cell Device Parameters
Lecture 26 - Solar Cell Device Parameters
Lecture 27 - Solar PV Technologies
Lecture 28 - Generation-I Technologies (Mono Silicon Solar Cells)
Lecture 29 - Generation-I Technologies (Mono Silicon Solar Cells)

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Lecture 30 - Generation-I Technologies (Poly Silicon Solar Cells)
Lecture 31 - Manufacturing of Si
Lecture 32 - Generation I Technologies
Lecture 33 - Generation II Technologies
Lecture 34 - Generation II Technologies
Lecture 35 - Generation II Technologies
Lecture 36 - Generation II Technologies
Lecture 37 - Generation II Technologies
Lecture 38 - Generation III Technologies
Lecture 39 - Generation III Technologies
Lecture 40 - Generation III Technologies
Lecture 41 - Generation III Technologies

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NPTEL Video Course - Metallurgy and Material Science - NOC:Defects in Crystalline Solids - Part II

Subject Co-ordinator - Prof. Shashank Shekhar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Dislocation structure in FCC
Lecture 2 - Partial dislocations in FCC
Lecture 3 - Thompsons Tetrahedron
Lecture 4 - Dislocation lock in FCC
Lecture 5 - Other defects in FCC (Twins and Frank Partial)
Lecture 6 - Dislocation structure in BCC
Lecture 7 - Soft core and Hard core for Screw dislocation in BCC
Lecture 8 - Dislocation structure in HCP
Lecture 9 - Burger vector and partial dislocation in HCP
Lecture 10 - Dislocation structure in ionic crystal
Lecture 11 - Dislocation structure in superlattices
Lecture 12 - Stacking fault and Kear-Wilsdorf lock in superlattices
Lecture 13 - Dislocation interaction & Strain hardening
Lecture 14 - Origin and Nucleation of dislocations
Lecture 15 - Multiplication of dislocations
Lecture 16 - Interactin of point defects and dislocation - Solid Solution Strengthening
Lecture 17 - Cottrell atmosphere and Yield-point phenomenon

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NPTEL Video Course - Metallurgy and Material Science - NOC:Corrosion - Part II

Subject Co-ordinator - Dr. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Recap of Electrochemical Polarization
Lecture 2 - Recap of Electrochemical Polarization - Activation and Concentration Polarization
Lecture 3 - Electrochemical Polarization
Lecture 4 - Activation and Concentration Polarization
Lecture 5 - Concentration Polarization and Mixed Potential Theory
Lecture 6 - Explanation of Corrosion Processes on the basis of Mixed Potential Theory - Introduction
Lecture 7 - Explanation of Corrosion Processes on the basis of Mixed Potential Theory - Part 1
Lecture 8 - Explanation of Corrosion Processes on the basis of Mixed Potential Theory - Part 2
Lecture 9 - Explanation of Corrosion Processes on the basis of Mixed Potential Theory - Part 2 (Continued...)
Lecture 10 - Explanation of Corrosion Processes on the basis of Mixed Potential Theory - Part 3
Lecture 11 - Effect of Exchange Current Density on Corrosion Rate of an Active Metal
Lecture 12 - Area Effect of the Cathodic and Anodic Component - I
Lecture 13 - Area Effect of the Cathodic and Anodic Component - II
Lecture 14 - Explanation of Corrosion Processess on the Basis of Mixed Potential Theory
Lecture 15 - Galvanic Coupling between Two Active Metals
Lecture 16 - Theory of Sacrificial Anode for the Protection of Steel Objects
Lecture 17 - Effect of two Active Metals on Fe-corrosion when they are Galvanically Coupled
Lecture 18 - Corrosion of Metals when Cathodic Protection is Concentration Controlled
Lecture 19 - Effect of Velocity on the Corrosion Rate of an Active Metal
Lecture 20 - Concentration Polarization and Activation Polarization
Lecture 21 - Numerical Problems and Passivation
Lecture 22 - Theory of Passivation - I
Lecture 23 - Theory of Passivation - II
Lecture 24 - Interaction between Passivation and Pourbaix Diagram - I
Lecture 25 - Interaction between Passivation and Pourbaix Diagram - II
Lecture 26 - Passivity
Lecture 27 - Interaction of Cathodic Polarization with an Active-Passive Metal
Lecture 28 - Interaction of Anodic Polarization with an Active-Passive Metal
Lecture 29 - Passivation and Mixed Potential Theory

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Lecture 30 - Passivation and Mixed Potential Theory
Lecture 31 - Effect of Galvanic Coupling between an Active-Passive Metal and a Noble Metal
Lecture 32 - Anodic Protection of an Active-Passive Metal and an Introduction of Linear Polarization
Lecture 33 - Linear Polarization and Understanding Relative Corrosion Resistance of a Metal
Lecture 34 - Oxidation of Metals and Alloys
Lecture 35 - Different Stages of Oxidation and Pilling Bedworth Ratio
Lecture 36 - Pilling Bedworth Ratio of Different Metal Oxides
Lecture 37 - Thermodynamics of Oxidation
Lecture 38 - Construction of Ellingham Diagram - I
Lecture 39 - Construction of Ellingham Diagram - II
Lecture 40 - Kinetics of Oxidation
Lecture 41 - Oxide Structure and Oxidation Mechanism

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals and Applications of Dielectric Cerami

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Outline of the Course
Lecture 2 - Basics of Crystal Structure
Lecture 3 - Basics of Crystallography and Bonding
Lecture 4 - Arrangement of Atoms in Crystal Lattice
Lecture 5 - Structure Formation
Lecture 6 - Pauling's Rule and Crystal Structure of Ceramics
Lecture 7 - Ceramic Materials
Lecture 8 - Defect Chemistry
Lecture 9 - Defect Chemistry
Lecture 10 - Concentration and Effect of Intrinsic Impurities
Lecture 11 - Intrinsic and Extrinsic Defects
Lecture 12 - Defect Concentration
Lecture 13 - Intrinsic Ionization in Metal Oxides
Lecture 14 - Brouwer's Diagram
Lecture 15 - Introduction to Dielectrics
Lecture 16 - Dielectric Displacement and Polarization Mechanism
Lecture 17 - Polarization Mechanisms
Lecture 18 - Dielectric Polarizability - 1
Lecture 19 - Dielectric Polarizability - 2
Lecture 20 - Frequency Dependence of Dielectrics
Lecture 21 - Losses in Dielectric Materials
Lecture 22 - Frequency Dependence of Dielectric Constant
Lecture 23 - Dipolar Relaxation
Lecture 24 - Debye Equations for Dipolar Relaxation
Lecture 25 - Impedance Spectroscopy
Lecture 26 - Impedance Spectroscopy and Dielectric Breakdown
Lecture 27 - Basics of Non-linear Dielectrics
Lecture 28 - Piezoelectric Effect
Lecture 29 - Pyroelectric Effect and Electrostriction

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Lecture 30 - Thermodynamics of Piezoelectric and Pyroelectric Materials
Lecture 31 - Basics of Ferroelectric Materials
Lecture 32 - Ferroelectric Phase Transitions
Lecture 33 - Thermodynamics of Phase Transition in Ferroelectrics
Lecture 34 - Second Order Phase Transition in Ferroelectric Materials
Lecture 35 - First Order Phase Transition in Ferroelectric Materials
Lecture 36 - Domain Walls in Ferroelectric Materials
Lecture 37 - Domain Structure and Properties of Ferroelectric Materials
Lecture 38 - Phase Diagram and Measurements of Ferroelectric Materials
Lecture 39 - Principal of Measurements and Applications of Piezoelectric and Pyroelectric Materials
Lecture 40 - Applications of Piezoelectric and Pyroelectric Materials

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NPTEL Video Course - Metallurgy and Material Science - NOC:Properties of Materials (Nature and Properties of

Subject Co-ordinator - Dr. Ashish Garg

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Basic Material Properties - Stress and Strain Tensor
Lecture 3 - Normal and Shear Stress and Transformation of Axes
Lecture 4 - Transformation of Axes and Principle Stresses
Lecture 5 - True and Engineering Stress and Strain
Lecture 6 - Illustration to True and Engineering Stress and Strain
Lecture 7 - Tensor Notation of Strain
Lecture 8 - Introduction to Elasticity and Elastic Properties
Lecture 9 - Theory of Elasticity
Lecture 10 - Atomic Basis of Elasticity
Lecture 11 - Elasticity of Different Materials, Design of Composites
Lecture 12 - Composites, Anelastic Behaviour
Lecture 13 - Stress-Strain Curve and Anelasticity
Lecture 14 - Mechanism of Anelasticity
Lecture 15 - Relaxation Time and Damping Capacity
Lecture 16 - Plastic Deformation of Materials
Lecture 17 - True and Engineering Stress-Strain Curves
Lecture 18 - Necking Phenomenon During Tension Test
Lecture 19 - Microscopic Mechanism of Plastic Deformation
Lecture 20 - Introduction to Slip
Lecture 21 - Slip Systems
Lecture 22 - Resolved Shear Stress
Lecture 23 - Critical Resolved Shear Stress
Lecture 24 - Theoretical Strength and Role of Dislocations
Lecture 25 - Dislocations and Slip - I
Lecture 26 - Dislocations and Slip - II
Lecture 27 - Dislocations and Peirells Nabarro Stress
Lecture 28 - Dislocation Generation
Lecture 29 - Dislocations and Strengthening

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Lecture 30 - Strain Hardening
Lecture 31 - Grain Boundary Strengthening
Lecture 32 - Solid Solution Strengthening
Lecture 33 - Precipitation Hardening
Lecture 34 - Electrical Conduction in Metals
Lecture 35 - Free Electron Theory
Lecture 36 - Fermi-Dirac Statistics and Electronic conductivity of Metals
Lecture 37 - Fundamental of Semiconductors
Lecture 38 - Band Theory
Lecture 39 - Intrinsic Semiconductors
Lecture 40 - Extrinsic Semiconductors

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NPTEL Video Course - Metallurgy and Material Science - NOC:Diffusion in Multicomponent Solids

Subject Co-ordinator - Prof. Kaustubh Kulkarni

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course and Thermodynamics Refresher
Lecture 2 - The Second law of Thermodynamics
Lecture 3 - Application of Second law and Illustration of Intermixing as Irreversible Process
Lecture 4 - Equilibrium, Stability and Phase Diagrams in Single Component Systems
Lecture 5 - Third Law of Thermodynamics and Numerical Examples
Lecture 6 - Thermodynamic Activity and Gibbs Free Energy of Mixing
Lecture 7 - Entropy of mixing of Multicomponent Ideal Solution
Lecture 8 - Regular Solution Model: Application to Ternary System
Lecture 9 - Gibbs Free Energy-Composition Curves, Phase Diagrams and Gibbs Phase rule
Lecture 10 - Exercise: Solution Thermodynamics
Lecture 11 - Driving force for Diffusion, Chemical Potentials and Concentrations
Lecture 12 - Diffusion flux and Frames of Reference
Lecture 13 - Fickâ s Law
Lecture 14 - Exercise: Deriving Sigma Cosine for any Cubic Lattice
Lecture 15 - Fick's Law for Multicomponent Diffusion
Lecture 16 - Diffusion Equation and Solution to Steady State Diffusion
Lecture 17 - Conversion of Set of Interdiffusion Coefficients from One Dependent Compared to Another
Lecture 18 - Refresher on Laplace Transform
Lecture 19 - Error Function and Its Laplace transform
Lecture 20 - Instantaneous Planar Source: Solution to Diffusion Equation and Its Applications
Lecture 21 - Solution to Diffusion Equation for Semi-Infinite Slab and Its Application in Carburizing of Stee
Lecture 22 - Solution to Diffusion Equation for Binary Diffusion Couple
Lecture 23 - Solution to Diffusion Equation for Multicomponent Diffusion Couple
Lecture 24 - Nature of Concentration Profiles in Binary and Multicomponent Diffusion Couples
Lecture 25 - Numerical Problems
Lecture 26 - Homogenization of Multicomponent alloys
Lecture 27 - Solution to Diffusion Equation: Periodic Boundary Conditions
Lecture 28 - Energetics of Vacancy Formation
Lecture 29 - Experimental Determination of Enthalpy of Vacancy Formation

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Lecture 30 - Mechanisms of Diffusion in Metals and Alloys
Lecture 31 - Point Defects in Intermetallics and Ionic Compounds
Lecture 32 - Diffusion Mechanisms in Intermetallics
Lecture 33 - Theory of Random Walk: Mean Squared Displacement
Lecture 34 - Physical Significance of Diffusivity: Einstein-Smoluchowski Equation
Lecture 35 - Derivation of Correlation Factors in Cubic Crystals by Vacancy Mechanism
Lecture 36 - Correlation Factors for Substitutional Diffusion by Vacancy Mechanism in FCC Crystal
Lecture 37 - Correlation Effects in BCC and Diamond Cubic for Vacancy Mechanism
Lecture 38 - Practice Problems
Lecture 39 - Deriving Relation Between Diffusion Flux and Chemical Potential Gradients
Lecture 40 - Atomic Mobility, Diffusivity and Diffusion Under External Driving Force
Lecture 41 - Non-Ideality as Driving Force
Lecture 42 - Theory of diffusion
Lecture 43 - Experimental Determination of Interdiffusion Coefficients: Boltzmann Matano Analysis
Lecture 44 - Analysis of Interdiffusion Fluxes in Multicomponent Diffusion Couples
Lecture 45 - Various Techniques for Experimental Determination of Multicomponent Interdiffusion Coefficients
Lecture 46 - Experiement Determination of Interdiffusion Coefficients: Examples from Literature
Lecture 47 - Intrinsic Diffusion and Kirkendall Effect
Lecture 48 - Experiemental Determination of Intrinsic Diffusion Coefficients
Lecture 49 - A Brief Introduction to Ternary Phase Diagram
Lecture 50 - Multiphase Diffusion: Diffusion Paths and Diffusion Structures
Lecture 51 - Interdiffusion Analysis of Multiphase Diffusion Couples

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NPTEL Video Course - Metallurgy and Material Science - NOC:Corrosion Failures and Analysis

Subject Co-ordinator - Prof. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An introduction to corrosion failure and analysis
Lecture 2 - Various forms of corrosion
Lecture 3 - Discussion of various factors affecting corrosion
Lecture 4 - Forms of corrosion: Uniform corrosion - Part 1
Lecture 5 - Forms of corrosion: Uniform corrosion - Part 2
Lecture 6 - Galvanic corrosion - I
Lecture 7 - Galvanic corrosion - II
Lecture 8 - Galvanic corrosion - III
Lecture 9 - Galvanic corrosion - IV
Lecture 10 - Importance of galvanic series
Lecture 11 - Factors associated with galvanic corrosion: Case study 1
Lecture 12 - Factors associated with galvanic corrosion: Case study 2
Lecture 13 - Factors associated with galvanic corrosion: Case study 3
Lecture 14 - Preventive measures and advantages of galvanic corrosion
Lecture 15 - Dealloying/Selective leaching
Lecture 16 - Dealloying or selective leaching: Mechanism
Lecture 17 - Dealloying or selective leaching: Applications and protection methods
Lecture 18 - Graphitic corrosion and protection from dezincification
Lecture 19 - Intergranular Corrosion
Lecture 20 - Intergranular corrosion in case of 304, 321 and 347 stainless steel
Lecture 21 - Intergranular Corrosion: Sensitization and Weld Decay
Lecture 22 - Intergranular Corrosion: Control of Sensitization - Weld Decay
Lecture 23 - Intergranular Corrosion: Knife Line Attack and Prevention Methods
Lecture 24 - Crevice Corrosion: Introduction
Lecture 25 - Crevice Corrosion: Mechanism
Lecture 26 - Crevice corrosion: Mechanism and Various stages
Lecture 27 - Crevice corrosion: Case studies and Protection methods
Lecture 28 - Pitting corrosion: Introduction and Case studies
Lecture 29 - Various conditions favouring pitting corrosion - I

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Lecture 30 - Various conditions favouring pitting corrosion - II
Lecture 31 - Various conditions favouring pitting corrosion - III
Lecture 32 - Pitting Corrosion: Mechanism and Protection
Lecture 33 - Erosion Corrosion: Introduction
Lecture 34 - Erosion Corrosion: Characteristics
Lecture 35 - Erosion Corrosion: Protection methods and cavitation corrosion
Lecture 36 - Cavitation corrosion and its case studies
Lecture 37 - Cavitation corrosion, Fretting corrosion and their preventive measures
Lecture 38 - Environmental cracking or stress assisted corrosion failures
Lecture 39 - Stress corrosion cracking: Mechanism - I
Lecture 40 - Stress corrosion cracking: Mechanism - II
Lecture 41 - Stress corrosion cracking: Mechanism - III
Lecture 42 - Stress corrosion cracking: Corrosion fatigue and protection methods

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NPTEL Video Course - Metallurgy and Material Science - NOC:Nanomaterials and their Properties

Subject Co-ordinator - Prof. Krishanu Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Nanomaterials: An Overview - Part I
Lecture 2 - Nanomaterials: An Overview - Part II
Lecture 3 - Nanomaterials: Hierarchial Nanostructures - I
Lecture 4 - Nanomaterials: Hierarchial Nanostructures - II
Lecture 5 - Nanomaterials: Surfaces and Interfaces - I
Lecture 6 - Nanomaterials: Surfaces and Interfaces - I (Continued...)
Lecture 7 - Nanomaterials: Surfaces - I
Lecture 8 - Nanomaterials: Magic Numbers
Lecture 9 - Thermodynamics of Nanomaterials
Lecture 10 - Surfaces and Interfaces - II
Lecture 11 - Thermodynamics of Nanomaterials
Lecture 12 - Surfaces and Interfaces - II (Continued...)
Lecture 13 - Nanophase Diagrams
Lecture 14 - Effect of Size on Phase Diagrams
Lecture 15 - Synthesis of Nanomaterials
Lecture 16 - Synthesis Routes of Nanomaterials - II
Lecture 17 - Mechanical Properties of Nanomaterials - I
Lecture 18 - Mechanical Properties of Nanomaterials - II
Lecture 19 - Thermal Properties of Nanomaterials - I
Lecture 20 - Thermal Properties of Nanomaterials - II
Lecture 21 - Thermal Properties of Nanomaterials - III
Lecture 22 - Thermal Properties of Nanomaterials - III (Continued...)
Lecture 23 - Electrical Property of Nanomaterials
Lecture 24 - Magnetic Properties of Nanomaterials - I
Lecture 25 - Magnetic Properties of Nanomaterials - II
Lecture 26 - Optical Properties of Nanomaterials - I
Lecture 27 - Optical Properties of Nanomaterials - II
Lecture 28 - Special Cases: Carbon-Based Nanomaterials
Lecture 29 - Special Cases: Polymer-Based Nanomaterials

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NPTEL Video Course - Metallurgy and Material Science - NOC:Mechanical Behaviour of Materials - Part I

Subject Co-ordinator - Prof. Shashank Shekhar, Prof. Sudhanshu Shekhar Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Origin of Elasticity
Lecture 3 - Stress as a Tensor
Lecture 4 - Principal Stress
Lecture 5 - Mohr's Circle
Lecture 6 - Stress-Strain Relation
Lecture 7 - Viscoelasticity
Lecture 8 - Tensile Testing
Lecture 9 - Universal Testing Machine
Lecture 10 - Flow Stress
Lecture 11 - Yield Criterions: Basics
Lecture 12 - Yield Criterions: Tresca, Von-Mises
Lecture 13 - Effective Stress_Effective Strain
Lecture 14 - Plastic Instability
Lecture 15 - Effect of Strain-rate and Temperature
Lecture 16 - Dislocations: Discovery
Lecture 17 - Dislocations: Fundamentals
Lecture 18 - Dislocations: Characteristics
Lecture 19 - Stress and Strain Fields of Dislocations
Lecture 20 - Energy of Dislocations
Lecture 21 - Dislocation Motion Glide
Lecture 22 - Cross-slip of Dislocations
Lecture 23 - Climb motion of Dislocations
Lecture 24 - Steps in Dislocations
Lecture 25 - Slip Systems
Lecture 26 - More on Slip Systems
Lecture 27 - Critical Resolved Shear Stress
Lecture 28 - Dislocation Interactions
Lecture 29 - Image Forces

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Lecture 30 - Partial Dislocations
Lecture 31 - Strengthening Mechanisms
Lecture 32 - Precipitation Strengthening: Basic Criteria
Lecture 33 - Precipitation Strengthening: Precipitate Characteristics
Lecture 34 - Precipitation Strengthening: Mechanisms
Lecture 35 - Effect of Temperature: Dispersion Strengthening
Lecture 36 - Solid Solution Strengthening: Basics
Lecture 37 - Solid Solution Strengthening: Interaction with Dislocations
Lecture 38 - Solid Solution Strengthening: Yield Point Phenomenon
Lecture 39 - Grain Boundary Strengthening
Lecture 40 - Strain Hardening: Single Xtal and Poly Crystal Deformation, Tylor Hardening
Lecture 41 - Strain Hardening: Dislocation Multiplication, Intersection and Locks
Lecture 42 - Summary of Strengthening Mechanisms
Lecture 43 - Hardness Testing
Lecture 44 - Impact Testing
Lecture 45 - Mechanical Behaviour of Composites

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NPTEL Video Course - Metallurgy and Material Science - NOC:Mechanical Behaviour of Materials - Part II

Subject Co-ordinator - Prof. Sudhanshu Shekhar Singh, Prof. Shashank Shekhar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Theoretical Strength
Lecture 2 - Stress Based Approach (Inglis)
Lecture 3 - Energy Based Approach (Griifith)
Lecture 4 - Mode of Deformation and Stress Distribution Ahead of Crack Tip
Lecture 5 - Stress Triaxiality
Lecture 6 - Plastic Zone Size
Lecture 7 - Plastic Zone Size and Shape (Continued...)
Lecture 8 - Stress Intensity Factors for Different Geometries
Lecture 9 - Fracture Toughness
Lecture 10 - Fracture Toughness Measurement
Lecture 11 - Fracture Mechanisms
Lecture 12 - Ductile Fracture Mechanisms
Lecture 13 - Ductile Fracture Mechanisms_Tunneling
Lecture 14 - Cleavage Fracture
Lecture 15 - Fracture Mechanisms (Images)
Lecture 16 - Fatigue (Stress Parameters)
Lecture 17 - Fatigue Testing (S-N curve)
Lecture 18 - Low and High Cycle Fatigue
Lecture 19 - Fatigue Crack Initiation
Lecture 20 - Fatigue Crack Propagation
Lecture 21 - Fatigue Striations, Beachmarks and Images
Lecture 22 - Deformation of Composites
Lecture 23 - Deformation of Composites (Continued...)
Lecture 24 - Toughening of Ceramics
Lecture 25 - Fracture in Polymers
Lecture 26 - Creep Fundamentals
Lecture 27 - Creep Models

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NPTEL Video Course - Metallurgy and Material Science - NOC:Electronic Properties of the Materials: Computatic

Subject Co-ordinator - Prof. Somnath Bhowmick

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Metallurgy and Material Science - NOC:Corrosion Protection Methods

Subject Co-ordinator - Prof. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 40 (Part 1)
Lecture 41 (Part 2)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Phase Diagrams in Single Component and Binary Syst

Subject Co-ordinator - Prof. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to phase diagram
Lecture 2 - Definition of important terms
Lecture 3 - Understanding of thermodynamic equilibrium - I
Lecture 4 - Understanding of thermodynamic equilibrium - II
Lecture 5 - Understanding of thermodynamic equilibrium - III
Lecture 6 - Understanding of thermodynamic equilibrium - IV
Lecture 7 - Significance of chemical potential in phase equilibrium
Lecture 8 - Phase equilibrium in H2O system - Part 1
Lecture 9 - Phase equilibrium in H2O system - Part 2
Lecture 10 - Part A - Phase equilibrium in H2O system - Part 3
Lecture 11 - Part B - Phase equilibrium in H2O system - Part 4
Lecture 12 - Practical importance of water phase diagram
Lecture 13 - Solution thermodynamics - Part I
Lecture 14 - Solution thermodynamics - Part II
Lecture 15 - Solution thermodynamics - Part III
Lecture 16 - Solution thermodynamics - Part IV
Lecture 17 - Solution thermodynamics - Part V
Lecture 18 - Solution thermodynamics - part VI
Lecture 19 - solution thermodynamics - part VII
Lecture 20 - Graphical understanding of free energy and composition of condensed solutions - Part 1
Lecture 21 - Graphical understanding of free energy and composition of condensed solutions - Part 2
Lecture 22 - Free energy composition plots and evolution of phase diagram for condensed solution - I
Lecture 23 - Free energy composition plots and evolution of phase diagram for condensed solution - II
Lecture 24 - Free energy composition plots and evolution of phase diagram for condensed solution - III
Lecture 25 - Free energy composition plots and evolution of phase diagram for condensed solution - IV
Lecture 26 - Free energy composition plots and evolution of phase diagram for condensed solution - V
Lecture 27 - Isomorphous phase diagram, tie line, and lever rule
Lecture 28 - Calculation of phase diagram - Part I
Lecture 29 - Calculation of phase diagram - Part II

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Lecture 30 - Introduction to the non-ideal solutions
Lecture 31 - The quasi-chemical approach
Lecture 32 - Quasi-chemical approach to obtain change in enthalpy in regular solutions
Lecture 33 - Effect of enthalpy change in change in Gibbs free energy - Part 1
Lecture 34 - Effect of enthalpy change in change in Gibbs free energy - Part 2
Lecture 35 - Effect of enthalpy change in change in Gibbs free energy and final Gibbs free energy - I
Lecture 36 - Effect of enthalpy change in change in Gibbs free energy and final Gibbs free energy - II
Lecture 37 - Effect of enthalpy change in change in Gibbs free energy and final Gibbs free energy - III
Lecture 38 - Free energies of liquid and solid solutions
Lecture 39 - Phase diagram on the basis of enthalpy of mixing of solid and liquid solutions - I
Lecture 40 - Phase diagram on the basis of enthalpy of mixing of solid and liquid solutions - II
Lecture 41 - Phase diagram on the basis of enthalpy of mixing of solid and liquid solutions - III
Lecture 42 - Eutectic, peritectic, and eutectoid phase diagrams - Part 1
Lecture 43 - Eutectic, peritectic, and eutectoid phase diagrams - Part 2
Lecture 44 - Phase rule - Part I
Lecture 45 - Derivation of phase rule

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NPTEL Video Course - Metallurgy and Material Science - NOC:Artificial Intelligence and Machine Learning in Ma

Subject Co-ordinator - Prof. Krishanu Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course - I
Lecture 2 - Introduction to the course - II
Lecture 3 - Introduction to AI - I
Lecture 4 - Introduction to AI - II
Lecture 5 - Basics of Materials Science - I
Lecture 6 - Basics of Materials Science - II
Lecture 7 - Basics of Materials Science - III
Lecture 8 - Basics of Materials Science - IV
Lecture 9 - Part 1 - Basics of Materials Science - V
Lecture 10 - Part 2 - Basics of Materials Science - VI
Lecture 11 - Part 1 - Basics of Materials Science - VII
Lecture 12 - Part 2 - Basics of Materials Science - VIII
Lecture 13 - Part 1 - Basics of Materials Science - IX
Lecture 14 - Part 2 - Basics of Materials Science - X
Lecture 15 - Part 1 - Basics of Materials Science - XI
Lecture 16 - Part 2 - Basics of Materials Science - XII
Lecture 17 - Part 1 - Basics of Materials Science - XIII
Lecture 18 - Part 2 - Basics of Materials Science - XIV
Lecture 19 - Part 1 - Basics of Materials Science - XV
Lecture 20 - Part 2 - Basics of Materials Science - XVI
Lecture 21 - Part 1 - Basics of Materials Science - XVII
Lecture 22 - Part 2 - Basics of Materials Science - XVIII
Lecture 23 - Part 1 - Basics of Materials Science - XIX
Lecture 24 - Part 2 - Basics of Materials Science - X
Lecture 25 - Part 1 - Basics of Materials Science - XI
Lecture 26 - Part 2 - Basics of Materials Science - XII
Lecture 27 - Part 1 - Basics of Materials Science - XIII
Lecture 28 - Part 2 - Basics of Materials Science - XIV
Lecture 29 - Part 1 - Machine Learning Algorithms - I

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Lecture 30 - Part 2 - Machine Learning Algorithms - II
Lecture 31 - Part 1 - Machine Learning Algorithms - III
Lecture 32 - Part 2 - Machine Learning Algorithms - IV
Lecture 33 - Part 1 - Machine Learning Algorithms - V
Lecture 34 - Part 2 - Machine Learning Algorithms - VI
Lecture 35 - Part 1 - Machine Learning Algorithms - VII
Lecture 36 - Part 2 - Machine Learning Algorithms - VIII
Lecture 37 - Part 1 - Machine Learning Algorithms - IX
Lecture 38 - Part 2 - Machine Learning Algorithms - X
Lecture 39 - Part 1 - Machine Learning Algorithms - XI
Lecture 40 - Part 2 - Machine Learning Algorithms - XII
Lecture 41 - Part 1 - Machine Learning Algorithms - XIII
Lecture 42 - Part 2 - Machine Learning Algorithms - XIV
Lecture 43 - Part 1 - Machine Learning Algorithms - XV
Lecture 44 - Part 2 - Machine Learning Algorithms - XVI
Lecture 45 - Part 1 - Machine Learning Algorithms - XVII
Lecture 46 - Part 2 - Machine Learning Algorithms - XVIII
Lecture 47 - Part 1 - Deep Learning Methods - I
Lecture 48 - Part 2 - Deep Learning Methods - II
Lecture 49 - Part 1 - Deep Learning Methods - III
Lecture 50 - Part 2 - Deep Learning Methods - IV
Lecture 51 - Part 1 - Deep Learning Methods - V
Lecture 52 - Part 2 - Deep Learning Methods - VI
Lecture 53 - Part 1 - Deep Learning Methods - VII
Lecture 54 - Part 2 - Deep Learning Methods - VIII
Lecture 55 - Part 1 - Materials Design at Different Length Scale - I
Lecture 56 - Part 2 - Materials Design at Different Length Scale - II
Lecture 57 - Part 1 - Materials Design at Different Length Scale - III
Lecture 58 - Part 2 - Materials Design at Different Length Scale - IV
Lecture 59 - Part 1 - Materials Design at Different Length Scale - V
Lecture 60 - Part 2 - Materials Design at Different Length Scale - VI
Lecture 61 - Part 1 - Molecular Dynamic Simulation
Lecture 62 - Part 2 - Molecular Dynamic Simulation
Lecture 63 - Part 1 - Density Function Theory (DFT)
Lecture 64 - Part 2 - Density Function Theory (DFT)
Lecture 65 - Part 1 - Advanced Deep Learning - I
Lecture 66 - Part 2 - Advanced Deep Learning - II
Lecture 67 - Part 1 - Advanced Deep Learning - III
Lecture 68 - Part 2 - Advanced Deep Learning - IV

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Lecture 69 - Part 1 - Data Preprocessing and Error Analyses - I
Lecture 70 - Part 2 - Data Preprocessing and Error Analyses - II
Lecture 71 - Part 1 - Material Informatics - I
Lecture 72 - Part 2 - Material Informatics - II
Lecture 73 - Part 1 - Materials Knowledge and Materials Data Science, Material Informatics - I
Lecture 74 - Part 2 - Materials Knowledge and Materials Data Science, Material Informatics - II
Lecture 75 - Part 1 - Materials knowledge and materials data science, Material informatics - III
Lecture 76 - Part 2 - Materials Knowledge and Materials Data Science, Material Informatics - IV
Lecture 77 - Part 1 - Materials Knowledge and Materials Data Science, Material Informatics - V
Lecture 78 - Part 2 - Conclusion

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NPTEL Video Course - Metallurgy and Material Science - NOC:Metallurgical and Electronic Waste Recycling

Subject Co-ordinator - Prof. Arunabh Meshram

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Materials Recycling
Lecture 2 - Classification of Metallurgical and Electronic Wastes - Part 1
Lecture 3 - Classification of Metallurgical and Electronic Wastes - Part 2
Lecture 4 - Importance of Unit Operations - Part 1
Lecture 5 - Importance of Unit Operations - Part 2
Lecture 6 - Pretreatments in Recycling
Lecture 7 - Pyrometallurgy
Lecture 8 - Electrometallurgy
Lecture 9 - Hydrometallurgy
Lecture 10 - Refining
Lecture 11 - Aluminium dross recycling
Lecture 12 - Spent pot lining recycling
Lecture 13 - Red mud recycling
Lecture 14 - Aluminium scrap recycling
Lecture 15 - Salt slag recycling
Lecture 16 - Copper Smelter Slag recycling
Lecture 17 - Copper Smelter Slag and Raffinate recycling
Lecture 18 - Raffinate recycling (Continued...)
Lecture 19 - Spent Electrolyte recycling
Lecture 20 - Copper scrap recycling
Lecture 21 - Zinc ash recycling
Lecture 22 - Zinc ash and zinc dross recycling
Lecture 23 - Zinc dross recycling (Continued...)
Lecture 24 - Zinc dust recycling
Lecture 25 - Zinc dust and zinc scrap recycling
Lecture 26 - Ironmaking slag recycling
Lecture 27 - Ironmaking and steelmaking slag recycling
Lecture 28 - Steelmaking slag recycling (Continued...)
Lecture 29 - Steel scrap recycling

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Lecture 30 - Wastewater recycling
Lecture 31 - Recycling of E-Waste
Lecture 32 - Waste Printed Circuit Boards (WPCBs) recycling
Lecture 33 - WPCBs recycling: Delamination
Lecture 34 - WPCBs recycling: Pyrometallurgical processes
Lecture 35 - WPCBs recycling: Hydrometallurgical processes
Lecture 36 - Battery Recycling: Ni-based batteries
Lecture 37 - Battery Recycling: Lead-acid batteries
Lecture 38 - Battery Recycling: Zinc-based batteries
Lecture 39 - Battery Recycling: Li-ion batteries
Lecture 40 - Environmental Impacts of Recycling
Lecture 41 - Conclusion

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NPTEL Video Course - Metallurgy and Material Science - NOC:Crystal Symmetry, X-Ray Diffraction and Physical P

Subject Co-ordinator - Prof. Sandeep Sangal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lattice and Translation Symmetry
Lecture 2 - Lattice, Motif, Crystals and Unit Cells
Lecture 3 - Crystallographic Patterns
Lecture 4 - Crystal Systems in 3D
Lecture 5 - Crystals Based on 3D
Lecture 6 - Miller Indices for Directions in Lattice Space
Lecture 7 - Miller Indices for Planes in Lattice Space
Lecture 8 - Interplanar Spacing
Lecture 9 - Properties of Planes and Directions in a Cubic Unic Cell
Lecture 10 - Weiss Zone Law
Lecture 11 - Translation and Point Symmetries
Lecture 12 - Restrictions on Rotational Symmetries
Lecture 13 - 2D Crystal Systems and Lattices - I
Lecture 14 - 2D Crystal Systems and Lattices - II
Lecture 15 - What is a Group ?
Lecture 16 - Point Groups - I
Lecture 17 - Point Groups - II
Lecture 18 - Matrix Representations of Rotation Operation
Lecture 19 - Matrix Operation of Reflection Operation
Lecture 20 - Combination of two mirrors
Lecture 21 - The 10 2D Point Groups and their notations
Lecture 22 - Combining Translation with Point Symmetries - I
Lecture 23 - Combining Translation with Point Symmetries - II
Lecture 24 - Combining Rotation and Translation Symmetries
Lecture 25 - Plane Groups - I
Lecture 26 - Plane Groups - II : Glide Planes
Lecture 27 - Plane Groups - III : Glide Planes
Lecture 28 - Hexagonal Plane Groups based on the Point Symmetry 3m
Lecture 29 - Derivation of the Remaining Plane Groups

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Lecture 30 - Decoding the International Tables - I
Lecture 31 - Combination of Three Rotation Axes in 3D
Lecture 32 - Combination of Three Rotation Axes in 3D - I
Lecture 33 - Combination of Three Rotation Axes in 3D - II
Lecture 34 - Stereographic Projection: Stereograms of Point Groups
Lecture 35 - The 32 Point Groups in 3D
Lecture 36 - Derivation of 3D - Bravais Lattices
Lecture 37 - Introduction to Space Groups
Lecture 38 - Space Groups: Screw Axes
Lecture 39 - Space Groups: Glide Planes
Lecture 40 - Decoding the International Tables - II
Lecture 41 - DVD as a Diffraction Grating
Lecture 42 - X-Ray Diffraction: Bragg's Law
Lecture 43 - Scattering of X-Rays: The Laue Equations - I
Lecture 44 - Scattering of X-Rays: The Laue Equations - II
Lecture 45 - The Structure Factor
Lecture 46 - Structure Factor Calculations
Lecture 47 - Structure Factor Calculations
Lecture 48 - The Reciprocal Lattice
Lecture 49 - Application of Reciprocal Lattice in Crystal Geometry
Lecture 50 - Reciprocal Lattice Examples
Lecture 51 - Reciprocal Lattice and Diffraction
Lecture 52 - X-Ray Diffraction Techniques
Lecture 53 - Analysis of Diffraction Pattern for a Cubic Crystal - I
Lecture 54 - Analysis of Diffraction Pattern for a Cubic Crystal - II
Lecture 55 - Decoding the International Tables - III
Lecture 56 - Tensor Representation of Physical Properties
Lecture 57 - Tensor Properties, Symmetry and Neumann's Principle
Lecture 58 - Transformation of Second Rank Tensor
Lecture 59 - Effect of Crystal Symmetry on Second Rank Property Tensor - I
Lecture 60 - Effect of Crystal Symmetry on Second Rank Property Tensor - II
Lecture 61 - Effect of Crystal Symmetry on Second Rank Property Tensor - III
Lecture 62 - Third Rank Piezoelectric Property Tensor - I
Lecture 63 - Third Rank Piezoelectric Property Tensor - II
Lecture 64 - Fourth Rank Elasticity Tensor

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NPTEL Video Course - Metallurgy and Material Science - NOC:Mechanical Behavior of Materials (Hindi)

Subject Co-ordinator - Prof. Niraj Mohan Chawake

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Elasticity: Introduction Definition and Units
Lecture 2 - Engineering Stress Strain Curve and Measures of Strength
Lecture 3 - Measures of Ductility, UTS and Necking
Lecture 4 - True Stress - True Strain Curve and Necking Criterion
Lecture 5 - Atomistic Basis of Elasticity
Lecture 6 - Stress at a point and Poissonâ s Ratio
Lecture 7 - Normal Stresses and Shear Stresses
Lecture 8 - Independence of stress components
Lecture 9 - Plane stress transformation equations in 2D
Lecture 10 - Mohrâ s Circle of stress
Lecture 11 - Principal stresses and Principal planes
Lecture 12 - Principal stresses in 3D and stress invariants
Lecture 13 - Stress Tensor: Transformation and Hydrostatic and Deviatoric stress state
Lecture 14 - Concept of Strain - Normal strain and shear strain
Lecture 15 - State of Strain at a Point - Displacement, Rotation and Strain Tensors
Lecture 16 - Elastic Constants and Elastic Stress - Strain Relations
Lecture 17 - Anisotropy of Elastic Behavior
Lecture 18 - Elastic Constants and Symmetry
Lecture 19 - Yielding Criteria
Lecture 20 - Atomistic Mechanisms of Yielding and Slip
Lecture 21 - Resolved Shear Stress and Schmidâ s law
Lecture 22 - Maximum Shear Strength of Crystalline Materials
Lecture 23 - Dislocations: Edge and Screw
Lecture 24 - Mixed Dislocation and Burgers Circuit
Lecture 25 - Peierls-Nabarro Stress
Lecture 26 - Geometrical Properties of Dislocations
Lecture 27 - Dislocation Motions: Glide, Cross-Slip and Climb
Lecture 28 - Plastic Strain and Dislocation Motion
Lecture 29 - Forces on dislocations: Peach Kohler Equation

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Lecture 30 - Stress Field around a Screw Dislocations
Lecture 31 - Stress Field around an Edge Dislocation
Lecture 32 - Strain Energy of a Dislocation
Lecture 33 - Dislocation Dissociation and Dislocation Line Tension
Lecture 34 - Strain Hardening and Dislocations Interactions
Lecture 35 - Dislocation Interaction: Stable Configurations and Strain Hardening
Lecture 36 - Dislocation: Nucleation and Frank Read Source
Lecture 37 - Partial Dislocations and Stacking Faults in FCC
Lecture 38 - Dislocation Locks: Lomer-Cottrell Lock
Lecture 39 - Ordered Structures: Superlattice Dislocations and APBs
Lecture 40 - Dislocation and Stacking Sequence in BCC
Lecture 41 - Intersection of Dislocations: Jogs and Kinks
Lecture 42 - Strain Hardening stages in an FCC Single Crystal
Lecture 43 - Independent Slip Systems: Von Mises Criterion for Plasticity
Lecture 44 - Solid Soloutions Strengthening (SSS)
Lecture 45 - Solid Soloutions Strengthening: Interaction of Solutes and Defects
Lecture 46 - Cottrell Atmosphere and Yield Point Phenomenon
Lecture 47 - Precipitation Hardening and Dispersion Strengthening
Lecture 48 - Grain Size Strengthening
Lecture 49 - Dislocation model for grain boundaries
Lecture 50 - Twinning in Crystalline Materials
Lecture 51 - Fracture and Theoretical Cohesive Strength of Materials
Lecture 52 - Fracture and Theoretical Cohesive Strength of Materials
Lecture 53 - Fracture modes and Stress Concentration
Lecture 54 - Fracture Mechanics - LEFM vs EPFM and J-Integral
Lecture 55 - Creep Deformation of Materials
Lecture 56 - Deformation Mechanics Map and Superplasticity
Lecture 57 - Fatigue of Materials: Introduction and SN Curve
Lecture 58 - Fatigue Stages and Paris Law
Lecture 59 - Cyclic Stress-Strain Curve and Strain Life Curve
Lecture 60 - Effect of Mean Stress and Stress Amplitude
Lecture 61 - Hardness of Materials
Lecture 62 - Impact Testing of Materials
Lecture 63 - Anelastic Behaviour and Composite Materials

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NPTEL Video Course - Metallurgy and Material Science - NOC:Introductory Materials Informatics

Subject Co-ordinator - Prof. Krishanu Biswas, Prof. Pratik Kumar Ray

Co-ordinating Institute - IIT Kanpur, IIT - Ropar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction - Part 1
Lecture 2 - General Introduction - Part 2
Lecture 3 - Statistics and Regression - Part 1
Lecture 4 - Statistics and Regression - Part 2
Lecture 5 - Probability and Classification - Part 1
Lecture 6 - Probability and Classification - Part 2
Lecture 7 - Data Handling-I : Part 1
Lecture 8 - Data Handling-I : Part 2
Lecture 9 - Data Handling-II : Part 1
Lecture 10 - Data Handling-II : Part 2
Lecture 11 - Materials Informatics in Action - Part 1
Lecture 12 - Materials Informatics in Action - Part 2
Lecture 13 - The Gradient Descent Methods - Part 1
Lecture 14 - The Gradient Descent Methods - Part 2
Lecture 15 - Regularization and solvers in regression
Lecture 16 - Regularization and solvers in regression
Lecture 17 - Various Types of Machine Learning - Part 1
Lecture 18 - Various Types of Machine Learning - Part 2
Lecture 19 - Describing the Problems - Part 1
Lecture 20 - Describing the Problems - Part 2
Lecture 21 - Linear Models - Part 1
Lecture 22 - Linear Models - Part 2
Lecture 23 - Decisions Tree - Part 1
Lecture 24 - Decisions Tree - Part 2
Lecture 25 - Decision Trees - Part 1
Lecture 26 - Support Vector Machine - Part 1
Lecture 27 - Support Vector Machine - Part 2
Lecture 28 - Support Vector Machine and Neural Networks - Part 2
Lecture 29 - Neural Networks - Part 1

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Lecture 30 - Neural Networks - Part 2
Lecture 31 - Clustering - Part 1
Lecture 32 - Clustering - Part 2
Lecture 33 - Model Selection - Part 1
Lecture 34 - Clustering - Part 2
Lecture 35 - Visualization - Part 1
Lecture 36 - Visualization and transformation - Part 2
Lecture 37 - Dataset transformations - Part 1
Lecture 38 - Dataset transformations - Part 2
Lecture 39 - Data mining - Part 1
Lecture 40 - Mapping of materials - Part 2
Lecture 41 - Data in Materials Informatics - Part 1
Lecture 42 - Data in Materials Informatics - Part 2
Lecture 43 - Structure Maps - Part 1
Lecture 44 - Structure Maps - Part 2
Lecture 45 - Phase Diagrams - Part 1
Lecture 46 - Periodic Table and Elemental Descriptors - Part 2
Lecture 47 - Featurization - Physical Principles - Part 1
Lecture 48 - Featurization - Pair Plots and Correlation Matrix - Part 2
Lecture 49 - Thermodynamic Features - Miedemaâ s Model
Lecture 50 - Structure of Materials - Part 1
Lecture 51 - Structure of Materials - Microstructure - Part 2
Lecture 52 - Prediction of Composition Based Properties - Part I
Lecture 53 - Prediction of Composition Based Properties - Part II
Lecture 54 - Molecular Fingerprints - Part I
Lecture 55 - Molecular Fingerprints - Part II
Lecture 56 - Mathematical Microstructure - Part 1
Lecture 57 - The Microstructure Function - Part 2
Lecture 58 - Two-point Statistics and Dimensionality Reduction
Lecture 59 - Combinatorial-Materials-Science
Lecture 60 - Convolutional Neural Network
Lecture 61 - Microstructure Representation-Synthetic Microstructures
Lecture 62 - P-S-P Linkage
Lecture 63 - Decision Making and Interpretation
Lecture 64 - Setting up ML problems - Part 1
Lecture 65 - Interrogating Machine Learning models - Examples - Part 2
Lecture 66 - Physically Informed Neural Networks
Lecture 67 - Combinatorial Materials Processing
Lecture 68 - High throughput Characterization

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Lecture 69 - Synthetic Data
Lecture 70 - Conclusion, Challenges and Future Directions

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NPTEL Video Course - Metallurgy and Material Science - NOC:Phase Diagrams in Single Component and Binary Syst

Subject Co-ordinator - Prof. Kallol Mondal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Definition of thermodynamic terms
Lecture 4 - Understanding of thermodynamic equilibrium - I
Lecture 5 - Understanding of thermodynamic equilibrium - II
Lecture 6 - Understanding of thermodynamic equilibrium - III
Lecture 7 - Concept of Entropy - I
Lecture 8 - Concept of Entropy - II
Lecture 9 - Concept of Entropy - III
Lecture 10 - Concept of equilibrium based on entropy and internal energy
Lecture 11 - Concept of equilibrium based on auxiliary functions
Lecture 12 - Equilibrium Condition - Helmholtz Free Energy
Lecture 13 - Equilibrium Condition - Gibbs Free Energy
Lecture 14 - Phase equilibria - consideration of chemical potential - I
Lecture 15 - Phase equilibria - consideration of chemical potential - II
Lecture 16 - Phase equilibria in H2O system - Clapeyron Equation
Lecture 17 - Phase equilibria in H2O system - Practical examples and â G calculations for given T
Lecture 18 - Phase equilibria in H2O system - Clausius-Clapeyron Equation
Lecture 19 - Phase equilibria in H2O system - Hierarchy of Equilibrium/Stability - I
Lecture 20 - Phase equilibria in H2O system - Hierarchy of Equilibrium/Stability - II
Lecture 21 - Phase equilibria in H2O system - G vs P plot at constant Temperature
Lecture 22 - Understanding the G vs T Plot for the Iron (Fe)
Lecture 23 - Multicomponent Systems - Concept of Standard State
Lecture 24 - Multicomponent Systems - Mixing of Ideal Gases
Lecture 25 - Multicomponent Systems - Calculation of â Hmix, â Gmix, and â Smix, for Ideal Gas Systems - I
Lecture 26 - Multicomponent Systems - Calculation of â Hmix, â Gmix, and â Smix, for Ideal Gas Systems - I
Lecture 27 - Condensed Solution - Analysing Gibbs Free Energy of Mixing
Lecture 28 - Condensed Solution - Understanding Raoultâ s Law
Lecture 29 - Condensed Solution - Understanding Henryâ s Law

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Lecture 30 - Condensed Solution - Calculation of â Gmix
Lecture 31 - Condensed Solution - Calculation of â Hmix, â Gmix, â Smix, and â Vmix
Lecture 32 - Condensed Solution - Understanding the Significance of â Hmix, â Gmix, â Smix, and â Vmix
Lecture 33 - Condensed Ideal Solution - Graphical Representation of â Hmix, â Smix, and â Gmix
Lecture 34 - Condensed Ideal Solution - Graphical Representation of â Gmix, Î GÌ MA and Î GÌ MB
Lecture 35 - Condensed Ideal Solution - Graphical Representation of Gibbs Free Energy of Solution
Lecture 36 - Condensed Ideal Solution - Graphical Representation of Partial Molar Gibbs Free Energy of Compor
Lecture 37 - Condensed Ideal Solution- Common Tangent and Concept of Equilibrium between Two Phases
Lecture 38 - Understanding Isomorphous Phase Diagram - I
Lecture 39 - Understanding Isomorphous Phase Diagram - II
Lecture 40 - Understanding Isomorphous Phase Diagram - Lever Rule and Fraction of Phases
Lecture 41 - Calculation of Isomorphous Phase Diagram - I
Lecture 42 - Calculation of Isomorphous Phase Diagram - II
Lecture 43 - Calculation of Isomorphous Phase Diagram - III
Lecture 44 - Deviation from Ideality- Formation of Solution
Lecture 45 - Non-Ideal Solution- Regular Solution Model and Expression of â Hmix - I
Lecture 46 - Non-Ideal Solution- Regular Solution Model and Expression of â Hmix - II
Lecture 47 - Enthalpy of mixing (â Hmix) and Gibbs Free Energy of Mixing (â Gmix) - Deviation from Ideality
Lecture 48 - Enthalpy of mixing (â Hmix) and Gibbs Free Energy of Mixing (â Gmix) - Deviation from Ideality
Lecture 49 - Enthalpy of mixing (â Hmix) and Gibbs Free Energy of Mixing (â Gmix) - Deviation from Ideality
Lecture 50 - Enthalpy of mixing (â Hmix) and Gibbs Free Energy of Mixing (â Gmix) - Deviation from Ideality
Lecture 51 - Enthalpy of mixing (â Hmix) and Gibbs Free Energy of Mixing (â Gmix)
Lecture 52 - Enthalpy of mixing (â Hmix) and Gibbs Free Energy of Mixing (â Gmix)
Lecture 53 - Evolution of G-X Plot with Variation in Interaction Parameter (Î©)
Lecture 54 - Evolution of G-X Plot and associated Phase Diagram with Variation in Interaction Parameter (Î©)
Lecture 55 - Evolution of G-X Plot and associated Phase Diagram with Variation in Interaction Parameter (Î©)
Lecture 56 - Evolution of G-X Plot and associated Phase Diagram with Variation in Interaction Parameter (Î©)
Lecture 57 - Evolution of G-X Plot and associated Phase Diagram with Variation in Interaction Parameter (Î©)
Lecture 58 - Understanding Eutectic Phase Diagram
Lecture 59 - Understanding Eutectic Phase Diagram and Partitioning and Partitionless Transformation
Lecture 60 - Understanding Eutectoid and Peritectic Phase Diagram
Lecture 61 - Understanding Peritectic Phase Diagram - Part A
Lecture 62 - Understanding Complex Phase Diagrams and the Concept of Diffusion Phenomena - Part B
Lecture 63 - Understanding Gibbsâ Phase Rule

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NPTEL Video Course - Metallurgy and Material Science - Advanced ceramics for strategic applications

Subject Co-ordinator - Prof. H.S. Maiti

Co-ordinating Institute - Central Glass and Ceramic Research Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Crystal Structure
Lecture 4 - Crystal Structure (Continued...)
Lecture 5 - Crystal Structure (Continued...)
Lecture 6 - Crystal Structure (Continued...)
Lecture 7 - Defects in crystalline solids
Lecture 8 - Defects in crystalline solids (Continued...)
Lecture 9 - Dislocation
Lecture 10 - Two and Three Dimensional Defects
Lecture 11 - Electrical Conduction in ceramics
Lecture 12 - Electrical Conduction in Ceramics (Continued...)
Lecture 13 - Electrical Conduction in Ceramics (Continued...)
Lecture 14 - Electrical Conduction in Ceramics (Continued...)
Lecture 15 - Electrical Conduction in Ceramics (Continued...)
Lecture 16 - Electrical Conduction in Ceramics (Continued...)
Lecture 17 - Electrical Phenomenon in Insulators
Lecture 18 - Electrical Phenomenon in Insulators (Continued...)
Lecture 19 - Ferroelectric , Piezoelectric and Pyroelectric Ceramics
Lecture 20 - Ferroelectric , Piezoelectric and Pyroelectric Ceramics (Continued...)
Lecture 21 - Ferroelectric , Piezoelectric and Pyroelectric Ceramics (Continued...)
Lecture 22 - Ferroelectric , Piezoelectric and Pyroelectric Ceramics (Continued...)
Lecture 23 - Relaxor Ferroelectric
Lecture 24 - Superconductivity
Lecture 25 - Superconductivity (Continued...)
Lecture 26 - Ceramic Gas Sensor
Lecture 27 - Ceramic Gas Sensor (Continued...)
Lecture 28 - Solid Oxide Fuel Cell
Lecture 29 - Solid Oxide Fuel Cell (Continued...)

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Lecture 30 - Solid Oxide Fuel Cell (Continued...)
Lecture 31 - Hydrogen Generation through MIEC Reactor
Lecture 32 - Lithium Ion Battery
Lecture 33 - Lithium Ion Battery (Continued...)
Lecture 34 - Magnetic Ceramics
Lecture 35 - Magnetic Ceramics (Continued...)
Lecture 36 - Magnetic Ceramics (Continued...)
Lecture 37 - Magnetic Ceramics (Continued...)
Lecture 38 - Sintering of Ceramics
Lecture 39 - Sintering of Ceramics (Continued...)
Lecture 40 - Sintering of Ceramics (Continued...)
Lecture 41 - Sintering of Ceramics (Continued...)
Lecture 42 - Mechanical Properties of Ceramic Materials
Lecture 43 - Mechanical Properties of Ceramic Materials (Continued...)
Lecture 44 - Mechanical Properties of Ceramic Materials (Continued...)
Lecture 45 - Mechanical Properties of Ceramic Materials (Continued...)
Lecture 46 - Structural Ceramics Materials
Lecture 47 - Bioceramics

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NPTEL Video Course - Metallurgy and Material Science - Non-ferrous Extractive Metallurgy

Subject Co-ordinator - Prof. H.S. Ray, Mr. L. Pugazhenthy

Co-ordinating Institute - IIT - Kharagpur | India Lead Zine Development Association

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief History of Non-ferrous Metal
Lecture 2 - Brief History of Non-ferrous Metal (Continued...)
Lecture 3 - Sources of Non-ferrous Metal
Lecture 4 - Mineral Benefication Techniques
Lecture 5 - General Methods of Metal Extraction
Lecture 6 - Principles of Carbon Reduction
Lecture 7 - Principles of Hydrometalling
Lecture 8 - Principles of Electrometallurgy
Lecture 9 - Electrometallurgy (Continued...) and Temkin Model for Fused Salts
Lecture 10 - Refining of Metals - Chemical Methods
Lecture 11 - Refining of Metals - Physical Methods
Lecture 12 - Concluding part of Module - 4
Lecture 13 - Concluding part of Module - 4 (Continued...)
Lecture 14 - Module - 5 Extraction of Metals from Oxides, Extraction of Magnesium
Lecture 15 - Extraction Aluminium
Lecture 16 - Extraction Aluminium (Continued...1)
Lecture 17 - Extraction Aluminium (Continued...2)
Lecture 18 - Extraction Aluminium (Continued...3)
Lecture 19 - Extraction of Tin
Lecture 20 - Extraction of Ferro Alloys
Lecture 21 - Module - 6 Extraction of Metals from Sulphides Extraction of Copper
Lecture 22 - Extraction of Copper (Continued...)
Lecture 23 - Hydrometallurgy of Copper
Lecture 24 - Extraction of Lead
Lecture 25 - Extraction of Zinc-Imperial Smelting Process
Lecture 26 - Module - 7 Extraction of metals from halides, Extraction of reactor metals
Lecture 27 - Extraction of reactor metals (Continued...1)
Lecture 28 - Extraction of reactor metals (Continued...2)
Lecture 29 - Extraction of Titanium

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Lecture 30 - Extraction of Precious Metals
Lecture 31 - Production of Secondary Metals and Treatment of Wastes
Lecture 32 - Energy and Environment Related Issues in Nonferrous Metals Production
Lecture 33 - Energy and Environment Related Issues in Nonferrous Metals Production (Continued...1)
Lecture 34 - Energy and Environment Related Issues in Nonferrous Metals Production (Continued...2)
Lecture 35 - Energy and Environment Related Issues in Nonferrous Metals Production (Continued...3)
Lecture 36 - Energy and Environment Related Issues in Nonferrous Metals Production (Continued...4)
Lecture 37 - Energy and Environment Related Issues in Nonferrous Metals Production (Continued...5)
Lecture 38 - Energy and Environment Related Issues in Nonferrous Metals Production (Continued...6)
Lecture 39 - Nonferrous Metals in India - Unleashing its true potential
Lecture 40 - Nonferrous Metals in India - Unleashing its true potential (Continued...)
Lecture 41 - Review and Summary
Lecture 42 - Review and Summary (Continued...1)
Lecture 43 - Review and Summary (Continued...2)

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NPTEL Video Course - Metallurgy and Material Science - Principles of Physical Metallurgy

Subject Co-ordinator - Prof. R.N. Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Atomic Bond and Crystal Structure
Lecture 3 - Atomic Bond and Crystal Structure (Continued...1)
Lecture 4 - Atomic Bond and Crystal Structure (Continued...2)
Lecture 5 - Experimental Tools & Techniques
Lecture 6 - Experimental Tools & Techniques (Continued...)
Lecture 7 - Solidification of Pure Metal
Lecture 8 - Plastic Deformation of Pure Metal
Lecture 9 - Plastic Deformation of Pure Metal (Continued...)
Lecture 10 - Crystal Defects in Metals
Lecture 11 - Crystal Defects in Metals (Continued...1)
Lecture 12 - Crystal Defects in Metals (Continued...2)
Lecture 13 - Crystal Defects in Metals (Continued...3)
Lecture 14 - Crystal Defects in Metals (Continued...4)
Lecture 15 - Diffusion in Solids
Lecture 16 - Diffusion in Solids (Continued...)
Lecture 17 - Numerical Examples in Diffusion
Lecture 18 - Solidification of Binary Alloys
Lecture 19 - Solidification of Binary Alloys (Continued...1)
Lecture 20 - Solidification of Binary Alloys (Continued...2)
Lecture 21 - Solidification of Binary Alloys (Continued...3)
Lecture 22 - Solidification of Binary Alloys (Continued...4)
Lecture 23 - Iron-Carbon Phase Diagram
Lecture 24 - Iron-Carbon Phase Diagram (Continued...)
Lecture 25 - Ternary Phase Diagram
Lecture 26 - Common Binary Alloys
Lecture 27 - Metal Working
Lecture 28 - Metal Working
Lecture 29 - Precipitation for Solid Solution

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Lecture 30 - Precipitation for Solid Solution (Continued...)
Lecture 31 - Heat Treatment of Steel
Lecture 32 - Heat Treatment of Steel (Continued...1)
Lecture 33 - Heat Treatment of Steel (Continued...2)
Lecture 34 - Heat Treatment of Steel (Continued...3)
Lecture 35 - Heat Treatment of Steel (Continued...4)
Lecture 36 - Heat Treatment of Steel (Continued...5)
Lecture 37 - Surface Hardening
Lecture 38 - Structural Steel
Lecture 39 - Structural Steel (Continued...)
Lecture 40 - Ultra High Strength Steel
Lecture 41 - Preferred Orientation
Lecture 42 - Metal Joining

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NPTEL Video Course - Metallurgy and Material Science - Processing of Semiconducting Materials

Subject Co-ordinator - Dr. Pallab Banerji

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Electronics Materials
Lecture 2 - Electrical Conductivity of Materials
Lecture 3 - Direct and Indirect Band Semiconductors
Lecture 4 - Doping in Semiconductors
Lecture 5 - Semiconductor Statistics
Lecture 6 - Importance of Doping
Lecture 7 - Diffusion and Ion Implantation - I
Lecture 8 - Diffusion and Ion Implantation - II
Lecture 9 - Diffusion and Ion Implantation - III
Lecture 10 - Elemental Semiconductors
Lecture 11 - Compound Semiconductors
Lecture 12 - Bulk Crystal Growth - I
Lecture 13 - Bulk Crystal Growth - II
Lecture 14 - Ga As Crystal Growth
Lecture 15 - Defects in Crystals - I
Lecture 16 - Defects in Crystals - II
Lecture 17 - Band Gap Engineering - I
Lecture 18 - Band Gap Engineering - II
Lecture 19 - Chemical Vapour Deposition - I
Lecture 20 - Chemical Vapour Deposition - II
Lecture 21 - MOCVD
Lecture 22 - Molecular Beam Epitaxy - I
Lecture 23 - Molecular Beam Epitaxy - II
Lecture 24 - p - n Junction
Lecture 25 - Carrier Transport in P - N Junction
Lecture 26 - Characterization - I
Lecture 27 - Characterization - II
Lecture 28 - Optical Characterization - I
Lecture 29 - Metal-Semiconductor Contact - I

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Lecture 30 - Metal-Semiconductor Contact - II
Lecture 31 - Applications of Metal-Semiconductor Contact
Lecture 32 - Oxidation - I
Lecture 33 - Oxidation - II
Lecture 34 - Different Types of Semiconductor - I
Lecture 35 - Oxidation - I
Lecture 36 - Oxidation - II
Lecture 37 - Dielectric Films
Lecture 38 - Low - K and High - K materials
Lecture 39 - Metallization
Lecture 40 - Materials for Photovoltaics

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NPTEL Video Course - Metallurgy and Material Science - Science and Technology of Polymers

Subject Co-ordinator - Prof. B. Adhikari

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts on Polymers
Lecture 2 - Basic Concepts on Polymers (Continued...)
Lecture 3 - Basic Concepts on Polymers (Continued...)
Lecture 4 - Polymer Raw Materials
Lecture 5 - Principles of Polymer Synthesis
Lecture 6 - Principles of Polymer Synthesis (Continued...)
Lecture 7 - Principles of Polymer Synthesis (Continued...)
Lecture 8 - Principles of Polymer Synthesis (Continued...)
Lecture 9 - Principles of Polymer Synthesis (Continued...)
Lecture 10 - Principles of Polymer Synthesis (Continued...)
Lecture 11 - Structure and Properties of Polymers (Continued...)
Lecture 12 - Structure and Properties of Polymers (Continued...)
Lecture 13 - Structure and Properties of Polymers (Continued...)
Lecture 14 - Structure and Properties of Polymers (Continued...)
Lecture 15 - Polymerization Techniques
Lecture 16 - Polymerization Techniques (Continued...)
Lecture 17 - Polymerization Techniques (Continued...)
Lecture 18 - Polymer Products
Lecture 19 - Polymer Products (Continued...)
Lecture 20 - Rubber Products
Lecture 21 - Rubber Products (Continued...)
Lecture 22 - Conducting Polymers
Lecture 23 - Conducting Polymers (Continued...)
Lecture 24 - Liquid Crystalline Polymers
Lecture 25 - Stimuli Responsive Polymer and its application
Lecture 26 - Stimuli Responsive Polymer and its application (Continued...)
Lecture 27 - Polymeric Nanomaterials and Devices (Continued...)
Lecture 28 - Polymeric Nanomaterials and Devices (Continued...)
Lecture 29 - Polymeric Nanomaterials and Devices (Continued...)

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Lecture 30 - Environmental Degradation of Polymers
Lecture 31 - Environmental Degradation of Polymers (Continued...)
Lecture 32 - Polymer Composites
Lecture 33 - Polymer Composites (Continued...)
Lecture 34 - Polymer Composites (Continued...)
Lecture 35 - Multicomponent Polymeric Materials
Lecture 36 - Multicomponent Polymeric Materials (Continued...)
Lecture 37 - Multicomponent Polymeric Materials (Continued...)
Lecture 38 - Viscoelasticity
Lecture 39 - Engineering and Speciality Polymers
Lecture 40 - Engineering and Speciality Polymers (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - Advanced Materials and Processes

Subject Co-ordinator - Prof. B.S. Murty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Structure of Materials - Part I
Lecture 2 - Structure of Materials - Part II
Lecture 3 - Nano Crystalline Materials - Part I
Lecture 4 - Nano Crystalline Materials - Part II
Lecture 5 - Nano Crystalline Materials - Part III
Lecture 6 - Nano Crystalline Materials - Part IV
Lecture 7 - Amorphous Materials - Part I
Lecture 8 - Amorphous Materials - Part II
Lecture 9 - Amorphous Materials - Part III
Lecture 10 - Amorphous Materials - Part IV
Lecture 11 - Amorphous Materials - Part V
Lecture 12 - Quasicrystals - Part I
Lecture 13 - Quasicrystals - Part II
Lecture 14 - Nano Quasicrystals - Part I
Lecture 15 - Nano Quasicrystals - Part II
Lecture 16 - Rapid Solidification Processing
Lecture 17 - Mechanical Alloying
Lecture 18 - Advanced AI Alloys - Part I
Lecture 19 - Advanced AI Alloys - Part II
Lecture 20 - Advanced AI Alloys - Part III
Lecture 21 - Advanced AI Alloys - Part IV and Ti Alloys
Lecture 22 - Shape Memory Alloys
Lecture 23 - Strengthening Mechanisms - Part I
Lecture 24 - Strengthening Mechanisms - Part II
Lecture 25 - Superalloys
Lecture 26 - In-Situ Composites - Part I

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NPTEL Video Course - Metallurgy and Material Science - NOC:Principles of Polymer Synthesis

Subject Co-ordinator - Prof. Rajat K Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical development of polymer science
Lecture 2 - Molecular Weight Determination Of Polymers
Lecture 3 - Molecular Weight Determination Of Polymers (Continued...)
Lecture 4 - Molecular Weight Determination of Polymers (Continued...)
Lecture 5 - Molecular Weight Determination of Polymers (Continued...)
Lecture 6 - Principles of step growth polymerization
Lecture 7 - Principles of step growth polymerization (Continued...)
Lecture 8 - Principles of step growth polymerization (Continued...)
Lecture 9 - Principles of step growth polymerization (Continued...)
Lecture 10 - Principles of step growth polymerization (Continued...)
Lecture 11 - Principles of radical chain polymerization
Lecture 12 - Principles of radical chain polymerization (Continued...)
Lecture 13 - Principles of radical chain polymerization (Continued...)
Lecture 14 - Principles of radical chain polymerization (Continued...)
Lecture 15 - Principles of radical chain polymerization (Continued...)
Lecture 16 - Principles of radical chain polymerization (Continued...)
Lecture 17 - Principles of Chain Copolymerization
Lecture 18 - Principles of Chain Copolymerization (Continued...)
Lecture 19 - Principles of Chain Copolymerization (Continued...)
Lecture 20 - Principles of Living Chain polymerization
Lecture 21 - Principles of Living Chain polymerization (Continued...)
Lecture 22 - Design of Chemical Reactors
Lecture 23 - Design of Chemical Reactors (Continued...)
Lecture 24 - Design of Chemical Reactors (Continued...)
Lecture 25 - Design of Chemical Reactors (Continued...)
Lecture 26 - Design of Chemical Reactors (Continued...)
Lecture 27 - Design of Chemical Reactors (Continued...)
Lecture 28 - Design of Chemical Reactors (Continued...)
Lecture 29 - Design of Chemical Reactors (Continued...)

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Lecture 30 - Design of Chemical Reactors (Continued...)
Lecture 31 - Design of Chemical Reactors (Continued...)
Lecture 32 - Synthesis of industrial polymers
Lecture 33 - Synthesis of industrial polymers (Continued...)
Lecture 34 - Synthesis of industrial polymers (Continued...)
Lecture 35 - Synthesis of industrial polymers (Continued...)
Lecture 36 - Synthesis of industrial polymers (Continued...)
Lecture 37 - Synthesis of industrial polymers (Continued...)
Lecture 38 - Synthesis of industrial polymers (Continued...)
Lecture 39 - Synthesis of industrial polymers (Continued...)
Lecture 40 - Synthesis of industrial polymers (Continued...)
Lecture 41 - Synthesis of industrial polymers (Continued...)
Lecture 42 - Synthesis of industrial polymers (Continued...)
Lecture 43 - Synthesis of industrial polymers (Continued...)
Lecture 44 - Synthesis of industrial polymers (Continued...)
Lecture 45 - Synthesis of industrial polymers (Continued...)
Lecture 46 - Synthesis of industrial polymers (Continued...)
Lecture 47 - Synthesis of industrial polymers (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Advanced Materials and Processes

Subject Co-ordinator - Prof. Jayanta Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Introduction (Continued...)
Lecture 4 - Introduction (Continued...)
Lecture 5 - Introduction (Continued...)
Lecture 6 - Bulk Metallic Glass, Glassy and Amorphous Materials
Lecture 7 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 8 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 9 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 10 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 11 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 12 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 13 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 14 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 15 - Bulk Metallic Glass, Glassy and Amorphous Materials (Continued...)
Lecture 16 - Shape Memory Alloys
Lecture 17 - Shape Memory Alloys (Continued...)
Lecture 18 - Shape Memory Alloys (Continued...)
Lecture 19 - Shape Memory Alloys (Continued...)
Lecture 20 - Shape Memory Alloys (Continued...)
Lecture 21 - Shape Memory Alloys
Lecture 22 - Shape Memory Alloys
Lecture 23 - Shape Memory Alloys
Lecture 24 - Shape Memory Alloys
Lecture 25 - Shape Memory Alloys
Lecture 26 - Introduction of High Temperature Materials
Lecture 27 - Introduction of High Temperature Materials (Continued...)
Lecture 28 - Introduction of High Temperature Materials (Continued...)
Lecture 29 - Introduction of High Temperature Materials (Continued...)

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Lecture 30 - Introduction of High Temperature Materials (Continued...)
Lecture 31 - Supearalloys
Lecture 32 - Supearalloys (Continued...)
Lecture 33 - Supearalloys (Continued...)
Lecture 34 - Supearalloys (Continued...)
Lecture 35 - Supearalloys (Continued...)
Lecture 36 - Nanomaterials
Lecture 37 - Nanomaterials
Lecture 38 - Nanomaterials
Lecture 39 - Nanomaterials
Lecture 40 - Nanomaterials
Lecture 41 - Nanomaterials
Lecture 42 - Nanomaterials
Lecture 43 - Nanomaterials
Lecture 44 - Nanomaterials
Lecture 45 - Nanomaterials
Lecture 46 - Soft and Hard Magnetic Materials
Lecture 47 - Soft and Hard Magnetic Materials (Continued...)
Lecture 48 - Soft and Hard Magnetic Materials (Continued...)
Lecture 49 - Soft and Hard Magnetic Materials (Continued...)
Lecture 50 - Soft and Hard Magnetic Materials (Continued...)
Lecture 51 - Advanced Processes
Lecture 52 - Advanced Processes (Continued...)
Lecture 53 - Advanced Processes (Continued...)
Lecture 54 - Advanced Processes (Continued...)
Lecture 55 - Advanced Processes (Continued...)
Lecture 56 - Advanced Functional Alloys
Lecture 57 - Advanced Functional Alloys (Continued...)
Lecture 58 - Advanced Functional Alloys (Continued...)
Lecture 59 - Advanced Functional Alloys (Continued...)
Lecture 60 - Advanced Functional Alloys (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Surface Engineering for Corrosion and Wear Resista

Subject Co-ordinator - Prof. Jyotsna Dutta Majumder, Prof. I. Manna

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Structure of Solids
Lecture 2 - Microstructure of Solids
Lecture 3 - Defects in Crystalline Solids
Lecture 4 - Surface and Surface Energy
Lecture 5 - Surface Properties-due to mechanical activation
Lecture 6 - Surface dependent physical and chemical property
Lecture 7 - Surface Dependent Properties and Surface initiated Degradation
Lecture 8 - Fatigue
Lecture 9 - Wear Part - I
Lecture 10 - Wear Part - II
Lecture 11 - Wear Part - III
Lecture 12 - Corrosion - I
Lecture 13 - Corrosion - II
Lecture 14 - Corrosion - III
Lecture 15 - Corrosion - IV
Lecture 16 - Corrosion - V
Lecture 17 - Classification of Surface engineering
Lecture 18 - Strengthening of metals
Lecture 19 - Strengthening of Non-Metals
Lecture 20 - Diffusive transformation in Steel
Lecture 21 - Non-Diffusive transformation in Steel
Lecture 22 - Shot Peening
Lecture 23 - Shot Peening and Rolling
Lecture 24 - Flame Hardening and Induction Hardening
Lecture 25 - Case Carburizing
Lecture 26 - Liquid Carburizing and Gas Carburizing
Lecture 27 - Gas Nitriding
Lecture 28 - Liquid and Salt Bath Nitriding
Lecture 29 - Plasma Nitriding and Ion Implantation

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Lecture 30 - Heat treatment after carburizing and Nitriding
Lecture 31 - Diffusion Coating Principle
Lecture 32 - Diffusion Coating Processes
Lecture 33 - Thick Coating by Cladding
Lecture 34 - High Temperature Degradation
Lecture 35 - Corrosion Prevention
Lecture 36 - Chemical Conversion Coating
Lecture 37 - Electroconversion Coating
Lecture 38 - Electro and Electroless Deposition Process
Lecture 39 - Hot Dipping - I
Lecture 40 - Hot Dipping - II
Lecture 41 - Thermal Spray Deposition - I
Lecture 42 - Thermal Spray Deposition - II
Lecture 43 - Thermal Spray Deposition - III
Lecture 44 - Thermal Spray Deposition - IV
Lecture 45 - Physical Vapur Deposition (PVD)
Lecture 46 - Sputtering
Lecture 47 - Chemical Vapor Deposition (CVD)
Lecture 48 - Composite Coating
Lecture 49 - Ion Implantation - I
Lecture 50 - Ion Implantation - II
Lecture 51 - Electron Beam Welding
Lecture 52 - Electron Beam Surface engineering
Lecture 53 - Laser Materials Processing
Lecture 54 - Laser Assisted Materials Processing
Lecture 55 - Laser Surface Engineering
Lecture 56 - Laser Surface Engineering with Laser surface hardening and laser surface melting
Lecture 57 - Laser Surface Alloying
Lecture 58 - Laser Surface Cladding
Lecture 59 - Surface Damage - Case Studies
Lecture 60 - Overview and Conclusion

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NPTEL Video Course - Metallurgy and Material Science - NOC:Ironmaking and Steelmaking

Subject Co-ordinator - Prof. Gour Gopal Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Various Routes of steelmaking
Lecture 3 - The Iron Blast Furnace
Lecture 4 - Thermodynamics of BF ironmaking
Lecture 5 - Thermodynamics of BF Ironmaking (Continued...)
Lecture 6 - Overall Heat and Material Balance in Blast Furnace
Lecture 7 - RIST Diagram based on overall heat and material balance
Lecture 8 - RIST Diagram based on heat and material balance in the Wustite Reserve Zone
Lecture 9 - Kinetics of gas solid reaction
Lecture 10 - Kinetics of gas solid reaction
Lecture 11 - Aerodynamics in Blast Furnace - Part 1
Lecture 12 - Aerodynamics in Blast Furnace - Part 2
Lecture 13 - Aerodynamics in Blast Furnace - Part 3
Lecture 14 - Coke rate and Fuel efficiency in Blast Furnace
Lecture 15 - oxygen enrichment of blast
Lecture 16 - Blast Furnace and it's Raw Material
Lecture 17 - Sintering of Iron Ore
Lecture 18 - Pelletization of Iron Ore
Lecture 19 - Coking Process
Lecture 20 - Testing of Burden Material
Lecture 21 - Burden Distribution
Lecture 22 - Blast Furnace products and their utilization
Lecture 23 - Blast Furnace Productivity
Lecture 24 - Modeling of Blast Furnace
Lecture 25 - New Potential Technologies for Blast Furnace
Lecture 26 - History of Steelmaking
Lecture 27 - Properties of slag
Lecture 28 - The Reaction Equilibria Unlisted
Lecture 29 - Dephosphorization of liquid steel

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Lecture 30 - Kinetics of slag metal reaction
Lecture 31 - LD steelmaking
Lecture 32 - LD Steel making
Lecture 33 - Evolution of impurities in steel and slag constituents during LD processing
Lecture 34 - Hybrid Processes
Lecture 35 - Electric steel making
Lecture 36 - Secondary Steel making
Lecture 37 - Secondary Steel making
Lecture 38 - Secondary Steel making
Lecture 39 - Homogenization and Gas stirred ladle
Lecture 40 - Ladle de-sulphurization, alloying, stainless steel making
Lecture 41 - Inclusion and its control
Lecture 42 - Injection Metallurgy
Lecture 43 - Cored wire injection-Modeling, melting sequence, effect of operating parameters
Lecture 44 - IM
Lecture 45 - IM
Lecture 46 - Casting fundamentals- Heat Transfer
Lecture 47 - Casting fundamentals- segregation
Lecture 48 - Morphology of solidification structure and Ingot casting
Lecture 49 - Continuous casting
Lecture 50 - Downstream processing and near net shape casting
Lecture 51 - Introduction to Direct Reduction (DR) and smelting Reduction (SR) Processes
Lecture 52 - Introduction to Direct Reduction (DR) and smelting Reduction (SR) Processes (Continued...)
Lecture 53 - Coal Based DR Processes
Lecture 54 - Coal Based DR Processes (Continued...)
Lecture 55 - Gas based DR Processes
Lecture 56 - Gas based DR Processes (Continued...)
Lecture 57 - Smelting Reduction (SR) Processes
Lecture 58 - Smelting Reduction (SR) Processes (Continued...)
Lecture 59 - Ironmaking and Steelmaking in India
Lecture 60 - Ironmaking and Steelmaking in India (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Non-Metallic Materials

Subject Co-ordinator - Prof. Subhasish Basu Majumder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Classification and applications of non-metallic materials
Lecture 2 - Understanding on polymer structures
Lecture 3 - Characteristics of polymers and advanced polymeric materials
Lecture 4 - Processing of polymers
Lecture 5 - Polymer composites and issues related to recycling
Lecture 6 - Defects in crystalline materials:point, line, planar and three dimensional defects
Lecture 7 - Non- stoichiometry in non-metallic materials
Lecture 8 - Laws of thermodynamics, reaction kinetics - Part 1
Lecture 9 - Laws of thermodynamics, reaction kinetics - Part 2
Lecture 10 - Phase diagram and microstructure evolution in non-metallic materials
Lecture 11 - Carbonaceous materials
Lecture 12 - Fundamental of diffusion, Fickâ s laws, their solution and applications - Part 1
Lecture 13 - Fundamental of diffusion, Fickâ s laws, their solution and applications - Part 2
Lecture 14 - Phase transformation of non-metallic materials
Lecture 15 - Introduction to glass and amorphous solids
Lecture 16 - Understanding on conventional glass and amorphous solids
Lecture 17 - Glass-ceramics and specialty glasses
Lecture 18 - Mechanical properties of non-metallic materials, stress-strain response, elastic, and plastic de
Lecture 19 - Brittle and ductile materials, introduction to fracture mechanics, strength of brittle materials
Lecture 20 - Strengthening of materials, fatigue, and creep
Lecture 21 - Composite materials: Particle-reinforced composites, and fiber reinforced composites
Lecture 22 - Structural Composite
Lecture 23 - Dielectric and piezoelectric behavior
Lecture 24 - Ferroelectric Behaviour of Non-Metallic Materials and Ferroelectric thin film for Non-Volatile M
Lecture 25 - Magnetic Properties : Origin of Magnetism, Para, Dia, Ferro, and Ferrimagnetism
Lecture 26 - Ceramic Magnets and their Applications
Lecture 27 - Thermal Properties : Specific Heat, Heat Conduction, Thermal Diffusivity, Thermal expansion
Lecture 28 - Thermoelectric Effect and Magnetocaloric Effect
Lecture 29 - Optical properties: Refractive index, absorption and transmission of electromagnetic radiation,

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Lecture 30 - Introduction to electrochemistry, Galvanic cells, Cell potentials and Gibbs Energy, Concentratio
Lecture 31 - Electrochemical storage, rechargeable batteries
Lecture 32 - Introduction to electrochemical methods; cyclic voltammetry and other related techniques
Lecture 33 - Fuel Cell and Energy harvesting
Lecture 34 - Preparation of ceramic powders: auto-combustion, sol-gel synthesis, microwave assisted hydrother
Lecture 35 - Introduction to sintering, sintering mechanism
Lecture 36 - Solid-state sintering and microstructure development
Lecture 37 - Solid-state sintering and microstructure development (Continued...)
Lecture 38 - Liquid phase sintering and microstructure development, speciality sintering, reactive sintering
Lecture 39 - Processing of glass and amorphous/non-crystalline solids
Lecture 40 - Fundamental of thin film growth, growth mechanism and kinetics
Lecture 41 - Thin film growth techniques, thermal evaporation, CVD, sputtering, CSD
Lecture 42 - Fundamentals and processing of conducting and semiconducting ceramic devices
Lecture 43 - Processing of ceramics devices
Lecture 44 - Organic electronic materials: conducting polymers, semi-conducting organic materials, applicatio
Lecture 45 - Thermal analyses
Lecture 46 - Introduction of spectroscopic technique : UV-VIS spectroscopy
Lecture 47 - Infra-red and Raman spectroscopy
Lecture 48 - Optical and scanning electron microscopy
Lecture 49 - X-ray photoelectron spectroscopy
Lecture 50 - Measurement of mechanical properties, fracture toughness, MOR, hardness
Lecture 51 - Ferroelectric thin film: synthesis and characterization
Lecture 52 - Thermal analysis techniques: Differential scanning calorimetry and thermogravimetry
Lecture 53 - Measurement of optical properties
Lecture 54 - Novel ferroic composites: Synthesis and measurement
Lecture 55 - Fundamentals of corrosion, corrosion of materials
Lecture 56 - Oxidation, corrosion of ceramic materials, degradation of polymers: swelling and dissolution, bo
Lecture 57 - Ceramics in biology and medicine
Lecture 58 - Design of Ceramics
Lecture 59 - Finishing of Ceramics
Lecture 60 - Fly-ash based glazed wall tiles: A case study

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NPTEL Video Course - Metallurgy and Material Science - NOC:Scanning Electron-Ion-Probe Microscopy in Material

Subject Co-ordinator - Prof. Debabrata Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Microscopy
Lecture 2 - Scanning Electron Microscopy
Lecture 3 - SEM and Its Capabilities
Lecture 4 - Main Components of SEM - Electron Guns
Lecture 5 - Main Components of SEM - Electron Guns and Electromagnetic Lenses
Lecture 6 - Electron Probe Diameter Verses Electron Probe Current
Lecture 7 - Electron Beam - Specimen Interaction
Lecture 8 - Detectors
Lecture 9 - BSE Detector and Sample Preparation for SEM
Lecture 10 - Parameters Need to be Considered to obtain a Good SEM Image
Lecture 11 - How to Get a Good SEM Image
Lecture 12 - Additional Capabilities of SEM
Lecture 13 - Additional Capabilities of SEM (Continued...)
Lecture 14 - Additional Capabilities of SEM (Continued...)
Lecture 15 - Scanning Ion Microscopy - An Introduction
Lecture 16 - Ions Versus Electrons as Source for Microscopy
Lecture 17 - Ions Source in HIM
Lecture 18 - GFIS Properties and Ion Optical Column
Lecture 19 - Ion Optical Column
Lecture 20 - Ion-Solid Interactions and Signal Generation
Lecture 21 - Signal Generation and Contrast Mechanism
Lecture 22 - Contrast Mechanism and Imaging Modes
Lecture 23 - Scanning Transmission Ion Microscopy and Microanalysis with HIM
Lecture 24 - Creation and Modification of Materials by HIM
Lecture 25 - Introduction to Scanning Probe Microscopy
Lecture 26 - STM Instrumentation
Lecture 27 - Main Components of STM
Lecture 28 - Main Components of STM (Continued...)
Lecture 29 - Main Components of STM (Continued...)

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Lecture 30 - Working Principle of STM
Lecture 31 - Operating Modes
Lecture 32 - Scanning Tunneling Spectroscopy
Lecture 33 - SPM - Atomic Force Microscopy (AFM)
Lecture 34 - Force Between Tip and Sample in AFM
Lecture 35 - Atomic Force Microscope - Parts
Lecture 36 - Modes of AFM Operation
Lecture 37 - Modes of AFM Operation (Continued...)
Lecture 38 - AFM Imaging
Lecture 39 - Phase Imaging, Noises and Resolution
Lecture 40 - Surface Properties Measurements using Other Forces
Lecture 41 - Surface Properties Measurements using AFM
Lecture 42 - Manipulation of Atoms, Molecules and Industrial Applications
Lecture 43 - Summary

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NPTEL Video Course - Metallurgy and Material Science - NOC:Techniques of Material Characterization

Subject Co-ordinator - Prof. Shibayan Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course and basic principles of image formation
Lecture 2 - Image formation, resolution, magnification, depth of field and depth of focus
Lecture 3 - Aberrations in microscopy: General concepts
Lecture 4 - Introduction, types and image formation in Optical microscopy
Lecture 5 - Components of optical microscope
Lecture 6 - Bright field and Dark field modes
Lecture 7 - Phase contrast optical microscopy
Lecture 8 - Polarized light microscopy
Lecture 9 - Differential interference contrast
Lecture 10 - Fluorescence microscopy
Lecture 11 - Basic components of electron microscope
Lecture 12 - Basic components of electron microscope (Continued...)
Lecture 13 - Basic components of electron microscope (Continued...)
Lecture 14 - Electron-material interaction
Lecture 15 - Electron-material interaction (Continued...)
Lecture 16 - Electron-material interaction (Continued...) and Image formation and contrast generation
Lecture 17 - Modes of TEM (BF and DF)
Lecture 18 - Modes of TEM
Lecture 19 - Modes of TEM (Continued...) and Electron diffraction in TEM
Lecture 20 - Electron diffraction in TEM
Lecture 21 - Electron diffraction in TEM (Continued...)
Lecture 22 - Electron diffraction in TEM (Continued...)
Lecture 23 - Electron diffraction in TEM (Continued...)
Lecture 24 - Electron diffraction in TEM (Continued...)
Lecture 25 - Application of Electron diffraction
Lecture 26 - Signal generation in SEM
Lecture 27 - Signal generation in SEM (Continued...)
Lecture 28 - Signal generation in SEM (Continued...)
Lecture 29 - Signal generation in SEM (Continued...)

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Lecture 30 - Signal generation in SEM (Continued...)
Lecture 31 - Basic components of SEM
Lecture 32 - Basic components of SEM (Continued...)
Lecture 33 - Optics of SEM
Lecture 34 - Optics of SEM (Continued...)
Lecture 35 - Optics of SEM (Continued...) and analytical detectors
Lecture 36 - Analytical detectors in SEM
Lecture 37 - Analytical (WDS) detector and contrast formation in SEM
Lecture 38 - Imaging in SEM
Lecture 39 - Imaging in SEM (Continued...)
Lecture 40 - Imaging in SEM (Continued...)
Lecture 41 - Imaging in SEM and X-ray diffraction
Lecture 42 - Continuous and characteristics X-ray spectrum
Lecture 43 - Characteristics X-ray radiation
Lecture 44 - Characteristics X-ray radiation (Continued...) and X-ray absorption
Lecture 45 - X-ray absorption (Continued...)
Lecture 46 - X-ray absorption and filters
Lecture 47 - Intensity of diffracted beam
Lecture 48 - Intensity of diffracted beam (Continued...)
Lecture 49 - Intensity of diffracted beam (Continued...)
Lecture 50 - Intensity of diffracted beam (Continued...)
Lecture 51 - Intensity of diffracted beam (Continued...)
Lecture 52 - Intensity of diffracted beam (Continued...)
Lecture 53 - Intensity of diffracted beam (Continued...)
Lecture 54 - Intensity of diffracted beam (Continued...)
Lecture 55 - Intensity of diffracted beam (Continued...)
Lecture 56 - Intensity of diffracted beam (Continued...) and X-ray diffraction profile and analysis
Lecture 57 - X-ray diffraction profile and analysis
Lecture 58 - X-ray diffraction profile and analysis (Continued...)
Lecture 59 - X-ray diffraction profile and analysis (Continued...)
Lecture 60 - Electron backscatter diffraction (EBSD)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Electrochemical Energy Storage

Subject Co-ordinator - Prof. Subhasish Basu Majumder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of electrochemistry, definition of primary and secondary batteries
Lecture 2 - Primary batteries and Secondary batteries
Lecture 3 - Supercapacitors
Lecture 4 - Concepts of thermodynamics pertinent to electrochemical cells
Lecture 5 - Kinetics of electrochemical cells and structural characteristics of electrodes
Lecture 6 - Introduction to EMF, redox potential, Faraday law and Nernstâ s law
Lecture 7 - Terminology related to secondary battery : half-cell,full-cell, redox couple,positive
Lecture 8 - Measurements: Cyclic voltammetry, nominal voltage, capacity, rate performance
Lecture 9 - Impedance spectroscopy measurement and analyses
Lecture 10 - Measurement of rechargeable cell: Case study
Lecture 11 - History and categories of lithium batteries
Lecture 12 - Operational mechanisms for lithium batteries: Intercalation materials, alloys
Lecture 13 - Differences of voltage profiles between intercalation materials, alloys, and conversion
Lecture 14 - Properties of electrode materials (Case study: alloy as anode)
Lecture 15 - Properties of electrode materials (conversion type oxide as case study)
Lecture 16 - Positive electrodes: Lithiated transition metal oxides, lithiated iron oxyphosphates etc
Lecture 17 - Negative electrodes: Carbonaceous materials, lithium titanium oxides etc
Lecture 18 - Electrolyte :Liquid Electrolyte, Polymer Electrolyte
Lecture 19 - Current Collector, Conductive Agents, Separator and Other Accessories
Lecture 20 - Novel materials for lithium ion rechargeable cells
Lecture 21 - Principle of Operation of Commerical Cells : viz. C - NMC, C - NCA etc
Lecture 22 - Principle of operation of commercial cells
Lecture 23 - Major characteristics of commercial Li ion cells: Cell performance,degradation phenomena
Lecture 24 - Fabrication of Li ion cell: Cylindrical configuration
Lecture 25 - Fabrication of Li ion cell: Pouch and prismatic cell
Lecture 26 - Positive electrodes: Layered oxide, polyanionic compounds (phosphates, sulphates etc)
Lecture 27 - Negative electrodes: Carbonaceous materials, alloy based and other materials
Lecture 28 - Electrolytes: Roles and requirements, organic electrolyte, ionic liquid electrolyte
Lecture 29 - Performance of Na ion rechargeable cell

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Lecture 30 - Future perspective of Na ion cells
Lecture 31 - Introduction to battery module, BMS, thermal management and pack design
Lecture 32 - Degradation and safety issues of Li ion rechargeable cells
Lecture 33 - Introduction to battery management system: BMS topologies, hardware, concept of active
Lecture 34 - Introduction to thermal management: Active thermal management system, passive thermal
Lecture 35 - Packaging of battery pack and battery testing: Material selection, sealing of enclosure
Lecture 36 - Classification of supercapacitors: EDLC and pseudocapacitative type
Lecture 37 - Pseudocapacitor
Lecture 38 - Asymmetric supercapacitor and BATCAP: Battery supercapacitor hybrid electrochemical
Lecture 39 - Electrolytes for supercapacitors: Aqueous/organic liquid electrolytes/ionic liquid
Lecture 40 - Current collectors, separators etc. and their effect on performance
Lecture 41 - Operational principles of aqueous and Li - O2 batteries
Lecture 42 - Electrolytes for Li - O2 batteries
Lecture 43 - Limitations of Li - Air batteries
Lecture 44 - State of the art Li - Air batteries : Carbonaceous materials
Lecture 45 - State of the art Li - Air batteries: Case study
Lecture 46 - The element sulfur, principle of operation
Lecture 47 - Advantages and disadvantages of Li - S batteries, positive electrodes
Lecture 48 - Electrolyte and negative electrode for Li - S battery
Lecture 49 - State of the art Li - S batteries : Case study - I
Lecture 50 - State of the art Li - S batteries : Case study - II
Lecture 51 - Global Geographic Distribution of Raw Lithium Resources
Lecture 52 - Nature and geological origin of all potential lithium resources
Lecture 53 - State of the art extraction techniques and known production reserves
Lecture 54 - Recycling of lithium and other battery constituents from used battery
Lecture 55 - Recycling of lithium and other battery constituents from used battery (Continued...)
Lecture 56 - Lead Acid Batteries: Operational principles, main characteristics and applications
Lecture 57 - Lead Acid Batteries: Operational principles, main characteristics and applications (Continued...
Lecture 58 - Ni-Cd and Ni-MeH Batteries: Operational principles, main characteristics and applications
Lecture 59 - Redox flow battery vanadium redox battery,operational principle, and main characteristics
Lecture 60 - Other Redox Flow Battery Technologies

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NPTEL Video Course - Metallurgy and Material Science - NOC:Texture in Materials

Subject Co-ordinator - Prof. Somjeet Biswas

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Texture and Anisotropy
Lecture 3 - Processing - Texture - Anisotropic Properties
Lecture 4 - Crystal Structure and Stereographic Projections
Lecture 5 - Utilization of Stereographic Projections
Lecture 6 - Diffraction and Bragg's Law
Lecture 7 - Structure Factor and Diffraction Extinction Criteria
Lecture 8 - Structure factor and diffraction extinction criteria (Continued...)
Lecture 9 - Pole figures
Lecture 10 - Pole figures (Continued...)
Lecture 11 - Inverse Pole Figures
Lecture 12 - Three Dimensional Texture Analysis
Lecture 13 - Euler Angles and ODFs
Lecture 14 - Euler Angles and ODFs (Continued...)
Lecture 15 - Euler Angles and ODFs (Continued...)
Lecture 16 - Euler Angles and ODFs (Continued...)
Lecture 17 - Symmetry Effects on Orientation Matrix
Lecture 18 - Euler Space and Orientation Matrices
Lecture 19 - Texture Fibre, Periodicity in Euler Space, Incomplete Pole Figures
Lecture 20 - Crystal Structures and Symmetry
Lecture 21 - Size of Euler Space in Relation to Crystal and Sample Symmetry
Lecture 22 - Macrotexture and Microtexture Measurements
Lecture 23 - Penetration Depth of X-ray, Neutron, e-1 and Basics of X-ray Generation
Lecture 24 - Characteristic X-ray, Absorption and Filters
Lecture 25 - Principles of pole figure measurements by X-ray diffraction
Lecture 26 - Texture Goniometer Components
Lecture 27 - Limitations and Errors in X-ray Texture Measurement and Corrections
Lecture 28 - Basics of Electron Microscopy - I
Lecture 29 - Basics of Electron Microscopy - II

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Lecture 30 - Kikuchi Diffraction Pattern - I
Lecture 31 - Kikuchi Diffraction Pattern - II
Lecture 32 - Quantitative Evaluation of Kikuchi Diffraction Pattern - I
Lecture 33 - Quantitative evaluation of Kikuchi Diffraction Pattern - II
Lecture 34 - Quantitative evaluation of Kikuchi Diffraction Pattern - III
Lecture 35 - Analysis using the TSL-OIM software
Lecture 36 - Analysis using the AZtec Crystal software
Lecture 37 - Analysis using the ATEX software
Lecture 38 - Introduction to solidification texture
Lecture 39 - Solidification texture in Alloys
Lecture 40 - Solidification texture in FCC, BCC, and HCP structures
Lecture 41 - Phase Transformation Texture and Bain Strain
Lecture 42 - Orientation Relationships between FCC and BCC / BCT
Lecture 43 - Various Orientation Relationships and Variants
Lecture 44 - Basic Mechanics of Polycrystal Plasticity
Lecture 45 - Basic Mechanics of Polycrystal Plasticity (Continued...)
Lecture 46 - A Metallurgist Point of View
Lecture 47 - A Metallurgist Point of View (Continued...)
Lecture 48 - Texture in FCC polycrystals
Lecture 49 - Texture in BCC polycrystals - I
Lecture 50 - Texture in BCC polycrystals - II
Lecture 51 - Texture in HCP polycrystals - I
Lecture 52 - Texture in HCP polycrystals - II
Lecture 53 - Texture in HCP polycrystals - III
Lecture 54 - Static recrystallization
Lecture 55 - Dynamic recrystallization and recrystallization texture
Lecture 56 - Dynamic recrystallization and grain refinement during hot large strain shear

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NPTEL Video Course - Metallurgy and Material Science - NOC:Bulk Material Transport and Handling Systems

Subject Co-ordinator - Prof. Khanindra Pathak

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Classification of Mining and Bulk Sold Handling Systems
Lecture 2 - Properties of bulk material vis-a-vis different bulk handling operations
Lecture 3 - Fundamentals of BMH and Transport: Capacity and Productivity Concepts
Lecture 4 - Bulk material handling in Processing plants: Crushing and Screening Flow Charts
Lecture 5 - Introduction to Bulk Material Transport and Autonomous Vehicles
Lecture 6 - Constructional Components: Trends of Developments
Lecture 7 - Belt Conveyor Construction: Belting for Bulk Material Conveyor
Lecture 8 - Idlers and Belt Cleaners
Lecture 9 - Feeding and Discharging Devices
Lecture 10 - Safety and Troubleshooting
Lecture 11 - Size Selection and Power Calculation
Lecture 12 - Principle of operations and applicability
Lecture 13 - Basic Design Calculations
Lecture 14 - Introduction to Pneumatic Conveying systems
Lecture 15 - Design Calculations for Pneumatic Conveying
Lecture 16 - Exercise with Basic Design Calculations
Lecture 17 - Stackers and Reclaimers: Classification and Selection Criteria
Lecture 18 - Stackers and Reclaimers: Comparison of Different Types
Lecture 19 - Principles of Blending and Reclaiming
Lecture 20 - Case studies of stacker and reclaimers application
Lecture 21 - System Layout
Lecture 22 - Introduction to Bin Bunker and Silo
Lecture 23 - Introduction to Bunker
Lecture 24 - Introduction to Silo
Lecture 25 - Silo Failures and Maintenance
Lecture 26 - Basics of Silo Design
Lecture 27 - Feeder Selection and Design
Lecture 28 - Crushers: Classification and selection
Lecture 29 - Secondary Crushers

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Lecture 30 - Screen: Classification and Selection
Lecture 31 - Monitoring and Maintenance of Processing Plant Equipment
Lecture 32 - Concentration and Separation
Lecture 33 - Fine Size Classification: Desliming and Cycloning
Lecture 34 - Froth Flotation Techniques, Magnetic Separation, Jigs and Thickeners
Lecture 35 - Jigs and Thickeners
Lecture 36 - Coal Washery Equipment and Practices
Lecture 37 - Classification and Selection
Lecture 38 - Crusher Selection and Application
Lecture 39 - Off-Highway trucks and Haul Roads - 1
Lecture 40 - Off-Highway trucks and Haul Roads - 2
Lecture 41 - Recent Developments in Truck Transportation
Lecture 42 - RopeCon Transportation
Lecture 43 - Aerial Ropeways: Introduction
Lecture 44 - Aerial Ropeways Calculation
Lecture 45 - Pipe Conveyor Belt: Enclosed Material Transport
Lecture 46 - Underground Mine Transport System
Lecture 47 - Rope Haulage for Underground Mine Transport
Lecture 48 - Main and Tail and Endless Rope Haulage
Lecture 49 - Pit Top and Pit Bottom Layout
Lecture 50 - Haulage calculation
Lecture 51 - Locomotive
Lecture 52 - Low Profile Dumper
Lecture 53 - Load Haul Dumper
Lecture 54 - Introduction to Cage and Skip Winding
Lecture 55 - Winding Calculations
Lecture 56 - Safety Aspects in Bulk Solid Handling and Transportation
Lecture 57 - Safety Aspects in Bulk Solid Handling and Transportation
Lecture 58 - Basic Introduction of Automatic Control
Lecture 59 - Automating Bulk Solids Processes
Lecture 60 - Online Monitoring

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NPTEL Video Course - Metallurgy and Material Science - NOC:Environmental Degradation and Surface Engineering

Subject Co-ordinator - Prof. Indranil Manna, Prof. Jyotsna Dutta Majumdar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Materials and Environment
Lecture 2 - Genesis of Materials Degradation
Lecture 3 - Classification of degradation and Parameters Influencing it - Part I
Lecture 4 - Parameters Influencing Degradation - Part II
Lecture 5 - Engineering Solution to Combat Environmental Degradation of Materials
Lecture 6 - Aqueous corrosion-thermodynamics of Wet Corrosion
Lecture 7 - Aqueous corrosion-Classification - Part I
Lecture 8 - Aqueous corrosion-Classification - Part II
Lecture 9 - Classification of Aqueous corrosion - Part III
Lecture 10 - Classification of Aqueous corrosion - Part IV
Lecture 11 - Friction and Wear-Part - I
Lecture 12 - Friction and Wear-Part - II
Lecture 13 - Wear- Classification of wear - Part I
Lecture 14 - Wear- Classification of wear - Part II
Lecture 15 - Fatigue â Surface Dependent Property
Lecture 16 - Failure Analysis - Part I
Lecture 17 - Failure Analysis - Part II
Lecture 18 - Characteristics of Failure - Part I
Lecture 19 - Characteristics of Failure - Part II
Lecture 20 - Characteristics of Failure - Part III
Lecture 21 - Prevention
Lecture 22 - Prevention of Chemical/Electrochemical Degradation
Lecture 23 - Prevention of Chemical/Electrochemical Degradation (Continued...)
Lecture 24 - Prevention of Chemical/Electrochemical Degradation (Continued...)
Lecture 25 - Prevention of Mechanical Degradation
Lecture 26 - Non Destructive Testing
Lecture 27 - Mechanical and Electrochemical Testing - Part I
Lecture 28 - Mechanical and Electrochemical Testing - Part II
Lecture 29 - Mechanical and Electrochemical Testing - Part III

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Lecture 30 - Characterization
Lecture 31 - Surface/Interface
Lecture 32 - Scope, Classification and Objectives of Surface Engineering
Lecture 33 - Shot Peening
Lecture 34 - Grinding and Polishing
Lecture 35 - Ultrasonic Peening and Laser Shock Peening
Lecture 36 - Conventional Surface Hardening (Flame and induction)
Lecture 37 - Pack Carburizing
Lecture 38 - Fluidized Bed Carburizing
Lecture 39 - Fused bath and Gas Nitriding
Lecture 40 - Plasma Nitriding
Lecture 41 - Diffusion Based Coatings - Solid State
Lecture 42 - Chemical Conversion Coatings
Lecture 43 - Electrodeposition
Lecture 44 - Electrophoretic and Electroless deposition
Lecture 45 - Galvanizing and Hot Dipping
Lecture 46 - Thick Coatings by Weld Overlay and Cladding
Lecture 47 - Introduction to thin film deposition
Lecture 48 - Physical Vapor Deposition including Sputtering
Lecture 49 - Chemical Vapor Deposition (CVD) and Composite Coating
Lecture 50 - Chemical Vapor Deposition (CVD) and Composite Coating
Lecture 51 - Spray Coating Techniques II - Plasma Spray and Cold Spray
Lecture 52 - Ion Implantation
Lecture 53 - Electron Beam Assisted Surface Engineering
Lecture 54 - Laser Material Processing
Lecture 55 - Laser Surface Engineering
Lecture 56 - Laser Assisted Additive Manufacturing, LAM
Lecture 57 - Strengthening Mechanisms in Surface Engineering
Lecture 58 - Microstructural Characterization after Surface Engineering
Lecture 59 - Compositional Characterization after Surface Engineering
Lecture 60 - Summary of surface engineering and Conclusion

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fracture, Fatigue and Failure of Materials

Subject Co-ordinator - Prof. Indrani Sen

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Modes of Fracture
Lecture 2 - Theoretical Strengths and Defects
Lecture 3 - Stress Concentration
Lecture 4 - Griffith Criterion
Lecture 5 - Griffith Criteria - Modification
Lecture 6 - Stress Intensity Factor
Lecture 7 - Fracture Toughness and Plane Stress-Plane Strain
Lecture 8 - Plastic Zone Size
Lecture 9 - Plane stress and plane strain fracture toughness
Lecture 10 - Plane stress and plane strain fracture toughness (Continued...)
Lecture 11 - Plane Strain Fracture Toughness Testing
Lecture 12 - Plane Strain-Plane Stress Fracture Toughness Testing
Lecture 13 - Plane Stress Fracture Toughness
Lecture 14 - Plane Stress fracture toughness-J integral
Lecture 15 - Experimental determination of JIC
Lecture 16 - J-integral and JIC
Lecture 17 - Impact Toughness
Lecture 18 - Impact Toughness (Continued...)
Lecture 19 - Impact Toughness (Continued...)
Lecture 20 - Impact Toughness (Continued...)
Lecture 21 - Impact Toughness (Continued...)
Lecture 22 - Fracture Toughness
Lecture 23 - Fracture Toughness (Continued...)
Lecture 24 - Fracture Toughness (Continued...)
Lecture 25 - Fracture Toughness (Continued...)
Lecture 26 - Fracture Toughness (Continued...)
Lecture 27 - Environment Assisted Fracture
Lecture 28 - Environment Assisted Fracture (Continued...)
Lecture 29 - Environment Assisted Fracture (Continued...)

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Lecture 30 - Introduction to Fatigue
Lecture 31 - Stress Controlled Fatigue
Lecture 32 - Stress Controlled Fatigue (Continued...)
Lecture 33 - Stress Controlled Fatigue (Continued...)
Lecture 34 - Stress Controlled Fatigue (Continued...)
Lecture 35 - Strain Controlled Fatigue (Continued...)
Lecture 36 - Strain Controlled Fatigue (Continued...)
Lecture 37 - Strain Controlled Fatigue (Continued...)
Lecture 38 - Strain Controlled Fatigue (Continued...)
Lecture 39 - Fatigue Crack Nucleation
Lecture 40 - Notch Effect
Lecture 41 - Crack in Fatigue
Lecture 42 - Fatigue Crack Propagation
Lecture 43 - Fatigue Crack Propagation (Continued...)
Lecture 44 - Fatigue Crack Propagation (Continued...)
Lecture 45 - Fatigue Crack Propagation (Continued...)
Lecture 46 - Fatigue Crack Propagation (Continued...)
Lecture 47 - Fatigue Crack Propagation (Continued...)
Lecture 48 - Fatigue in Materials
Lecture 49 - Fatigue in Materials (Continued...)
Lecture 50 - Effect of Temperature on Fatigue
Lecture 51 - Failure Analysis
Lecture 52 - Failure Analysis (Continued...)
Lecture 53 - Failure Analysis (Continued...)
Lecture 54 - Failure Analysis - Case study - Titanic
Lecture 55 - Failure Analysis - Case Study - ALK
Lecture 56 - Failure Analysis - Case study - Point Pleasant Bridge
Lecture 57 - Failure Analysis - Case Study - Rail Crash
Lecture 58 - Failure Analysis - Case Study - Comet
Lecture 59 - Failure Analysis - Case Study - Columbia
Lecture 60 - Failure Analysis - Summary

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NPTEL Video Course - Metallurgy and Material Science - NOC:Mine Closure and Sustainability Planning

Subject Co-ordinator - Prof. Khanindra Pathak

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to closure concept
Lecture 2 - Mine Closure Objectives and Regulatory Aspects
Lecture 3 - Mining Footprint and Regulatory Aspects
Lecture 4 - Mine Closure Costs and Financing Approaches
Lecture 5 - Decommissioning of Mines
Lecture 6 - Demolition Techniques
Lecture 7 - Post Closure Liabilities and Activities
Lecture 8 - Post Closure Community Concerns and Sustainable Development Plans
Lecture 9 - Closure oriented Resource Development-Post Mining Land Uses
Lecture 10 - Post mining site monitoring
Lecture 11 - Planning inputs, tools and techniques
Lecture 12 - Tools and Techniques for Closure Plan Development and Procedures
Lecture 13 - Closure Plan Development Procedures
Lecture 14 - Monitoring, Review and Feedback of Closure Plan Implementation-Closure Criteria
Lecture 15 - Failure Mode and Effect Analysis Framework for Mine Closure Planning
Lecture 16 - Multiple Accounts Analysis (MAA) for Assessment of Closure Alternatives
Lecture 17 - Provisioning of capital
Lecture 18 - Closure costs and Rehabilitation Costs
Lecture 19 - Finance and Accounting: Closure cost estimate
Lecture 20 - Closure Economics and Audit
Lecture 21 - Application of Remote Sensing for Mine Closure-Introduction
Lecture 22 - Remote Sensing Sensors
Lecture 23 - Remote Sensing media and sensors
Lecture 24 - Image Processing and Data Interpretation
Lecture 25 - GIS for Mine Closure: Mapping and Geo-Spatial Data Analysis
Lecture 26 - Integration of phase operations
Lecture 27 - Integration of Interdepartmental work and phase operations - Part 1
Lecture 28 - Integration of Interdepartmental work and phase operations - Part 2
Lecture 29 - Risk Analysis Techniques and Management

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Lecture 30 - Post Mine Closure Waste to Wealth Conversion
Lecture 31 - CSR and EMP Integration
Lecture 32 - Introduction to Asset Management
Lecture 33 - Principle of Asset Management and Decommissioning of Assets for Site Restoration
Lecture 34 - Brownfield Redevelopment and Value Addition to Assets
Lecture 35 - Landform Design and Post Mining Asset Creation
Lecture 36 - Concept of Sustainable Development and Mining industry
Lecture 37 - Sustainability Measurement and Reporting
Lecture 38 - Sustainability Measurement and Reporting (Continued...)
Lecture 39 - Sustainable Mineral Industry
Lecture 40 - Policy and Legislative Framework of Sustainability for SDG and Mine Closure
Lecture 41 - Communicating sustainability performance
Lecture 42 - Framework of Sustainability reporting
Lecture 43 - Sustainable accounting
Lecture 44 - Case studies on Sustainability initiatives in Mining Industry
Lecture 45 - Data Analytics for Sustainability management
Lecture 46 - Cleaner Production Based Closure Management
Lecture 47 - Regenerative environment design for sustainable Mine Closure
Lecture 48 - Reusable resource identification in post closure mine site
Lecture 49 - Optimization of Residual Value of Assets
Lecture 50 - Post Mining Site for Community wealth
Lecture 51 - Management of water resources
Lecture 52 - Soil Treatment and Revegetation
Lecture 53 - Bio-diversity: Post Land reclamation and plantation
Lecture 54 - Physical and Chemical Stability issues
Lecture 55 - Economic Utilization of Post Mining Structures and assets
Lecture 56 - Techniques for closing underground workings
Lecture 57 - Application of Industry 4.0 for Mine
Lecture 58 - Best mining practices for Sustainable mining - Case studies
Lecture 59 - Stability Monitoring and Enhancing tools
Lecture 60 - VR and AR Technology for Post Mining Mine site Visualization and Design

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of Composite and Cellular Materials

Subject Co-ordinator - Dr. Siddhartha Roy, Dr. Tapas Laha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamental aspects of hybrid materials
Lecture 2 - Materials selection basics for design with hybrid materials
Lecture 3 - Classes of materials and material property charts
Lecture 4 - Material property charts and concept of material indices
Lecture 5 - Material property chart-indices and concept of hybridization
Lecture 6 - Hybrid materials - Composite
Lecture 7 - Cellular solids - Applications of metal foams
Lecture 8 - Cellular solids - Applications of porous ceramics and polymer foams
Lecture 9 - Basics of Composite Materials and Classification
Lecture 10 - Composite Classification - Matrix and Reinforcement
Lecture 11 - Fibers - Fundamentals, Glass fiber
Lecture 12 - Fibers - Boron and Carbon Fibers
Lecture 13 - Fibers - Aramid and Ceramic fibers, Alumina fiber
Lecture 14 - Fibers - SiC fiber and Whiskers
Lecture 15 - Metal matrix composites (MMCs) - Basic concept, Liquid state processing
Lecture 16 - Metal matrix composites (MMCs) - Liquid and Solid state processing
Lecture 17 - Ceramic Matrix Composites (CMCs) - Basic concept, Processing techniques
Lecture 18 - Ceramic Matrix Composites (CMCs) - Processing techniques
Lecture 19 - CMCs and PMCs - Processing and Application
Lecture 20 - Fabrication of cellular ceramics
Lecture 21 - Sintering of ceramics - Aspects and mechanisms
Lecture 22 - Fabrication of cellular ceramics
Lecture 23 - Processing of metal foams - Foaming techniques
Lecture 24 - Processing of metal foams (Continued...)
Lecture 25 - Processing of metal foams (Continued...)
Lecture 26 - Polymer foams - Processing and properties
Lecture 27 - Additive manufacturing - Definition and Prospects
Lecture 28 - Cellular solids classification and Structure description
Lecture 29 - Structure of cellular solids - Pore structure characterization

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Lecture 30 - Interfacial phenomena - Basic concept, Adhesion and Wettability
Lecture 31 - Interfacial phenomena - Factors affecting wettability
Lecture 32 - Interfacial phenomena - Interfacial bonding
Lecture 33 - Interfacial phenomena - Interfacial strength measurement
Lecture 34 - Interfacial phenomena - Case study - Al-MWCNT nanocomposite
Lecture 35 - Interfacial phenomena - Case studies: MMCs and CMCs
Lecture 36 - Interfacial phenomena - Case studies: MMCs and CMCs (Continued...)
Lecture 37 - Mechanics of Composites - Unidirectional Lamina
Lecture 38 - Mechanics: Fiber-reinforced composites - Transverse Loading
Lecture 39 - Mechanics: Fiber-reinforced composites - Problem Solving
Lecture 40 - Mechanics: Fiber-reinforced composites - Discontinuous fibers
Lecture 41 - Mechanics of Composites - Discontinuous fibers
Lecture 42 - Dependence of properties on pore structure
Lecture 43 - Mechanics of cellular solids
Lecture 44 - Mechanics of cellular solids (Continued...)
Lecture 45 - Deformation behavior of honeycomb and foams
Lecture 46 - Deformation behaviour of Foams
Lecture 47 - Deformation behaviour of Foams (Continued...)
Lecture 48 - Deformation behaviour of Foams (Continued...)
Lecture 49 - Thermal properties of foams
Lecture 50 - Other important properties of foams (Continued...)
Lecture 51 - Advanced composites - MMCs
Lecture 52 - Advanced composites - MMCs (Continued...)
Lecture 53 - Advanced composites - CMCs
Lecture 54 - Advanced composites - Advanced Processing Techniques
Lecture 55 - Advanced composites - Advanced Processing Techniques (Continued...)
Lecture 56 - Advanced composites - Advanced Processing Techniques (Continued...)
Lecture 57 - Advanced composites - Application oriented advanced composites
Lecture 58 - Microstructure and properties of natural cellular solid - wood
Lecture 59 - Advanced hybrid material - Functionally graded composite materials (FGMs)
Lecture 60 - Advanced hybrid material - Functionally graded composite materials (FGMs) (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Principles of Extractive Metallurgy

Subject Co-ordinator - Prof. Tarun Kumar Kundu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Classification and Uses of Metals
Lecture 2 - Introduction, Classification and Uses of Metals (Continued...)
Lecture 3 - Occurrence/Source of Metals
Lecture 4 - Metal Extraction Process Overview
Lecture 5 - Mineral Beneficiation: Overview and Mass Balances
Lecture 6 - Crushing and Grinding (Comminution)
Lecture 7 - Mineral Classification: Separation in Flowing Fluid
Lecture 8 - Mineral Concentration by Froth Flotation
Lecture 9 - Mineral Concentration by Froth Flotation
Lecture 10 - Magnetic and Electric Separation/Concentration
Lecture 11 - Sensor-based/Automatic Ore Sorting
Lecture 12 - Solid-Liquid Separation
Lecture 13 - Particle Size Estimation and Screening
Lecture 14 - Fuels in Metallurgical Processes and Coal Characteritics
Lecture 15 - Calorific Value and Caking Properties of Coal
Lecture 16 - Coke: Making and Properties
Lecture 17 - Combustion of Fuels
Lecture 18 - Combustion: Mass and Heat Balance
Lecture 19 - Combustion Heat Balance: Flame Temperature
Lecture 20 - Combustion Heat Utilization in Furnace
Lecture 21 - Heat Utilization in Furnace: Numerical Examples
Lecture 22 - Classification of Furnaces
Lecture 23 - Refractories for Furnace Linings
Lecture 24 - Refractories: Testing and Production
Lecture 25 - Agglomeration of Fines: Pelletization and Briquetting
Lecture 26 - Agglomeration of Fines: Sintering
Lecture 27 - Extraction of Metal from Sulfides: Roasting
Lecture 28 - Roasting Reactors and Heat Balance
Lecture 29 - Roasting: Predominance Area Diagram

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Lecture 30 - Roasting: Application of Predominance Area Diagram
Lecture 31 - Reduction Smelting and Matte Smelting
Lecture 32 - Metallurgical Slag
Lecture 33 - Slag Viscosity, Surface Tention and Theories
Lecture 34 - Slag: Masson and Molecular Theory, Numerical Examples
Lecture 35 - Copper Extraction: Matte Smelting
Lecture 36 - Copper Extraction: Flash Smelting
Lecture 37 - Cu Extraction: Cyclone Flash Smelting and Numerical Examples
Lecture 38 - Cu Extraction: Conversion
Lecture 39 - Conversion of Nickel Sulphide and Numerical Examples
Lecture 40 - TSL Smelting, Continuous Conversion and Direct Cu-Production
Lecture 41 - Reduction Smelting: Lead Extraction
Lecture 42 - Reduction Smelting: Zinc Extraction and ISP
Lecture 43 - Extraction of Thin, Tungsten, Molybdenum and Numerical Examples
Lecture 44 - Extraction of Nb, V, Ferroalloys and Titania (from llmenite)
Lecture 45 - Silicothermy: Pyrometallurgical Magnesium Extraction
Lecture 46 - Reduction Smelting: Iron Extraction in Blast Furnace
Lecture 47 - Alternative Routes of Iron Extraction
Lecture 48 - Halide Metallurgy: Extraction of Ti, Zr, Hf, U, Si Purification
Lecture 49 - Purification of Bulk Metals: Chemical Refining
Lecture 50 - Chemical Refining: Purification of Lead
Lecture 51 - Chemical Refining of Zinc, Tin, Nickel, Ti (Zr, Hf, Th)
Lecture 52 - Physical Refining: Vacuum De-gassing, Zone Melting and Distillation
Lecture 53 - Hydrometallurgy: Unit Steps, Leaching Reagents and Methods
Lecture 54 - Physiochemical Aspect of Leaching, Bacterial Leaching, S/L Separation
Lecture 55 - Hydrometallurgy: Solution Purification and Metal Ion Reduction
Lecture 56 - Hydrometallurgy: Cementation, Electrowinning, Au Extraction and Bayer Process
Lecture 57 - Electrometallurgy: Electrowinning, Electrorefining, Current and Energy Efficiency
Lecture 58 - Electrometallurgy: Extraction of Mg and Al
Lecture 59 - Environmental Concern and Sustainable Metal Extraction
Lecture 60 - New Development in Metal Extraction: Solvometallurgy, Bio-Metallurgy, Membrane Technology

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NPTEL Video Course - Metallurgy and Material Science - NOC:Clean Coal Technology

Subject Co-ordinator - Prof. Barun Kumar Nandi

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Coal Quality Parameters
Lecture 2 - Coal Quality Parameters (Continued...)
Lecture 3 - Coal Quality Parameters (Continued...)
Lecture 4 - Coal Quality Parameters (Continued...)
Lecture 5 - Coal Quality Parameters (Continued...)
Lecture 6 - Coal Cleaning
Lecture 7 - Coal Cleaning (Continued...)
Lecture 8 - Coal Cleaning (Continued...)
Lecture 9 - Coal Cleaning (Continued...)
Lecture 10 - Coal Cleaning (Continued...)
Lecture 11 - Coal Cleaning Methods
Lecture 12 - Coal Cleaning Methods (Continued...)
Lecture 13 - Coal Cleaning Methods (Continued...)
Lecture 14 - Coal Cleaning Methods (Continued...)
Lecture 15 - Coal Cleaning Methods (Continued...)
Lecture 16 - Coal Combustion Fundamentals
Lecture 17 - Coal Combustion Fundamentals (Continued...)
Lecture 18 - Coal Combustion Fundamentals (Continued...)
Lecture 19 - Coal Combustion Fundamentals (Continued...)
Lecture 20 - Coal Combustion Fundamentals (Continued...)
Lecture 21 - Effects of Coal Properties on Combustion
Lecture 22 - Effects of Coal Properties on Combustion (Continued...)
Lecture 23 - Effects of Coal Properties on Combustion (Continued...)
Lecture 24 - Effects of Coal Properties on Combustion (Continued...)
Lecture 25 - Effects of Coal Properties on Combustion (Continued...)
Lecture 26 - Industrial Coal Combustion Methods
Lecture 27 - Industrial Coal Combustion Methods (Continued...)
Lecture 28 - Industrial Coal Combustion Methods (Continued...)
Lecture 29 - Industrial Coal Combustion Methods (Continued...)

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Lecture 30 - Industrial Coal Combustion Methods (Continued...)
Lecture 31 - Emission Control from Combustion Utilities
Lecture 32 - Emission Control from Combustion Utilities (Continued...)
Lecture 33 - Emission Control from Combustion Utilities (Continued...)
Lecture 34 - Emission Control from Combustion Utilities (Continued...)
Lecture 35 - Emission Control from Combustion Utilities (Continued...)
Lecture 36 - SOx Control Strategies
Lecture 37 - NOx Emission Control
Lecture 38 - Oxy Fuel Combustion
Lecture 39 - Carbon Dioxide Capture and Storage
Lecture 40 - Carbon Dioxide Capture and Storage (Continued...)
Lecture 41 - Fundamentals of Coal Gasification
Lecture 42 - Chemical Reactions in Coal Gasification
Lecture 43 - Fundamentals of Coal Gasification (Continued...)
Lecture 44 - Fuel Properties and Gasification
Lecture 45 - Scope of Coal Gasification
Lecture 46 - Updraft and Down Draft Gasifier
Lecture 47 - Lurgi Gasifier
Lecture 48 - Fluidized Bed and other Gasifier
Lecture 49 - Syn Gas Cleaning
Lecture 50 - Coal Gasification Downstream Plants
Lecture 51 - Coal Based Power Generation
Lecture 52 - Coal Based Power Generation (Continued...)
Lecture 53 - Coal Based Power Generation (Continued...)
Lecture 54 - Coal Based Power Generation (Continued...)
Lecture 55 - Combined Cycle Power Generation and IGCC
Lecture 56 - Underground Coal Gasification
Lecture 57 - Coal Bed Methane
Lecture 58 - Coal Mine Methane
Lecture 59 - Clean Coal Technology : Case Studies
Lecture 60 - Clean Coal Technology : Case Studies (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - Advanced Metallurgical Thermodynamics

Subject Co-ordinator - Prof. B.S. Murty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic definitions
Lecture 2 - Free energy, Stability, equilibrium in a unary system
Lecture 3 - Effect of Pressure on equilibrium transformations
Lecture 4 - Free energy of solutions, free energy-composition diagrams
Lecture 5 - Solution models, chemical potential
Lecture 6 - Phase rule, free energy-composition diagrams and phase diagrams
Lecture 7 - Evolution of phase diagrams
Lecture 8 - Evolution of phase diagrams, miscibility gap
Lecture 9 - To concept, partition less solidification
Lecture 10 - To concept, partition less solidification (Continued...)
Lecture 11 - Eutectic solidification, glass formation
Lecture 12 - Kauzmann paradox, order of a transformation, glass forming ability
Lecture 13 - Eutectic solidification, coupled growth, heterogeneous nucleation
Lecture 14 - Peritectic solidification, metastable phase diagrams
Lecture 15 - Errors in drawing phase diagrams, Fe-C vs. Fe-Fe3C phase diagram
Lecture 16 - Free energy of undercooled liquid, shape of nucleus
Lecture 17 - Solid state phase transformations - Precipitation
Lecture 18 - Precipitation
Lecture 19 - Precipitation - quasicrystals
Lecture 20 - Precipitate coarsening, stability of a phase, spinodal decomposition
Lecture 21 - Spinodal decomposition
Lecture 22 - Eutectioid reaction
Lecture 23 - Eutectioid reaction (Continued...)
Lecture 24 - Bainitic transformation
Lecture 25 - Kinetics of eutectoid transformations
Lecture 26 - Martensitic Transformation
Lecture 27 - Martensitic transformation, order-disorder transformation
Lecture 28 - Miscibility gap in phase diagrams
Lecture 29 - Phase diagram calculations

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Lecture 30 - Thermodynamics of heterogeneous systems
Lecture 31 - Thermodynamics of heterogeneous systems (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - Materials Characterization

Subject Co-ordinator - Dr. S. Sankaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Properties of light, Image formation
Lecture 2 - Magnification and resolution
Lecture 3 - Depth of field,focus and field of view
Lecture 4 - Lens defects,filters and light microscopy introduction
Lecture 5 - Optical microscope demo., Bright field imaging, opaque specimen illumination
Lecture 6 - Opaque stop microscopy, Phase contrast microscopy
Lecture 7 - Dark field microscopy, Polarization microscopy
Lecture 8 - Differential interference contrast and fluorescence microscopy
Lecture 9 - Sample preparation techniques for optical microscopy
Lecture 10A - Tutorial problems (Continuation...)
Lecture 10 - Tutorial problems
Lecture 11 - Introduction to scanning electron Microscopy
Lecture 12 - Lens aberrations, Object resolution, Image quality
Lecture 13 - Interaction between electrons and sample, Imaging capabilities, Structural analysis, Elemental a
Lecture 14 - SEM and its mode of operation, Effect of aperture size,Working distance,condenser lens strength
Lecture 15 - SEM and its mode of operation- continuation, Relation between probe current and probe diameter,
Lecture 16 - Factors affecting Interaction volume, Demonstration of SEM
Lecture 17 - Image formation and interpretation
Lecture 18 - Image formation and interpretation continued, EDS, WDS
Lecture 19 - Special contrast mechanisms, Monte Carlo simulations of Interaction volume
Lecture 20 - Electron channeling contrast imaging (ECCI), Electron back scattered diffraction(EBSD)-Theory &
Lecture 21 - Tutorial Problems on SEM
Lecture 22 - Basics of X-ray emission from source, electron excitation and X-ray interaction with materials i
Lecture 23 - Properties of X-rays
Lecture 24 - Bragg's Law Derivation
Lecture 25 - Diffraction relationship with reciprocal space
Lecture 26 - X-ray scattering
Lecture 27 - Factors affecting intensities of X-ray peaks
Lecture 28 - Factors affecting intensities of X-ray peaks- continuation

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Lecture 29 - Effect of crystallite size and strain on intensity of X-rays
Lecture 30 - Profile fit, Factors affecting peak brodening
Lecture 31 - Indexing of diffraction pattern, Quantitative analysis
Lecture 32 - Indexing, Quantitative analysis-continuation, Residual stress measurements
Lecture 33 - XRD and Residual stress measurement- lab demonstration
Lecture 34 - Introduction to Transmission Electron Microscopy (TEM)
Lecture 35 - Fundementals of Transmission Electron Microscopy (TEM)
Lecture 36 - Basics of Diffraction-1
Lecture 37 - Basics of Diffraction-2
Lecture 38 - TEM imaging-1
Lecture 39 - TEM imaging-2
Lecture 40 - TEM instrument demonstration
Lecture 41 - TEM sample preparation-1
Lecture 42 - TEM sample preparation-2
Lecture 43 - XRD Tutorial - 1
Lecture 44 - XRD tutorial - 2
Lecture 45 - TEM Tutorial - 1
Lecture 46 - TEM Tutorial - 2
Lecture 47 - Quantitative metallography - Tutorial 1
Lecture 48 - Quantitative metallography - Tutorial 2
Lecture 49 - Quantitative metallography - Tutorial 3
Lecture 50 - Quantitative metallography - Tutorial 4
Lecture 51 - Quantitative metallography - Tutorial 5
Lecture 52 - Quantitative metallography - Tutorial 6
Lecture 53 - Quantitative metallography - Tutorial 7

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NPTEL Video Course - Metallurgy and Material Science - Physics of Materials

Subject Co-ordinator - Dr. Prathap Haridoss

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Properties of Materials
Lecture 3 - Thermal Expansion
Lecture 4 - Measuring Electrical Conductivity
Lecture 5 - Free Electron Gas
Lecture 6 - The Ideal Gas
Lecture 7 - Drude Model
Lecture 8 - Drude Model
Lecture 9 - Drude Model
Lecture 10 - Drude Model
Lecture 11 - Large Systems and Statistical Mechanics
Lecture 12 - Maxwell Boltzmann Statistics
Lecture 13 - Classical Particles and Quantum Particles
Lecture 14 - History of Quantum Mechanics - 1
Lecture 15 - History of Quantum Mechanics - 2
Lecture 16 - Introduction to Drude Sommerfeld model
Lecture 17 - Fermi-Dirac Statistics - Part 1
Lecture 18 - Fermi-Dirac Statistics - Part 2
Lecture 19 - Features of the Fermi Dirac Distribution Function
Lecture 20 - Maxwell-Boltzmann Distribution Vs Fermi-Dirac Distribution
Lecture 21 - Anisotropy and Periodic Potential in a Solid
Lecture 22 - Confinement and Quantization - Part 1
Lecture 23 - Confinement and Quantization - Part 2
Lecture 24 - Density of States
Lecture 25 - Fermi Energy, Fermi Surface, Fermi Temperature
Lecture 26 - Electronic Contribution to Specific Heat at Constant Volume
Lecture 27 - Reciprocal Space-1
Lecture 28 - Reciprocal Space-2
Lecture 29 - Reciprocal Space-3

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Lecture 30 - Wigner Seitz Cell and Introduction to Brillouin Zones
Lecture 31 - Brillouin Zones, Diffraction, and Allowed Energy Levels
Lecture 32 - E Vs k, Brillouin Zones and the Origin of Bands
Lecture 33 - Calculating Allowed Energy Bands and Forbidden Band Gaps
Lecture 34 - Bands; Free Electron Approximation, Tight Binding Approximation
Lecture 35 - Semiconductors
Lecture 36 - Magnetic Properties
Lecture 37 - Electron Compounds; Phonons, Optoelectronic Materials
Lecture 38 - Superconductivity
Lecture 39 - Bose-Einstein Statistics
Lecture 40 - Physics of Nano Scale Materials; Course Summary

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NPTEL Video Course - Metallurgy and Material Science - Electronic materials, devices, and fabrication

Subject Co-ordinator - Prof. Parasuraman S

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Metals, semiconductors and insulators
Lecture 2 - Introduction to semiconductors
Lecture 3 - Density of states and Fermi-Dirac statistics
Lecture 4 - Assignment 1 - Bonding, DOS, and Fermi statistics
Lecture 5 - Intrinsic semiconductors
Lecture 6 - Intrinsic semiconductors - conductivity
Lecture 7 - Assignment 2 - Intrinsic semiconductors
Lecture 8 - Extrinsic semiconductors
Lecture 9 - Extrinsic semiconductors - Fermi level
Lecture 10 - Extrinsic semiconductors - conductivity
Lecture 11 - Assignment 3 - Extrinsic semiconductors
Lecture 12 - Metal-semiconductor junctions
Lecture 13 - Assigment 4 - Metal-semiconductor junctions
Lecture 14 - pn junctions in equilibrium
Lecture 15 - pn junctions under bias
Lecture 16 - pn junction breakdown and heterojunctions
Lecture 17 - Assignment 5 - pn junctions
Lecture 18 - Transistors
Lecture 19 - MOSFETs
Lecture 20 - Assignment 6 - transistors
Lecture 21 - Optoelectronic devices
Lecture 22 - Optoelectronic devices
Lecture 23 - Optoelectronic devices
Lecture 24 - Optoelectronic devices
Lecture 25 - Optoelectronic devices
Lecture 26 - Assignment 7 - optical properties
Lecture 27 - Assignment 8 - optoelectronic devices
Lecture 28 - Semiconductor manufacturing
Lecture 29 - Si wafer manufacturing

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Lecture 30 - IC device manufacturing
Lecture 31 - Layering
Lecture 32 - Doping
Lecture 33 - Lithography
Lecture 34 - Etching and deposition (growth)
Lecture 35 - Metallization and polishing
Lecture 36 - Process and device evaluation
Lecture 37 - Productivity and process yield
Lecture 38 - Clean room design and contamination control
Lecture 39 - Devices and IC formation
Lecture 40 - IC circuit logic and packaging

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of optical and scanning electron micr

Subject Co-ordinator - Dr. S. Sankaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Properties of light, Image formation
Lecture 2 - Magnification and resolution
Lecture 3 - Depth of field, focus and field of view
Lecture 4 - Lens defects, filters and light microscopy introduction
Lecture 5 - Optical microscope demo., Bright field imaging, opaque specimen illumination
Lecture 6 - Opaque stop microscopy, Phase contrast microscopy
Lecture 7 - Dark field microscopy, Polarization microscopy
Lecture 8 - Differential interference contrast and fluorescence microscopy
Lecture 9 - Sample preparation techniques for optical microscopy
Lecture 10 - Tutorial problems
Lecture 11 - Tutorial problems (Continued...)
Lecture 12 - Introduction to scanning electron Microscopy
Lecture 13 - Lens aberrations, Object resolution, Image quality
Lecture 14 - Interaction between electrons and sample, Imaging capabilities, Structural analysis, Elemental a
Lecture 15 - SEM and its mode of operation, Effect of aperture size,Working distance,condenser lens strength
Lecture 16 - SEM and its mode of operation- continuation, Relation between probe current and probe diameter,
Lecture 17 - Factors affecting Interaction volume, Demonstration of SEM
Lecture 18 - Image formation and interpretation
Lecture 19 - Image formation and interpretation continued, EDS, WDS
Lecture 20 - Special contrast mechanisms, Monte Carlo simulations of Interaction volume
Lecture 21 - Electron channeling contrast imaging (ECCI), Electron back scattered diffraction (EBSD)-Theory &
Lecture 22 - Tutorial Problems on SEM

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of electronic materials and devices

Subject Co-ordinator - Prof. Parasuraman S

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Electronic Materials
Lecture 2 - Semiconductors - Introduction
Lecture 3 - Electron statistics in a solid
Lecture 4 - Worked numericals on week 1 lessons
Lecture 5 - Intrinsic semiconductors
Lecture 6 - Intrinsic semiconductors - conductivity
Lecture 7 - Optional - worked assignment on intrinsic semiconductors
Lecture 8 - Extrinsic semiconductors - Introduction
Lecture 9 - Extrinsic semiconductors - Fermi level
Lecture 10 - Extrinsic semiconductors - Mobility
Lecture 11 - Worked assignment on extrinsic semiconductors
Lecture 12 - Metal-semiconductor junctions
Lecture 13 - pn junctions in equilibrium
Lecture 14 - Optional - worked assignment on metal-semiconductor junctions
Lecture 15 - pn junctions under bias
Lecture 16 - Junction breakdown and heterojunctions
Lecture 17 - Worked assignment on pn junctions
Lecture 18 - Transistors - overview
Lecture 19 - MOSFETs
Lecture 20 - Worked assignment on transistors
Lecture 21 - Optoelectronic devices - Introduction
Lecture 22 - Light emitting diodes
Lecture 23 - Solid state semiconductor lasers
Lecture 24 - Optional - worked assignment on optical properties
Lecture 25 - Photodetectors
Lecture 26 - Solar cells
Lecture 27 - Worked assignment on optoelectronic devices

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NPTEL Video Course - Metallurgy and Material Science - NOC:Introduction to Reciprocal Space and its use in Sc

Subject Co-ordinator - Dr. Prathap Haridoss

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Reciprocal space; Definition and Properties
Lecture 2 - Condition for Diffraction
Lecture 3 - Worked out examples
Lecture 4 - Ewald Sphere and lattices in reciprocal space
Lecture 5 - Wigner Sietz cells and Brillouin Zones
Lecture 6 - Worked out exmaples
Lecture 7 - Brillouin Zones, Diffraction and allowed energy levels
Lecture 8 - E Vs K, Brillouin zones and the Origin of Bands
Lecture 9 - Week 3 Worked out examples
Lecture 10 - Reciprocal space as Fourier transform of real lattice
Lecture 11 - Alternate notation of reciprocal space

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NPTEL Video Course - Metallurgy and Material Science - NOC:Analysis and Modeling of Welding

Subject Co-ordinator - Dr. G. Phanikumar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to fusion welding processes
Lecture 2 - Introduction to fusion welding processes
Lecture 3 - Heat sources - Part 1/2
Lecture 4 - Heat sources - Part 2/2
Lecture 5 - Heat removal
Lecture 6 - Thermal Modelling - Part 1/2
Lecture 7 - Thermal Modelling - Part 2/2
Lecture 8 - Zones in a weldment
Lecture 9 - Analytical Solutions to Weld Thermal Field
Lecture 10 - Conduction to Keyhole mode
Lecture 11 - Fluid flow modelling - Part 1/2
Lecture 12 - Fluid flow modelling - Part 2/2
Lecture 13 - Solute transfer modelling - Part 1/2
Lecture 14 - Solute transfer modelling - Part 2/2
Lecture 15 - Solute segregation profile - Part 1/2
Lecture 16 - Solute segregation profile - Part 2/2
Lecture 17 - Microstructure Formation in Fusion Welds
Lecture 18 - Numerical Solutions to Thermal Field and Fluid Flow in Welding - Part 1
Lecture 19 - Numerical Solutions to Thermal Field and Fluid Flow in Welding - Part 2
Lecture 20 - Dissimilar Welding

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NPTEL Video Course - Metallurgy and Material Science - NOC:Fundamentals of X-ray Diffraction and Transmissior

Subject Co-ordinator - Dr. S. Sankaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of X-ray emission from source, electron excitation and X-ray interaction with materials ir
Lecture 2 - Properties of X-rays
Lecture 3 - Bragg's law derivation
Lecture 4 - Diffraction relationship with reciprocal space
Lecture 5 - X-ray scattering
Lecture 6 - Factors affecting intensities of X-ray peaks
Lecture 7 - Factors affecting intensities of X-ray peaks (Continued...)
Lecture 8 - Effect of crystallite size and strain on intensity of X-rays
Lecture 9 - Profile fit, Factors affecting peak brodening
Lecture 10 - Indexing of diffraction pattern, Quantitative analysis
Lecture 11 - Indexing and Quantitative analysis-continuation, Residual stress measurements
Lecture 12 - XRD and Residual stress measurement - lab demonstration
Lecture 13 - XRD Tutorial - 1
Lecture 14 - XRD tutorial - 2
Lecture 15 - Introduction to Transmission Electron Microscopy (TEM)
Lecture 16 - Fundamentals of Transmission Electron Microscopy (TEM)
Lecture 17 - Fundamentals of X-ray diffraction and Transmission electron microscopy
Lecture 18 - Basics of Diffraction - 2
Lecture 19 - TEM Imaging - 1
Lecture 20 - TEM Imaging - 2
Lecture 21 - TEM instrument demonstration
Lecture 22 - TEM sample preparation - 1
Lecture 23 - TEM sample preparation - 2
Lecture 24 - TEM Tutorial - 1
Lecture 25 - TEM Tutorial - 2
Lecture 26 - TEM Tutorial - 3
Lecture 27 - TEM Tutorial - 4

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NPTEL Video Course - Metallurgy and Material Science - NOC:Theory and Practice of Non Destructive Testing

Subject Co-ordinator - Dr. Ranjit Bauri

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Visual optical method
Lecture 2 - Dye Penetrant Testing - 1
Lecture 3 - Dye Penetrant Testing - 2
Lecture 4 - Dye Penetrant Testing - 3
Lecture 5 - Dye Penetrant Testing - 4
Lecture 6 - Magnetic particle testing - 1
Lecture 7 - Magnetic particle testing - 2
Lecture 8 - Magnetic particle testing - 3
Lecture 9 - Magnetic particle testing - 4
Lecture 10 - Magnetic particle testing - 5
Lecture 11 - Eddy current testing - 1
Lecture 12 - Eddy current testing - 2
Lecture 13 - Eddy current testing - 3
Lecture 14 - Eddy current testing - 4
Lecture 15 - Eddy current testing - 5
Lecture 16 - Ultrasonic testing - 1
Lecture 17 - Ultrasonic testing - 2
Lecture 18 - Ultrasonic testing - 3
Lecture 19 - Ultrasonic testing - 4
Lecture 20 - Ultrasonic testing - 5
Lecture 21 - Ultrasonic testing - 6
Lecture 22 - Ultrasonic testing - 7
Lecture 23 - Ultrasonic testing - 8
Lecture 24 - Ultrasonic testing - 9
Lecture 25 - Ultrasonic testing - 10
Lecture 26 - Acoustic Emission Testing - 1
Lecture 27 - Acoustic Emission Testing - 2
Lecture 28 - Acoustic Emission Testing - 3
Lecture 29 - Acoustic Emission Testing - 4

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Lecture 30 - Acoustic Emission Testing - 5
Lecture 31 - Radiography - 1
Lecture 32 - Radiography - 2
Lecture 33 - Radiography - 3
Lecture 34 - Radiography - 4
Lecture 35 - Radiography - 5
Lecture 36 - Radiography - 6
Lecture 37 - Radiography - 7
Lecture 38 - Radiography - 8
Lecture 39 - Radiography - 9
Lecture 40 - Radiography - 10

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NPTEL Video Course - Metallurgy and Material Science - NOC:Defects in Materials

Subject Co-ordinator - Prof. Sundararaman M

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to defects in materials
Lecture 2 - 1-D Lattice
Lecture 3 - 2-D Lattice
Lecture 4 - 3-D Lattice - a
Lecture 5 - 3-D Lattice - b
Lecture 6 - 3-D Lattice - c
Lecture 7 - 3-D Crystals
Lecture 8 - Types of Point Defects
Lecture 9 - Vacancy Concentration Determination - 1
Lecture 10 - Vacancy Concentration Determination - 2
Lecture 11 - Point Defect Interstitial
Lecture 12 - Transforamtion of co-ordinates
Lecture 13 - Tensor - 1
Lecture 14 - Tensor - 2
Lecture 15 - Strain
Lecture 16 - Stress
Lecture 17 - Description of Dislocation - 1
Lecture 18 - Description of Dislocation - 2
Lecture 19 - Stress field around Dislocation
Lecture 20 - Self Energy of Dislocation
Lecture 21 - Force on Dislocation
Lecture 22 - Forces Between Dislocation
Lecture 23 - Chemical Force on Dislocation
Lecture 24 - Perfect Dislocation in FCC Structures
Lecture 25 - Instrinsic Stacking Faults in FCC
Lecture 26 - Extrinsic Faults and Thompson Tetrahedron in FCC
Lecture 27 - Dislocations in BCC and HCP
Lecture 28 - Dislocations in Ordered Alloys and Dislocation Dislocation Interaction
Lecture 29 - Twinning - 1

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Lecture 30 - Twinning - 2
Lecture 31 - Martensitic Transformation - 1
Lecture 32 - Martensitic Transformation - 2
Lecture 33 - Interfaces - 1
Lecture 34 - Interfaces - 2
Lecture 35 - Defect Interaction and Strength

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NPTEL Video Course - Metallurgy and Material Science - NOC:Elementary Stereology for Quantitative Metallograp

Subject Co-ordinator - Dr. S. Sankaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Method of Stereology
Lecture 2 - Volume Fraction and Particle Size - Part 1
Lecture 3 - Volume Fraction and Particle Size - Part 2
Lecture 4 - Geometric Probability - Part 1
Lecture 5 - Geometric Probability - Part 2
Lecture 6 - Probability Distributions
Lecture 7 - Volume Fraction and Particle Size - Part 3
Lecture 8 - Volume Fraction and Particle Size - Part 4
Lecture 9 - Geometrical Probability - I
Lecture 10 - Geometrical Probability - II
Lecture 11 - Basic Stereological Parameters - Part 1
Lecture 12 - Basic Stereological Parameters - Part 2
Lecture 13 - Counting of grains and particles - Part 1
Lecture 14 - Description of Polycrystalline Microstructures derived measures
Lecture 15 - Counting of grains and particles - Part 2
Lecture 16 - Counting of Grains and Particles - Part 3
Lecture 17 - Counting of Grains and Particles - Part 4
Lecture 18 - Other Applications of the Disector
Lecture 19 - Stereology of Anisotropic Microstructures

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NPTEL Video Course - Metallurgy and Material Science - NOC:Welding of Advanced High Strength Steels for Autom

Subject Co-ordinator - Prof. Murugaiyan Amirthalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course, Introduction to physical metallurgy of steels
Lecture 2 - Martensitic transformation, Introduction to modern automotive steels
Lecture 3 - Introduction to modern automotive steels
Lecture 4 - Introduction to advanced high strength steels
Lecture 5 - Introduction to Dual Phase Steel and TRIP Steel Heat Treatments
Lecture 6 - Thermal and Mechanical Processing of TRIP and Hot Forming Steels
Lecture 7 - Introduction to Welding Processes in Automotive Industries
Lecture 8 - Principles of Resistance Spot Welding (RSW)
Lecture 9 - Process Characteristics of Resistance Spot Welding - Part I
Lecture 10 - Process Characteristics of Resistance Spot Welding - Part II
Lecture 11 - Introduction to Laser Beam Welding - Part I
Lecture 12 - Introduction to Laser Beam Welding - Part II
Lecture 13 - Principles of Gas Metal Arc Welding - Part I
Lecture 14 - Principles of Gas Metal Arc Welding - Part II
Lecture 15 - Welding Metallurgy of Advanced High Strength Steels - Part I
Lecture 16 - Microstructural Evolution During Welding of Advanced High Strength Steels
Lecture 17 - Elemental Behaviour During Welding of Advanced High Strength Steels
Lecture 18 - Quantification of Microstructural Constituents in Automotive Steel Welds - Part I
Lecture 19 - Quantification of Microstructural Constituents in Automotive Steel Welds - Part II and Mechanica
Lecture 20 - Methodologies to Improve the Weldability of Advanced High Strength Steels

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NPTEL Video Course - Metallurgy and Material Science - NOC:Welding Processes

Subject Co-ordinator - Prof. Murugaiyan Amirthalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Classification of welding processes and definition of welding arc
Lecture 3 - Physics of welding arc - Part 1
Lecture 4 - Physics of welding arc - Part 2
Lecture 5 - Physics of welding arc - Part 3
Lecture 6 - Physics of welding arc - Part 4
Lecture 7 - Fundamentals of ionisation in welding arc
Lecture 8 - Electrical conductivity of welding arc
Lecture 9 - Electrical resistivity of welding arc
Lecture 10 - Heat transfer inside the arc
Lecture 11 - Arc ignition mechanisms Part - I
Lecture 12 - Arc ignition mechanisms Part - II
Lecture 13 - Principles of Gas Tungsten Arc Welding
Lecture 14 - Shielding gases for arc welding
Lecture 15 - Selection of shielding gases for engineering alloys
Lecture 16 - Arc welding power sources - Part 1
Lecture 17 - Arc welding power sources - Part 2
Lecture 18 - Arc welding power sources - Part 3
Lecture 19 - Variations in GTAW process
Lecture 20 - Square wave, variable polarity, GTAW with filler, hot wire GTAW
Lecture 21 - Dual gas GTAW and Plasma Welding processes
Lecture 22 - Multi cathode GTAW and Activated GTAW
Lecture 23 - Buried GTAW and Rate controlling parameters of GTAW
Lecture 24 - Introduction to consumable welding processes
Lecture 25 - Melting rate of consumable wires
Lecture 26 - Physics of droplet transfer in consumable welding
Lecture 27 - Modes of droplet transfer - Part 1
Lecture 28 - Modes of droplet transfer - Part 2
Lecture 29 - Modes of droplet transfer - Part 3

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Lecture 30 - Shielded Metal Arc Welding
Lecture 31 - Flux cored arc welding - Introduction
Lecture 32 - Electrode fluxes and process characteristics of flux cored arc welding
Lecture 33 - Flux cored arc welding - Process characteristics
Lecture 34 - Advances in gas metal arc welding - Pulsed GMAW
Lecture 35 - Advances in gas metal arc welding - Controlled dip short circuiting processes
Lecture 36 - Submerged arc welding
Lecture 37 - Resistance welding - Fundamentals
Lecture 38 - Resistance spot welding - Part 1
Lecture 39 - Resistance spot welding - Part 2
Lecture 40 - Resistance spot welding - Part 3
Lecture 41 - Resistance spot welding - Part 4
Lecture 42 - Variants in resistance welding - Part 1
Lecture 43 - Variants in resistance welding - Part 2
Lecture 44 - Laser welding process - Introduction - Part 1
Lecture 45 - Laser welding process - Part 2
Lecture 46 - Laser welding process - Part 3
Lecture 47 - Laser welding process - Part 4
Lecture 48 - Electron beam welding process
Lecture 49 - Other welding processes - Electroslag welding
Lecture 50 - Magnetically Impelled Arc Butt (MIAB) welding
Lecture 51 - Aluminothermic (thermit) welding
Lecture 52 - Introduction to solid state welding processes - Friction welding
Lecture 53 - Friction stir welding - Part 1
Lecture 54 - Friction stir welding - Part 2
Lecture 55 - Other solid state welding processes
Lecture 56 - Joining processes for Plastics - Part 1
Lecture 57 - Joining processes for Plastics - Part 2
Lecture 58 - Adhesive bonding of plastics
Lecture 59 - Welding nomenclatures

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NPTEL Video Course - Metallurgy and Material Science - NOC:Creep Deformation of Materials

Subject Co-ordinator - Prof. Srikant Gollapudi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Importance of studying creep
Lecture 2 - Basics of plastic deformation and characteristics of dislocations - Part 1
Lecture 3 - Basics of plastic deformation and characteristics of dislocations - Part 2
Lecture 4 - Basics of plastic deformation and characteristics of dislocations - Part 3
Lecture 5 - Creep and different factors that influence creep deformation - Part 1
Lecture 6 - Creep and different factors that influence creep deformation - Part 2
Lecture 7 - Creep and different factors that influence creep deformation - Part 3
Lecture 8 - Creep and different factors that influence creep deformation - Part 4
Lecture 9 - Creep and different factors that influence creep deformation - Part 5
Lecture 10 - Creep and different factors that influence creep deformation - Part 6
Lecture 11 - Mechanisms of Creep - Part 1
Lecture 12 - Mechanisms of Creep - Part 2
Lecture 13 - Mechanisms of Creep - Part 3
Lecture 14 - Mechanisms of Creep - Part 4
Lecture 15 - Mechanisms of Creep - Part 5
Lecture 16 - Transitions in Creep Mechanisms and Creep Constitutive Equation
Lecture 17 - Deformation Mechanism Maps - Part 1
Lecture 18 - Deformation Mechanism Maps - Part 2
Lecture 19 - Modeling the Useful Creep Life of Materials/Components - Part 1
Lecture 20 - Modeling the Useful Creep Life of Materials/Components - Part 2
Lecture 21 - Modeling the Useful Creep Life of Materials/Components - Part 3
Lecture 22 - Creep Testing Methods - Part 1
Lecture 23 - Creep Testing Methods - Part 2
Lecture 24 - Improving Creep Resistance of Materials

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NPTEL Video Course - Metallurgy and Material Science - NOC:Nanotechnology, Science and Applications

Subject Co-ordinator - Dr. Prathap Haridoss

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Nanotechnology Science and Applications - Introduction
Lecture 2 - Nanotechnology
Lecture 3 - Discussion on Feynmanâ s talk on Nanotechnology - Part I
Lecture 4 - Discussion on Feynmanâ s talk on Nanotechnology - Part II
Lecture 5 - Impact of the nanoscale on thermodynamic considerations
Lecture 6 - Phase Diagrams and Stable Phases
Lecture 7 - Calorimetry
Lecture 8 - Zirconia - ZrO2
Lecture 9 - Experimentally Investigating the Hall-Petch relationship
Lecture 10 - Impact of the Nanoscale on the Hall-Petch Relationship
Lecture 11 - Impact of the nanoscale on Mechanical properties
Lecture 12 - Superplasticity and the Nanoscale
Lecture 13 - Superplasticity and the Nanoscale
Lecture 14 - Severe Plastic Deformation and the nanoscale
Lecture 15 - An approach to prepare bulk nanostructures
Lecture 16 - Nanosized Ferroelectrics
Lecture 17 - Impact of the nanoscale on optical properties
Lecture 18 - Experimental approach to study impact of the nanoscale on optical properties
Lecture 19 - Impact of the nanoscale on optical properties
Lecture 20 - Nanocomposites
Lecture 21 - Effect of Nanoscale on Magnetic Properties
Lecture 22 - Effect of Nanostructure on Damping Properties
Lecture 23 - Carbon
Lecture 24 - Carbon Nanotubes
Lecture 25 - Graphene, a 2D nanomaterials

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NPTEL Video Course - Metallurgy and Material Science - NOC:Powder Metallurgy

Subject Co-ordinator - Dr. Ranjit Bauri

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Powder Metallurgy
Lecture 2 - Powder Fabrication Methods
Lecture 3 - Powder Fabrication Methods
Lecture 4 - Powder Fabrication Methods
Lecture 5 - Powder Fabrication Methods
Lecture 6 - Gas atomization
Lecture 7 - Water Atomization
Lecture 8 - Centrifugal Atomization
Lecture 9 - Comparison of Atomization techniques
Lecture 10 - Nucleation and Growth
Lecture 11 - Thermodynamics and Kinetic of Solidification
Lecture 12 - Microstructure Control
Lecture 13 - Microstructure control
Lecture 14 - Dendritic growth in pure metals
Lecture 15 - Dendritic growth in alloys
Lecture 16 - Crystalline and Amorphous structures
Lecture 17 - Crystalline vs Amorphous
Lecture 18 - T-T-T diagram
Lecture 19 - Effect of particle size on microstructure
Lecture 20 - Powder Characterization
Lecture 21 - Basis for particle size measurement
Lecture 22 - Measurement of particle size and size distribution
Lecture 23 - Particle size distribution
Lecture 24 - Dynamic Light Scattering - 1
Lecture 25 - Dynamic Light Scattering - 2
Lecture 26 - Particle size measurement - Other methods
Lecture 27 - Surface Area Analysis - 1
Lecture 28 - Surface Area Analysis - 2
Lecture 29 - BET Surface Area Analysis

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Lecture 30 - Interparticle friction
Lecture 31 - Powder packing
Lecture 32 - Powder mixing and blending
Lecture 33 - Powder Lubrication and Coating
Lecture 34 - Powder compaction - 1
Lecture 35 - Powder compaction - 2
Lecture 36 - Powder compaction - 3
Lecture 37 - Cold Isostatic Pressing and; Powder Injection Molding
Lecture 38 - Powder Injection Molding - 2
Lecture 39 - Slurry Techniques
Lecture 40 - Tape casting
Lecture 41 - Sintering - 1
Lecture 42 - Sintering - 2
Lecture 43 - Sintering - 3
Lecture 44 - Sintering - 4
Lecture 45 - Sintering - 5
Lecture 46 - Sintering - 6
Lecture 47 - Sintering - 7
Lecture 48 - Sintering - 8
Lecture 49 - Sintering - 9
Lecture 50 - Sintering - 10
Lecture 51 - Liquid Phase Sintering - 1
Lecture 52 - Liquid Phase Sintering - 2
Lecture 53 - Liquid Phase Sintering - 3
Lecture 54 - Liquid Phase Sintering - 4
Lecture 55 - Liquid Phase Sintering - 5
Lecture 56 - Full Density Processing - 1
Lecture 57 - Full Density Processing - 2
Lecture 58 - Full Density Processing - 3
Lecture 59 - Full Density Processing - 4
Lecture 60 - Spark Plasma Sintering (SPS)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Carbon Materials and Manufacturing

Subject Co-ordinator - Prof. Swati Sharma

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Materials and Manufacturing
Lecture 2 - Mathematical Representation of Material Properties
Lecture 3 - Story of Carbon: Carbon on Earth and in Outer Space
Lecture 4 - Story of Carbon: Carbon in Technology
Lecture 5 - Isotopes of carbon
Lecture 6 - Hybridization in Carbon Atoms
Lecture 7 - sp3, sp2 and sp Hybridization: Diamond, Graphite and Carbyne
Lecture 8 - sp(2+n) Hybridization: Curved Carbon
Lecture 9 - Allotropes of Carbon and Their Classification
Lecture 10 - Carbon Allotrpoe Conversion
Lecture 11 - Phase Diagram of Carbon
Lecture 12 - Introduction to Engineering Carbons
Lecture 13 - Graphite Crystal Structure
Lecture 14 - Rhombohedral Graphite and Stacking Faults
Lecture 15 - Graphite Ore Processing
Lecture 16 - Synthetic Graphite Production from Needle Coke
Lecture 17 - Kish Graphite and PVC-Derived Graphite
Lecture 18 - Highly Oriented Pyrolytic Graphite
Lecture 19 - Pyrolysis of Gaseous Hydrocarbons
Lecture 20 - Polymer-derived Carbon: Coking and Charring Mechanism
Lecture 21 - Kinetics of Graphitization
Lecture 22 - Microstructure of Non-Graphitizing Carbon
Lecture 23 - Glass-Like Carbon: Introduction and Properties
Lecture 24 - Glass-Like Carbon: Industrial Manufacturing
Lecture 25 - Microfabrication with Glass-Like Carbon
Lecture 26 - Carbon Materials and Manufacturing
Lecture 27 - X-Ray and Nano-Imprint Lithography
Lecture 28 - Activated Carbon: Introduction and Properties
Lecture 29 - Activated Carbon: Industrial Manufacturing

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Lecture 30 - Carbon Black: Introduction and Properties
Lecture 31 - Carbon Black: Industrial Manufacturing
Lecture 32 - Carbon Fiber: Introduction and Properties
Lecture 33 - Melt Spinning of Petroleum Pitches
Lecture 34 - Electrospinning and Viscoelasticity
Lecture 35 - Carbonization of Polyacrylonitrile (PAN) Fibers
Lecture 36 - Mechanical Property Testing Methods for Carbon Fibers
Lecture 37 - Defects in Carbon Fibers
Lecture 38 - Introduction to Carbon Fiber Reinforced Plastic (CFRP)
Lecture 39 - Machining of Carbon Fiber Reinforced Plastic
Lecture 40 - Carbon/Carbon Composite
Lecture 41 - Carbon/Metal and Carbon/Concrete Composites: Manufacture and Properties
Lecture 42 - Graphene: Introduction and Crystal Structure
Lecture 43 - Graphene: History and Nomenclature
Lecture 44 - Chemical Vapor Deposition of Graphene - I
Lecture 45 - Chemical Vapor Deposition of Graphene - II
Lecture 46 - Defects in Graphene and the (n,m) Notations
Lecture 47 - Carbon Nanotube: Introduction and Properties
Lecture 48 - Vapor Phase Growth of Carbon Nanotube
Lecture 49 - Vapor Deposited Diamond
Lecture 50 - Diamond Like Carbon
Lecture 51 - X-Ray Diffraction Analysis of Carbon Materials
Lecture 52 - Raman Spectroscopy of Carbon Materials
Lecture 53 - Transmission Electron Microscopy of Carbon Materials
Lecture 54 - Surface Area Analysis of Carbon Materials
Lecture 55 - Numerical Problems: Carbon Manufacturing and Characterization
Lecture 56 - Large Scale Industrial Applications of Carbon Materials
Lecture 57 - Micro and Nano Scale Applications of Carbon Materials: Rigid and flexible carbon devices
Lecture 58 - Supply Chain of Industrial Carbons
Lecture 59 - Summary of NPTEL Course on Carbon Materials and Manufacturing

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NPTEL Video Course - Metallurgy and Material Science - NOC:Mechanical Behavior of Materials

Subject Co-ordinator - Prof. S. Sankaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Chemical Bonding in Materials
Lecture 3 - Strength of materials - A Short Overview - Part I
Lecture 4 - Strength of materials - A Short Overview - Part II
Lecture 5 - Strength of materials - A Short Overview - Part III
Lecture 6 - Strength of materials - A Short Overview - Part IV
Lecture 7 - Strength of materials - A Short Overview - Part V
Lecture 8 - Elastic Stress- Strain Relations - Part I
Lecture 9 - Elastic Stress- Strain Relations - Part II
Lecture 10 - Elastic properties - Part I
Lecture 11 - Elastic properties - Part II
Lecture 12 - Anelasticity
Lecture 13 - Introduction to Dislocations - I
Lecture 14 - Introduction to Dislocations - II
Lecture 15 - Introduction to Dislocations - III
Lecture 16 - Introduction to Dislocations - IV
Lecture 17 - Introduction to Dislocations - V
Lecture 18 - Introduction to Dislocations - VI
Lecture 19 - Introduction to Dislocations - VII
Lecture 20 - Introduction to Dislocations - VIII
Lecture 21 - Introduction to Dislocations - IX
Lecture 22 - Introduction to Plastic deformation - I
Lecture 23 - Introduction to Plastic deformation - II
Lecture 24 - Introduction to Plastic Deformation - III
Lecture 25 - Introduction to Plastic Deformation - IV
Lecture 26 - Introduction to Plastic Deformation - V
Lecture 27 - Introduction to Plastic Deformation - VI
Lecture 28 - Strengthening Mechanisms in Crystalline Materials - I
Lecture 29 - Strengthening Mechanisms in Crystalline Materials - II

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Lecture 30 - Strengthening Mechanisms in Crystalline Materials - III
Lecture 31 - Strengthening Mechanisms in Crystalline Materials - IV
Lecture 32 - Strengthening Mechanisms in Crystalline Materials - V
Lecture 33 - Mechanical Testing - I
Lecture 34 - Mechanical Testing - II
Lecture 35 - Mechanical Testing - III
Lecture 36 - Mechanical Testing - IV
Lecture 37 - Mechanical Testing - V
Lecture 38 - Mechanical Testing - VI
Lecture 39 - Mechanical Testing - VII
Lecture 40 - Mechanical Testing - VIII
Lecture 41 - Mechanical Testing - IX
Lecture 42 - Mechanical Testing - X
Lecture 43 - Creep - I
Lecture 44 - Creep - II
Lecture 45 - Creep - III
Lecture 46 - Creep - IV
Lecture 47 - Creep - V
Lecture 48 - Creep - VI
Lecture 49 - Fracture Mechanics - I
Lecture 50 - Fracture Mechanics - II
Lecture 51 - Fracture Mechanics - III
Lecture 52 - Fracture Mechanics - IV
Lecture 53 - Fracture Mechanics - V
Lecture 54 - Fracture Mechanics - VI
Lecture 55 - Fracture Mechanics - VII
Lecture 56 - Fracture Mechanics - VIII
Lecture 57 - Fracture Mechanics - IX
Lecture 58 - Fracture Mechanics - X
Lecture 59 - Fracture Mechanics - XI
Lecture 60 - Fatigue - I
Lecture 61 - Fatigue - II
Lecture 62 - Fatigue - III
Lecture 63 - Fatigue - IV
Lecture 64 - Fatigue - V

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NPTEL Video Course - Metallurgy and Material Science - NOC:Aluminium based Alloys and Metal Matrix Composites

Subject Co-ordinator - Prof. Ranjit Bauri

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Pure Aluminium
Lecture 2 - Extraction of Aluminium
Lecture 3 - Alloy Designations
Lecture 4 - Cast Aluminium Alloys
Lecture 5 - Hypo and Hyper eutectic alloys
Lecture 6 - Modifying Al-Si alloys and Decoding Alloy Designation
Lecture 7 - Solid Solution Hardening - 1
Lecture 8 - Solid Solution Hardening - 2
Lecture 9 - Yield point phenomena and Strain aging
Lecture 10 - Cottrel-Bilby theory of strain aging
Lecture 11 - Portevinâ Le Chatelier (PLC) effect
Lecture 12 - Dynamic Strain Aging (DSA)
Lecture 13 - Features of Serrrated Flow - 1
Lecture 14 - Features of Serrrated Flow - 2
Lecture 15 - Precipitation hardening - 1
Lecture 16 - Precipitation hardening - 2
Lecture 17 - Precipitation hardening - 3
Lecture 18 - Precipitation hardening - 4
Lecture 19 - Precipitation hardening - 5
Lecture 20 - Precipitation hardening - 6
Lecture 21 - 7XXX and 8XXX Series Alloys
Lecture 22 - Strain Hardening - 1
Lecture 23 - Strain Hardening - 2
Lecture 24 - Recovery and Recrystallization
Lecture 25 - Recrystallization Mechanism
Lecture 26 - Recrystallization: Nucleation and Growth
Lecture 27 - Dynamic Recrystallization
Lecture 28 - Discontinuous and Continuous Dynamic Recrystallization
Lecture 29 - Continuous Dynamic Recrystallization

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Lecture 30 - Geometric Dynamic Recrystallization (GDRX)
Lecture 31 - Grain boundary strenthening
Lecture 32 - Grain refinement methods
Lecture 33 - Homogeneous vs Heterogeneous Nucleation
Lecture 34 - Grain refinement by Melt inoculation
Lecture 35 - Mechanisms of grain refinement by melt inoculation - 1
Lecture 36 - Mechanisms of grain refinement by melt inoculation - 2
Lecture 37 - Melt inoculation: Fading and Poisoning
Lecture 38 - Grain refinement by melt vibration
Lecture 39 - Severe Plastic Deformation (SPD)
Lecture 40 - Dynamic recrystallization in SPD
Lecture 41 - Metal Matrix Composites
Lecture 42 - Processing of Metal Matrix Composites
Lecture 43 - Two-phase process, Insitu composites
Lecture 44 - Particle wetting and Bonding
Lecture 45 - Particle Distribution in MMCs - 1
Lecture 46 - Particle Distribution in MMCs - 2
Lecture 47 - Rule of Mixture - 1
Lecture 48 - Rule of Mixture - 2
Lecture 49 - Strengthening Mechanism in MMCs - 1
Lecture 50 - Strengthening Mechanism in MMCs - 2
Lecture 51 - Fracture Behavior of Fiber Reinforced Composites
Lecture 52 - Ductile Fracture of Metals
Lecture 53 - Fracture Behavior of Discontinuously Reinforced Composites
Lecture 54 - Fatigue
Lecture 55 - Fatigue Crack propagation and Growth
Lecture 56 - Fatigue Behavior of MMCs - 1
Lecture 57 - Fatigue Behavior of MMCs - 2
Lecture 58 - Fatigue Behavior of MMCs - 3
Lecture 59 - Fatigue Behavior of MMCs - 4
Lecture 60 - Fatigue Behavior of MMCs - 5

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NPTEL Video Course - Metallurgy and Material Science - NOC:Welding Science and Technology (In Tamil)

Subject Co-ordinator - Prof. Murugaiyan Amirthalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and learning objectives
Lecture 2 - Definition of welding and necessity for welding
Lecture 3 - Classification of welding processes
Lecture 4 - Introduction to welding arc
Lecture 5 - Types of gas discharges
Lecture 6 - Characteristics of a welding arc
Lecture 7 - Role of polarity in a welding arc
Lecture 8 - Anode and cathode fall zones
Lecture 9 - Arc column - Part I
Lecture 10 - Arc column - Part II
Lecture 11 - Arc column - Part III
Lecture 12 - Characteristics of arc welding processes
Lecture 13 - Introduction to arc ignition and gas tungten arc welding
Lecture 14 - Gas tungsten arc welding - I
Lecture 15 - Shielding gases used for arc welding
Lecture 16 - Plasma welding
Lecture 17 - Consumable welding processes - I
Lecture 18 - Consumable welding processes - II
Lecture 19 - Fundamentals of resistance welding
Lecture 20 - Resistance spot welding - Part I
Lecture 21 - Resistance spot welding - Part II
Lecture 22 - Other resistance welding processes
Lecture 23 - High energy beam welding processes - Laser beam welding
Lecture 24 - High energy beam welding processes - Electron beam welding
Lecture 25 - Other welding processes - Part I
Lecture 26 - Other welding processes - Part II

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NPTEL Video Course - Metallurgy and Material Science - NOC:Thermodynamics and Kinetics of Materials

Subject Co-ordinator - Prof. Saswata Bhattacharya

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Concepts
Lecture 2 - Energy, Heat and Work I - Part 1
Lecture 3 - Energy, Heat and Work II - Part 2
Lecture 4 - Heat capacity and Enthalpy
Lecture 5 - Heat capacity relations in materials
Lecture 6 - Introduction to the Second law of Thermodynamics
Lecture 7 - Clausius inequality and entropy of transformation
Lecture 8 - First and Second Laws Combined
Lecture 9 - Third Law, Absolute Zero, and Other Energy Functions
Lecture 10 - Axiomatic Approach and Thermodynamic Equilibrium in Simple Systems
Lecture 11 - Formulations of Equilibrium in Thermodynamic Systems
Lecture 12 - Fundamental relations and alternative formulations of equilibrium criterion
Lecture 13 - Maxwell relations and their application
Lecture 14 - Concepts of Statistical Thermodynamics - 1
Lecture 15 - Concepts of Statistical Thermodynamics - 2
Lecture 16 - Thermodynamic Equilibrium in Statistical Thermodynamics
Lecture 17 - Phase equilibria and phase transition in unary systems - 1
Lecture 18 - Phase equilibria and phase transition in unary systems - 2
Lecture 19 - Phase equilibria and phase transition in unary systems - 3
Lecture 20 - Applications of Clausius-Clapeyron Equation
Lecture 21 - Thermodynamics of solutions - 1
Lecture 22 - Thermodynamics of solutions - 2
Lecture 23 - Multicomponent solutions and mixing process
Lecture 24 - Thermodynamic properties due to mixing
Lecture 25 - Ideal and Real Solutions
Lecture 26 - Regular solutions and thermodynamic properties of mixing
Lecture 27 - Colligative Properties
Lecture 28 - Quasichemical Approach and regular solutions
Lecture 29 - Quasichemical solution model for ordered phases - I

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Lecture 30 - Quasichemical solution model for ordered phases - II
Lecture 31 - Phase equilibria in multiphase, multicomponent, non-reacting systems
Lecture 32 - Binary phase diagrams and lever rule
Lecture 33 - Binary alloy phase diagrams and invariant points
Lecture 34 - Binary alloy phase diagrams - intermediate phases and miscibility gap
Lecture 35 - Thermodynamics of phase diagrams - G-x curves
Lecture 36 - Thermodynamic Stability and Numerical Modeling
Lecture 37 - Thermodynamics of reacting systems
Lecture 38 - Elements of thermodynamics of interfaces and thermodynamics of irreversible processes

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NPTEL Video Course - Metallurgy and Material Science - NOC:Diffusion in Solids

Subject Co-ordinator - Prof. Mayur Vaidya

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Diffusion in materials world
Lecture 2 - Revisiting relevant mathematical concepts
Lecture 3 - Ficks law of Diffusion
Lecture 4 - Introduction to Laplace transform
Lecture 5 - Tutorial 1
Lecture 6 - Laplace transformation of Fick's second law
Lecture 7 - Solutions to Diffusion equations - 1
Lecture 8 - Solutions to Diffusion equations - 2
Lecture 9 - Solutions to Diffusion equations - 3
Lecture 10 - Tutorial 2
Lecture 11 - Demo of Scilab: Plotting the diffusion profile
Lecture 12 - Revisiting structure and defects in crystalline solids - 1
Lecture 13 - Revisiting structure and defects in crystalline solids - 2
Lecture 14 - Random walk and atomic jumps
Lecture 15 - Tutorial 3
Lecture 16 - Atomic mechanisms of diffusion
Lecture 17 - Correlation factors - 1
Lecture 18 - Correlation factors - 2
Lecture 19 - Temperature and pressure dependence of diffusion
Lecture 20 - Tutorial 4
Lecture 21 - Revisiting G-X curves and phase diagrams
Lecture 22 - Basics of Interdiffusion
Lecture 23 - Phase Formation in Interdiffusion Zone
Lecture 24 - Composition profiles in interdiffusion zone - 1
Lecture 25 - Tutorial 5
Lecture 26 - Composition profiles in interdiffusion zone - 2
Lecture 27 - Boltzmann-Matano Analysis
Lecture 28 - Kirkendall Effect
Lecture 29 - Intrinsic diffusion and Darkens analysis

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Lecture 30 - Tutorial 6
Lecture 31 - Introduction to CALPHAD
Lecture 32 - CALPHAD implementation software and diffusion module
Lecture 33 - Thermodynamic and kinetic databases
Lecture 34 - Moving boundary and multiphase diffusion simulations
Lecture 35 - Tutorial 7
Lecture 36 - Techniques to measure diffusion coefficients, Radiotracer diffusion, Deviations from Gaussian pr
Lecture 37 - SIMS AND EPMA
Lecture 38 - Mechanical spectroscopy and Electrical Methods
Lecture 39 - Nuclear methods - 1
Lecture 40 - Tutorial 8
Lecture 41 - Nuclear Methods - 2
Lecture 42 - Grain boundary structure and fisher model
Lecture 43 - Kinetic regime of grain boundary diffusion
Lecture 44 - Disloaction pipe diffusion
Lecture 45 - Tutorial 9
Lecture 46 - Diffusion in Intermetallics
Lecture 47 - Diffusion in nanocrystalline materials
Lecture 48 - Diffusion in quasicrystalline alloys
Lecture 49 - Diffusion in metallic alloys - 1
Lecture 50 - Tutorial 10
Lecture 51 - Diffusion in metallic alloys - 2
Lecture 52 - Diffusion in high entropy alloys
Lecture 53 - Diffusion in semiconductors - 1
Lecture 54 - Diffusion in semiconductors - 2
Lecture 55 - Tutorial 11
Lecture 56 - Diffusion in glasses
Lecture 57 - Diffusion in ionic solids - 1
Lecture 58 - Diffusion in ionic solids - 2
Lecture 59 - Tutorial 12
Lecture 60 - Revision of important concepts

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NPTEL Video Course - Metallurgy and Material Science - NOC:Computational Thermodynamics and Kinetics of Mater

Subject Co-ordinator - Prof. K. Guruvidyathri

Co-ordinating Institute - University of Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Essential physical metallurgy concepts : Part 1 - Microstructure | Phase
Lecture 2 - Essential physical metallurgy concepts : Part 2 - Types of phases | Chemical order | Phase Equili
Lecture 3 - Essential physical metallurgy concepts : Part 3 - Phase diagrams - Unary | Isomorphous
Lecture 4 - Essential physical metallurgy concepts : Part 4 - Phase diagram Information
Lecture 5 - Essential physical metallurgy concepts : Part 5 - Phase diagarms - Transformations
Lecture 6 - Essential physical metallurgy concepts : Part 6 - Ternary phase diagrams: isothermal sections
Lecture 7 - Essential physical metallurgy concepts : Part 7 - Phase diagrams: Extended and emergent phases, v
Lecture 8 - Essential physical metallurgy concepts : Part 8 - Phase diagrams: Reactions, Liquidus projections
Lecture 9 - Essential physical metallurgy concepts : Part 9 - Phase fraction plots, Mechanisms and Kinetics c
Lecture 10 - Experimental methods of phase diagram determination - Cooling curve method
Lecture 11 - Essential concepts of thermodynamics : Part 1 - Scope, State, State properties
Lecture 12 - Essential concepts of thermodynamics : Part 2 - Temperature, Heat capacity, Internal energy
Lecture 13 - Essential concepts of thermodynamics : Part 3 - The first law, Reversible and Irreversible proce
Lecture 14 - Essential concepts of thermodynamics : Part 4 - Isothermal and Adiabatic processes, Path quantit
Lecture 15 - Essential concepts of thermodynamics : Part 5 - Engine, Entropy, Clausius inequality, The second
Lecture 16 - Essential concepts of thermodynamics : Part 6 - Statistical thermodynamics, Meaning of entropy
Lecture 17 - Essential concepts of thermodynamics : Part 7 - Types of Entropy, Combined laws, Enthalpy and Gi
Lecture 18 - Thermodynamics of Materials : Part 1 - Lattice stability, Enthalpy of mixing
Lecture 19 - Thermodynamics of Materials : Part 2 - Interaction Parameter, Entropy, Gibbs Energy and Chemical
Lecture 20 - Thermodynamics of Materials : Part 3 - Chemical potential | Activity | Solutions
Lecture 21 - Thermodynamics of Materials : Part 4 - G-x plots | Common tangent construction
Lecture 22 - Thermodynamics of Materials : Part 5 - G-x diagrams | G description
Lecture 23 - Thermodynamics of Materials : Part 6 - G-x curves | Driving force | T0 curve
Lecture 24 - Thermodynamics of Materials : Part 7 - G-x curves exercises | Gibbs phase rule
Lecture 25 - Computational Thermodynamics : Part 1 - Introduction, unary models and data
Lecture 26 - Computational Thermodynamics : Part 2 - Binary and higher order models, Minimization
Lecture 27 - Hands-on Thermodynamic Calculations : Part 1 - Software, Modes, Single point calculations
Lecture 28 - Hands-on Thermodynamic Calculations : Part 2 - Unary G vs T, Binary phase fraction plot
Lecture 29 - Hands-on Thermodynamic Calculations : Part 3 - Binary, Ternary and Metastable Phase Diagrams

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Lecture 30 - Hands-on Thermodynamic Calculations : Part 4 - Ternary Vertical, Pseudo binary section, Console
Lecture 31 - Hands-on Thermodynamic Calculations : Part 5 - Vertical sections
Lecture 32 - Hands-on Thermodynamic Calculations : Part 6 - Quternary and higher order diagrams
Lecture 33 - Hands-on Thermodynamic Calculations : Part 7 - Property diagrams
Lecture 34 - Hands-on Thermodynamic Calculations : Part 8 - T0 curve
Lecture 35 - Hands-on Thermodynamic Calculations : Part 9 - Scheil solidification
Lecture 36 - Thermodynamic assessment : Part 1 - Outline of the method, Input thermochemical data
Lecture 37 - Thermodynamic assessment : Part 2 - Input thermochemical data
Lecture 38 - Thermodynamic Assessment : Part 3 - Input phase equilibria data, non-isothermal methods
Lecture 39 - Thermodynamic assessment : Part 4 - Input phase equilibria data, isothermal methods
Lecture 40 - Thermodynamic assessment : Part 5 - Input data collection, critical evaluation
Lecture 41 - Thermodynamic assessment : Part 6 - Models 1
Lecture 42 - Thermodynamic assessment : Part 7 - Models 2
Lecture 43 - Thermodynamic Assessment : Part 8 - Optimization guidelines
Lecture 44 - Thermodynamic Assessment : Part 9 - Hands-on G Optimization
Lecture 45 - Thermodynamic Assessment : Part 10 - Database compilation
Lecture 46 - Kinetics of Materials : Part 1 - Diffusion, Fick's laws
Lecture 47 - Kinetics of Materials : Part 2 - Phase equilibria and diffusion, Mobility
Lecture 48 - Computational Thermokinetics: Introduction and mobility assessment
Lecture 49 - Hands-on kinetic simulation : Part 1 - Homogenization
Lecture 50 - Hands-on kinetic simulation : Part 2 - Moving phase boundary problems
Lecture 51 - Hands on kinetic simulation : Part 3 - Diffusion couple, Non-isothermal diffusion
Lecture 52 - Hands on kinetic simulation : Part 4 - Modified Scheil: Back diffusion, Solute trapping
Lecture 53 - Essential concepts of overall kinetics - Nucleation, Growth
Lecture 54 - Hands-on kinetic simulation : Part 5 - Overall kinetics, TTT
Lecture 55 - Hands-on kinetic simulation : Part 6 - Precipitation aging
Lecture 56 - Compositional design - High-throughput Calphad
Lecture 57 - Insights from Calphad for alloy design and characterization
Lecture 58 - Material properties in Calphad spirit
Lecture 59 - Calphad - Size effects, Electrochemistry, Process metallurgy
Lecture 60 - Calphad - Summary, history and future

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NPTEL Video Course - Metallurgy and Material Science - NOC:Transmission Electron Microscopy: Theory of Imagir

Subject Co-ordinator - Prof. Sai Rama Krishna Malladi

Co-ordinating Institute - IIT Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Intro to Transmission Electron Microscopy (TEM)
Lecture 2 - Layout of TEM, lab tour and overview of components
Lecture 3 - Electron Sources: Types of Electron Sources
Lecture 4 - Electron Sources: Charateristics and influence on imaging
Lecture 5 - Electron Lenses
Lecture 6 - Image Formation in TEM and Function of a Lens - Part 1
Lecture 7 - Image Formation in TEM and Function of a Lens - Part 2
Lecture 8 - Apertures, Detectors and Specimen Preparation
Lecture 9 - Signals in a TEM
Lecture 10 - Scattering Cross Section and Projected Potential
Lecture 11 - More on electron-specimen interaction
Lecture 12 - Contrast mechanisms in conventional TEM
Lecture 13 - Basic conventional TEM operation, handson demonstration on LaB6 TEM - JEOL JEM 2100
Lecture 14 - Basic conventional TEM operation, handson demonstration on Cold FEG TEM - JEOL JEM F200
Lecture 15 - Interpreting simple images in conventional TEM
Lecture 16 - Introduction and overview of electron diffraction techniques
Lecture 17 - Basics of crystallography to understand electron diffraction - Part 1
Lecture 18 - Basics of crystallography to understand electron diffraction - Part 2 A
Lecture 19 - Basics of crystallography to understand electron diffraction - Part 2 B
Lecture 20 - Demonstration of orienting crystal and obtaining diffraction pattern on TEM
Lecture 21 - Understanding electron diffraction patterns
Lecture 22 - Indexing electron diffraction patterns
Lecture 23 - High-resolution Imaging in TEM
Lecture 24 - HREM - Linear imaging theory and image formation mechanisms
Lecture 25 - HREM - Multiwave imaging concepts and extension to real specimens
Lecture 26 - HREM - Demonstration on microscope
Lecture 27 - Scanning transmission Electron Microscopy - Concepts
Lecture 28 - Scanning transmission Electron Microscopy - Methodology
Lecture 29 - STEM - Demonstration on the microscope - Experimental Demonstration

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Lecture 30 - Inelastic scattering and Analytical TEM
Lecture 31 - Intro to EELS and EFTEM
Lecture 32 - More on EELS and applications
Lecture 33 - Aberration correction in TEM
Lecture 34 - Demonstration on Image Corrector TEM - JEOL NeoARM 200F
Lecture 35 - Demonstration on Probe Corrected TEM - JEOL NeoARM 200F
Lecture 36 - Tutorial on Basic Image Operations with Digital Micrograph and ImageJ
Lecture 37 - Inâ situ and Environmental TEM using MEMS
Lecture 38 - Course Summary - TEM, Theory of Imaging to Advanced Applications - Part 1
Lecture 39 - Course Summary - TEM, Theory of Imaging to Advanced Applications - Part 2

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NPTEL Video Course - Metallurgy and Material Science - NOC:Surface Engineering of Nanomaterials

Subject Co-ordinator - Prof. Kaushik Pal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Tribology and Its Classification
Lecture 2 - Friction Tribology
Lecture 3 - Wear and Corrosion
Lecture 4 - Lubrication
Lecture 5 - Effect of Tribology on Surface of Nanomaterials
Lecture 6 - Conventional Surface Engineering
Lecture 7 - Types of Surface Modifications
Lecture 8 - Physical Modifications
Lecture 9 - Chemical Modifications
Lecture 10 - Applications of Surface Engineering towards Nanomaterials
Lecture 11 - Deposition and Surface Modification Methods
Lecture 12 - Physical Vapour Deposition (PVD)
Lecture 13 - Chemical Vapour Deposition (CVD)
Lecture 14 - Advanced Surface Modification Practices
Lecture 15 - Advantages of Deposition for Surface Modification
Lecture 16 - Synthesis, Processing and Characterization of Nano-structured Coatings
Lecture 17 - Functional Coatings
Lecture 18 - Advanced Coating Practices
Lecture 19 - Characterization of Nano-coatings
Lecture 20 - Applications of Nano-coatings
Lecture 21 - Need of Advanced Methods for Surface and Coating Testings
Lecture 22 - Size Dependency in Nanostructures of Nanocoatings
Lecture 23 - Size Effect in Electrochemical Properties of Nanostructured Coatings
Lecture 24 - Size Effect in Mechanical Properties of Nanostructured Coatings
Lecture 25 - Size Effect in Physical and Other Properties of Nanostructured Coatings
Lecture 26 - Thin Films for Surface Engineering of Nanomaterials
Lecture 27 - Sputtering Techniques
Lecture 28 - Evaporation Processes
Lecture 29 - Thin Film Deposition through Gas Phase Techniques

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Lecture 30 - Liquid Phase Techniques
Lecture 31 - Microencapsulation Processes
Lecture 32 - Microencapsulation
Lecture 33 - Plating of Nanocomposite Coatings - I
Lecture 34 - Plating of Nanocomposite Coatings - II
Lecture 35 - Advantages of Microencapsulation over Other Conventional Methods
Lecture 36 - Current Trends in Surface Modification of Nanomaterials - Part-1
Lecture 37 - Current Trends in Surface Modification of Nanomaterials - Part-2
Lecture 38 - Current Trends in Surface Modification of Nanomaterials - Part-3
Lecture 39 - Modified Nanomaterials
Lecture 40 - Main Problems in Synthesis of Modified Nanomaterials

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NPTEL Video Course - Metallurgy and Material Science - NOC:Material Science and Engineering

Subject Co-ordinator - Dr. Vivek Pancholi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Atomic structure and bonding
Lecture 3 - Crystal systems and structures
Lecture 4 - X-ray diffraction
Lecture 5 - Crystal planes and directions
Lecture 6 - Optical microscope
Lecture 7 - Optical aberration
Lecture 8 - Metallography
Lecture 9 - Microstructure
Lecture 10 - Quantitative metallography
Lecture 11 - Crystallographic defects
Lecture 12 - Diffusion
Lecture 13 - Phase diagram - 1
Lecture 14 - Phase diagram - 2
Lecture 15 - Eutectic phase diagram
Lecture 16 - Equilibrium and non-equilibrium cooling
Lecture 17 - Equilibrium cooling of eutectic system
Lecture 18 - Solidification structure
Lecture 19 - Iron-carbon phase diagram
Lecture 20 - Nucleation and growth
Lecture 21 - TTT and CCT curves
Lecture 22 - Heat treatment
Lecture 23 - Precipitation
Lecture 24 - Elastic behaviour
Lecture 25 - Tensile test
Lecture 26 - Engineering and true stress and strain
Lecture 27 - Plastic deformation - 1
Lecture 28 - Plastic deformation - 2
Lecture 29 - Strengthening mechanism - 1

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Lecture 30 - Strengthening mechanism - 2
Lecture 31 - Strengthening mechanism - 3
Lecture 32 - Strengthening mechanism - 4
Lecture 33 - Fracture
Lecture 34 - Fracture
Lecture 35 - Fatigue
Lecture 36 - Creep
Lecture 37 - NDT
Lecture 38 - Ceramics, polymers, composites
Lecture 39 - Electrical and magnetic properties
Lecture 40 - Alloy designation and properties

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NPTEL Video Course - Metallurgy and Material Science - NOC:Structural Analysis of Nanomaterials

Subject Co-ordinator - Prof. Kaushik Pal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Structure of Materials
Lecture 3 - Imperfections in Structure of Materials
Lecture 4 - Phase Diagram
Lecture 5 - Transformation of Phases
Lecture 6 - Basic Properties
Lecture 7 - Basic Properties
Lecture 8 - Basic Properties
Lecture 9 - Basic Properties
Lecture 10 - Selection of Nanomaterials based on Applications
Lecture 11 - Introduction to X-Ray Diffraction
Lecture 12 - Diffraction Methods and Directions of XRD
Lecture 13 - Determination of Crystal Structures by XRD Patterns
Lecture 14 - Precise Parameter Measurements
Lecture 15 - Orientation of Single Crystals
Lecture 16 - Qualitative Analysis by Diffraction
Lecture 17 - Quantitative Analysis by Diffraction
Lecture 18 - Microscopic Structural Analysis of Nanomaterials - I
Lecture 19 - Microscopic Structural Analysis of Nanomaterials - II
Lecture 20 - Other Characterization Techniques

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NPTEL Video Course - Metallurgy and Material Science - NOC:Thermo-Mechanical and Thermo-Chemical Processes

Subject Co-ordinator - Prof. S. R. Meka

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Thermomechanical Processes
Lecture 2 - Conventional Thermomechanical Processes
Lecture 3 - Non-conventional Thermomechanical Processes
Lecture 4 - Stress and Strain
Lecture 5 - Effect of Strain Rate and Temperature
Lecture 6 - Microstructure Evolution
Lecture 7 - Dynamic Recovery
Lecture 8 - Discontinuous Dynamic Recrystallization
Lecture 9 - Dynamic Recrystallization
Lecture 10 - Continuous Dynamic Recrystallization (CDRX) and Geometrical Dynamic Recrystallization (GDRX)
Lecture 11 - Stereographic Projection
Lecture 12 - Using Stereographic Projection
Lecture 13 - Crystallographic Texture
Lecture 14 - Crystallographic Texture
Lecture 15 - Crystallographic Texture
Lecture 16 - Constitutive Analysis
Lecture 17 - Constitutive Analysis
Lecture 18 - Higher Strain Rate
Lecture 19 - Constitutive Based Model
Lecture 20 - Constitutive analysis
Lecture 21 - Processing Maps
Lecture 22 - Processing Maps
Lecture 23 - Microstructure and Application
Lecture 24 - Processing Maps
Lecture 25 - Processing Maps
Lecture 26 - Equal Channel Angular Pressing (ECAP)
Lecture 27 - Friction Stir Processing (FSP)
Lecture 28 - Accumulative Roll Bonding (ARB)
Lecture 29 - Multi Axial Forging (MAF)

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Lecture 30 - Severe Plastic Deformation
Lecture 31 - Overview on Thermo-Chemical treatments
Lecture 32 - Overview on Thermo-Chemical treatments (Continued...)
Lecture 33 - Thermodynamic aspects of thermo-chemical treatments
Lecture 34 - Thermodynamics of Gaseous Nitriding - I
Lecture 35 - Thermodynamics of Gaseous Nitriding - II
Lecture 36 - Gaseous Nitriding of Pure Iron
Lecture 37 - Gaseous Nitriding of Iron based alloys
Lecture 38 - Duplex and Dual Phase microstructures through nitriding
Lecture 39 - Alloying element nitride precipitation during nitriding of iron based alloys
Lecture 40 - Kinetics of gaseous nitriding

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NPTEL Video Course - Metallurgy and Material Science - NOC:Welding Metallurgy

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to welding metallurgy
Lecture 2 - Overview of Welding Processes
Lecture 3 - Introduction to phase diagrams
Lecture 4 - Phase diagram of Iron Carbon system
Lecture 5 - Phase diagram of non ferrous metals and alloys
Lecture 6 - Phase Transformations
Lecture 7 - Time Temperature Transformation Diagrams
Lecture 8 - Continuous Cooling Transformation Diagrams
Lecture 9 - Carbon Equivalent, Schaeffler Diagrams
Lecture 10 - Problem solving on Phase Diagrams
Lecture 11 - Introduction to strengthening mechanism in metals
Lecture 12 - Solid solution strengthening and grain refinement
Lecture 13 - Precipitation Hardening and Martensite Strengthening
Lecture 14 - Strain Hardening and Strain Ageing
Lecture 15 - Problem solving on strengthening mechanism in metals
Lecture 16 - Introduction to Heat treatment Processes in Welding
Lecture 17 - Hardening and Hardenability
Lecture 18 - Martempering and Austempering
Lecture 19 - Case Hardening methods
Lecture 20 - Heat treatment of Non-Ferrous metals and alloys
Lecture 21 - Heat Sources in Welding
Lecture 22 - Heat Flow in Welding
Lecture 23 - Temperature Distribution in Welding
Lecture 24 - Effect of Welding Parameters
Lecture 25 - Metallurgical effect of Heat Flow on Welding
Lecture 26 - Principles of Solidification in Welding
Lecture 27 - Solute redistribution during Solidification
Lecture 28 - Constitutional Supercooling
Lecture 29 - Microsegregation and Banding

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Lecture 30 - Grain Structure during Solidification in Welding
Lecture 31 - Distinct Zones in Fusion Welded Specimen
Lecture 32 - Heat Affected Zone
Lecture 33 - Properties of Heat Affect Zone
Lecture 34 - Microstructural Products in Weldments
Lecture 35 - Introduction to Preheat and Postweld Heat Treatment
Lecture 36 - Preheat and Postweld Heat Treatment of Different Materials
Lecture 37 - Residual Stresses in Welding
Lecture 38 - Causes of Residual Stress Development in Welding
Lecture 39 - Measurement of Residual Stresses in Weldments
Lecture 40 - Controlling Residual Stresses in Weldments
Lecture 41 - Introduction to Welding Distortion
Lecture 42 - Types of Welding Distortions
Lecture 43 - Angular Distortions in Welds
Lecture 44 - Bowing, Buckling and Twisting in Welds
Lecture 45 - Control of Distortion in Welds
Lecture 46 - Introduction to Cracks in Welds
Lecture 47 - Types of Weld Cracks
Lecture 48 - Specific Weld Cracks
Lecture 49 - Chevron Cracks and Reheat Cracks
Lecture 50 - Lamellar Cracks and Stress Corrosion Cracking
Lecture 51 - Introduction to Weldability of Metals
Lecture 52 - Weldability of Carbon Steels
Lecture 53 - Weldability of Alloy Steels
Lecture 54 - Weldability of Cast Iron
Lecture 55 - Weldability of Non Ferrous Metals and Alloys
Lecture 56 - Introduction to Welding Defects
Lecture 57 - Surface and Subsurface Welding Defects
Lecture 58 - Issues in Welding
Lecture 59 - Considerations for Fatigue Loading in Welding
Lecture 60 - Design Features for Fatigue and Static Loading in Welding

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NPTEL Video Course - Metallurgy and Material Science - NOC:Modeling of Tundish Steelmaking Process in Continu

Subject Co-ordinator - Dr. Pradeep K. Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Continuous Casting Process
Lecture 2 - Role of Tundish in Continuous Casting
Lecture 3 - Types of Continuous Casting Machine
Lecture 4 - Components of Continuous Casting Unit
Lecture 5 - Tundish Metallurgy
Lecture 6 - Introduction to Physical Modeling
Lecture 7 - Concept of Similarity in Physical Modeling
Lecture 8 - Dimensional analysis
Lecture 9 - Physical Modeling of Isothermal and Non-Isothermal system
Lecture 10 - Consideration in Aqueous Modeling
Lecture 11 - Introduction to Stimulus Response Techniques
Lecture 12 - Characterization of Flow
Lecture 13 - Characterization of Flow in Actual Systems
Lecture 14 - Analysis of RTD Curves
Lecture 15 - Plug, Mixed and Dead Regions in Tundish
Lecture 16 - Fluid Flow Fundamentals
Lecture 17 - Mass Conservation Equation
Lecture 18 - Momentum Conservation Equation
Lecture 19 - Energy Conservation Equation
Lecture 20 - Navier Stokes Equations for Newtonian Fluid
Lecture 21 - Introduction to Turbulence in Fluid Flow
Lecture 22 - Characteristics of Turbulent Flow
Lecture 23 - RANS Equations
Lecture 24 - Turbulent Flow Calculations
Lecture 25 - Turbulence Modeling Using k-É Model
Lecture 26 - Introduction to Heat Transfer Phenomena
Lecture 27 - Numerical Methods for Solving Governing Equation
Lecture 28 - Finite Volume Method for Convection and Diffusion Problems
Lecture 29 - Different Discretization Schemes

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Lecture 30 - Assessment of Discretization Schemes
Lecture 31 - Elements of Mathematical Modeling in Tundish Steelmaking
Lecture 32 - Boundary Conditions
Lecture 33 - Flow Analysis in Tundish
Lecture 34 - Analysis of Fluid Flow and Mixing in Tundish
Lecture 35 - Non-isothermal Flow Considerations in Tundish
Lecture 36 - Intermixing in Tundish
Lecture 37 - Modeling Consideration For Inclusion Removal in Tundish - I
Lecture 38 - Modeling Consideration For Inclusion Removal in Tundish - II
Lecture 39 - Case Studies in Modeling of Tundish Steelmaking - 1
Lecture 40 - Case Studies in Modeling of Tundish Steelmaking - 2

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NPTEL Video Course - Metallurgy and Material Science - NOC:Biomaterials for Bone Tissue Engineering Applicati

Subject Co-ordinator - Prof. Bikramjit Basu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Biomaterial
Lecture 3 - Biocompatibility
Lecture 4 - Host response
Lecture 5 - Tissue Eng
Lecture 6 - Scaffold
Lecture 7 - Bone structure
Lecture 8 - Bone properties
Lecture 9 - Implant - I
Lecture 10 - Implant - II
Lecture 11 - Proteins
Lecture 12 - Cell structure
Lecture 13 - Bacteria structure
Lecture 14 - Antibacterial assay
Lecture 15 - Cell fate processes
Lecture 16 - Cell division
Lecture 17 - Cell differentiation
Lecture 18 - Stem cells
Lecture 19 - Osseointegration
Lecture 20 - In vivo testing
Lecture 21 - Cell-material interaction
Lecture 22 - Cell-signalling
Lecture 23 - In vitro testing
Lecture 24 - Cytotoxicity assays
Lecture 25 - Biocompatibility assay
Lecture 26 - Clinical trials - I
Lecture 27 - Clinical trials - II
Lecture 28 - Metal manufacturing
Lecture 29 - Ceramics manufacturing

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Lecture 30 - Polymers manufacturing
Lecture 31 - Additive manufacturing
Lecture 32 - HA-Ti-Toughness, Cell functionality
Lecture 33 - HA-CaTiO 3 development
Lecture 34 - HA- BaTiO 3 Functional Prop
Lecture 35 - HA-Ag antimicrob and cell viability
Lecture 36 - HA-ZnO, Cell fate and antimicrobial
Lecture 37 - Dental ceramics processing
Lecture 38 - Sr-based glass Ceramics
Lecture 39 - Acetabular socket (Compression mold)
Lecture 40 - ZTA femoral ball head fabrication

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NPTEL Video Course - Metallurgy and Material Science - NOC:Iron Making

Subject Co-ordinator - Prof Govind S Gupta

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39 - Live Session

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NPTEL Video Course - Metallurgy and Material Science - NOC:Friction and Wear of Materials: Principles and Cas

Subject Co-ordinator - Prof. Dr. B. V. Manoj Kumar, Prof. Bikramjit Basu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Tribology
Lecture 2 - Surfaces and contacts
Lecture 3 - Friction
Lecture 4 - Contact temperature
Lecture 5 - Lubrication
Lecture 6 - Wear mechanisms
Lecture 7 - Wear mechanisms
Lecture 8 - Wear mechanisms
Lecture 9 - Wear mechanisms
Lecture 10 - Wear mechanisms
Lecture 11 - Overview of tribological materials
Lecture 12 - Friction and wear of metal matrix composites
Lecture 13 - Overview
Lecture 14 - Fabrication of engineering polymers
Lecture 15 - Polymer Ceramic Composites for Orthopedic Applications
Lecture 16 - Processing concepts of ceramics
Lecture 17 - Mechanical properties of ceramics
Lecture 18 - Fracture and toughening of brittle solids
Lecture 19 - Sliding wear of SiC Ceramics
Lecture 20 - Sliding wear of SiC-WC Composites
Lecture 21 - Friction and wear of HDPE-HA-Al2O3
Lecture 22 - Wear behavior of bioceramics and biocomposites
Lecture 23 - Tribological behavior of dental restorative materials
Lecture 24 - Wear of transformation toughened zirconia
Lecture 25 - Fretting wear of SiAlON Ceramics
Lecture 26 - Tribochemistry in wear of cermets
Lecture 27 - Overview
Lecture 28 - Wear of YSZ nanoceramics
Lecture 29 - Wear behavior of nanostructured WC-ZrO2 nanocomposites

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Lecture 30 - Erosive wear of SiC-WC composites
Lecture 31 - Overview
Lecture 32 - Sliding wear of alumina ceramics and zirconia ceramics in cryogenic environment
Lecture 33 - Sliding wear of silicon carbide in cryogenic environment
Lecture 34 - Wear of TiB2 Ceramic Composites
Lecture 35 - Erosive wear of ultra-high temperature NbB2-based ceramic composites
Lecture 36 - Erosive wear of ultra-high temperature ZrB2-based ceramic composites
Lecture 37 - Computational analysis in assessing wear
Lecture 38 - Basics of ceramics coating techniques
Lecture 39 - Erosive wear of WC-Co coating
Lecture 40 - Abrasive wear of WC-Co coating

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NPTEL Video Course - Metallurgy and Material Science - NOC:Materials Design for Electronic, Electromechanical

Subject Co-ordinator - Prof. Pavan Nukala

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Description of material properties
Lecture 2 - Direct and Coupled properties
Lecture 3 - Tensor algebra and property tensor
Lecture 4 - Tensor algebra (Continued...)
Lecture 5 - Property tensor: higher rank tensor and nonlinear property
Lecture 6 - Property tensor (Continued...)
Lecture 7 - Field tensor: Stress and strain
Lecture 8 - Point symmetry operation: rotation and inversion
Lecture 9 - Point symmetry operation: rotoinversion
Lecture 10 - Point symmetry operation: examples in material system
Lecture 11 - Crystal Systems, Bravais Lattices and Symmetry
Lecture 12 - Crystal Systems, Bravais Lattices and Symmetry
Lecture 13 - Crystal Systems, Bravais Lattices and Symmetry
Lecture 14 - Crystal Systems, Bravais Lattices and Symmetry
Lecture 15 - Crystal Systems, Bravais Lattices and Symmetry
Lecture 16 - Development of point group - Part 1
Lecture 17 - Development of point group - Part 2
Lecture 18 - Development of point group - Part 3 : Some visualization in real crystals
Lecture 19 - Point groups, polar groups and consequences in property
Lecture 20 - Structure-symmetry- property correlation
Lecture 21 - Ferroelectricity, polar point groups - I
Lecture 22 - Ferroelectricity, polar point groups - II
Lecture 23 - Space Groups - I
Lecture 24 - Space Groups - II
Lecture 25 - Visualizing Important Crystals (A space group perspective)
Lecture 26 - Some more popular structures and their visualization
Lecture 27 - Symmetry-property correlation - Part 1
Lecture 28 - Symmetry-property correlation - Part 2
Lecture 29 - Symmetry-property correlation - Part 3

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Lecture 30 - Thermodynamics and equilibrium properties - Part 1
Lecture 31 - Thermodynamics and equilibrium properties - Part 2
Lecture 32 - Thermodynamics and equilibrium properties - Part 3
Lecture 33 - Thermodynamics and equilibrium properties - Part 4
Lecture 34 - Statistical Mechanics
Lecture 35 - Title Statistical Mechanics (Continued...)
Lecture 36 - Properties as fluctuations and correlations of order parameter
Lecture 37 - Properties as fluctuations and correlations (Continued...)
Lecture 38 - Landau Theory and Phase Transitions
Lecture 39 - Landau Theory and Phase Transitions (Continued...)
Lecture 40 - Phase transitions and enhancement of fluctuations
Lecture 41 - Dissipative properties
Lecture 42 - Dissipative properties
Lecture 43 - Dissipative properties: Onsagers linear response theory
Lecture 44 - Onsagers linear response theory (Continued...)
Lecture 45 - Onsagers theory: A few case studies
Lecture 46 - Measurement of response function
Lecture 47 - Small Signal Measurement
Lecture 48 - Atomistic picture of Dielectric constant
Lecture 49 - Relaxation vs Resonance
Lecture 50 - Resonance
Lecture 51 - Causality
Lecture 52 - Kramers-Kronig relations
Lecture 53 - Kramers-Kronig and Spectroscopy
Lecture 54 - Spectroscopy at various time scale
Lecture 55 - Spectroscopy (Continued...)
Lecture 56 - Spectroscopy (Continued...)

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NPTEL Video Course - Metallurgy and Material Science - NOC:Advanced Manufacturing and Process Modelling

Subject Co-ordinator - Prof. Prosenjit Das

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Manufacturing science
Lecture 2 - Finite difference method and Finite volume method
Lecture 3 - Introduction to Finite Element Methods
Lecture 4 - Introduction to Finite Element Methods
Lecture 5 - Introduction to Boundary element methods
Lecture 6 - Introduction to casting and solidification
Lecture 7 - Solidification of metal and alloys
Lecture 8 - Introduction to casting
Lecture 9 - Introduction to casting
Lecture 10 - Introduction to casting
Lecture 11 - Introduction to casting and its types
Lecture 12 - Types of casting and defects
Lecture 13 - Introduction to die filling analysis
Lecture 14 - Porosity Modelling and Gravity die casting
Lecture 15 - Rheology
Lecture 16 - Case studies on Die filling
Lecture 17 - Introduction to welding
Lecture 18 - Principle of fusion welding
Lecture 19 - Principle of fusion welding
Lecture 20 - Welding Mechanics
Lecture 21 - Welding Mechanics, Types of welding
Lecture 22 - Types of welding
Lecture 23 - Types of welding
Lecture 24 - Types of welding
Lecture 25 - Types of welding
Lecture 26 - Procedure for numerical modelling
Lecture 27 - Procedure for solving governing equations
Lecture 28 - Procedure for solving governing equations
Lecture 29 - Solvers and Boundary conditions

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Lecture 30 - Transport phenomena during solidification (Continued...)
Lecture 31 - Introduction to Powder Metallurgy
Lecture 32 - Process methodology on Powder Metallurgy
Lecture 33 - Process methodology on Powder Metallurgy
Lecture 34 - Atomization and Sintering
Lecture 35 - Theory of sintering
Lecture 36 - Theory of sintering
Lecture 37 - Different processes in powder metallurgy
Lecture 38 - Design of the molding system
Lecture 39 - Ceramic Injection Molding and metal injection molding
Lecture 40 - Metal forming and process modelling
Lecture 41 - Mechanics of metal working
Lecture 42 - Mechanics of metal working
Lecture 43 - Metal working processes
Lecture 44 - Metal working processes
Lecture 45 - Metal working processes
Lecture 46 - Metal working processes
Lecture 47 - Phase field Modelling
Lecture 48 - Numerical Modelling for welding
Lecture 49 - Introduction to Additive manufacturing
Lecture 50 - Numerical Modelling of Additive manufacturing
Lecture 51 - Phase field
Lecture 52 - Transport phenomena, Process modelling of Metal forming, Machining

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NPTEL Video Course - Metallurgy and Material Science - NOC:Advances in Additive Manufacturing of Materials: C

Subject Co-ordinator - Prof. Bikramjit Basu

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to additive manufacturing
Lecture 2 - Introduction and classification of AM processes
Lecture 3 - Advantages of AM over Conventional Manufacturing
Lecture 4 - Design aspects in 3D printing
Lecture 5 - Introduction to Engineering Materials
Lecture 6 - Properties of material classes
Lecture 7 - Introduction to material characterization
Lecture 8 - Introduction to mechanical property of materials
Lecture 9 - Overview of AM Processes and Demonstration of industry-scale L-PBF machine
Lecture 10 - Overview of AM Processes
Lecture 11 - Binderjet 3D printing: Process Science
Lecture 12 - Scientific Case study: Binderjet 3D printing of Ti6Al4V
Lecture 13 - Scientific Case study: Binderjet 3D printing of Ti-6Al-4V with in situ polymerisable ink
Lecture 14 - Scientific Case study: Binderjet 3D printing of Ti-6Al-4V with in situ polymerisable ink
Lecture 15 - Scientific Case study: Zirconia based bioceramics: binderjet printing using the novel binder
Lecture 16 - Scientific Case study: Binderjet 3D Printing of bioceramics
Lecture 17 - Inkjet Cell Printing
Lecture 18 - Process Science of Laser-based AM Process of metallic materials
Lecture 19 - Microstructure development during Laser-based AM Process
Lecture 20 - Introduction to Lattice Structures
Lecture 21 - Introduction to Cellular structure and Topology Optimisation
Lecture 22 - Scientific case study: SLM Printing of Ti6Al4V lattice structures and properties
Lecture 23 - Scientific case study: SLM Printing of SS316L lattice structures and properties
Lecture 24 - Labscale Demonstration of Directed Energy Deposition (DED)-printing of Materials
Lecture 25 - Additive Manufacturing of Materials - Applications, solutions and Future Perspective
Lecture 26 - Additive Manufacturing of Materials - Applications, solutions and Future Perspective
Lecture 27 - Introduction to biological system
Lecture 28 - Introduction to biological system
Lecture 29 - Introduction to Biological System

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Lecture 30 - Introduction to biological system
Lecture 31 - Fundamentals of Rheology
Lecture 32 - Process Science: 3D extrusion (Bio)printing/4D Bioprinting
Lecture 33 - Process Science: 3D extrusion (Bio)printing/4D Bioprinting
Lecture 34 - Scientific case study: 3D extrusion printing of Alginate-Gelatin hydrogels
Lecture 35 - 3D extrusion printing of Gelatin glycidyl methacrylate/alginate/nanocellulose-based hydrogel
Lecture 36 - Scientific case study-3D extrusion bioprinting of GelMA hydrogels for hard tissue
Lecture 37 - 3D extrusion (Bio)printing of GelMA hydrogels for hard tissue
Lecture 38 - 3D (Bio)printing of GelMA hydrogels for neural tissue regeneration
Lecture 39 - 3D (Bio)printing of GelMA hydrogels for neural tissue regeneration
Lecture 40 - Labscale demonstration of 3D extrusion printing of hydrogels
Lecture 41 - 3D printing of cranium models mediated bone flaps for patient-specific Cranioplasty surgery
Lecture 42 - 3D printing of cranium models mediated bone flaps for patient-specific Cranioplasty surgery
Lecture 43 - 3D printing of Ceramic Dental implants
Lecture 44 - 3D printing of Ceramic Dental implants
Lecture 45 - Emerging topics in AM - Introduction to artificial intelligence and machine learning
Lecture 46 - Emerging topics in AM - Introduction to artificial intelligence and machine learning
Lecture 47 - Emerging topics in AM - Introduction to artificial intelligence and machine learning
Lecture 48 - Scientific case study - DED of SS316L melt pool prediction using machine learning
Lecture 49 - Scientific case study - AI/ML for regression and Classification analysis in DED 3D printing
Lecture 50 - Challenges and opportunities in Additive Manufacturing
Lecture 51 - Challenges and opportunities in Additive Manufacturing
Lecture 52 - Challenges and opportunities in Additive Manufacturing
Lecture 53 - Challenges and opportunities in Additive Manufacturing
Lecture 54 - Challenges and opportunities in Additive Manufacturing
Lecture 55 - Challenges and opportunities in Additive Manufacturing
Lecture 56 - Challenges and opportunities in Additive Manufacturing
Lecture 57 - Emerging opportunity: Bioprinting in Space
Lecture 58 - Emerging opportunity: Bioprinting in Space
Lecture 59 - Summary of key concepts in AM
Lecture 60 - Summary of Emerging topics and challenges in AM

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NPTEL Video Course - Metallurgy and Material Science - NOC:Advanced Material Characterization by Atom Probe T

Subject Co-ordinator - Prof. Surendra Kumar Makineni

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - History from electrons to field ionisation to field evaporation
Lecture 3 - Filed Ion Microscopy
Lecture 4 - Basic physics behind Field Ionisation
Lecture 5 - Field Ion Microscopy Instrumentation
Lecture 6 - Field Ionisation to Field Evaporation
Lecture 7 - Field Desorption Microscopy
Lecture 8 - Atom Probe Tomography: Variables
Lecture 9 - Instrumentation
Lecture 10 - Pulsing methods
Lecture 11 - Photon-assisted Ionisation
Lecture 12 - Experimental protocols for APT
Lecture 13 - Experimental protocols for APT
Lecture 14 - Experimental protocols for APT
Lecture 15 - Tomographic Reconstruction
Lecture 16 - Tomographic Reconstruction
Lecture 17 - Tomographic Reconstruction
Lecture 18 - Calibration of reconstruction
Lecture 19 - Common artifacts in reconstruction
Lecture 20 - Spatial resolution in reconstruction
Lecture 21 - Electropolishing
Lecture 22 - Focused Ion Beam (FIB)
Lecture 23 - Focused Ion Beam (FIB)
Lecture 24 - Focused Ion Beam (FIB)
Lecture 25 - Data analysis
Lecture 26 - Quality of data
Lecture 27 - Mounting of specimens
Lecture 28 - Ion milling of specimens
Lecture 29 - Data analysis

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Lecture 30 - Specimen loading
Lecture 31 - Data acquisition
Lecture 32 - Data analysis
Lecture 33 - Basics
Lecture 34 - Basics
Lecture 35 - Basics
Lecture 36 - Electron specimen interaction
Lecture 37 - TEM column cross-section
Lecture 38 - Electron Diffraction
Lecture 39 - Diffraction Patterns
Lecture 40 - Imaging
Lecture 41 - Defect analysis
Lecture 42 - Image Formation
Lecture 43 - Detection of electrons and ECCI
Lecture 44 - Application to Materials Science
Lecture 45 - Application to Materials Science
Lecture 46 - Application to Materials Science

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NPTEL Video Course - Metallurgy and Material Science - NOC:Materials Informatics

Subject Co-ordinator - Prof. Sai Gautam Gopalakrishnan

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of Materials modelling
Lecture 2 - Introduction to Machine learning
Lecture 3 - Anaconda installation and python basics
Lecture 4 - Functions and classes
Lecture 5 - Numpy basics
Lecture 6 - Pandas basics
Lecture 7 - Regression
Lecture 8 - Regression (Continued...)
Lecture 9 - Classification
Lecture 10 - Classification (Continued...)
Lecture 11 - Regression and classification example on materials data
Lecture 12 - Regression models
Lecture 13 - Regression models (Continued...)
Lecture 14 - Classification models
Lecture 15 - Support vector machines and decision trees
Lecture 16 - Ensemble models
Lecture 17 - Ensemble models (Continued...) and dimentionality reduction
Lecture 18 - Comparison of classical models on materials data
Lecture 19 - Neural networks
Lecture 20 - Neural networks with keras and tensorflow
Lecture 21 - Neural networks with pytorch
Lecture 22 - Neural networks example on materials data
Lecture 23 - Convolutions
Lecture 24 - Graph Networks
Lecture 25 - Crystal Graph Convolutional Neural Networks
Lecture 26 - First Principles methods
Lecture 27 - Density Functional Theory
Lecture 28 - Exchange Correlation Functionals
Lecture 29 - Basis sets and Pesudo potentials

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Lecture 30 - DFT hands on
Lecture 31 - Introduction to Molecular Dynamics
Lecture 32 - Molecular Dynamics (Continued...)
Lecture 33 - Introduction to Statistical Mechanics
Lecture 34 - Statistical Mechanics - I
Lecture 35 - Statistical Mechanics - II
Lecture 36 - Introduction to lattice models
Lecture 37 - Lattice models and Monte Carlo simulations
Lecture 38 - Cluster expasnion hands on
Lecture 39 - Monte Carlo simulation hands on
Lecture 40 - Introduction to machine learned potentials
Lecture 41 - Machine learned interatomic potentials (Continued...)
Lecture 42 - Atomic cluster expasnion
Lecture 43 - Machine learned interatomic potentials hands on
Lecture 44 - Transfer Learning - I
Lecture 45 - Transfer Learning - II
Lecture 46 - Transfer Learning hands on
Lecture 47 - Diffusion Models
Lecture 48 - Diffusion models hands on
Lecture 49 - Large Language Models
Lecture 50 - Large Language Models hands on

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NPTEL Video Course - Mining Engineering - Fundamentals of Environmental Pollution and Control

Subject Co-ordinator - Prof. J. Bhattacharyya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - State of the Environment
Lecture 2 - Environmental Movement
Lecture 3 - Definitions of Environmental Terms
Lecture 4 - Water Pollutants
Lecture 5 - Water Pollutants (Continued...)
Lecture 6 - Water Pollution Modelling-Surface Water
Lecture 7 - Water Pollution Modelling-Surface Water(Continued...)
Lecture 8 - BOD Modelling - Part 1
Lecture 9 - BOD Modelling - Part 2
Lecture 10 - Oxygen Demanding Waste in Streams - Part 1
Lecture 11 - Oxygen Demanding Waste in Streams - Part 2
Lecture 12 - Ground Water and its Contamination
Lecture 13 - Ground Water and its Contamination (Continued...)
Lecture 14 - Ground Water and its Contamination (Continued...)
Lecture 15 - Waste Water Treatment
Lecture 16 - Wastewater Treatment (Continued...)
Lecture 17 - Wastewater Treatment (Continued...)
Lecture 18 - Chemical Treatment
Lecture 19 - Wetland Treatment and Bio-Technology Applications
Lecture 20 - Introduction to Soil
Lecture 21 - Parameters to Soil for Vegetative Growth
Lecture 22 - Parameters to Soil for Vegetative Growth (Continued...)
Lecture 23 - Soil Acidity
Lecture 24 - Soil Erosion
Lecture 25 - Mechanical Soil Erosion Control
Lecture 26 - Soil Erosion Prediction
Lecture 27 - Universal Soil Loss Equation
Lecture 28 - Air Pollutants
Lecture 29 - Health Effects of Air Pollutants - Part 1

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Lecture 30 - Health Effects of Air Pollutants - Part 2
Lecture 31 - Air Pollutants and Meteorology - Part 1
Lecture 32 - Air Pollutants and Meteorology - Part 2
Lecture 33 - The Point-Source Gaussian Plume Model
Lecture 34 - Ground Level Concentration
Lecture 35 - Emission Control
Lecture 36 - EIA, EMP & EA

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NPTEL Video Course - Mining Engineering - NOC:Drilling and Blasting Technology

Subject Co-ordinator - Prof. Kaushik Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Drilling Technology
Lecture 2 - Introduction to Blasting Technology
Lecture 3 - Rock Formation
Lecture 4 - Rock Formation (Continued...)
Lecture 5 - Rock Formation (Continued...)
Lecture 6 - Rock Properties and Testing - 1
Lecture 7 - Rock Properties and Testing - 2
Lecture 8 - Drilling Mechanism
Lecture 9 - Drillability of Rock
Lecture 10 - Drilling Machines - 1
Lecture 11 - Drilling Machines - 2
Lecture 12 - Drilling Pattern - 1
Lecture 13 - Drilling Pattern - 2
Lecture 14 - Special Drilling Methods - I
Lecture 15 - Special Drilling Methods - II
Lecture 16 - Explosives - 1
Lecture 17 - Explosives - 2
Lecture 18 - Explosives accessories - 1
Lecture 19 - Explosives accessories - 2
Lecture 20 - Explosives accessories - 3
Lecture 21 - Explosives properties - 1
Lecture 22 - Explosives properties - 2
Lecture 23 - Explosives properties - 3
Lecture 24 - Basics of blasting - 1
Lecture 25 - Basics of blasting - 2
Lecture 26 - Explosive storage and transportation - 1
Lecture 27 - Explosive storage and transportation - 2
Lecture 28 - Surface blasting - 1
Lecture 29 - Surface blasting - 2

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Lecture 30 - Surface blast design
Lecture 31 - Underground blast design - 1
Lecture 32 - Underground blast design - 2
Lecture 33 - Blasting results - 1
Lecture 34 - Blasting results - 2
Lecture 35 - Blasting results - 3
Lecture 36 - Blasting results - 4
Lecture 37 - Problems - 1
Lecture 38 - Problems - 2
Lecture 39 - Problems - 3
Lecture 40 - Problems - 4

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NPTEL Video Course - Mining Engineering - NOC:Network Analysis for Mines and Mineral Engineering

Subject Co-ordinator - Prof. Kaushik Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Network Analysis
Lecture 2 - Introduction to network and some terminology
Lecture 3 - Construction of network
Lecture 4 - Introduction to activity on node diagram and comparison with arrow diagram
Lecture 5 - Rules of dummy job,redundancy and cycles
Lecture 6 - Critical path and its calculation
Lecture 7 - Algorithm for critical path early start and early finish times
Lecture 8 - Late start and late finish times algorithm
Lecture 9 - Understanding the slack
Lecture 10 - Examples of slacks and calculation of AON network
Lecture 11 - Project due dates and earliest completion time examples
Lecture 12 - CPM model and cost modelling
Lecture 13 - Lowest cost schedule and optimum schedule
Lecture 14 - Crashing and stretching of jobs
Lecture 15 - Crashing and stretching of jobs (Continued...)
Lecture 16 - Introduction to PERT
Lecture 17 - Expected length of critical path calculation with examples
Lecture 18 - Probability of completion of a project
Lecture 19 - Event oriented project management
Lecture 20 - Algorithm and computer program

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NPTEL Video Course - Mining Engineering - NOC:Mining Machinery

Subject Co-ordinator - Prof. Khanindra Pathak

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mining Machinery - Part A
Lecture 2 - Introduction to Mining Machinery - Part B
Lecture 3 - Introduction to Machine Elements
Lecture 4 - Mechanical Transmission of Power
Lecture 5 - Shafts, Pulleys, Gears, and Geartrains Bearing and Brakes
Lecture 6 - Belt Drives, Chain Drives
Lecture 7 - Prime Movers
Lecture 8 - Fluid Power for Mining Machinery
Lecture 9 - Pneumatic Power for Mining Machinery
Lecture 10 - Steel Wire Rope : Types and Basic Calculation
Lecture 11 - Steel Wire Rope Maintenance
Lecture 12 - Principle of Rock - Tool Interaction
Lecture 13 - Site and Rock Preparation Equipment : Dozer Ripper
Lecture 14 - Site and Rock Preparation Equipment : Ripper
Lecture 15 - Drilling Machines for Mining
Lecture 16 - Site and Rock Preparation Equipment : Scraper
Lecture 17 - Site and Rock Preparation Equipment : Motor Grader
Lecture 18 - Surface Mining Machinery : Machinery for Cyclic Excavation : Electric Rope Shovel
Lecture 19 - Surface Mining Machinery : Machinery for Cyclic Excavation : Hydraulic Excavators and Back Hoe
Lecture 20 - Surface Mining Machinery : Machinery for Cyclic Excavation : Front End Loader
Lecture 21 - Surface Mining Machinery : Machinery for Cyclic Excavation : Dragline
Lecture 22 - Surface Mining Machinery : Machinery for Continuous Excavation : Bucket Wheel Excavator
Lecture 23 - Surface Mining Machinery : Machinery for Continuous Excavation : Bucket Chain Excavators
Lecture 24 - Surface Mining Machinery : Machinery for Continuous Excavation : Continuous Surface Miner
Lecture 25 - Surface Mining Machinery : Machinery for Continuous Excavation : Dredger
Lecture 26 - Underground Mining Machinery Loaders : Gathering Arm Loader
Lecture 27 - Underground Mining Machinery Loaders : Rocker Shovel and Side Discharge Loader
Lecture 28 - Underground Mining Machinery Loaders : Load Haul Dump (LHD) Loader
Lecture 29 - Underground Mining Machinery : Road Header

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Lecture 30 - Underground Mining Machinery Underground Drills and Roof Bolter
Lecture 31 - Underground Mining Machinery Continuous Miner
Lecture 32 - Underground Mining Machinery Shuttle Car
Lecture 33 - Longwall Mining Machinery Shearer
Lecture 34 - Longwall Mining Machinery Armored Face Conveyor
Lecture 35 - Longwall Mining Machinery Power Support
Lecture 36 - Mine Pumps
Lecture 37 - Mine Pumps : Special Pumps
Lecture 38 - Basic Pumping Theory
Lecture 39 - Air Compressor
Lecture 40 - Fans for Mining
Lecture 41 - Transportation Machinery for Surface Mines
Lecture 42 - Automobiles in Mines and Mining Truck
Lecture 43 - Off-highway Trucks
Lecture 44 - Off-highway Trucks : Rimpull Curves and Tires
Lecture 45 - Off-highway Trucks : Performance
Lecture 46 - Belt Conveyor
Lecture 47 - Belt Conveyor Design Criteria
Lecture 48 - Power Requirements for Belt Conveyor
Lecture 49 - Belt Conveyor Maintenance
Lecture 50 - Aerial Rope Ways
Lecture 51 - Machinery for Underground Mine Transport
Lecture 52 - Endless Rope Haulage
Lecture 53 - Rope Haulage in Underground Mines
Lecture 54 - Locomotive
Lecture 55 - Equipment for Shaft : Winding Machines
Lecture 56 - Mechanics of Hoisting
Lecture 57 - Low Profile Dumper
Lecture 58 - Maintenance of Mining Machinery
Lecture 59 - Maintenance Management Information System
Lecture 60 - Non Destructive Testing

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NPTEL Video Course - Mining Engineering - NOC:Underground Mining of Metalliferous Deposits

Subject Co-ordinator - Prof. Bibhuti Bhusan Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Metals and Civilisation
Lecture 2 - Mine Life Cycle
Lecture 3 - Present Status of Mineral Deposits
Lecture 4 - Present Status of Underground Mining
Lecture 5 - Terminology - I
Lecture 6 - Terminology - II
Lecture 7 - Determination of Cut Off Grade - I
Lecture 8 - Determination of Cut Off Grade - II
Lecture 9 - Determination of Cut Off Grade - III
Lecture 10 - Dilution
Lecture 11 - Recovery
Lecture 12 - Adit - I
Lecture 13 - Adit - II
Lecture 14 - Incline Shaft
Lecture 15 - Shaft - I
Lecture 16 - Shaft - II
Lecture 17 - Shaft - III
Lecture 18 - Horizontal Drivages - I
Lecture 19 - Horizontal Drivages - II
Lecture 20 - Horizontal Drivages - III
Lecture 21 - Horizontal Drivages - IV
Lecture 22 - Raising and Winzing - I
Lecture 23 - Raising and Winzing - II
Lecture 24 - Raising and Winzing - III
Lecture 25 - Raising and Winzing - IV
Lecture 26 - Selection of Mining Methods - I
Lecture 27 - Selection of Mining Methods - II
Lecture 28 - Selection of Mining Methods - III
Lecture 29 - Selection of Mining Methods - IV

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Lecture 30 - Selection of Mining Methods - V
Lecture 31 - Breast Stoping
Lecture 32 - Sampling Practices
Lecture 33 - Stope and Pillar - I
Lecture 34 - Stope and Pillar - II
Lecture 35 - Room and Pillar Mining - I
Lecture 36 - Room and Pillar Mining - II
Lecture 37 - Tributary area method
Lecture 38 - Pillar Failure
Lecture 39 - Shrinkage Stoping - I
Lecture 40 - Shrinkage Stoping - II
Lecture 41 - Cut and Fill stoping - I
Lecture 42 - Cut and Fill stoping - II
Lecture 43 - Cut and Fill stoping - III [Post Pillar Method]
Lecture 44 - Backfill Materials
Lecture 45 - Backfill Materials - II
Lecture 46 - Rock Bolting - I
Lecture 47 - Rock Bolting - II
Lecture 48 - Cable Bolting
Lecture 49 - Sublevel Stoping
Lecture 50 - Long Hole Stoping
Lecture 51 - Resuing Method of Stoping
Lecture 52 - Square Set Stoping
Lecture 53 - Vertical Crater Retreat Method - I
Lecture 54 - Vertical Crater Retreat Method - II
Lecture 55 - Sublevel Caving - I
Lecture 56 - Sublevel Caving - II
Lecture 57 - Block Caving - I
Lecture 58 - Block Caving - II
Lecture 59 - Safety in U/G Metal Mines - I
Lecture 60 - Safety in U/G Metal Mines - II

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NPTEL Video Course - Mining Engineering - NOC:Surface Mining Technology

Subject Co-ordinator - Prof. Kaushik Dey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Rocks Mineral and Ore
Lecture 2 - Current Status of Surface Mining
Lecture 3 - Stripping Ratios and Pit Layouts - I
Lecture 4 - Stripping Ratios and Pit Layouts - II
Lecture 5 - Stripping Ratios and Pit Layouts - III
Lecture 6 - Phases of Surface Mining - I
Lecture 7 - Phases of Surface Mining - II
Lecture 8 - Phases of Surface Mining - III
Lecture 9 - Opening Through Box Cut - I
Lecture 10 - Opening Through Box Cut - II
Lecture 11 - Drilling Technology for Surface Blasting - I
Lecture 12 - Drilling Technology for Surface Blasting - II
Lecture 13 - Drilling Technology for Surface Blasting - III
Lecture 14 - Drilling Technology for Surface Blasting - IV
Lecture 15 - Technology for Surface Blasting - I
Lecture 16 - Technology for Surface Blasting - II
Lecture 17 - Technology for Surface Blasting - III
Lecture 18 - Technology for Surface Blasting - IV
Lecture 19 - Technology for Surface Blasting - V
Lecture 20 - Technology for Surface Blasting - VI
Lecture 21 - Excavation by Ripper - I
Lecture 22 - Excavation by Ripper - II
Lecture 23 - Excavation by Ripper - III
Lecture 24 - Excavation with Shovel - I
Lecture 25 - Excavation with Shovel - II
Lecture 26 - Excavation with Shovel - III
Lecture 27 - Excavation with Shovel - IV
Lecture 28 - Transportation in Surface Mines - I
Lecture 29 - Transportation in Surface Mines - II

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Lecture 30 - Transportation in Surface Mines - III
Lecture 31 - Excavation with Surface Miner - I
Lecture 32 - Excavation with Surface Miner - II
Lecture 33 - Excavation with Surface Miner - III
Lecture 34 - Excavation with Surface Miner - IV
Lecture 35 - Excavation with Surface Miner - V
Lecture 36 - Excavation with Dragline - I
Lecture 37 - Excavation with Dragline - II
Lecture 38 - Excavation with Dragline - III
Lecture 39 - Highwall Mining - I
Lecture 40 - Highwall Mining - II
Lecture 41 - Highwall Mining - III
Lecture 42 - Excavation with Bucket Wheel Excavator - I
Lecture 43 - Excavation with Bucket Wheel Excavator - II
Lecture 44 - Excavation with Bucket Wheel Excavator - III
Lecture 45 - Some Auxiliary Operations
Lecture 46 - Haul Road - I
Lecture 47 - Haul Road - II
Lecture 48 - Haul Road - III
Lecture 49 - Inland Transportation System - I
Lecture 50 - Inland Transportation System - II
Lecture 51 - Dimensional Stone Mining - I
Lecture 52 - Dimensional Stone Mining - II
Lecture 53 - Dimensional Stone Mining - III
Lecture 54 - Seabed Mining -I
Lecture 55 - Seabed Minimg - II
Lecture 56 - Stability Of Bench Slopes - I
Lecture 57 - Stability Of Bench Slopes - II
Lecture 58 - Stability Of Bench Slopes - III
Lecture 59 - Closure Of Surface Mines - I
Lecture 60 - Closure Of Surface Mines - II

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NPTEL Video Course - Mining Engineering - NOC:Mine Automation and Data Analytics

Subject Co-ordinator - Prof. Radhakanta Koner

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Automation
Lecture 2 - Principle of Automation and Strategies
Lecture 3 - Elements of Automated System
Lecture 4 - Elements of Automated System (Continued...)
Lecture 5 - Autonomous Haulage System
Lecture 6 - Autonomous Haulage System (Continued...)
Lecture 7 - Automated Drilling System
Lecture 8 - Automated Drilling System (Continued...)
Lecture 9 - Fleet Management System
Lecture 10 - Fleet Management System (Continued...)
Lecture 11 - Introduction to CMMS
Lecture 12 - Enterprise resource planning (ERP) system
Lecture 13 - Remote operation and control center
Lecture 14 - Remote operation and control center
Lecture 15 - Proximity Sensors
Lecture 16 - Proximity Sensors and Control System
Lecture 17 - Sensing System: Radar Technology
Lecture 18 - RFID in Mining Engineering
Lecture 19 - Introduction to Geo-fencing
Lecture 20 - CCD camera in Mine safety and management
Lecture 21 - GNSS in Mining
Lecture 22 - GNSS Case Studies - Part I
Lecture 23 - GNSS Case Studies - Part II
Lecture 24 - Image Processing and Analysis in Remote Sensing
Lecture 25 - Basics of Digital Image Processing
Lecture 26 - Automated communication andtracking technologies: Image processing
Lecture 27 - Automated Communication and Tracking Technologies: SCADA
Lecture 28 - SCADA and its Application in Mining
Lecture 29 - Introduction to VR Systems

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Lecture 30 - Virtual Reality Application in Mining
Lecture 31 - Introduction to Augmented Reality (AR)
Lecture 32 - Augmented Reality Application in Mining
Lecture 33 - Introduction - I
Lecture 34 - Introduction - II
Lecture 35 - Introduction to Probability and its associated terms
Lecture 36 - Introduction to Probability and its associated terms
Lecture 37 - Discrete Random Variable - Part I
Lecture 38 - Discrete Random Variable - Part II
Lecture 39 - Continuous Random Variable - Part I
Lecture 40 - Continuous Random Variable - Part II
Lecture 41 - Hypothesis Testing - I
Lecture 42 - Hypothesis Testing - II
Lecture 43 - t-test
Lecture 44 - Chi-Squared Test
Lecture 45 - Introduction to Machine Learning
Lecture 46 - Regression
Lecture 47 - Logistic Regression
Lecture 48 - K Nearest Neighbor
Lecture 49 - Support Vector Machine
Lecture 50 - NaÃ Â¯ve Bayes Classifier
Lecture 51 - Artificial Neural Networks
Lecture 52 - K Means Clustering
Lecture 53 - DBSCAN
Lecture 54 - Principal Component Analysis (PCA)
Lecture 55 - Application of Big Data Analytics in Mining
Lecture 56 - Big Data and AI Used Cases
Lecture 57 - Cognitive Maintenance in Mining
Lecture 58 - Cognitive Maintenance Case Studies
Lecture 59 - Introduction to Orebody Modelling and Mine Design
Lecture 60 - Case studies on Orebody Modeling and Mine Design

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NPTEL Video Course - Mining Engineering - NOC:Mineral Economics and Business

Subject Co-ordinator - Prof. Bibhuti Bhusan Mandal, Prof. Shantanu Kumar Patel

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Globalization and FDI
Lecture 3 - Mining enterprises
Lecture 4 - Acts and Regulations - I
Lecture 5 - Acts and Regulations - II
Lecture 6 - Reserve reporting practices
Lecture 7 - Reserve reporting practices (Continued...)
Lecture 8 - Ore Reserve Estimation - 1
Lecture 9 - Ore Reserve Estimation - 2
Lecture 10 - Mining Plan, Sustainable Mining and Mine Closure Plan
Lecture 11 - Mineral Auction Rules, 2015
Lecture 12 - Cutoff Grade - 1
Lecture 13 - Cutoff Grade - 2
Lecture 14 - Cutoff Grade - 3
Lecture 15 - Demand and Supply of Minerals
Lecture 16 - Feasibility study and Hypothetical project financing
Lecture 17 - Capital Expenditure and Operating Expenditure
Lecture 18 - Greenfield projects and Surface mine cost models
Lecture 19 - Underground mine cost models
Lecture 20 - Beneficiation Cost, Environmental Impact and Cost
Lecture 21 - Purpose and Types of Valuation studies
Lecture 22 - Time Value of Money - 1
Lecture 23 - Time Value of Money - 2
Lecture 24 - Time Value of Money - 3
Lecture 25 - Valuation models and Evaluation techniques
Lecture 26 - Introduction to mining finance
Lecture 27 - Cost of Capital - I
Lecture 28 - Cost of Capital - II
Lecture 29 - Determining Appropriate Discount Rate - 1

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Lecture 30 - Determining Appropriate Discount Rate - 2
Lecture 31 - Problems and solutions - I
Lecture 32 - Problems and solutions - II
Lecture 33 - Inflation - 1
Lecture 34 - Inflation - 2
Lecture 35 - Inflation - 3
Lecture 36 - Net Present Value (NPV)
Lecture 37 - Internal Rate of Return (IRR)
Lecture 38 - Modified Internal Rate of Return (MIRR)
Lecture 39 - Benefit Cost Ratio (BCR) and Discounted Payback Period
Lecture 40 - Problems and Solutions - III
Lecture 41 - Cost accounting in mining
Lecture 42 - Cost Volume Profit analysis - I
Lecture 43 - Cost Volume Profit analysis - II
Lecture 44 - Depreciation - I
Lecture 45 - Depreciation - II
Lecture 46 - Problems and Solutions - IV
Lecture 47 - Problems and Solutions - V
Lecture 48 - Mining and Minerals â other sources of finance
Lecture 49 - Business risk and Mining
Lecture 50 - Management and Quantification of mining investment risk
Lecture 51 - Coal Grade and Prices
Lecture 52 - Average sale price (ASP)
Lecture 53 - Royalty and Taxes - I
Lecture 54 - Royalty and Taxes - II
Lecture 55 - Critical minerals
Lecture 56 - Problems Solving
Lecture 57 - National Mineral Policy - I
Lecture 58 - National Mineral Policy - II
Lecture 59 - Current strategies in mining business
Lecture 60 - International trade in minerals and coal

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NPTEL Video Course - Mining Engineering - NOC:Mechanical and Electrical Systems of Mining Machines

Subject Co-ordinator - Prof. Aurobinda Routray, Dr. Sunita Mishra

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview on Mining Machines
Lecture 2 - Overview on Mining Machines (Continued...)
Lecture 3 - Simple Mechanisms
Lecture 4 - Belt, Rope and Chain Drives
Lecture 5 - Belt, Rope and Chain Drives (Continued...)
Lecture 6 - Tutorials on Belt Drives
Lecture 7 - Toothed Gears
Lecture 8 - Toothed Gears (Continued...)
Lecture 9 - Gear Trains
Lecture 10 - Tutorials on Toothed Gears and Gear Trains
Lecture 11 - Brakes and Dynamometers
Lecture 12 - Brakes and Dynamometers (Continued...)
Lecture 13 - Tutorials on Brakes
Lecture 14 - Internal Combustion Engine
Lecture 15 - Internal Combustion Engine (Continued...)
Lecture 16 - Internal Combustion Engine (Continued...)
Lecture 17 - Internal Combustion Engine (Theory and Tutorial)
Lecture 18 - Power Transmission System
Lecture 19 - Power Transmission System (Continued...)
Lecture 20 - Tutorials on Power Transmission System
Lecture 21 - Mechanical Transmission in Shovel
Lecture 22 - Mechanical Transmission in Shovel
Lecture 23 - Tutorials on Shovels
Lecture 24 - Bucket Wheel Excavator
Lecture 25 - Dragline
Lecture 26 - Tutorials on Bucket Wheel Excavator and Dragline
Lecture 27 - Surface Miner, Continuous Miner and Shearer
Lecture 28 - Front-end loader, Scraper and Dozer
Lecture 29 - Front-end loader, Scraper and Dozer (Continued...)

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Lecture 30 - Mechatronics in HEMM
Lecture 31 - Introduction
Lecture 32 - Electrical Power System
Lecture 33 - Concept of a Phasor
Lecture 34 - Generator Transformer etc
Lecture 35 - Magnetic Circuits
Lecture 36 - Magnetic Circuits
Lecture 37 - Transformer
Lecture 38 - Transformer
Lecture 39 - Transformer
Lecture 40 - Transformer
Lecture 41 - Transformer : Problem Solving
Lecture 42 - Transformer : Problem Solving (Continued...)
Lecture 43 - Rotating Machines
Lecture 44 - Rotating Machines
Lecture 45 - Rotating Magnetic Field
Lecture 46 - Rotating Magnetic Field
Lecture 47 - Induction Motor Performance and Operation
Lecture 48 - Induction Motor Performance and Operation (Continued...)
Lecture 49 - Induction Motor Open Circuit and Short Circuit Test
Lecture 50 - Induction Motor Open Circuit and Short Circuit Test (Continued...)
Lecture 51 - Cables - I
Lecture 52 - Cables - II
Lecture 53 - Cables
Lecture 54 - Cables
Lecture 55 - Cable Equivalent Circuits and Analysis
Lecture 56 - Batteries
Lecture 57 - Batteries (Continued...)
Lecture 58 - Batteries (Continued...)
Lecture 59 - Power Electronics
Lecture 60 - Power Electronics (Continued...)

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NPTEL Video Course - Multi Disciplinary - NOC:Designing Learner-Centric MOOCs

Subject Co-ordinator - Prof.Sridhar Iyer, Prof.Sahana Murthy, Dr.Jayakrishnan M., Dr.Sameer Sahasrabudhe

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Course Introduction
Lecture 3 - Perspectives of the teachers and learners
Lecture 4 - Key takeaways for online instruction
Lecture 5 - Key Evolution of MOOCs
Lecture 6 - Known Challenges
Lecture 7 - Need of LC in MOOCs post pandemic
Lecture 8 - Why LCM
Lecture 9 - The LCM Model
Lecture 10 - Perceptions of MOOC
Lecture 11 - Learner Expectation
Lecture 12 - Learner Engagement
Lecture 13 - What is an LeD?
Lecture 14 - Chunking a Lectuer into LeD
Lecture 15 - Introducing Reflection Spot
Lecture 16 - Making Your Own LeD
Lecture 17 - Deciding appropriateness of various mediums to create LeDs
Lecture 18 - Example of various mediums from this course
Lecture 19 - Doâ s and Donâ ts - Part 1
Lecture 20 - Doâ s and Donâ ts - Part 2
Lecture 21 - LeDs Takeaway
Lecture 22 - What is an LbD?
Lecture 23 - Creating LbDs
Lecture 24 - Constructive Customized Feedback in LbDs
Lecture 25 - Giving Feedback for Open Ended Questions
Lecture 26 - Recommendations for effective LbDs
Lecture 27 - What is an LxT?
Lecture 28 - Creating LxTs
Lecture 29 - Creating an Assimilation Quiz

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Lecture 30 - What is an LxI
Lecture 31 - Creating LxI with Reflection Quiz
Lecture 32 - Orchestrating your MOOC
Lecture 33 - Orchestration Dynamics in LCM
Lecture 34 - Assessment
Lecture 35 - From Regular course to LCM
Lecture 36 - Course Design in MOOC
Lecture 37 - Maintaining Learner Connect
Lecture 38 - Implementing the Learner Centric Approach
Lecture 39 - Designing LxTs using LLMs
Lecture 40 - Licensing and Ethical usage
Lecture 41 - LeD 8.3 LCM lite
Lecture 42 - Various Production Teams
Lecture 43 - Adopting LCM Model : Prof. Mandar Bhanushe
Lecture 44 - Adopting LCM Model : Prof. Tejinder Pal Singh

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NPTEL Video Course - Multi Disciplinary - NOC:Introduction to Learning Analytics

Subject Co-ordinator - Prof. Ramkumar Rajendran

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Learning Analytics
Lecture 2 - LA, EDM and Academic Analytics
Lecture 3 - Types of Learning Analytics - I
Lecture 4 - Types of Learning Analytics - II
Lecture 5 - Data Collection
Lecture 6 - Data Collection in TELE
Lecture 7 - Data collection in MOOC
Lecture 8 - Multichannel Data
Lecture 9 - Ethics and Data Privacy in LA
Lecture 10 - Descriptive Analytics
Lecture 11 - Data Visualization
Lecture 12 - YouTube Analytics Dashboard
Lecture 13 - MOOCs Analytics Dashboard
Lecture 14 - Predictive Analytics
Lecture 15 - Linear Regression
Lecture 16 - Weka demo and how to read the results
Lecture 17 - MOOC data for Course Project
Lecture 18 - Summary of the Course

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NPTEL Video Course - Multi Disciplinary - NOC:Designing Learner-Centric e-Learning in STEM Disciplines

Subject Co-ordinator - Prof.Sahana Murthy

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Preview
Lecture 2 - What is this course about?
Lecture 3 - Course Format_Learner Centric MOOC (LCM)
Lecture 4 - E-Learning in STEM
Lecture 5 - Making online Teaching Decisions
Lecture 6 - Challenges in e-learning
Lecture 7 - What is Learner-centric Approach?
Lecture 8 - Promoting Learner Engagement with Content
Lecture 9 - Why and How to Design Interactive Videos?
Lecture 10 - What is an LeD?
Lecture 11 - Learning by Doing (LbD)
Lecture 12 - Articulation and Reflection
Lecture 13 - Construct your Own Understanding
Lecture 14 - Contextualized Learning
Lecture 15 - Feedback to Learners
Lecture 16 - Collaboration and Peer Learning
Lecture 17 - Addressing Diversity
Lecture 18 - Putting it All Together
Lecture 19 - Selection and Analysis of Effective Technology
Lecture 20 - Effective Integration of Technology
Lecture 21 - Instructional Design in e-learning
Lecture 22 - ADDIE Process of Instructional Design
Lecture 23 - Constructive Alignment
Lecture 24 - Implementing constructive alignment
Lecture 25 - Multimedia Principle and Contiguity Principle
Lecture 26 - Modality Principle and Redundancy Principle
Lecture 27 - Coherence Principle
Lecture 28 - Segmenting and Personalization Principles
Lecture 29 - Visual Communication Strategies for E-content

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Lecture 30 - Forms of Learning
Lecture 31 - Integrating LC Elements in E-content
Lecture 32 - E-learning Design Process
Lecture 33 - Closing

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NPTEL Video Course - Multi Disciplinary - NOC:Sustainable and Affordable Sanitation Solutions for Small Towns

Subject Co-ordinator - Prof. N.C Narayanan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Issue of Sanitation
Lecture 2 - Overview of Sanitation in the country
Lecture 3 - Centralised or Decentralised?
Lecture 4 - Need for Participatory Planning
Lecture 5 - Context setting for the Alappuzha Project
Lecture 6 - Environmental Policy
Lecture 7 - Environmental Impact Assessment 2006 and National Urban Sanitation Plan
Lecture 8 - Environmental Governance - Challenges and Alternatives
Lecture 9 - Municipal Solid Waste Management
Lecture 10 - MSWM - Status, Policy, governance structure
Lecture 11 - Integrated Municipal Solid Waste Management
Lecture 12 - Plastic Waste Management
Lecture 13 - Municipal Solid Waste Management in Alappuzha
Lecture 14 - Liquid Waste Management - an Overview
Lecture 15 - Introduction to Faecal Sludge Management
Lecture 16 - Faecal Sludge Management for Alappuzha town
Lecture 17 - Introduction to liquid waste treatment technologies
Lecture 18 - Decentralized Waste Water Treatment system - An Introduction
Lecture 19 - Case studies - Decentralised waste water treatment
Lecture 20 - Decentralized waste water treatment systems plan for Alappuzha
Lecture 21 - History of Sanitation in Alappuzha
Lecture 22 - Organic waste management in Alappuzha
Lecture 23 - Inorganic waste management - Role of Kudumbashree and Haritha Karma Sena
Lecture 24 - Youth engagement for recaiming canals
Lecture 25 - Significance of institution building in reclaiming canals

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NPTEL Video Course - Multi Disciplinary - NOC:Engineering Statistics

Subject Co-ordinator - Prof. Manjesh Kumar Hanawal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Probability
Lecture 2 - Consequences of Axioms
Lecture 3 - Interpretation of Probability
Lecture 4 - Total Probability law and Baye's Theorem - I
Lecture 5 - Total Probability law and Baye's Theorem - II
Lecture 6 - Random variables and Cumulative Density Function
Lecture 7 - Discrete and Continuous random variables - I
Lecture 8 - Discrete and Continuous random variables - II
Lecture 9 - Expectation and Variance
Lecture 10 - Function of Random variables
Lecture 11 - Generating RVs, Joint Distribution of RVs
Lecture 12 - Joint Distribution of RVs and Marginal densities
Lecture 13 - Covariance of Random variables
Lecture 14 - Moment Generating Functions
Lecture 15 - Conditional PMF and PDF
Lecture 16 - Law of Large numbers, Central Limit Theorem
Lecture 17 - Application of Central Limit Theorem - I
Lecture 18 - Application of Central Limit Theorem - II
Lecture 19 - Gamma and Chi-square distributions
Lecture 20 - Beta distributions and Exponential families
Lecture 21 - Random Sampling, Sample mean and Sample variance
Lecture 22 - Sampling from Gaussian distribution and t-distribution
Lecture 23 - Student's t- distribution
Lecture 24 - F-distribution and its properties
Lecture 25 - Convergence of Random variables and Consistency
Lecture 26 - Order statistics, Median and Percentiles
Lecture 27 - Generating random sample-Direct method
Lecture 28 - Generating random sample-Indirect method
Lecture 29 - Introduction to python

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Lecture 30 - Python- Loops and Numpy library
Lecture 31 - Sufficiency Principles and Sufficient Statistics
Lecture 32 - Sufficient Statistics and Characterization of Sufficient Statistics
Lecture 33 - Characterization of Sufficient Statistics and Factorization Theorem
Lecture 34 - Example of Factorization Theorem, Minimal Sufficient Statistics
Lecture 35 - Minimal sufficient statistics
Lecture 36 - Test for minimal sufficient statistics withexamples, Ancillary Statistics
Lecture 37 - Likelihood Functions, Maximum Likelihood Estimator
Lecture 38 - Method of moments, Baye's Estimator
Lecture 39 - Evaluating Estimator, Cramer Rao Bound, Fisher Information
Lecture 40 - Evaluating Estimator, Cramer Rao Bound, Fisher Information (Continued...)
Lecture 41 - Hypothesis Testing, Likelihood Ratio Test
Lecture 42 - Hypothesis Testing, Bayes Test
Lecture 43 - Type I and II errors, Power Functions
Lecture 44 - Type I and II errors, Power Functions (Continued...)
Lecture 45 - Calculations of Power Functions
Lecture 46 - Unbiased Test, Uniformly Most Powerful Test,Neyman- Pearson Lemma, Interval Estimation
Lecture 47 - Interval Estimation
Lecture 48 - Interval Estimation (Continued...)
Lecture 49 - Constructiong Confidence Intervals from tests
Lecture 50 - Python- numpy and pandas functions II
Lecture 51 - Tutology of tests and confidence intervals
Lecture 52 - Tutology of tests and confidence intervals (Continued...)
Lecture 53 - p-value, p-test of significance of a statistical test
Lecture 54 - t-test and F-test, ANOVA
Lecture 55 - Non-parametric test, Goodness of fit, Chi- squared test
Lecture 56 - Distribution of Chi-squared test statistics
Lecture 57 - Kolmogrov-Smirnov test
Lecture 58 - Lilliefors's test and Explorator Data Analysis, Q-Q Plot and P-P Plot
Lecture 59 - Generating random samples using Python, Hypothesis Testing using Python
Lecture 60 - Generating random samples using Python, Hypothesis Testing using Python (Continued...)

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NPTEL Video Course - Multi Disciplinary - NOC:Intelligent Feedback and Control

Subject Co-ordinator - Prof. Leena Vachhani

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding PID Control
Lecture 2 - Process Model: Experimental Methods
Lecture 3 - Model Reduction
Lecture 4 - Disturbance Models and PID
Lecture 5 - PID Tuning Methods
Lecture 6 - PID Tuning Methods (Continued...)
Lecture 7 - Selection of PID Controller
Lecture 8 - Designing Controllers in a Jugaad Way
Lecture 9 - To explain why jugaad works....
Lecture 10 - Feedforward Design
Lecture 11 - State-space methods - Feedforward Control
Lecture 12 - Internal Model Control (IMC)
Lecture 13 - Overview of Control Techniques
Lecture 14 - Multivariable Control
Lecture 15 - Multivariable Control (Continued...)
Lecture 16 - Decoupler Design
Lecture 17 - Feedback Decouplers and Centralized Controllers
Lecture 18 - Large Scale MIMO Systems
Lecture 19 - Understanding irreducible transfer functions
Lecture 20 - Data Driven PID Control
Lecture 21 - Data Driven PID Control (Continued...)
Lecture 22 - Control and Learning
Lecture 23 - Control using Reinforcement Learning (RL)
Lecture 24 - Reinforcement learning based control for inverted pendulum
Lecture 25 - Policy Gradient based Reinforcement Learning
Lecture 26 - Using MATLAB for Reinforcement Learning
Lecture 27 - Course Summary

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NPTEL Video Course - Multi Disciplinary - NOC:Introduction to Evolutionary Dynamics

Subject Co-ordinator - Prof. Supreet Saini

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Story of proposal of the theory of natural selection
Lecture 2 - Natural Selection; Patrick Matthew. History of life on earth
Lecture 3 - Where did life come from ?
Lecture 4 - Elements of theory of natural selection
Lecture 5 - Limitations of Darwins proposal of theory of natural selection
Lecture 6 - Natural selection in action in ecology
Lecture 7 - Central Dogma of Molecular Biology
Lecture 8 - Gene expression in biology
Lecture 9 - Numbers in E. coli
Lecture 10 - Growth and evolution in microbial populations
Lecture 11 - Mutations and errors in DNA replication
Lecture 12 - How does E. coli divide ?
Lecture 13 - How does evolution take place in sexually reproducing organisms ?
Lecture 14 - Growth in batch culture
Lecture 15 - How to define fitness in a batch culture ?
Lecture 16 - Model for growth in exponential growth
Lecture 17 - Logistic model for growth
Lecture 18 - Growth in a chemostat
Lecture 19 - Modeling genotype competition in a chemostat
Lecture 20 - Mutations and their selection coefficients
Lecture 21 - Distribution of fitness effects (DFE)
Lecture 22 - Sequence Space and Fitness Landscape
Lecture 23 - Epistasis and structure of landscape
Lecture 24 - Epistasis and structure of landscape
Lecture 25 - Landscape of antibiotic resistance
Lecture 26 - IPsec and Virtual Private Networks (VPNs) for Network-Layer Security - Part 1
Lecture 27 - IPsec and Virtual Private Networks (VPNs) for Network-Layer Security - Part 2
Lecture 28 - IPsec and Virtual Private Networks (VPNs) for Network-Layer Security - Part 3
Lecture 29 - Securing Wireless LANs - Part 1

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Lecture 30 - Securing Wireless LANs - Part 2
Lecture 31 - Marbles in a jar continued
Lecture 32 - Moran Process
Lecture 33 - Transition probability in Moran process
Lecture 34 - Fixation probability
Lecture 35 - Fixation probability of a neutral mutation
Lecture 36 - Fixation probability of a beneficial mutation
Lecture 37 - Fixation probability of a beneficial mutation (Continued...)
Lecture 38 - Fixation probability of a beneficial mutation (Continued...)
Lecture 39 - Time of occurance of mutations
Lecture 40 - Graphical representation of evolving populations
Lecture 41 - Time of fixation of mutations
Lecture 42 - Estimating t_wait
Lecture 43 - Traveling wave model of microbial evolution
Lecture 44 - Deriving traveling wave model equations
Lecture 45 - dN/dS
Lecture 46 - dN/dS (Continued...), and how to do an evolution experiment in lab ?
Lecture 47 - Serial Subculture Experiment
Lecture 48 - Evolution in Chemostat and Mutation Accumulation Experiment
Lecture 49 - Megaplate Experiment
Lecture 50 - Long Term Evolution Experiment (LTEE)
Lecture 51 - Fitness trajectory with number of generations
Lecture 52 - Second order selection - mutation rate
Lecture 53 - Do fitness landscapes have a peak ?
Lecture 54 - Do fitness landscapes have a peak ? (Continued...)
Lecture 55 - Metabolic innovation in a lab evolution experiment ?
Lecture 56 - Selection vs. Drift
Lecture 57 - Historical Contingency in evolution
Lecture 58 - Unicellularity to Multicellularity
Lecture 59 - Adaptive diversification in microbial populations
Lecture 60 - Synonymous mutations have fitness effects. Mutation Accumulation Experiments

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NPTEL Video Course - Multi Disciplinary - NOC:Risk-Conscious Operations Management (RCOM)

Subject Co-ordinator - Prof. Prabhakar V. Varde

Co-ordinating Institute - Homi Bhabha National Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Background and Introduction
Lecture 2 - Probabilistic Risk Assessment - An Introduction
Lecture 3 - PRA Modelling (Continued...)
Lecture 4 - Introduction - Risk-based Engineering
Lecture 5 - Introduction - RCOM Case studies
Lecture 6 - Dependability Engineering - Introduction
Lecture 7 - Dependability Engineering - Reliability Engineering
Lecture 8 - Dependability Engineering - System Reliability
Lecture 9 - Dependability Engineering - Availability Modelling
Lecture 10 - Dependability Engineering - Maintainability and Safety/Risk Modelling
Lecture 11 - Risk-based Engineering - Introduction
Lecture 12 - Risk-based Engineering - The RBE Framework
Lecture 13 - Risk-based Engineering - The Deterministic Approach to Operations
Lecture 14 - Risk-based Engineering - Probabilistic Approach
Lecture 15 - Risk-based Engineering - Special Areas
Lecture 16 - Risk-Conscious Culture - Introduction
Lecture 17 - Risk-Conscious Culture - Governing Principles
Lecture 18 - Risk-based Engineering - The Risk model for RCC
Lecture 19 - RCC - Human and Organisational Factors
Lecture 20 - RCC - Technical Elements
Lecture 21 - Risk Modelling and Simulation - Introduction
Lecture 22 - Integrated Risk Simulation Framework
Lecture 23 - Probabilistic Modelling
Lecture 24 - Probabilistic Risk Assessment
Lecture 25 - Major Elements and Functions in Integrated Simulation
Lecture 26 - Probabilistic Security Risk Assessment - (PSRA): Introduction
Lecture 27 - Probabilistic Security Risk Assessment - (PSRA): Design Basis Threat
Lecture 28 - Physical Protection System Modelling and Vulnerability
Lecture 29 - Probabilistic Security Risk Assessment - I

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Lecture 30 - Cyber Security Risk Assessment - An Introduction
Lecture 31 - Role of consciousness in RCOM - Introduction
Lecture 32 - Evolution of Science and Philosophy of Consciousness - An Overview
Lecture 33 - Neuroscience of Consciousness
Lecture 34 - Major Scientific Approaches and State-of-the-art of Consciousness - I
Lecture 35 - Major Scientific Approaches and State-of-the-art of Consciousness - II
Lecture 36 - Operations Research in RCOM - Introduction
Lecture 37 - Operations Research in RCOM - Simplex Method - Part I
Lecture 38 - Operations Research in RCOM - Simplex Method - Part II
Lecture 39 - Operations Research - Inventory Management
Lecture 40 - PRA PROJECT Management
Lecture 41 - Human Factors in Operation - Introduction
Lecture 42 - Human Reliability Model - CQB
Lecture 43 - Consciousness and Conscience Attributes in CQB
Lecture 44 - Reference Human Model in CQB
Lecture 45 - Quantification in CQB
Lecture 46 - Operational Risk Management - Introduction
Lecture 47 - ORM - Integrated ORM Approach
Lecture 48 - Integrated Operations Management System
Lecture 49 - IORM - Root Cause Analysis And Failure Precursor
Lecture 50 - ORM - Plant Ageing Management and Relicensing
Lecture 51 - Risk-conscious Maintenance Management - Introduction
Lecture 52 - Risk-conscious Maintenance Management - Role of Riskinformed/Risk-based Engineering
Lecture 53 - RCMM - Framework and Implementation
Lecture 54 - RCMM - Surveillance Test and Maintenance Interval Optimization (RCTMM)
Lecture 55 - Intelligent Approach in Support for Optimization in RCTMM
Lecture 56 - Artificial Intelligence in Operation and Maintenance Management - Introduction
Lecture 57 - AI Models and Methods
Lecture 58 - AI/ML Based Operator Advisory Systems
Lecture 59 - Prognostics And Health Management - A Systems Approach
Lecture 60 - Intelligent Diagnostics and Risk Of AI

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NPTEL Video Course - Multi Disciplinary - NOC:Industry 4.0: Managing the Digital Transformation

Subject Co-ordinator - Prof Murli Dhar Agrawal

Co-ordinating Institute - IIT Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evolution of the Fourth Industrial Revolution (4IR) and Industry 40
Lecture 2 - Digital Transformation and Industry 40 Principles
Lecture 3 - Foundation Technologies of Industry 40: Connectivity, IoT, Big Data, Cloud
Lecture 4 - Foundation Technology: IoT platform, Edge Computing, Connected Products
Lecture 5 - Data, cloud and advance Analytics
Lecture 6 - Playbook of Industry 40 Technologies, Convergence, Integration, Digitalization and Framework
Lecture 7 - Automation of Enterprise using RPA and Intelligent RPA
Lecture 8 - Additive Manufacturing and 3D based revolution in manufacturing
Lecture 9 - Augmented Reality, Virtual Reality, Mixed Reality and Computer Vision
Lecture 10 - Advance concepts of Augmented Technologies, Computer Vision, Virtual AI
Lecture 11 - Business Value Vale Chain and Processes for Industry 40
Lecture 12 - Frameworks: Industry 40 Value, RAMI 40 engineering core McKinsey Industry 40
Lecture 13 - Digitalization and digital transformation and Roadmap for implementation
Lecture 14 - Six models of Digitalization, Cert and Cyber Security standards Global Lighthouses
Lecture 15 - What are learnings from World Economic Forum's Global Lighthouse Companies Use Cases
Lecture 16 - Tata Steel Case Study One of Global Light House Company by WEF
Lecture 17 - Innovation Playbook for Industry 40 and Overview of Industry 50 and Advance Technologies
Lecture 18 - Emergence of industry 50 standards: Transcending I40 to I50
Lecture 19 - Role of AI in Building Industry 50 Solutions
Lecture 20 - Introduction of Digital Twin (Concept)
Lecture 21 - Introduction of reference architecture for setting up Digital Infrastructure
Lecture 22 - Application Layer API Platform as a service for application integration
Lecture 23 - An overview of Data Management Reference data architecture
Lecture 24 - Digital data product, Cyber security management, Data Privacy Law
Lecture 25 - Case Studies of Cyber and Information security, AI security failure, governance framework, Data
Lecture 26 - Introduction of Smart Manufacturing and Intelligent Manufacturing
Lecture 27 - Framework of Smart Manufacturing, connected workers, assets, plants
Lecture 28 - Automation Vs Autonomous and Role of Robotics, Humanoid, GenAI
Lecture 29 - Revolution in Humanoid Use and AI playbook for smart manufacturing

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Lecture 30 - Strategy for preparing workers for Smart Manufacturing and Smart Supply Chain and Logistics
Lecture 31 - Re-envisioning Manufacturing Business Model
Lecture 32 - Maturity Assessment elements and a brief overview of the global SIRI Framework and KPI
Lecture 33 - Re-envisioning the Digital Workplace for Industry 40 / 50
Lecture 34 - Democratization of Industry 40: Health Care and BFSI
Lecture 35 - Democratization of Industry 40: Agriculture and Retail& Consumer
Lecture 36 - AI Acceleration by the Government of India: Plans and Schemes
Lecture 37 - Key Success Factors for the adoption of Industry 40 / 50 and preparing for Industry 40 and AI Mi
Lecture 38 - Industry 40 rollouts in India
Lecture 39 - Impact of Industry 40 and AI
Lecture 40 - Industry 40 Driver for emergence of New category of Jobs

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NPTEL Video Course - Multi Disciplinary - NOC:Similitude and Approximations in Engineering

Subject Co-ordinator - Vijay Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27

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NPTEL Video Course - Multi Disciplinary - NOC:Fundamental of Fluid Mechanics for Chemical and Biomedical Engi

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fluid Mechanics and Chemical Engineering
Lecture 3 - Biomedical Applications of Fluid Mechanics
Lecture 4 - Vectors: A review
Lecture 5 - Introductory Concepts - 1
Lecture 6 - Introductory Concepts - 2
Lecture 7 - Flow Visualisation
Lecture 8 - Dimensional Analysis - Pi Theorem
Lecture 9 - Dimensional Analysis- Ipsen Method
Lecture 10 - Similitude
Lecture 11 - Pressure Distribution in a Static Fluid
Lecture 12 - Force of Submerged Surfaces
Lecture 13 - Buoyancy
Lecture 14 - Surface Tension
Lecture 15 - Reynolds Transport Theorem
Lecture 16 - Mass Conservation
Lecture 17 - Momentum Conservation - I
Lecture 18 - Momentum Conservation - II
Lecture 19 - Energy Conservation
Lecture 20 - Fluid Translation
Lecture 21 - Fluid Rotation and Deformation
Lecture 22 - Mass Conservation: Derivation
Lecture 23 - Mass Conservation: Cylindrical Coordinates
Lecture 24 - Navier Stokes Equations: Derivation
Lecture 25 - Flow Between Two Parallel Plates
Lecture 26 - Flow in a Falling Liquid Film
Lecture 27 - Fully-developed flow in a circular channel
Lecture 28 - Flow between two concentric cylinders
Lecture 29 - Lubrication Approximation

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Lecture 30 - Creeping Flows
Lecture 31 - Equation of Motion in Streamline Coordinates
Lecture 32 - Irrotational Flow
Lecture 33 - Bernoulli's Equation and Flow Measurement
Lecture 34 - Boundary Layers
Lecture 35 - Momentum Integral Equation
Lecture 36 - Flow Separation and Drag
Lecture 37 - Introduction to Turbulence
Lecture 38 - Turbulent Flow in a Pipe
Lecture 39 - Turbulent Boundary Layers
Lecture 40 - Flow in Pipes: Major Losses
Lecture 41 - Flow in Pipes: Minor Losses
Lecture 42 - Flow in Pipes: Types of Problems
Lecture 43 - Cavitation and NPSH

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NPTEL Video Course - Multi Disciplinary - NOC:Sustainable Power Generation Systems

Subject Co-ordinator - Dr. Pankaj Kalita

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory lectuer
Lecture 2 - Fundamentals of solar thermal collector
Lecture 3 - Low temperature solar thermal power plant
Lecture 4 - Medium and high temperature solar thermal power plant
Lecture 5 - Thermal analysis of solar thermal power plant
Lecture 6 - Fundamentals and concept of solar PV power plant
Lecture 7 - Offgrid solar photovoltaic systems
Lecture 8 - Offgrid solar photovoltaic systems deisgn
Lecture 9 - Grid connected solar photovoltaic systems
Lecture 10 - Performance of grid connected solar photovoltaic systems
Lecture 11 - Introduction to wind power generation
Lecture 12 - Wind data analysis
Lecture 13 - Performance parameters and blade geometry
Lecture 14 - Betz limit and optimum tip speed ratio
Lecture 15 - Design of wind farm
Lecture 16 - Fundamentals and working principle
Lecture 17 - Analysis of small hydro power generation
Lecture 18 - Introduction to biomass power generation
Lecture 19 - Biochemical conversion for electricity generation
Lecture 20 - Thermochemical conversion of solid fuels and gasification system
Lecture 21 - Hydrogen energy
Lecture 22 - Fuel cells technologies - Part I
Lecture 23 - Fuel cells technologies - Part II
Lecture 24 - Hydrogen energy tutorial
Lecture 25 - Fundamentals and methods of geothermal energy harvesting
Lecture 26 - Analysis of geothermal plant and resources
Lecture 27 - Fundamentals and working of ocean thermal energy conversion systems
Lecture 28 - Analysis of close rankine cycle OTEC system
Lecture 29 - Fundamentals and working of tidal energy conversion systems

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Lecture 30 - Fundamentals and working of wave energy conversion systems
Lecture 31 - Overview and analysis of thermal energy storage
Lecture 32 - Fundamentals and analysis of mechanical energy storage system
Lecture 33 - Fundamentals and analysis of electro chemical energy storage system
Lecture 34 - Summary and numerical exercise
Lecture 35 - Fundamentals and methodology of evaluation of energy economics
Lecture 36 - Case study involving energy economics of biomass power generation system and LCA
Lecture 37 - Course Summary

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NPTEL Video Course - Multi Disciplinary - NOC:Foundation Certificate in Palliative Care

Subject Co-ordinator - Prof. Geeta Joshi, Prof. Piyush Gupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Intro
Lecture 2 - Discussion on Course
Lecture 3 - Faculty Intro: Dr. Geeta Joshi and Dr. Piyush Gupta
Lecture 4 - Faculty Intro: Dr. Abhijit Dam
Lecture 5 - Principles of Palliative Care
Lecture 6 - Integrating Science
Lecture 7 - Growth of Palliative Care
Lecture 8 - Holistic Care
Lecture 9 - Palliative Care Concepts - Interview
Lecture 10 - National Scenario of Palliative Care
Lecture 11 - National Scenario
Lecture 12 - WHO Perspective
Lecture 13 - Allopathy
Lecture 14 - Ayush Ministry
Lecture 15 - Ayurveda
Lecture 16 - Ayur Siddha Nature Yoga
Lecture 17 - Naturopathy
Lecture 18 - NHAM
Lecture 19 - Ayush Modules
Lecture 20 - Unani
Lecture 21 - Homeopathy
Lecture 22 - PC Delivery
Lecture 23 - PC Delivery
Lecture 24 - Practicing PC
Lecture 25 - Home Based PC
Lecture 26 - Home Care
Lecture 27 - Home Nursing
Lecture 28 - Hospice
Lecture 29 - Caregiver

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Lecture 30 - Caregiver
Lecture 31 - Integrative PC
Lecture 32 - AYUSH in PC
Lecture 33 - Siddha in PC
Lecture 34 - Siddha
Lecture 35 - Siddha
Lecture 36 - Intro Yoga
Lecture 37 - Yoga
Lecture 38 - Yoga and Stress
Lecture 39 - Introduction Pain
Lecture 40 - Classification Pain
Lecture 41 - Pain Assessment
Lecture 42 - Total Pain
Lecture 43 - Hospice Total Pain
Lecture 44 - WHO 3 Step Ladder
Lecture 45 - Pain Management
Lecture 46 - Cancer Pain
Lecture 47 - Pain Assessment
Lecture 48 - Symptom Assessment
Lecture 49 - Holistic Symptom Management
Lecture 50 - Constipation
Lecture 51 - Delirium
Lecture 52 - Dyspnea
Lecture 53 - Hygiene Bedsores
Lecture 54 - Pressure Sore
Lecture 55 - Secretions
Lecture 56 - Fungating
Lecture 57 - Fungating Wound
Lecture 58 - Fungating pdf
Lecture 59 - Oral NGT Catheter
Lecture 60 - Oral NGT Cathe pdf
Lecture 61 - Nutrition
Lecture 62 - Communication
Lecture 63 - Communications
Lecture 64 - Communication in PC
Lecture 65 - Body Language
Lecture 66 - Communicating Patients
Lecture 67 - Good and Bad Communication
Lecture 68 - Good and Bad Communication

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Lecture 69 - Communication Bridging Gap
Lecture 70 - Overview of Psychological Reactions
Lecture 71 - Psychological Reactions
Lecture 72 - Psychological Aspects
Lecture 73 - Communicating with Patient
Lecture 74 - Breaking Bad News
Lecture 75 - Distress and Denial
Lecture 76 - BBN Collusion Denial
Lecture 77 - Emotional Reactions Breaking Denial
Lecture 78 - Communication Interview
Lecture 79 - Psychological Aspects
Lecture 80 - Anxiety Depression Distress
Lecture 81 - Counsellor in PC
Lecture 82 - Caregiver Burnout Yoga
Lecture 83 - PC in Elderly
Lecture 84 - Spirituality
Lecture 85 - Spirituality and Religion
Lecture 86 - Laws of Karma
Lecture 87 - Last Days of Life
Lecture 88 - Care of Dying and Bereavement
Lecture 89 - Quality of Death
Lecture 90 - Death
Lecture 91 - Grief and Bereavement
Lecture 92 - Ethics in PC
Lecture 93 - Volunteering
Lecture 94 - Volunteers
Lecture 95 - Volunteers
Lecture 96 - Community
Lecture 97 - Community Based PC
Lecture 98 - Community Based PC
Lecture 99 - Network Neighborhood
Lecture 100 - Nurse in Home Care
Lecture 101 - Care of Dying
Lecture 102 - Safety Precaution
Lecture 103 - Self Care
Lecture 104 - Respite Care
Lecture 105 - IT in PC
Lecture 106 - COC
Lecture 107 - Sandhi

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Lecture 108 - Cancer Aid Society
Lecture 109 - Alpha
Lecture 110 - PC Services in Punjab

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NPTEL Video Course - Multi Disciplinary - NOC:Multi-Criteria Decision Making and Applications

Subject Co-ordinator - Prof. Raghu Nandan Sengupta

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Example 01, 02, 03
Lecture 2 - Example 03, 04, 05, 06
Lecture 3 - Example 04, 05, 06 (Continued...)
Lecture 4 - Example 06 (Continued...), Example 07
Lecture 5 - Example 06 (Continued...), Example 07
Lecture 6 - MCDM: Definitions, Theory of Choice, MCDM Axioma, Condorcet Paradox
Lecture 7 - Theory of Choice, MCDM Axioms, Condorcet Paradox
Lecture 8 - MCDM Axioms, Condorcet Paradox, Utility Theory
Lecture 9 - Utility Theory, Expected value of Utility Function, Lotteries, Rational Choice, Properties of Uti
Lecture 10 - Rational Choice, Properties of Utility Function, Risk Aversion, Neutrality, Seeking Properties,
Lecture 11 - Utility Theory Examples, Properties of Utility Function, Risk Aversion, Neutrality, Seekingi Pro
Lecture 12 - Properties of Utility Function, Risk Aversion, Neutrality, Seeking Properties, Marginal Utility,
Lecture 13 - Example of Utility Functions, Certainty Equivalent, Geomatric Mean Methods, Safety First Princip
Lecture 14 - Example of Utility Functions, Certainty Equivalent, Geomatric Mean Methods, Safety First Princip
Lecture 15 - Certainty Equivalent, Geomatric Mean Methods, Safety First Principle, Stochastic Dominance, Hype
Lecture 16 - Geomatric Mean Methods, Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk A
Lecture 17 - Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function
Lecture 18 - Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function
Lecture 19 - Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function
Lecture 20 - Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function
Lecture 21 - Concept of Pareto Optimally in 2D Space, Effective Versus Inefficient Solutions, Karusch Kuhn Tu
Lecture 22 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karusch Kuhn T
Lecture 23 - Pareto Optimality, Property of Dominance, Strong Pareto Optimality, Weak Pareto Optimality, Conc
Lecture 24 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karusch Kuhn T
Lecture 25 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karusch Kuhn T
Lecture 26 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karusch Kuhn T
Lecture 27 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karusch Kuhn T
Lecture 28 - Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programm
Lecture 29 - Pareto Optimality, Concept of Pareto Optimality, Goal Programming

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Lecture 30 - Pareto Optimality, Pareto Curves, Goal Programming
Lecture 31 - Goal Programming, Concepts of Pareto Optimality in 2D Space for LP, Concepts of Pareto Optimalit
Lecture 32 - Concepts of Pareto Optimality in 2D Space for LP, Concepts of Pareto Optimality in 3D Space for
Lecture 33 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM
Lecture 34 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM (Continued...)
Lecture 35 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM (Continued...)
Lecture 36 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM (Continued...)
Lecture 37 - Quadratic Programming, Goal Programming
Lecture 38 - Multi Attribute Utility Theory, TOPSIS
Lecture 39 - Multi Attribute Utility Theory, TOPSIS
Lecture 40 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS)
Lecture 41 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS)
Lecture 42 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS)
Lecture 43 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS), Elimination and Choice
Lecture 44 - Elimination and Choice Translating Reality (ELECTRE)
Lecture 45 - Elimination and Choice Translating Reality (ELECTRE)
Lecture 46 - Elimination and Choice Translating Reality (ELECTRE)
Lecture 47 - Elimination and Choice Translating Reality (ELECTRE)
Lecture 48 - Elimination and Choice Translating Reality (ELECTRE), e-ELECTRE
Lecture 49 - Elimination and Choice Translating Reality (ELECTRE), e-ELECTRE
Lecture 50 - Elimination and Choice Translating Reality (ELECTRE), e-ELECTRE, VIKOR
Lecture 51 - VIKOR (VIsekriterijumska Optimizacija I Kompromisno Resenje)
Lecture 52 - VIKOR (VIsekriterijumska Optimizacija I Kompromisno Resenje)
Lecture 53 - Analytical Hierarchy Process (AHP)
Lecture 54 - Analytical Hierarchy Process (AHP) (Continued...)
Lecture 55 - Analytical Hierarchy Process (AHP) (Continued...)
Lecture 56 - Data Envelopment Analysis (DEA)
Lecture 57 - Data Envelopment Analysis (DEA)
Lecture 58 - Decision Tree Analysis
Lecture 59 - Decision Tree Analysis (Continued...)
Lecture 60 - Example in Multi Objective Decision Making

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NPTEL Video Course - Multi Disciplinary - NOC:Basic Certificate in Palliative Care

Subject Co-ordinator - Prof. Geeta Joshi, Prof. Piyush Gupta

Co-ordinating Institute - International Institute Of Distance Learning

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prelude
Lecture 2 - Prologue BCPC
Lecture 3 - Introductory Dialogue - Week 1
Lecture 4 - Basics of Palliative Care
Lecture 5 - Community Participation
Lecture 6 - Communication Skills in Palliative Care - Part I
Lecture 7 - Communication Skills in Palliative Care - Part II
Lecture 8 - Introductory Dialogue - Week 2
Lecture 9 - What is Active Listening ?
Lecture 10 - Are You Really Listening ?
Lecture 11 - Active Listening Skills
Lecture 12 - Communication Skills for Health Professionals
Lecture 13 - Communication Competency in Health Professional
Lecture 14 - Talking About Death
Lecture 15 - Introductory Dialogue - Week 3
Lecture 16 - Psychological Aspects in PC
Lecture 17 - What is Psychological Distress ?
Lecture 18 - Types of Psychological Distress
Lecture 19 - Kessler Psychological Distress Scale
Lecture 20 - Generalized Anxiety Disorder (GAD)
Lecture 21 - Guilt and Regret
Lecture 22 - Introductory Dialogue - Week 4
Lecture 23 - Cultural Aspects in Palliative Care
Lecture 24 - Spirituality (FAQs)
Lecture 25 - Spiritual Distress
Lecture 26 - Ways to Lead Spiritual Life !
Lecture 27 - Introductory Dialogue - Week 5
Lecture 28 - What is Stress and Burnout
Lecture 29 - Some Tips to Manage Stress

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Lecture 30 - Burnout in Health Care Professionals
Lecture 31 - Avoiding Burnout in Health Care Professionals
Lecture 32 - Voluteers to Prevent Burnout !
Lecture 33 - Self Care
Lecture 34 - Introductory Dialogue - Week 6
Lecture 35 - Ethical Aspects of End of Life
Lecture 36 - Impact of Bereavement on Family
Lecture 37 - Kubler-Ross Model
Lecture 38 - Theoretical Models of Grief and Bereavement
Lecture 39 - Psychology of Grief and Bereavement
Lecture 40 - Management of Grief and Bereavement
Lecture 41 - Introductory Dialogue - Week 7
Lecture 42 - Metastatic Bone Pain Management
Lecture 43 - How to Prescribe ENDs ?
Lecture 44 - Safe Use of ENDs
Lecture 45 - Neuropathic Pain and Its Management
Lecture 46 - Introduction to Intervention Pain Management
Lecture 47 - Introductory Dialogue - Week 8
Lecture 48 - Gastrointestinal Symptoms
Lecture 49 - Respiratory Symptoms Management - Part I
Lecture 50 - Respiratory Symptoms Management - Part II
Lecture 51 - Delirium and Dementia
Lecture 52 - Emergencies in Palliative Medicine
Lecture 53 - Recent Advances in Nausea and Vomiting
Lecture 54 - Introductory Dialogue - Week 9
Lecture 55 - Nursing Care Plans: Case Scenario
Lecture 56 - Bladder and Bowel Care
Lecture 57 - Stoma Care - Part I
Lecture 58 - Stoma Care - Part II
Lecture 59 - Skin Care in Colostomy
Lecture 60 - Introductory Dialogue - Week 10
Lecture 61 - Importance of Prognostication
Lecture 62 - Diagnosing the Dying !
Lecture 63 - Facing Death: How to Help ?
Lecture 64 - Subcutaneous Route
Lecture 65 - Introductory Dialogue - Week 11
Lecture 66 - National Health Mission (NHM)
Lecture 67 - Aushman Bharat
Lecture 68 - Government Schemes for Palliative Care

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Lecture 69 - NDPS Rules 2015
Lecture 70 - Delivery Models of Palliative Care
Lecture 71 - Introductory Dialogue - Week 12
Lecture 72 - Availability of ENDs and Advocacy
Lecture 73 - Availability of ENDs and Advocacy
Lecture 74 - Euthanasia
Lecture 75 - Advance Directive
Lecture 76 - History of Opium - Part I
Lecture 77 - History of Opium - Part II
Lecture 78 - Panel Discussion

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NPTEL Video Course - Multi Disciplinary - NOC:Certificate in Integrative Palliative Care - III

Subject Co-ordinator - Prof. Piyush Gupta, Prof. Geeta Joshi, Prof. Yashavant Joshi

Co-ordinating Institute - International Institute of Distance Learning An Initiative of NAPCAIM

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prologue CIPC
Lecture 2 - Introductory Dialogue
Lecture 3 - Basics of Palliative Care
Lecture 4 - Integrative Palliative Care
Lecture 5 - Complementary Medicine
Lecture 6 - Community Participation in PC
Lecture 7 - Communication Skills in Palliative Care - Part I
Lecture 8 - Communication Skills in Palliative Care - Part II
Lecture 9 - Introductory Dialogue
Lecture 10 - What is Naturopathy?
Lecture 11 - Naturopathy Basic Concepts and Principles
Lecture 12 - Air Therapy
Lecture 13 - Helio Therapy
Lecture 14 - Hydro Therapy
Lecture 15 - Mud Therapy
Lecture 16 - Fasting Therapy
Lecture 17 - Massage Therapy
Lecture 18 - Magnet Therapy
Lecture 19 - Introduction (The Integrative Role of Yoga in Palliative Care)
Lecture 20 - Overview of Yoga in Palliative Care, Challenges and Therepeutic Role of Yoga
Lecture 21 - Concept of Ashtang Yoga for Enhancing QOL
Lecture 22 - Health and Diseases According to Yoga
Lecture 23 - Role of Yoga as Preventive and Curative Approach in Palliative Care
Lecture 24 - Ganesh Asana, Chair Surya Namaskar Practical
Lecture 25 - Sukshma Asana Practical
Lecture 26 - Therapeutic Role of Mudra for Mental and Emotional Health
Lecture 27 - Yoga Interventions for Physical and Mental Health
Lecture 28 - Role of Pratyahara in Palliative Care
Lecture 29 - Relaxation Technique of Yoga Nidra for Palliative Care

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Lecture 30 - Yoga Intervention for Enhancing Spiritual Health
Lecture 31 - Understanding Cancer and Yoga Practices for Dealing with Cancer
Lecture 32 - Introduction (Pranic Healing)
Lecture 33 - Role of Pranic Healing in Palliative Care
Lecture 34 - Pranic Healing Five Elements
Lecture 35 - Chakaras
Lecture 36 - Twin Heart Meditation
Lecture 37 - Forgiveness
Lecture 38 - Gratitude
Lecture 39 - Introductory Dialogue (Energy Healing)
Lecture 40 - Remote Energy Healing
Lecture 41 - Reiki
Lecture 42 - Reiki: Symbols and Meaning
Lecture 43 - Reiki and Pranic Healing
Lecture 44 - Qigong
Lecture 45 - Tai Chi
Lecture 46 - Emotional Freedom Technique (EFT)
Lecture 47 - Introduction (Acupressure and Acupuncture)
Lecture 48 - Meridians - A System of Pathway !
Lecture 49 - Acupressure: A Beginner's Guide
Lecture 50 - Popular Acupressure Points
Lecture 51 - Acupuncture Miracle Remedy for Everything ?
Lecture 52 - Acupressure and Acupuncture, What is the Difference ?
Lecture 53 - Auricular Acupuncture
Lecture 54 - Introduction (Aroma Therapy)
Lecture 55 - Introduction to Aroma Therapy
Lecture 56 - Essential Oils
Lecture 57 - Clinical Aromatherapy in Pallative Care
Lecture 58 - Aroma Therapy - Incorporating into Daily Life !
Lecture 59 - Aroma Therapy - Myths and FAQs
Lecture 60 - Introduction
Lecture 61 - Music Therapy
Lecture 62 - Music Therapy - History and Benefits
Lecture 63 - Music Therapy (Palliative Care)
Lecture 64 - Tools and Activities
Lecture 65 - Interventions and Raga
Lecture 66 - Introduction
Lecture 67 - Diet Therapy
Lecture 68 - Nutrition - Does it Really Matter ?

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Lecture 69 - Eat Natural Food! Boot Your Energy Naturally!
Lecture 70 - Stop Eating Junk Food!
Lecture 71 - Role of Nutrition Palliative Care
Lecture 72 - Dispelling Nutrition Myths! Unveiling the Truth for Better Health
Lecture 73 - Nutrition At the End of Life!
Lecture 74 - Introduction (Expressive Art Therapy)
Lecture 75 - Expressive Art Therapy
Lecture 76 - Art Therapy
Lecture 77 - Sand Play Therapy: A Healing Journey
Lecture 78 - Colour Therapy
Lecture 79 - Writing Therapy
Lecture 80 - Introduction
Lecture 81 - Religiosity, Spirituality and Palliative Medicine
Lecture 82 - Exploring the Science Behind Spirituality
Lecture 83 - Loving Yourself
Lecture 84 - Spiritual Distress
Lecture 85 - Panel Discussion: Death and Dying
Lecture 86 - Introduction (First Aid)
Lecture 87 - Introduction to First Aid
Lecture 88 - Purpose of First Aid Training
Lecture 89 - Emergency Procedure
Lecture 90 - Cardiopulmonary Resuscitation CPR
Lecture 91 - Making a Splint
Lecture 92 - Recovery Position
Lecture 93 - Emergency Scene Management (ESM)

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NPTEL Video Course - Multi Disciplinary - NOC:Artificial Intelligence in Industrial and Management Engineerir

Subject Co-ordinator - Prof. Deepu Philip, Prof. Prabal Pratap Singh

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Business - I
Lecture 2 - Basics of Business - II
Lecture 3 - Basics of Business - III
Lecture 4 - Understanding Industrial Engineering
Lecture 5 - Relationship of IE with other Disciplines
Lecture 6 - BI, Analytics, and AI: The Business Decision System
Lecture 7 - Business Intelligence
Lecture 8 - AI: The Abused Word in Business
Lecture 9 - K-Means Clustering Algorithm Explained
Lecture 10 - Knowledge Representation
Lecture 11 - Backward Chaining Example
Lecture 12 - Logic
Lecture 13 - Expert System for Reasonable Reasoning - Part 1
Lecture 14 - Expert System for Reasonable Reasoning - Part 2
Lecture 15 - Expert System for Reasonable Reasoning - Part 3
Lecture 16 - Sorting and Searching
Lecture 17 - Other Searching Algorithm
Lecture 18 - Change goal: Visit all vertices on the graph
Lecture 19 - Implementing Depth-First Search
Lecture 20 - Greedy Best-First search
Lecture 21 - Machine Learning Basics - Part 1
Lecture 22 - Machine Learning Basics - Part 2
Lecture 23 - Machine Learning Basics - Part 3
Lecture 24 - Machine Learning Basics - Part 4
Lecture 25 - Machine Learning Basics - Part 5
Lecture 26 - Neural Networks - Part 1
Lecture 27 - Neural Networks - Part 2
Lecture 28 - Neural Networks - Part 3
Lecture 29 - Natural Language Processing - Part 1

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Lecture 30 - Natural Language Processing - Part 2
Lecture 31 - Natural Language Processing - Part 3
Lecture 32 - Natural Language Processing - Part 4
Lecture 33 - Natural Language Processing - Part 5
Lecture 34 - Introduction to Scheduling
Lecture 35 - Scheduling
Lecture 36 - Facility Layout - Part 1
Lecture 37 - Facility Layout - Part 2
Lecture 38 - Facility Layout - Part 3
Lecture 39 - Genetic Algorithm - Part 1
Lecture 40 - Genetic Algorithm - Part 2
Lecture 41 - Genetic Algorithm - Part 3

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NPTEL Video Course - Multi Disciplinary - NOC:Introduction to Infrastructure Asset Management

Subject Co-ordinator - Prof. Sudhir Misra, Prof. Chirag Kothari

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Course
Lecture 2 - Deterioration and Performance over time
Lecture 3 - Concepts in Maintenance of Infrastructure
Lecture 4 - Basic Economics for Infrastructure Management
Lecture 5 - Infrastructure: Stakeholders and Life Cycle
Lecture 6 - Illustrative example 1: Collapse of a Multistorey Residential Apartment Building
Lecture 7 - Illustrative example 2: Contaminated water supply
Lecture 8 - Illustrative example 3: A rail derailment that should not have been
Lecture 9 - Summarizing the examples and an overview
Lecture 10 - Generic Infrastructure Asset Management Process
Lecture 11 - Data requirements for Infrastructure Asset Management
Lecture 12 - Prioritization of Data for Infrastructure Asset Management
Lecture 13 - Data Collection: Handling Missing Data
Lecture 14 - Role and Importance of Qualitative Data
Lecture 15 - Concept of Performance Modelling
Lecture 16 - Role of Maintenance and Maintenance Alternatives
Lecture 17 - Budget Planning and Budget Programming
Lecture 18 - Budget Programming
Lecture 19 - Life-cycle perspective in Infrastructure decision-making
Lecture 20 - Multi criteria decision making: AHP - Part 1
Lecture 21 - Multi criteria decision making: AHP - Part 2
Lecture 22 - Decision making using multi-objective optimization
Lecture 23 - Consideration in Infrastructure management decision making
Lecture 24 - Sustainability considerations in Infrastructure management
Lecture 25 - Resilience considerations in Infrastructure management
Lecture 26 - Performance considerations in Infrastructure management
Lecture 27 - Carbonation in RC Structures
Lecture 28 - Chloride penetration in concrete and Reinforcement corrosion
Lecture 29 - Specifications - Providing initial integrity to concrete

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Lecture 30 - Closing the module: Specifications and limitations
Lecture 31 - Maintenance framework
Lecture 32 - Non-destructive testing and evaluation methods for concrete structures - Part 1
Lecture 33 - Non-destructive testing and evaluation methods for concrete structures - Part 2
Lecture 34 - Maintenance action
Lecture 35 - Concluding remarks

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NPTEL Video Course - Multi Disciplinary - NOC:Energy and the Climate Crisis: The Path to Net-Zero Emissions

Subject Co-ordinator - Prof. Rajeev Jindal

Co-ordinating Institute - IIT Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Greenhouse Effect and Issue of Climate Change
Lecture 2 - Evidences of Climate Change
Lecture 3 - Effects of Climate Change
Lecture 4 - Reasons of Drastic Climate Change
Lecture 5 - GHGs and Imporatance of CO2
Lecture 6 - Carbon Sinks and Major Reasons for Carbon dioxide Rise
Lecture 7 - GHG Emissions and Introduction to Future Projections
Lecture 8 - Climate Modelling and Future Projections
Lecture 9 - Future Projections
Lecture 10 - Politics of Responsibilities - I
Lecture 11 - Politics of Responsibilities - II
Lecture 12 - Evolution of Energy Sources
Lecture 13 - Type of Energy Source and Emission
Lecture 14 - Human Development Index and Role of Energy
Lecture 15 - Kaya Identity
Lecture 16 - Kaya Identity and Policy Implications
Lecture 17 - Green Growth and Energy Efficiency
Lecture 18 - Energy Intensity: A Misleading Parameter
Lecture 19 - Energy Efficiency: A Decarbonization Tool
Lecture 20 - Energy Efficiency and Demand Side Management
Lecture 21 - Demand Side Management
Lecture 22 - Energy Efficiency and Impact of Rebound Effect
Lecture 23 - Rebound Effect and Other Behavioral Economic Impact on Efficiency
Lecture 24 - Efficiency to Sufficiency and Degrowth
Lecture 25 - Advantage of Sectoral Analysis
Lecture 26 - MAC Curve: Importance of Power Sector
Lecture 27 - Levers of Power Sector Analysis
Lecture 28 - Indian Power Sector
Lecture 29 - Industrial Sector - 1

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Lecture 30 - Industrial Sector - 2
Lecture 31 - Steel Industry Decarbonisation Pathway
Lecture 32 - Aluminium Sector
Lecture 33 - Cement Sector
Lecture 34 - Transport Sector - 1
Lecture 35 - Transport Sector - 2
Lecture 36 - Indian Transport Sector
Lecture 37 - Building Sector - 1
Lecture 38 - Building Sector - 2
Lecture 39 - Agriculture Sector - 1
Lecture 40 - Agriculture Sector - 2
Lecture 41 - Energy Generation and Role of Electricity
Lecture 42 - Energy Generation Technology Scenarios
Lecture 43 - Energy Generation - India's Narrative
Lecture 44 - Solar Energy - 1
Lecture 45 - Solar Energy - 2
Lecture 46 - India Solar Journey
Lecture 47 - Wind Energy
Lecture 48 - Need for Energy Storage
Lecture 49 - Energy Storage Technologies
Lecture 50 - Energy Storage - 2
Lecture 51 - Nuclear and Hydro Energy
Lecture 52 - Hydrogen
Lecture 53 - Carbon Sequestration and path to Net Zero Emissions
Lecture 54 - Role of Geopolitics in Net-Zero Emission Pathway
Lecture 55 - Financial Architecture of Net Zero: Article 6 and Beyond - 1
Lecture 56 - Financial Architecture of Net Zero: Article 6 and Beyond - 2
Lecture 57 - India's Strategic Position in the Carbon Economy
Lecture 58 - Is Net Zero So Difficult? A Framework for Analysis

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NPTEL Video Course - Multi Disciplinary - NOC:Fuzzy Logic and Neural Networks

Subject Co-ordinator - Prof. Dilip Kumar Pratihar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fuzzy Sets
Lecture 2 - Introduction to Fuzzy Sets (Continued...)
Lecture 3 - Introduction to Fuzzy Sets (Continued...)
Lecture 4 - Introduction to Fuzzy Sets (Continued...)
Lecture 5 - Introduction to Fuzzy Sets (Continued...)
Lecture 6 - Introduction to Fuzzy Sets (Continued...)
Lecture 7 - Applications of Fuzzy Sets
Lecture 8 - Applications of Fuzzy Sets (Continued...)
Lecture 9 - Applications of Fuzzy Sets (Continued...)
Lecture 10 - Applications of Fuzzy Sets (Continued...)
Lecture 11 - Applications of Fuzzy Sets (Continued...)
Lecture 12 - Applications of Fuzzy Sets (Continued...)
Lecture 13 - Applications of Fuzzy Sets (Continued...)
Lecture 14 - Applications of Fuzzy Sets (Continued...)
Lecture 15 - Applications of Fuzzy Sets (Continued...)
Lecture 16 - Applications of Fuzzy Sets (Continued...)
Lecture 17 - Optimizationof Fuzzy Reasoning and Clustering Tool
Lecture 18 - Optimizationof Fuzzy Reasoning and Clustering Tool (Continued...)
Lecture 19 - Optimizationof Fuzzy Reasoning and Clustering Tool (Continued...)
Lecture 20 - Optimizationof Fuzzy Reasoning and Clustering Tool (Continued...)
Lecture 21 - Some Examples of Neural Networks
Lecture 22 - Some Examples of Neural Networks (Continued...)
Lecture 23 - Some Examples of Neural Networks (Continued...)
Lecture 24 - Some Examples of Neural Networks (Continued...)
Lecture 25 - Some Examples of Neural Networks (Continued...)
Lecture 26 - Some Examples of Neural Networks (Continued...)
Lecture 27 - Some Examples of Neural Networks (Continued...)
Lecture 28 - Some Examples of Neural Networks (Continued...)
Lecture 29 - Some Examples of Neural Networks (Continued...)

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Lecture 30 - Some Examples of Neural Networks (Continued...)
Lecture 31 - Optimal Designs of Neural Networks
Lecture 32 - Optimal Designs of Neural Networks (Continued...)
Lecture 33 - Neuro-Fuzzy System
Lecture 34 - Neuro-Fuzzy System (Continued...)
Lecture 35 - Neuro-Fuzzy System (Continued...)
Lecture 36 - Neuro-Fuzzy System (Continued...)
Lecture 37 - Concepts of Soft Computing and Expert Systems
Lecture 38 - Concepts of Soft Computing and Expert Systems (Continued...)
Lecture 39 - A Few Applications
Lecture 40 - A Few Applications (Continued...)
Lecture 41 - A Few Applications (Continued...)
Lecture 42 - A Few Applications (Continued...)

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NPTEL Video Course - Multi Disciplinary - NOC:Entrepreneurship Essentials

Subject Co-ordinator - Prof. Manoj Kumar Mondal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Economic Contributions of Entrepreneurs
Lecture 2 - Definition, Motivation and Types of Entrepreneurship
Lecture 3 - Vision, Mission and Values
Lecture 4 - Entrepreneurial Qualities
Lecture 5 - Two Inspiring Stories
Lecture 6 - Myths and Realities around Entrepreneurship
Lecture 7 - Causes of Failure of Startups
Lecture 8 - Why Startups Fail (Continued...)
Lecture 9 - Forms of Legal Entities
Lecture 10 - Factors Driving Competitive Advantages
Lecture 11 - Marketing for Startups - I
Lecture 12 - Marketing for Startups - II
Lecture 13 - Marketing for Startups - III
Lecture 14 - Marketing Research
Lecture 15 - Marketing Research (Continued...)
Lecture 16 - Business Model Canvas
Lecture 17 - Value Proposition Canvas
Lecture 18 - Illustration of Business Model Canvas
Lecture 19 - Features of Winning Business Models
Lecture 20 - Business Model Innovation
Lecture 21 - Identifying Opportunities Based on Trend
Lecture 22 - Circle of Competence and Effectuation
Lecture 23 - Lean Startup - I
Lecture 24 - Lean Startup - II
Lecture 25 - Lean Startup - III
Lecture 26 - Design and Innovation - I
Lecture 27 - Design and Innovation - II
Lecture 28 - Design and Innovation - III
Lecture 29 - Design and Innovation - IV

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Lecture 30 - Design and Innovation - V
Lecture 31 - Introduction to Financial Statements
Lecture 32 - Introduction to Financial Statements (Continued...)
Lecture 33 - Introduction to Financial Statements (Continued...)
Lecture 34 - Introduction to Financial Statements (Continued...)
Lecture 35 - Introduction to Financial Statements (Continued...)
Lecture 36 - Introduction to Financial Statements (Continued...)
Lecture 37 - Introduction to Financial Statements (Continued...)
Lecture 38 - Depreciation and Amortization and Treatment of Capital Gain or Loss from Sale of Fixed Asset
Lecture 39 - Cost, Volume, Profit
Lecture 40 - Cost, Volume, Profit
Lecture 41 - Founding Team and Early Recruits
Lecture 42 - Business Plan - I
Lecture 43 - Business Plan - II
Lecture 44 - Pitching the Business Plan - I
Lecture 45 - Pitching the Business Plan - II
Lecture 46 - Funding New Venture - I
Lecture 47 - Funding New Venture - II
Lecture 48 - Funding New Venture - III
Lecture 49 - Funding New Venture - IV
Lecture 50 - Funding New Venture - V
Lecture 51 - Some Dos and Donts
Lecture 52 - Go-To-Market Strategies - I
Lecture 53 - Go-To-Market Strategies - II
Lecture 54 - Capital Budgeting Decisions
Lecture 55 - Capital Budgeting Decisions (Continued...)
Lecture 56 - Start up Valuation - I
Lecture 57 - Start up Valuation - II
Lecture 58 - Human Resource Management - I
Lecture 59 - Human Resource Management - II
Lecture 60 - Growth Strategies

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NPTEL Video Course - Multi Disciplinary - NOC:Roadmap for Patent Creation

Subject Co-ordinator - Prof. Gouri Gargate

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Roadmap for patent creation - Introduction
Lecture 2 - Roadmap for patent creation - Property and IP
Lecture 3 - Roadmap for patent creation - IPR
Lecture 4 - Roadmap for patent creation - IP and future areas
Lecture 5 - Roadmap for patent creation - Patent - Introduction
Lecture 6 - Patent searching and analysis
Lecture 7 - Patent-Definition
Lecture 8 - Novelty
Lecture 9 - Non obviousness
Lecture 10 - Industrial application
Lecture 11 - Parts of patent document
Lecture 12 - Terminologies and codes used in a patent document
Lecture 13 - How to read a patent ? - I
Lecture 14 - How to read a patent ? - II
Lecture 15 - How to read a patent ? - III
Lecture 16 - Roadmap for patent creation - IP identification tool
Lecture 17 - Roadmap for patent creation - Patentability tool
Lecture 18 - Roadmap for patent creation - IP audit framework
Lecture 19 - Roadmap for patent creation - Public patent databases
Lecture 20 - Roadmap for patent creation - Capsule version
Lecture 21 - Types of patent
Lecture 22 - Patent filing procedure in India
Lecture 23 - Patent timelines - India and PCT
Lecture 24 - Inventions not patent in India
Lecture 25 - Indicators for patentability
Lecture 26 - Use of patent database for research/project topic identification
Lecture 27 - Importance of laboratory notebook
Lecture 28 - In which technical category my invention falls - IPC
Lecture 29 - Patent - Statutory differences between India, Europe and USA

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Lecture 30 - Identification of inventor and applicant and their rights
Lecture 31 - Developing your own IP system
Lecture 32 - When to publish and when to patent (confidentiality)
Lecture 33 - Statutory exceptions (anticipation)
Lecture 34 - Procedure for patent filing (Forms and fees)
Lecture 35 - Interaction with IP attorney (Initial drafting, FER reply and hearing)
Lecture 36 - Research/project planning
Lecture 37 - Post patent filing requirments
Lecture 38 - Patent commercialization
Lecture 39 - Capsule version

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NPTEL Video Course - Multi Disciplinary - NOC:Accreditation and Outcome based Learning

Subject Co-ordinator - Prof. Shyamal Kumar Das Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Challenges and Needs of 21st Century Education
Lecture 3 - Accreditation
Lecture 4 - Accreditation (Continued...)
Lecture 5 - Outcome based Learning
Lecture 6 - Important Steps in Outcome based education
Lecture 7 - Introduction to Taxonomies of Learning and Cognitive Domains of Learning
Lecture 8 - Psychomotor Domain and Affective Domain of Learning
Lecture 9 - Instructional Objectives or Outcome
Lecture 10 - Need and Use of Instructional Objectives or Outcome
Lecture 11 - Example of Different Instructional Objectives or Outcome and their Cognitive Level
Lecture 12 - Outcome-based Curriculum Design
Lecture 13 - Outcome-based Curriculum Design (Continued...)
Lecture 14 - Outcome-based Curriculum Design software framework
Lecture 15 - Course outcome, Module outcome and lecture/unit outcome and teaching learning process
Lecture 16 - Mapping of outcome based curriculum with Graduate attribute
Lecture 17 - Introduction to Assessment and Evaluation
Lecture 18 - Formative Assessment and Summative Assessments
Lecture 19 - Test Item analysis
Lecture 20 - Test Item analysis (Continued...)
Lecture 21 - Evaluation Rubrics
Lecture 22 - Mission and Vision, Program Educational Objectives (PEOs), Program Outcome (PO) and their Consis
Lecture 23 - Mapping of course outcome and Program Outcome
Lecture 24 - Attainment of Program outcome and course outcome
Lecture 25 - Calculation of direct attainment
Lecture 26 - Calculation of Indirect Attainment
Lecture 27 - Introduction to Tutored Video Instruction (TVI)
Lecture 28 - TVI Learning Improvement Data - as reported in literature
Lecture 29 - Use of TVI as ELNET-3L program

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Lecture 30 - Lessons on Good Teaching from ELNET-3L
Lecture 31 - Evaluation of Teaching Quality
Lecture 32 - Evaluation of Teaching Quality - A Research Proposal
Lecture 33 - Evaluation of Teaching Quality - A Research Proposal (Continued...)
Lecture 34 - Evaluation of Teaching Quality - A Research Proposal (Continued...)
Lecture 35 - Assessment and Evaluation - to Improve Teaching
Lecture 36 - Item Analysis - Theory and Practice
Lecture 37 - Learning Styles and Learning Approaches
Lecture 38 - Good Teaching Attributes and Characteristics
Lecture 39 - Teacher Effectiveness Research
Lecture 40 - Teacher Effectiveness Research (Continued...)
Lecture 41 - Teaching Learning Process using Outcome based Education

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NPTEL Video Course - Multi Disciplinary - NOC:Introduction to Environmental Engineering and Science - Fundame

Subject Co-ordinator - Prof. Brajesh Kumar Dubey

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sustainability Concepts - Innovations and Challenges
Lecture 2 - Sustainability Concepts - Innovations and Challenges
Lecture 3 - Basics and Sustainability Concepts and Evolution
Lecture 4 - Engineering for Sustainability
Lecture 5 - Life Cycle Thinking and Circular Economy
Lecture 6 - Mass Concentration Units
Lecture 7 - Partial Pressure Units
Lecture 8 - Other Types of Units
Lecture 9 - Units (Continued...), Qualitative and Quantitative Measurements
Lecture 10 - Quantative Measurements Basics
Lecture 11 - Ecology
Lecture 12 - Energy Flow and Ecological Concepts
Lecture 13 - Population
Lecture 14 - Population, Consumption and Biodiversity
Lecture 15 - Environmental Chemistry
Lecture 16 - Mass Balance and Reactor Systems
Lecture 17 - Mass Balance in Continuous Reactor / Continuous Stirred Tank Reactor (CSTR) and Plug Flow Reacto
Lecture 18 - Plug Flow Reactor and Energy Flow
Lecture 19 - Energy Balance and Earth Overshot Day
Lecture 20 - Mass Transport Processes
Lecture 21 - Oxygen Demand in Environmental Systems
Lecture 22 - BOD Examples, Oxygen Levels in Surface Waters, COD
Lecture 23 - Environmental Health Basics and SDGs
Lecture 24 - Field Applications
Lecture 25 - Nutrient Cycle
Lecture 26 - Environmental Risk
Lecture 27 - Risk Assessment Steps and EIA Introduction
Lecture 28 - Environmental Risk Assessments with Concepts of EIA and LCA
Lecture 29 - Environmental Risk Assessments with Concepts of EIA and LCA (Continued...)

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Lecture 30 - Environmental Risk Assessments with Concepts of EIA and LCA (Continued...)
Lecture 31 - Water Quantity
Lecture 32 - Water Availability and Usage
Lecture 33 - Population Forecasting
Lecture 34 - Water Quality
Lecture 35 - Water Quality (Continued...)
Lecture 36 - Plain Sedimentation
Lecture 37 - Coagulation
Lecture 38 - Review of Sedimentation and Rapid Sand Filtration
Lecture 39 - Disinfection and Water Supply
Lecture 40 - Water Treatment Plant Visit
Lecture 41 - Wastewater collection and characterization
Lecture 42 - Sewerage System and Sewage Characteristics
Lecture 43 - BOD Concepts and Preliminary Treatment of Wastewater
Lecture 44 - Wastewater Treatment - I
Lecture 45 - Activated Sludge Process and Sludge Disposal
Lecture 46 - Introduction to Solid Waste Management
Lecture 47 - Introduction to Solid Waste Management (Continued...)
Lecture 48 - Components of Solid Waste Management
Lecture 49 - Collection and Treatment
Lecture 50 - Waste Disposal and Summary
Lecture 51 - Basics of Air Pollution Issues - Global and Local
Lecture 52 - Air Pollutants and Air Pollution Index
Lecture 53 - Global Warming and Climate Change
Lecture 54 - Air Pollution Models
Lecture 55 - SDGs, Noise and Soil Pollution
Lecture 56 - Present Issues and Few Case Studies
Lecture 57 - Case Study - Solid Waste Management
Lecture 58 - Case Study - Industrial Pollution and Disasters
Lecture 59 - Case Study - Global Food Waste Initiatives
Lecture 60 - Case Study - Global Food Waste and Resource Recovery

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NPTEL Video Course - Multi Disciplinary - NOC:Biophotonics

Subject Co-ordinator - Prof. Basudev Lahiri

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biophotonics - Part I
Lecture 2 - Introduction to Biophotonics - Part II
Lecture 3 - Introduction to Biophotonics - Part III
Lecture 4 - Nature of Light - Part I (As Wave)
Lecture 5 - Nature of Light - Part II (As Particle)
Lecture 6 - Fact of Matter - Part I
Lecture 7 - Fact of Matter - Part II
Lecture 8 - Basic of Light-Matter Interaction
Lecture 9 - Molecular Materials
Lecture 10 - Introduction to Fluorescence
Lecture 11 - The Cell
Lecture 12 - The Central Dogma
Lecture 13 - Genetic Code
Lecture 14 - Building Blocks
Lecture 15 - Remaining Topics
Lecture 16 - Light-Matter Interactions in Molecules (Basic of Spectroscopy)
Lecture 17 - Light-Matter Interactions in Molecules (Basic of Spectroscopy) (Continued...)
Lecture 18 - Interaction of Light with Cells
Lecture 19 - Interaction of Light with Tissues
Lecture 20 - Photoprocesses in Biopolymers
Lecture 21 - Laser Principles and Operation
Lecture 22 - Types of Lasers
Lecture 23 - Nonlinear Optical Processes
Lecture 24 - In Vivo Photoexcitation
Lecture 25 - Examples and Applications
Lecture 26 - Introduction
Lecture 27 - Microscopy Techniques
Lecture 28 - Near Field Microscopy and Optical Coherence Tomography
Lecture 29 - Fluorophores and Fluorescence Microscopy Techniques

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Lecture 30 - The Future: AFM-IR
Lecture 31 - Biosensing Background
Lecture 32 - Optical Fiber Sensors
Lecture 33 - Metamaterials
Lecture 34 - Metamaterials as Biosensors
Lecture 35 - Biosensing with Optical Nano-antennas
Lecture 36 - Introduction to Photodynamic Therapy (PDT)
Lecture 37 - Application of Photodynamic Therapy (PDT)
Lecture 38 - Light Irradiation for Photodynamic Therapy (PDT)
Lecture 39 - Real Life Examples of Photodynamic Therapy (PDT)
Lecture 40 - Future of PDT and Photothermal Therapy (PTT)
Lecture 41 - Laser Based Tissue Engineering
Lecture 42 - Laser Tissue Contouring: Dermatological Application
Lecture 43 - Laser Tissue Welding and Tissue Regeneration
Lecture 44 - Laser Tissue Contouring: Ophthalmic Application
Lecture 45 - Laser in Dentistry
Lecture 46 - Tools for Micromanipulation
Lecture 47 - The Optical/Laser Tweezer
Lecture 48 - Design of Optical Tweezers
Lecture 49 - Optical Scissors
Lecture 50 - Selected Examples of Application
Lecture 51 - Introduction to nanotechnology
Lecture 52 - Processes of Nanotechnology
Lecture 53 - Nano-Lithography: The Art of Small
Lecture 54 - Thin Film Deposition
Lecture 55 - Bionanophotonics Applications
Lecture 56 - Introduction to Optogenetics
Lecture 57 - Controlling the Brain with Light
Lecture 58 - Optical Neuroimaging and Tomography
Lecture 59 - Functional Near Infrared Spectroscopy (fNIRS) of the Brain
Lecture 60 - Summary and Revisiting Few topics

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NPTEL Video Course - Multi Disciplinary - NOC:Vacuum Technology and Process Application

Subject Co-ordinator - Prof. V. Vasudeva Rao

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Vacuum, Natural Vacuum
Lecture 2 - History of Vacuum Technology
Lecture 3 - Kinetic Theory of Gases, Physical Parameters of Vacuum and Regions of Vacuum
Lecture 4 - Vacuum Process Applications - I
Lecture 5 - Vacuum Process Applications - II
Lecture 6 - Pumping Speed and Throughput Concepts
Lecture 7 - Rotary Vacuum Pump
Lecture 8 - Diffusion Pump
Lecture 9 - Roots Vacuum Pump
Lecture 10 - Rotary Piston Pump
Lecture 11 - Liquid Ring Pump
Lecture 12 - Steam Jet Ejector
Lecture 13 - Diaphragm Pump
Lecture 14 - Claw Pump
Lecture 15 - Screw Pump
Lecture 16 - Scroll Pump, Sorption Concepts and Pumps
Lecture 17 - Ion Pumping-Sputter Ion Pump
Lecture 18 - Turbomolecular Pump
Lecture 19 - Cryopumps
Lecture 20 - Selection Criteria of Vacuum Pumps
Lecture 21 - Primary vs Secondary Gauges, U Tube/McLeod gauges (Primary)
Lecture 22 - Bourdon/Capacitance Gauges (Mechanical Deflection)
Lecture 23 - Thermo-couple/Pirani gauges (Thermal Conductivity)
Lecture 24 - Spinning Rotor/Ionization/Bayard Alpert Gauges
Lecture 25 - Penning/ Inverted Magnetron gauges, Gauge calibration
Lecture 26 - Vacuum Materials (Metals, Glasses, Ceramics, Greases and Oils)
Lecture 27 - Vacuum Components (Flanges, Couplings, Seals, Valves)
Lecture 28 - Vacuum Chamber Design
Lecture 29 - Fabrication Techniques for Vacuum Systems

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Lecture 30 - Testing of Vacuum Systems for Mechanical Failures, Gas Leaks and Outgassing
Lecture 31 - Gas Flow at Low Pressures, Conductance and Effective Pumping Speed Concepts
Lecture 32 - Conductance Calculations in Viscous Flow Region
Lecture 33 - Molecular Flow
Lecture 34 - Transition and Choked Flows
Lecture 35 - Conductance and Pump Down Calculations in Vacuum Systems
Lecture 36 - Design Aspects of Vacuum Systems for Different Applications - Part I
Lecture 37 - Design Aspects of Vacuum Systems for Different Applications - Part II
Lecture 38 - Design of a Vacuum Furnace for Metallurgical Processing
Lecture 39 - Leak Detection in Vacuum Systems
Lecture 40 - Magnetic Deflection Leak Detector and Quadrupole Residual Gas Analyzer
Lecture 41 - Vacuum Processes in Chemical and Pharmaceutical Industries
Lecture 42 - Vacuum for Food Processing
Lecture 43 - Vacuum Technology in the Packaging Industry
Lecture 44 - Vacuum in Wood Industry
Lecture 45 - Vacuum Systems for Medical and Dental Applications
Lecture 46 - Vacuum for Desalination of Sea Water and Treatment of Waste Water
Lecture 47 - Vacuum Technology for Power Sector
Lecture 48 - Vacuum Technology In Oil and Gas Industries
Lecture 49 - Vacuum Technology in LNG industry
Lecture 50 - Vacuum Technology for Cryogenic Applications
Lecture 51 - Vacuum Technology in High Speed Transportation (Hyperloop and Maglev)
Lecture 52 - Vacuum technology for Metallurgical applications
Lecture 53 - Vacuum Technology for Analytical Instruments
Lecture 54 - Vacuum based coating units for thin film deposition
Lecture 55 - Vacuum for solar energy (Thermal and PV)
Lecture 56 - Vacuum Technology for semiconductor chip manufacturing
Lecture 57 - Vacuum Technology for Display Systems
Lecture 58 - Vacuum Technology for Nuclear Applications - Part I
Lecture 59 - Vacuum Technology for Nuclear Applications - Part II
Lecture 60 - Vacuum technology for Space Applications

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NPTEL Video Course - Multi Disciplinary - NOC:Basics of Health Promotion and Education Intervention

Subject Co-ordinator - Prof. Sweety Suman Jha, Prof.Chandrashekhar Taklikar, Prof. Madumita Dobe, Prof. Arist

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief history of public health
Lecture 2 - Scope and Evolution of Health Promotion and Education
Lecture 3 - Ottawa Charter
Lecture 4 - Principles of health promotion
Lecture 5 - Settings and audiences for health promotion
Lecture 6 - Concepts of Health Behavior
Lecture 7 - Health Risk Behavior Vs Health Promotion Behavior
Lecture 8 - Concepts of Health Communication - Part I
Lecture 9 - Concepts of Health Communication - Part II
Lecture 10 - Health Literacy
Lecture 11 - Information Education and Communication (IEC)
Lecture 12 - Behavior Change Communication (BCC) - Part I
Lecture 13 - Behavior Change Communication (BCC) - Part II
Lecture 14 - Social and Behavior Change Communication (SBCC) - Part I
Lecture 15 - Social and Behavior Change Communication (SBCC) - Part II
Lecture 16 - Need Assessment for Health Promotion
Lecture 17 - Approaches for Health Promotion and Behavior Change
Lecture 18 - Models of Individual Health Behavior
Lecture 19 - Models of Inter-Personal Health Behaviour
Lecture 20 - Community and Group Models of Health Behavior Change
Lecture 21 - Planning HPE Intervention - Part I
Lecture 22 - Planning HPE Intervention - Part II
Lecture 23 - Implementing HPE Intervention - Part I
Lecture 24 - Implementing HPE Intervention - Part II
Lecture 25 - Monitoring HPE Intervention
Lecture 26 - Principles of Designing Messages
Lecture 27 - Processes and Approaches of Designing Messages - Part I
Lecture 28 - Processes and Approaches of Designing Messages - Part II
Lecture 29 - Overview of Pretesting

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Lecture 30 - Pretesting of Health Promotion and Education Tools
Lecture 31 - Health Education Methods - Part I
Lecture 32 - Health Education Methods - Part II
Lecture 33 - Health Education Material - Part I
Lecture 34 - Health Education Material - Part II
Lecture 35 - Technology-based approaches to health behavior change
Lecture 36 - Evaluation of Theory-based HPE Interventions - Part I
Lecture 37 - Evaluation of Theory-based HPE Interventions - Part II
Lecture 38 - Analyzing Health Behavior Change Data
Lecture 39 - RE-AIM Framework for Health Promotion Program Evaluation
Lecture 40 - Health Impact Assessment

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NPTEL Video Course - Multi Disciplinary - NOC:Basics of Mental Health and Clinical Psychiatry

Subject Co-ordinator - Prof. Arijita Banerjee, Prof. Sumit Kumar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Neuroanatomy
Lecture 2 - Cerebellum
Lecture 3 - Basal Ganglia
Lecture 4 - Thalamus and Hypothalamus
Lecture 5 - Cerebral Cortex
Lecture 6 - Synapse and Neurotransmitters - 1
Lecture 7 - Synapse and Neurotransmitters - 2
Lecture 8 - Limbic System
Lecture 9 - Physiology of Emotions
Lecture 10 - Reticular Formation
Lecture 11 - Electrical activity of brain
Lecture 12 - Descriptive Psychopathology
Lecture 13 - Principles of Personality Development
Lecture 14 - Schizophrenia
Lecture 15 - Mood Disorders - 1
Lecture 16 - Mood Disorders - 2
Lecture 17 - Anxiety Disorders - I
Lecture 18 - Anxiety Disorders - II
Lecture 19 - Eating Disorders
Lecture 20 - Physiology of sleep
Lecture 21 - Sleep Disorders
Lecture 22 - Learning and Memory - 1
Lecture 23 - Learning and Memory - 2
Lecture 24 - Neurocognitive Disorders - I
Lecture 25 - Neurocognitive Disorders - II
Lecture 26 - Substance - I
Lecture 27 - Substance - II
Lecture 28 - Physiology of sensations
Lecture 29 - Psychosomatic Illness

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Lecture 30 - Emergency Psychiatry
Lecture 31 - Child Psychiatry - I
Lecture 32 - Child Psychiatry - II
Lecture 33 - Psychotherapy - I
Lecture 34 - Psychotherapy - II
Lecture 35 - Psychological Tests
Lecture 36 - Anti-psychotic drugs
Lecture 37 - Antidepressants
Lecture 38 - Mood Stabilizer
Lecture 39 - Anti-anxiety drugs
Lecture 40 - Forensic Psychiatry

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NPTEL Video Course - Multi Disciplinary - NOC:Introduction to Reliability Engineering

Subject Co-ordinator - Prof. Neeraj Kumar Goyal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Reliability Engineering
Lecture 2 - Introduction to Reliability Engineering
Lecture 3 - Introduction to Reliability Engineering
Lecture 4 - Probability Basics
Lecture 5 - Probability Basics (Continued...)
Lecture 6 - Constant Failure Rate Model - I
Lecture 7 - Constant Failure Rate Model - II
Lecture 8 - Constant Failure Rate Model - III
Lecture 9 - Two Parameter Exponential Distribution
Lecture 10 - Weibull Distribution (2 Parmeter)
Lecture 11 - Burn-in Screening for Weibull
Lecture 12 - Weibull Distribution
Lecture 13 - Normal Distribution
Lecture 14 - Lognormal Distribution
Lecture 15 - System Reliability Modelling
Lecture 16 - System Reliability Modelling (Continued...)
Lecture 17 - System Reliability Modelling (Continued...)
Lecture 18 - System Reliability Modelling (Continued...)
Lecture 19 - System Reliability Modelling (Continued...)
Lecture 20 - System Reliability Modelling (Continued...)
Lecture 21 - Markov Analysis
Lecture 22 - Markov Analysis (Continued...)
Lecture 23 - Markov Analysis (Continued...)
Lecture 24 - Markov Analysis (Continued...)
Lecture 25 - Markov Analysis (Continued...)
Lecture 26 - Failure Data Analysis: Non-Parametric Approach
Lecture 27 - Failure Data Analysis: Non-Parametric Approach (Continued...)
Lecture 28 - Failure Data Analysis: Non-Parametric Approach (Continued...)
Lecture 29 - Failure Data Analysis: Non-Parametric Approach (Continued...)

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Lecture 30 - Failure Data Analysis (Parametric)
Lecture 31 - Failure data analysis (Parametric) (Continued...)
Lecture 32 - Failure data analysis (Parametric) (Continued...)
Lecture 33 - Goodness of fit
Lecture 34 - Goodness of Fit (GoF) Tests
Lecture 35 - Goodness of Fit (GoF) Tests (Continued...)
Lecture 36 - Maintainability and Availability
Lecture 37 - Maintainability and Availability (Continued...)
Lecture 38 - Maintainability and Availability (Continued...)
Lecture 39 - Maintainability and Availability (Continued...)
Lecture 40 - Summary of the course Introduction to Reliability Engineering

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NPTEL Video Course - Multi Disciplinary - NOC:Nanobio Technology Enabled Point-of-Care Devices

Subject Co-ordinator - Prof. Gorachand Dutta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Biosensors and its Application
Lecture 3 - Translational Research and Nano Biosensing
Lecture 4 - Nanomaterials for Healthcare Biosensing
Lecture 5 - Signal Amplification for Ultrasensitive Biosensors
Lecture 6 - Signal Amplification for Ultrasensitive Biosensors (Continued...)
Lecture 7 - Signal Amplification for Ultrasensitive Biosensors (Continued...)
Lecture 8 - Signal Amplification for Ultrasensitive Biosensors (Continued...)
Lecture 9 - Different Measurement Techniques for Electrochemical Biosensors
Lecture 10 - Limit of Detection and Wash-Free Detection for Biosensors
Lecture 11 - Wash-Free Detection for Biosensors (Continued...)
Lecture 12 - Label-Free Detection for Biosensors
Lecture 13 - Label-free detection and Multiplex Biosensors
Lecture 14 - Multiplex Biosensors (Continued...)
Lecture 15 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities
Lecture 16 - Enhanced electrocatalytic activity for biosensors
Lecture 17 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities
Lecture 18 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities
Lecture 19 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities
Lecture 20 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities
Lecture 21 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities
Lecture 22 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities
Lecture 23 - Effect of pretreatment on PCB and biosensor developement
Lecture 24 - Impact of surface Roughness of PCB and PCB for Glucose sensors
Lecture 25 - Tutorial on Biosensors Fabrication
Lecture 26 - Tutorial on Biosensors Fabrication (Continued...)
Lecture 27 - Tutorial on Biosensors Fabrication (Continued...)
Lecture 28 - Tutorial on Biosensors Fabrication (Continued...)
Lecture 29 - Tutorial on Biosensors Fabrication (Continued...)

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Lecture 30 - Tutorial on Biosensors Fabrication (Continued...)
Lecture 31 - Self-Powered Biosensors
Lecture 32 - Biosensors for Safety and Security
Lecture 33 - Research Proposal and Ethical Clearance
Lecture 34 - Special Chemestry for Biosensing
Lecture 35 - Tutorial - 2
Lecture 36 - Tutorial - 3
Lecture 37 - Tutorial - 4
Lecture 38 - Lab Demonstration - 1
Lecture 39 - Lab Demonstration - 2
Lecture 40 - Lab Demonstration - 3

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NPTEL Video Course - Multi Disciplinary - NOC:Adolescent Health and Well-Being : A Holistic Approach

Subject Co-ordinator - Dr. Sumana Samanta, Dr. Parmeshwar Satpathy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Adolescent Health Statistics
Lecture 2 - Introduction to Nutrition and Dietetics
Lecture 3 - Role of Macronutrients
Lecture 4 - Role of Micronutrients
Lecture 5 - Basics of Adolescent Mental Health
Lecture 6 - Physiological and Psychological changes during Adolescence
Lecture 7 - Special Nutritional Requirements in Adolescents
Lecture 8 - Malnutrition in Adolescents and their effects in Adult life
Lecture 9 - Adolescent Immunization
Lecture 10 - High risk behaviour in Adolescents
Lecture 11 - Nutrition Care Process
Lecture 12 - Dietary Counseling and Nutrition Planning
Lecture 13 - Common Micronutrient Deficiency in Adolescents
Lecture 14 - Eating Disorders in Adolescents
Lecture 15 - National Initiatives related to Adolescents
Lecture 16 - Behavior Modification for Weight Management
Lecture 17 - Adolescents And Physical Activity
Lecture 18 - Combating Special Situations
Lecture 19 - Legislations for Adolescents
Lecture 20 - Innovations for Holistic Well-being of Adolescents

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NPTEL Video Course - Multi Disciplinary - NOC:Research Methods in Health Promotion

Subject Co-ordinator - Dr. Arista Lahiri, Dr. Sweety Suman Jha, Prof. Madhumita Dobe

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Health Promotion
Lecture 2 - Basic Principles of Health Promotion
Lecture 3 - The Health Promotion Research Process
Lecture 4 - Process of Health Promotion Research: Integrity and Rigor
Lecture 5 - Ethics in Health Promotion Research
Lecture 6 - Health Behavior and Health Behavior Change
Lecture 7 - Theory, Research and Behavior Change Techniques
Lecture 8 - Intervention Mapping
Lecture 9 - Ecological Models of Health Behavior
Lecture 10 - Social Science Techniques
Lecture 11 - Precede-Proceed Model
Lecture 12 - Models of Individual Health Behavior - I
Lecture 13 - Models of Individual Health Behavior - II
Lecture 14 - Models of Interpersonal Health Behavior
Lecture 15 - Community and Group Models of Health Behavior Change
Lecture 16 - Research design and techniques
Lecture 17 - Observational research designs
Lecture 18 - Experimental Research Designs
Lecture 19 - Experimental Research Designs: Issues and Challenges
Lecture 20 - Measurements in Health promotion
Lecture 21 - Qualitative methods in Health Promotion - Part I
Lecture 22 - Qualitative Methods in Health Promotion - Part II
Lecture 23 - Qualitative Methods in Health Promotion - Part III
Lecture 24 - Qualitative Methods in Health Promotion - Part IV
Lecture 25 - Qualitative Methods in Health Promotion - Part V
Lecture 26 - Introduction to Mixed Methods Research
Lecture 27 - The Convergent Design
Lecture 28 - The Explanatory Sequential Design
Lecture 29 - The Exploratory Sequential Design (Continued...)

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Lecture 30 - The Embedded Design
Lecture 31 - Different study tools and their application in health promotion research
Lecture 32 - Formulating an appropriate study tool (Quantitative data collection tools)
Lecture 33 - Validity and reliability of study tools in quantitative research - Part I
Lecture 34 - Validity and reliability of study tools in quantitative research - Part II
Lecture 35 - Formulating an appropriate study tool(Qualitative data collection tools)
Lecture 36 - Designing messages - Part I
Lecture 37 - Designing messages - Part II
Lecture 38 - Materials and Methods of Intervention Delivery - Part I
Lecture 39 - Materials and Methods of Intervention Delivery - Part II
Lecture 40 - Pretesting of an intervention tool
Lecture 41 - BCC and SBCC - Part I
Lecture 42 - BCC and SBCC - Part II
Lecture 43 - BCC and SBCC - Part III
Lecture 44 - BCC and SBCC - Part IV
Lecture 45 - BCC and SBCC - Part V
Lecture 46 - Community-Based Participatory Research in context to Health Promotion - Part I
Lecture 47 - Community-Based Participatory Research in context to Health Promotion - Part II
Lecture 48 - Community-Based Participatory Research in context to Health Promotion - Part III
Lecture 49 - Community-Based Participatory Research in context to Health Promotion - Part IV
Lecture 50 - Community-Based Participatory Research in context to Health Promotion - Part V
Lecture 51 - Quantitative analytical methods - Part I
Lecture 52 - Quantitative analytical methods - Part II
Lecture 53 - Quantitative analytical methods - Part III
Lecture 54 - Analysis of Qualitative data
Lecture 55 - Analyzing Mixed Methods data
Lecture 56 - Developing a research proposal in health promotion
Lecture 57 - Report writing in health Promotion: An Overview
Lecture 58 - Report writing: quantitative research in health promotion - Part I
Lecture 59 - Report writing: quantitative research in health promotion - Part II
Lecture 60 - Report Writing: Qualitative and Mixed Methods research

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NPTEL Video Course - Multi Disciplinary - NOC:Urban Ecological Heritagescapes through Interactive Governance:

Subject Co-ordinator - Prof. Jenia Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Urban Heritage - Global Conventions and Declarations
Lecture 3 - Historical Urban Landscape (HUL) - Approach, Toolkit, and Actions
Lecture 4 - Urban Heritage - The Indian Context
Lecture 5 - SDG(s) 11(.4) - Transdisciplinary Possibilities, Pathways, and Actions
Lecture 6 - Historicizing lakes of Bangalore - social-ecological perspectives
Lecture 7 - Urban environmentalisms - lake-based and rights-based
Lecture 8 - Example 1: The Jakkur Lake
Lecture 9 - Example 2: The Puttenahalli Lake
Lecture 10 - Example 3: The Kaikondrahalli Lake
Lecture 11 - Kolkata's heritage - Applying the urban ecological heritage lens
Lecture 12 - Kolkata and EKW - conveying the co-evolutionary narrative
Lecture 13 - Living Systems infrastructure of Kolkata
Lecture 14 - Case study 1: The Nalban and Goltala Fisheries
Lecture 15 - Case study 2: Baro Chaynavi Cooperative
Lecture 16 - Case study 3: Jhagrashisha
Lecture 17 - EKW as heritage - Lessons from a Practical Empirical Implementation Project - I
Lecture 18 - EKW as heritage - Lessons from a Practical Empirical Implementation Project - I
Lecture 19 - Conclusions

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NPTEL Video Course - Multi Disciplinary - NOC:Experimental Robotics

Subject Co-ordinator - Prof. Dilip Kumar Pratihar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Experiment 1: Teaching of Serial Manipulator
Lecture 3 - Experimentation I
Lecture 4 - Experiment 1: Teaching of Serial Manipulator (Continued...)
Lecture 5 - Experiment 2: Control of Tracked Mobile Manipulator
Lecture 6 - Experimentation II
Lecture 7 - Experiment 2: Control of Tracked Mobile Manipulator (Continued...)
Lecture 8 - Experiment 3: Path and Gait Planning of Six-legged Robot
Lecture 9 - Experimentation III
Lecture 10 - Experiment 3: Path and Gait Planning of Six-legged Robot (Continued...)
Lecture 11 - Experiment 4: Navigation of Drone
Lecture 12 - Experimentation IV
Lecture 13 - Experimentation IV (Continued...)
Lecture 14 - Experiment 5: Path and Gait Planning of 25 dof NAO Humanoid Robot
Lecture 15 - Experimentation V
Lecture 16 - Experiment 5: Path and Gait Planning of 25 dof NAO Humanoid Robot (Continued...)
Lecture 17 - Current Trends in Robotics Research
Lecture 18 - Summary of the Course

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NPTEL Video Course - Multi Disciplinary - NOC:Medical Law

Subject Co-ordinator - Prof. Narendran Thiruthy, Prof. Chaitanya Mittal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Interface between Medical Profession and Law
Lecture 2 - Role of Medical practitioners in Justice Administration
Lecture 3 - Dos and Don'ts of Doctors
Lecture 4 - Dos and Don'ts for Legal Practitioners
Lecture 5 - Knowledge exchange between Medical and Legal Practitioners
Lecture 6 - Consent in Law
Lecture 7 - Types of Consent in Medical Field
Lecture 8 - Ethics in Medical Profession
Lecture 9 - Importance of Documentation in Medical practice
Lecture 10 - Legal Implications of Improper Documentation
Lecture 11 - Legal Responsibilities of Medical Practitioners
Lecture 12 - Medical Negligence and Legal Implications
Lecture 13 - Legal Implications of Medical Malpractice
Lecture 14 - Landmark Judgments on Medical Negligence
Lecture 15 - Testimony of Doctors in Medical Negligence
Lecture 16 - Healthcare Policy and Law
Lecture 17 - Clinical Establishment Law
Lecture 18 - Legal liability of Hospitals/Clinical Establishments
Lecture 19 - Legal responsibility in Diagnostics
Lecture 20 - Penalties for non-compliance
Lecture 21 - Role of IPR in promoting medical innovation and technologies
Lecture 22 - Health Policy formulation and Role of IPR
Lecture 23 - Intellectual Property and Access to Medicine
Lecture 24 - Neglected diseases and Role of IPR
Lecture 25 - Patenting Therapeutic Practices and Techniques
Lecture 26 - Duties of Doctor in Courts
Lecture 27 - Evidence Law and Medical experts
Lecture 28 - Admissibility of Forensic Evidence
Lecture 29 - Various Legal procedures in Medical practice

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Lecture 30 - Collection, preservation and dispatch of Forensic Evidence
Lecture 31 - Ethical insight into different aspects of Surrogacy practice
Lecture 32 - Surrogacy Regulation in India
Lecture 33 - Assisted Reproductive Technology Regulation in India
Lecture 34 - Pre-Conception and Pre-Natal Diagnostic
Lecture 35 - Penalties for non-compliance
Lecture 36 - Ethical Issues in Organ Transplantation
Lecture 37 - Law governing organ transplantation
Lecture 38 - Comparative Law on Organ Transplantation
Lecture 39 - Medico-Legal Issues in Clinical Trials
Lecture 40 - Regulatory Law for Clinical Trials in India

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NPTEL Video Course - Multi Disciplinary - NOC:An Overview on Maternal Health Antenatal, Intranatal and Postna

Subject Co-ordinator - Prof. Barnali Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Obstetrics
Lecture 2 - Anatomy of Vulva or pudendum
Lecture 3 - Anatomy of Vagina
Lecture 4 - Anatomy of Cervix and Uterus
Lecture 5 - Anatomy of Uterus
Lecture 6 - Anatomy of fallopian tubes and ovary
Lecture 7 - Anatomy of plvic floor and perineum
Lecture 8 - Gametogenesis
Lecture 9 - Fertilisation and Embryogenesis
Lecture 10 - Implantation
Lecture 11 - Placentation (normal and abnormal)
Lecture 12 - Placentation (normal and abnormal) (Continued...)
Lecture 13 - Umbilical cord and Fetal membranes - Part 1
Lecture 14 - Umbilical cord and Fetal membranes - Part 2
Lecture 15 - FETUS (physiology and circulation)
Lecture 16 - Physiological changes in pregnancy - Part 1
Lecture 17 - Physiological changes in pregnancy - Part 2
Lecture 18 - Physiological changes in pregnancy - Part 3
Lecture 19 - Hormones in pregnancy
Lecture 20 - Hormones in pregnancy (Continued...)
Lecture 21 - Diagnosis of pregnancy - 1
Lecture 22 - Diagnosis of Pregnancy - 2
Lecture 23 - Obstetrical Examination
Lecture 24 - Obstetrical Examinationon antenatal mother (Clinical Study)
Lecture 25 - Maternal Pelvis $ Foetal Skill - Part 1
Lecture 26 - Fetal Skull
Lecture 27 - Pre-conceptional counselling and care
Lecture 28 - Nutrition in Pregnancy
Lecture 29 - Antenatal Care - Part 1

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Lecture 30 - Antenatal Care - Part 2
Lecture 31 - Antenatal Care - Part 3
Lecture 32 - Antenatal Assessment of Fetal Well-Being - Part 1
Lecture 33 - Antenatal Assessment of Fetal Well-Being - Part 2
Lecture 34 - Antenatal Assessment of Fetal Well-Being - Part 3
Lecture 35 - Prenatal Screening and Diagnosis of aneuploidies
Lecture 36 - Invasive and non-invasive Prenatal Diagnostic Test
Lecture 37 - Invasive and non-invasive Prenatal Diagnostic Test (Continued...)
Lecture 38 - Fetal Imaging and Amniotic Fluid Study
Lecture 39 - Fetal Imaging and Amniotic Fluid Study
Lecture 40 - Teratology, Teratogens and feto-toxic agents - Part 1
Lecture 41 - Teratology, Teratogens and feto-toxic agents - Part 2
Lecture 42 - Normal Labour - Stages and cause of onset
Lecture 43 - Physiology of Labor
Lecture 44 - Events of Normal Labour
Lecture 45 - Mechanism of Normal Labour
Lecture 46 - Mechanism of Normal Labour (Continued...)
Lecture 47 - Clinical course of Labour
Lecture 48 - Monitoring of Normal Labour - Part 1
Lecture 49 - Monitoring of Normal Labour - Part 2
Lecture 50 - Labour Analgesia
Lecture 51 - Labour Analgesia (Continued...)
Lecture 52 - Abnormal Labour
Lecture 53 - Intrapartum Fetal Monitoring - Partogram
Lecture 54 - Intrapartum Fetal Monitoring - Cardiotocography (CTG)
Lecture 55 - Intrapartum Fetal Monitoring - Cardiotocography (CTG) (Continued...)
Lecture 56 - Induction and Augmentation of Labour
Lecture 57 - WHO Labour Guide
Lecture 58 - Episiotomy
Lecture 59 - Instrumental Vaginal Delivery
Lecture 60 - Obstetric anal sphincter injuries OASIS
Lecture 61 - Lower Segment Caesarean Section
Lecture 62 - Normal Puerperal changes
Lecture 63 - Management of Puerperium
Lecture 64 - Post-Natal care and postpartum contraception
Lecture 65 - Maternal Health Indicators and demographic scenario
Lecture 66 - Government health programmes related to Maternal Health
Lecture 67 - Government health programmes related to Maternal Health (Continued...)
Lecture 68 - Comprehensive Abortion Care (MTP Amendment Act 2021)

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NPTEL Video Course - Multi Disciplinary - NOC:Recommender Systems

Subject Co-ordinator - Prof. Mamata Jenamani

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Recommender system and its business value
Lecture 2 - Types of recommender system - I
Lecture 3 - Types of recommender system - II
Lecture 4 - Data Collection
Lecture 5 - Data Description
Lecture 6 - Data preprocessing
Lecture 7 - Dimensionality Reduction
Lecture 8 - Introduction to machine learning - I
Lecture 9 - Introduction to machine learning - II
Lecture 10 - Introduction to machine learning - III
Lecture 11 - Distance and Similarity
Lecture 12 - Distance and Similarity (Continued...)
Lecture 13 - User-Based Approach
Lecture 14 - Item-Based Approach
Lecture 15 - Additional Topics in Neighbourhood Based Approach
Lecture 16 - Association rule based model
Lecture 17 - UV Decomposition
Lecture 18 - The latent factor model
Lecture 19 - Basic latent factor models
Lecture 20 - Other advanced models
Lecture 21 - Introduction to content based recommender system: Foundations
Lecture 22 - Feature Engineering - I
Lecture 23 - Feature Engineering - II
Lecture 24 - Feature Engineering - III
Lecture 25 - Feature Engineering - IV
Lecture 26 - Decision Trees for content based recommendation
Lecture 27 - NaÃ Â¨ve Bayes classifier for content based recommendation
Lecture 28 - kNN Classifier for Recommender System
Lecture 29 - Rule based classification

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Lecture 30 - Regression methods and conclusions
Lecture 31 - Introduction to evaluation ofrecommender system
Lecture 32 - Resampling methods
Lecture 33 - Evaluation metrics for accuracy
Lecture 34 - Drawing reliable conclusions - I
Lecture 35 - Drawing reliable conclusions - II
Lecture 36 - Hybrid recommender systems
Lecture 37 - Knowledge based recommender systems
Lecture 38 - Context-Sensitive recommender systems
Lecture 39 - Structural Recommendations in Networks
Lecture 40 - Trust aware recommender systems

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NPTEL Video Course - Multi Disciplinary - NOC:Comprehensive Molecular Diagnostics and Advanced Gene Expressio

Subject Co-ordinator - Prof. Arindam Ghosh, Prof. Aritri Bir

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Foundation of Molecular Biology
Lecture 2 - DNA Replication and Repair Mechanism
Lecture 3 - Transcription (RNA Synthesis)
Lecture 4 - Protein Synthesis (Translation)
Lecture 5 - Nucleic Acid Isolation and Detection Methods
Lecture 6 - PCR (Polymerase Chain Reaction) Fundamentals
Lecture 7 - Realtime PCR - Part 1
Lecture 8 - Realtime PCR - Part 2
Lecture 9 - Variations of the PCR - Part 1
Lecture 10 - Variations of the PCR - Part 2
Lecture 11 - DNA Cloning and Recombinant DNA technology - I
Lecture 12 - DNA Cloning and Recombinant DNA technology - II
Lecture 13 - DNA Cloning and Recombinant DNA technology - III
Lecture 14 - Genome Editing Technologies - I
Lecture 15 - Genome Editing Technologies - II
Lecture 16 - DNA Microarray
Lecture 17 - FISH (Fluorescence in situ Hybridization)
Lecture 18 - Methods to study DNA-protein interaction - I
Lecture 19 - Methods to study DNA-protein interaction - II
Lecture 20 - Epigenetics and DNA methylation analysis
Lecture 21 - DNA Sequencing - Part 1 - Maxam Gilbert Sequencing
Lecture 22 - DNA Sequencing - Part 2 - Sanger Sequencing
Lecture 23 - Next Generation Sequencing - Part 1
Lecture 24 - Next Generation Sequencing - Part 2
Lecture 25 - Next Generation Sequencing - Part 3
Lecture 26 - Overview, Importance, Methods in Proteomics
Lecture 27 - Proteomic Techniques - High performance liquid chromatography (HPLC)
Lecture 28 - Proteomic Techniques - Mass Spectrometry
Lecture 29 - Proteomic Techniques - Differential in-gel electrophoresis

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Lecture 30 - Proteomic Techniques - Protein Microarray
Lecture 31 - Label-based Protein Quantification Technologies - Part 1
Lecture 32 - Label-based Protein Quantification Technologies - Part 2
Lecture 33 - Label free methods of protein quantification
Lecture 34 - Next Generation Proteomics
Lecture 35 - Proteomic Data Analysis and Bioinformatic Tools
Lecture 36 - Syndromic Panels and Multiplex Assay : Molecular identification of Microorganism
Lecture 37 - Molecular Diagnostics in Antimicrobial Resistance Testing
Lecture 38 - RNA Sequencing: Role in Infectious diseases - I
Lecture 39 - RNA Sequencing: Role in Infectious diseases - II
Lecture 40 - Point of Care (POC) diagnostics in Infectious diseases
Lecture 41 - Molecular genetics in tumorogenesis
Lecture 42 - Liquid biopsies in cancer detection
Lecture 43 - Digital PCR in Cancer detection
Lecture 44 - Mutation Detection Methods
Lecture 45 - Isothermal Nucleic Acid Amplification
Lecture 46 - Genetic Testing and Inherited Disorders - Part 1
Lecture 47 - Genetic Testing and Inherited Disorders - Part 2
Lecture 48 - Prenatal diagnostics and NIPT
Lecture 49 - Reproductive genetics and genetic counselling
Lecture 50 - Genetic counselling and patient education
Lecture 51 - Serial Analysis of Gene Expression
Lecture 52 - Metabolomics in Molecular Diagnostics
Lecture 53 - Immunoassay and Luminex Multiplex Assay
Lecture 54 - Molecular diagnostics in Metabolic, Cardiovascular and Gastrointestinal disorders
Lecture 55 - Molecular diagnostics in Endocrine, Neurodegenerative and Transplantation disorders
Lecture 56 - Pharmacogenomics and Personalized Medicine
Lecture 57 - Quality control (QC) in molecular diagnostics
Lecture 58 - Ethical concerns in molecular diagnostics
Lecture 59 - Artificial Intelligence and Machine learning in Genomics
Lecture 60 - Integration of Multiomics Data in Molecular Diagnostics

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NPTEL Video Course - Multi Disciplinary - NOC:Thin Film Technology

Subject Co-ordinator - Prof. Samit K Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction
Lecture 2 - Thin Film Materials and Components
Lecture 3 - Semiconductor Films and Heterostructures
Lecture 4 - Chemical Methods
Lecture 5 - Physical Vapor Deposition (PVD) : Thermal Evaporation
Lecture 6 - Thermal Evaporation
Lecture 7 - Sources of Thermal Evaporation
Lecture 8 - Evaporation of Elements and Compounds
Lecture 9 - Compound Evaporation and Thickness Uniformity
Lecture 10 - Film Thickness Monitoring and Control
Lecture 11 - Pulsed Laser Deposition
Lecture 12 - Sputtering Process and Mechanism
Lecture 13 - Plasma Discharge and DC Sputtering
Lecture 14 - RF Sputtering Process
Lecture 15 - Magnetron Sputtering
Lecture 16 - Sputtering of Binary Alloys and Compounds
Lecture 17 - Ion Beam and Hybrid Deposition
Lecture 18 - Introduction to CVD Process
Lecture 19 - Thermal CVD Process
Lecture 20 - Gas Transport and Growth Kinetics
Lecture 21 - CVD Processes and Systems
Lecture 22 - Plasma Enhanced CVD (PECVD)
Lecture 23 - Liquid Phase Epitaxy
Lecture 24 - Vapor Phase Epitaxy - Compound Semiconductors
Lecture 25 - Metal-Organic CVD (MOCVD)
Lecture 26 - Introduction and Film Purity
Lecture 27 - MBE System and Growth Mechanism
Lecture 28 - Effusion Source and Growth Rate
Lecture 29 - Insitu Growth Monitoring - RHEED Oscillation

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Lecture 30 - Atomic Layer Deposition / Atomic Layer Epitaxy
Lecture 31 - Thin Film Growth Modes
Lecture 32 - Homogeneous Nucleation
Lecture 33 - Heterogenous Nucleation
Lecture 34 - Stranski-Krastanov (2D-3D) Growth Mode
Lecture 35 - SiGe Strained Layer Epitaxy (2D) and Ge Islands (3D)
Lecture 36 - Thickness Measurement
Lecture 37 - Thickness Measurement - Interference Method
Lecture 38 - Thickness and Optical Constants - Ellipsometry
Lecture 39 - Mechanical Properties - Film Porosity and Adhesion
Lecture 40 - Mechanical Properties â Residual Stress
Lecture 41 - Electron Beam Techniques - SEM
Lecture 42 - Scanning Electron Microscopy
Lecture 43 - Microprobe and Transmission Electron Microscopy
Lecture 44 - Transmission Electron Microscopy
Lecture 45 - Scanning Probe Microscopy
Lecture 46 - X-ray Photoelectron Spectroscopy
Lecture 47 - Auger Electron Spectroscopy
Lecture 48 - Secondary Ion Mass Spectrometry (SIMS)
Lecture 49 - Different SIMS Techniques and Depth Profile Analysis
Lecture 50 - Rutherford Backscattering Spectrometry (RBS)
Lecture 51 - Basic Device Fabrication Techniques
Lecture 52 - Metal-Oxide-Semiconductor (MOS) Capacitor
Lecture 53 - n-MOSFET and CMOS FET Devices
Lecture 54 - Scaled Si MOSFET Devices
Lecture 55 - Heterostructure FET and Bipolar Transistors
Lecture 56 - Optoelectronic Materials and Devices
Lecture 57 - Light Emitting Devices
Lecture 58 - Photodetector Devices
Lecture 59 - Photovoltaic Devices
Lecture 60 - Nanotechnology and Photonic Devices

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NPTEL Video Course - Multi Disciplinary - NOC:An Integrated Approach to Common Childhood Diseases and Develop

Subject Co-ordinator - Prof. Nabarun Karmakar, Prof. Soumi Kundu, Prof. Parama Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Neonatal screening in India - Clinical Aspect
Lecture 2 - Neonatal Screening - Biochemical Aspect - Part I
Lecture 3 - Neonatal Screening - Biochemical Aspect - Part II
Lecture 4 - Neonatal Screening - Biochemical Aspect - Part III
Lecture 5 - India Newborn Action Plan (INAP)
Lecture 6 - Congenital Adrenal Hyperplasia - Biochemical Aspect
Lecture 7 - Congenital Adrenal Hyperplasia
Lecture 8 - Congenital and Acquired hypothyroidism
Lecture 9 - National Program for Hemoglobinopathies
Lecture 10 - Common Genetic Disorders in children
Lecture 11 - Congenital Hearing Disorders
Lecture 12 - Congenital Ophthalmological Disorders
Lecture 13 - Congenital Orthopedic Disorders
Lecture 14 - Congenital Structural Disorders
Lecture 15 - Malnutrition in Indian Children
Lecture 16 - Clinical features and management of Protein Energy Malnutrition
Lecture 17 - Medico-Social aspects and Prevention of Malnutrition in India
Lecture 18 - Integrated Child Developmental Services (ICDS)
Lecture 19 - Community Nutrition Programs
Lecture 20 - Vitamin A
Lecture 21 - Vitamin A disorders in Children
Lecture 22 - Vitamin B 1, 2, 3
Lecture 23 - Vitamin B 6, 9
Lecture 24 - Vitamin B 9, 12
Lecture 25 - Vitamin C
Lecture 26 - Vitamin B and C disorders in Children
Lecture 27 - Vitamin D
Lecture 28 - Vitamin D disorders in Children
Lecture 29 - Iodine

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Lecture 30 - National program for Vitamin A and Iodine deficiency disorders
Lecture 31 - Iron
Lecture 32 - Iron (Anaemia)
Lecture 33 - Anemia in Children - Part I
Lecture 34 - Anemia in Children - Part II
Lecture 35 - Anemia Mukt Bharat
Lecture 36 - Universal Immunization Program and Mission Indradhanush
Lecture 37 - Vaccine preventable disease - Part I
Lecture 38 - Vaccine preventable disease - Part II
Lecture 39 - Vaccine preventable disease - Part III
Lecture 40 - IAP immunization schedule and VPD surveillance
Lecture 41 - NVBDCP - Part I
Lecture 42 - NVBDCP - Part II
Lecture 43 - NVBDCP - Part III (Program aspect)
Lecture 44 - National program for TB and Leprosy
Lecture 45 - National program for AIDS and Hepatitis
Lecture 46 - Pneumonia
Lecture 47 - Diarrhea
Lecture 48 - IMNCI - Part I
Lecture 49 - IMNCI - Part II
Lecture 50 - RMNCH+A
Lecture 51 - Common Congenital Heart Diseases
Lecture 52 - Rheumatic Heart Disease
Lecture 53 - Childhood Asthma
Lecture 54 - Seizures in Childhood
Lecture 55 - Nephrotic syndrome
Lecture 56 - Developmental Delay and Cerebral Palsy
Lecture 57 - Common behavioral and psychiatric Disorders in Childhood - Part I
Lecture 58 - Common behavioral and psychiatric Disorders in Childhood - Part II
Lecture 59 - Learning and Developmental Disorders in Children
Lecture 60 - School Health Programme and Rashtriya Bal Swasthya Karyakram (RBSK)

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NPTEL Video Course - Multi Disciplinary - NOC:Sustainable Mining and Geoinformation

Subject Co-ordinator - Prof. B. K. Prusty, Prof. M. D. Behera

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamental of geoinformation
Lecture 2 - Optical remote sensing
Lecture 3 - LiDAR Remote Sensing
Lecture 4 - Microwave remote sensing
Lecture 5 - Thermal/Column Concentration
Lecture 6 - Geographic Information System (GIS)
Lecture 7 - Global Navigation Satellite System (GNSS)
Lecture 8 - 3-Dimentional Terrain Modeling
Lecture 9 - Cloud Computing
Lecture 10 - Internet of Things (IoT)
Lecture 11 - Exploration Mapping
Lecture 12 - Environmental Management
Lecture 13 - Restoration Monitoring
Lecture 14 - Contamination Mapping and Geo-Assessments
Lecture 15 - Volume Measurement and Geospatial Techniques
Lecture 16 - Subsidence Detection
Lecture 17 - Topographic and Slope Analysis
Lecture 18 - Disaster Management
Lecture 19 - Heat Detection and Monitoring
Lecture 20 - Gas and Particulate Matter Monitoring
Lecture 21 - Minerals, Mining and Society - I
Lecture 22 - Minerals, Mining and Society - II
Lecture 23 - Mining and Its Environmental Impacts - I
Lecture 24 - Mining and Its Environmental Impacts - II
Lecture 25 - Environmental Impact Assessment for Mining Projects - I
Lecture 26 - Environmental Impact Assessment for Mining Projects - II
Lecture 27 - Sustainable Development for Mining Industry - I
Lecture 28 - Sustainable Development for Mining Industry - II
Lecture 29 - SDF for Mining Industry - I

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Lecture 30 - SDF for Mining Industry - II
Lecture 31 - Fundamental: Geoinformation and SDGs in Mining
Lecture 32 - SDG 1 and 2 [No Poverty and Zero Hunger]
Lecture 33 - SDG 3, 4 and 5
Lecture 34 - SDG 6 [Clean Water and Sanitation]
Lecture 35 - SDG 7, 8 and 9
Lecture 36 - SDG 11
Lecture 37 - SDG 12, 13
Lecture 38 - SDG 14, 15, 17
Lecture 39 - Life Cycle and Associated Environmental Impacts
Lecture 40 - Sustainability Performance Monitoring
Lecture 41 - Land Acquisition and Rehabilitation and Resettlement Act - I
Lecture 42 - Land Acquisition and Rehabilitation and Resettlement Act - II
Lecture 43 - Land Acquisition, R and R Act - III
Lecture 44 - Mine Closure Plan - I
Lecture 45 - Mine Closure Plan - II
Lecture 46 - Challenges Towards SD In Mining Industry
Lecture 47 - Sustainable Development in Mining Legislation - NMP 2019
Lecture 48 - Sustainable Development in Mining Legislation - II
Lecture 49 - Life Cycle Analysis
Lecture 50 - Life Cycle Analysis for Mining Industry
Lecture 51 - Circular Economy for Mining Industry - I
Lecture 52 - Circular Economy for Mining Industry - II
Lecture 53 - Circular Economy for Mining Industry - III
Lecture 54 - Carbon footprints of mining industry
Lecture 55 - Net Zero and Decarbonisation of Mining Industry
Lecture 56 - Sustainability Reporting for Mining Industry - I
Lecture 57 - Sustainability Reporting for Mining Industry - II
Lecture 58 - Sustainability Assessment for Indian Mines
Lecture 59 - CSR for Sustainable Development
Lecture 60 - Sustainable Development in Mining Industry - Case Study

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NPTEL Video Course - Multi Disciplinary - NOC:Essential Neuroscience: A Beginners Guide

Subject Co-ordinator - Prof. Basudev Lahiri

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Overview
Lecture 2 - Genetics
Lecture 3 - Cellular Components
Lecture 4 - The Neuron
Lecture 5 - Glial Cells and Neural Circuit
Lecture 6 - Electrical Signals of the Nerve
Lecture 7 - Synaptic Transmission
Lecture 8 - Neurotransmitters
Lecture 9 - Neuroplasticity
Lecture 10 - Measuring Neural Activities
Lecture 11 - Overview of the eye
Lecture 12 - The Retina
Lecture 13 - Visual System
Lecture 14 - Perceiving and Recognizing Objects
Lecture 15 - Perception of Colour
Lecture 16 - Overview of the Auditory System
Lecture 17 - Sound Localization
Lecture 18 - The Vestibular System
Lecture 19 - Olfaction
Lecture 20 - Olfactory Physiology
Lecture 21 - Touch Physiology
Lecture 22 - Receptors of the Skin
Lecture 23 - Pain
Lecture 24 - Taste
Lecture 25 - Taste Receptors
Lecture 26 - Motor Control
Lecture 27 - Movements
Lecture 28 - Eye Movement
Lecture 29 - Anatomy of the Brain - 1

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Lecture 30 - Anatomy of the Brain - 2
Lecture 31 - Anatomy of the Brain - 3
Lecture 32 - Anatomy of the Nervous System
Lecture 33 - Overview
Lecture 34 - Risk and Reward
Lecture 35 - Uncertaininty, Integration and Comparison to reach Decision
Lecture 36 - Consciousness - 1
Lecture 37 - Consciousness - 2
Lecture 38 - Attention
Lecture 39 - Memory - 1
Lecture 40 - Memory - 2
Lecture 41 - Language - 1
Lecture 42 - Language - 2
Lecture 43 - Emotions - 1
Lecture 44 - Emotions - 2
Lecture 45 - Sleep
Lecture 46 - Stroke
Lecture 47 - Neuro-oncology
Lecture 48 - Headache Disorders and Neurologic Pain
Lecture 49 - Epilepsy
Lecture 50 - Neurodegenerative diseases
Lecture 51 - Mood Disorders : Depression and Bipolar Disorder
Lecture 52 - Thought Disorders : Psychosis, Schizophrenia
Lecture 53 - Anxiety Disorders
Lecture 54 - Addiction and Substance Abuse Disorders
Lecture 55 - Sleep Disorders
Lecture 56 - Autism Spectrum Disorder (ASD)
Lecture 57 - The Damaged Brain
Lecture 58 - Regeneration in the CNS
Lecture 59 - Neurological Infection and Neurotrauma
Lecture 60 - Revision

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NPTEL Video Course - Multi Disciplinary - NOC:Climate Risk, Adaptation and Sustainable Development

Subject Co-ordinator - Prof. MD Behera

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Earthâ s Climate
Lecture 2 - Overview of the Earthâ s Atmosphere
Lecture 3 - Solar Radiation and The Earthâ s Energy Balance
Lecture 4 - Global Season and Indian Monsoon
Lecture 5 - Global Biogeography
Lecture 6 - Overview of the Hydrologic System
Lecture 7 - Oceanic Circulation
Lecture 8 - Soil Health and Climate Change
Lecture 9 - Mechanism of Climate Change
Lecture 10 - Mechanism of Climate Change
Lecture 11 - IPCC Projection Scenarios: SRES
Lecture 12 - IPCC Projection Scenarios: RCPs
Lecture 13 - IPCC Projection Scenarios: SSPs
Lecture 14 - Projected Changes: Temperature-Past Observations
Lecture 15 - Projected Changes: Temperature
Lecture 16 - Climate Risks, Socioeconomic Dispairity, and Adaptation Options
Lecture 17 - Climate Risks, Terrestrial and Fresh Water Ecosystems and Feedback
Lecture 18 - Terrestrial and Fresh Water Ecosystems - Adaptation and Mitigation
Lecture 19 - Water and Hydrological Risks - Observation and Projection
Lecture 20 - Water and Hydrological Adaptation : Responses, Outcomes and Constraints
Lecture 21 - Infrastructure: Risks and Adaptation
Lecture 22 - Health and Wellbeing - Observations and Risks
Lecture 23 - Health and Wellbeing - Adaptation
Lecture 24 - Impacts, Risks and Adaptation Options - Asia
Lecture 25 - Impacts, Risks and Adaptation Options - Mountains
Lecture 26 - Mitigation Pathways
Lecture 27 - Agriculture, Forestry and Other Land Uses (AFOLU) Mitigation
Lecture 28 - Mitigation - Energy
Lecture 29 - Mitigation: Urban and other Settlements

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Lecture 30 - Mitigation: Transport
Lecture 31 - Nature Based Solutions
Lecture 32 - Nature Based Solutions for Climate Mitigation
Lecture 33 - Agriculture, Forestry and Other Land Uses - NbS and Climate Mitigation
Lecture 34 - Nature Based Solutions : Urban Infrastructure
Lecture 35 - Nature Based Solutions : Multiple Benefits - Indian Examples
Lecture 36 - Overview of SDGs
Lecture 37 - SDG Target 131
Lecture 38 - Climate Action - SDG Target 132 and Indicators
Lecture 39 - Climate Action - SDG Target 13 [3 a b] and Indicators
Lecture 40 - Connecting Climate Action with other SDGs
Lecture 41 - Climate Technology: Concepts and Frameworks
Lecture 42 - Climate Technology: Mitigation
Lecture 43 - Climate Technology: Adaptation
Lecture 44 - Climate Technology: Cross-Cutting Technologies -GeoAI
Lecture 45 - Climate Technology: CO2 Capture and Storage and Removal Technologies
Lecture 46 - Climate Finance: Sources, Instruments and Flows
Lecture 47 - Climate Finance: Adaptation Finance
Lecture 48 - Climate Finance: Adaptation and Mitigation Mechanisms - UNFCCC
Lecture 49 - Climate Finance: Carbon Pricing and Carbon Market Mechanisms
Lecture 50 - Climate Finance: Institutions and Intermediaries
Lecture 51 - Global Climate Governance: UNFCCC
Lecture 52 - Global Climate Governance: Kyoto Protocol
Lecture 53 - Global Climate Governance: The Paris Agreement - Mechanisms
Lecture 54 - Global Climate Governance: Glasgow Climate Pact (COP26) - India
Lecture 55 - Global Climate Governance: Role of India
Lecture 56 - Indian's Climate Action: Shift from Mitigation to Adaptation
Lecture 57 - Indian's Climate Action: Intended Nationally Determined Contribution
Lecture 58 - Indian's Climate Action: Just Transition Framework
Lecture 59 - Indian's Climate Action: Technology Readiness Level
Lecture 60 - Indian's Climate Action: Financial Intrumentations

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NPTEL Video Course - Multi Disciplinary - NOC:Neuroscience of Human Movement

Subject Co-ordinator - Prof. Varadhan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Neuroscience of Human Movement
Lecture 1 - Membrane Physiology - Part 1
Lecture 2 - Membrane Physiology - Part 2
Lecture 3 - Nernst Equation
Lecture 4 - Goldman Equation
Lecture 5 - Action Potential - Part 1
Lecture 6 - Action Potential - Part 2
Lecture 7 - Action Potential - Part 3
Lecture 8 - Action Potential - Part 4
Lecture 9 - Action Potential - Part 5
Lecture 10 - Review of Action Potential and Neurotransmitters
Lecture 11 - Neuromuscular Junction
Lecture 12 - Disorders of Neuromuscular Junction
Lecture 13 - Skeletal Muscles - Part 1
Lecture 14 - Skeletal Muscles - Part 2
Lecture 15 - Skeletal Muscles - Part 3
Lecture 16 - Skeletal Muscles - Part 4
Lecture 17 - Muscle force production
Lecture 18 - Motor Units - Part 1
Lecture 19 - Motor Units - Part 2
Lecture 20 - Motor Units - PIC and EMG
Lecture 21 - Receptors - Part 1
Lecture 22 - Receptors - Part 2
Lecture 23 - Spine and Spinal Cord
Lecture 24 - Excitation and Inhibition within Spinal Cord - Part 1
Lecture 25 - Excitation and Inhibition within Spinal Cord - Part 2
Lecture 26 - Monosynaptic Reflexes - Part 1
Lecture 27 - Monosynaptic Reflexes - Part 2
Lecture 28 - Monosynaptic Reflexes - Part 3

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Lecture 29 - Oligosynaptic and Polysynaptic Reflexes - Part 1
Lecture 30 - Oligosynaptic and Polysynaptic Reflexes - Part 2
Lecture 31 - Pre-Programmed Reactions - Part 1
Lecture 32 - Pre-Programmed Reactions - Part 2
Lecture 33 - Spinal Cord Injuries and Central Pattern Generators
Lecture 34 - Animal Preparations for Neuroscience Experiments
Lecture 35 - Overview of motor control system
Lecture 36 - Terminology
Lecture 37 - Primary Motor Cortex - Part 2
Lecture 38 - Primary Motor Cortex - Part 3
Lecture 39 - Primary Motor Cortex - Part 4
Lecture 40 - Primary Motor Cortex - Part 5
Lecture 41 - Primary Motor Cortex - Part 6
Lecture 42 - Primary Motor Cortex - Part 7
Lecture 43 - Primary Motor Cortex - Part 8
Lecture 44 - Primary Motor Cortex - Part 9
Lecture 45 - Primary Motor Cortex - Part 10
Lecture 46 - Primary Motor Cortex - Part 11
Lecture 47 - Primary Motor Cortex - Part 12
Lecture 48 - Primary Motor Cortex - Part 13
Lecture 49 - Primary Motor Cortex - Part 14
Lecture 50 - Primary Motor Cortex - Part 15
Lecture 51 - Cerebellum - Part 1
Lecture 52 - Cerebellum - Part 2
Lecture 53 - Cerebellum - Part 3
Lecture 54 - Cerebellum - Part 4
Lecture 55 - Cerebellum - Part 5
Lecture 56 - Cerebellum - Part 6
Lecture 57 - Cerebellum - Part 7
Lecture 58 - Cerebellum - Part 8
Lecture 59 - Cerebellum - Part 9
Lecture 60 - Cerebellum - Part 10
Lecture 61 - Cerebellum - Part 11
Lecture 62 - Cerebellum - Part 12
Lecture 63 - Basal Ganglia - Part 1
Lecture 64 - Basal Ganglia - Pathways
Lecture 65 - Basal Ganglia - Inputs
Lecture 66 - Basal Ganglia - Outputs
Lecture 67 - Basal Ganglia - Various Functions

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Lecture 68 - Basal Ganglia - Motor Functions
Lecture 69 - Basal Ganglia - Motor Functions.
Lecture 70 - Basal Ganglia - Dopamine and Acetylcholine
Lecture 71 - Basal Ganglia - Disorders
Lecture 72 - Parkinson's Disease - Intro
Lecture 73 - Parkinson's Disease - Rate Model, Pathophysiology
Lecture 74 - Parkinson's Disease - Current therapeutic approaches and the future
Lecture 75 - Basal Ganglia - Various Disorders
Lecture 76 - Neuropsychiatric disorders due to BG dysfunction
Lecture 77 - Parietal and Premotor Cortex - Part 1
Lecture 78 - Parietal and Premotor Cortex - Part 2
Lecture 79 - Parietal and Premotor Cortex - Part 3
Lecture 80 - Parietal and Premotor Cortex - Part 4
Lecture 81 - Parietal and Premotor Cortex - Part 5
Lecture 82 - Parietal and Premotor Cortex - Part 6

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NPTEL Video Course - Multi Disciplinary - NOC:Manage TB

Subject Co-ordinator - Dr. M S Jawahar, Dr.V.V.Banu Rekha, Prof. Mohan Natrajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - How is TB affecting public health Globally and Nationally
Lecture 2 - Epidemiology of TB-Session - 1
Lecture 3 - Epidemiology of TB-Session - 2
Lecture 4 - Pathogenesis of TB-Session - 1
Lecture 5 - Pathogenesis of TB-Session - 2
Lecture 6 - Clinical manifestations of TB-Session - 1
Lecture 7 - Clinical manifestations of TB-Session - 2
Lecture 8 - Clinical manifestations of TB-Session - 3
Lecture 9 - Bacteriological Diagnosis of Tuberculosis - Smear and Culture
Lecture 10 - Demonstration of processing of sputum specimen for culture for diagnosis of tuberculosis
Lecture 11 - Demonstration of sputum smear examination for diagnosis of tuberculosis
Lecture 12 - Demonstration of solid culture method for diagnosis of tuberculosis
Lecture 13 - Demonstration of liquid culture method for diagnosis of tuberculosis in sputum
Lecture 14 - Phenotypic drug susceptibility testing in Tuberculosis
Lecture 15 - Demonstration of drug susceptibility testing of first line anti-TB drugs by liquid culture
Lecture 16 - Molecular Diagnosis of Tuberculosis-Session - 1
Lecture 17 - Molecular Diagnosis of Tuberculosis-Session - 2
Lecture 18 - Demonstration of Xpert MTB-RIF assay for diagnosis of tuberculosis from sputum specimens
Lecture 19 - Demonstration of Line Probe Assay (LPA) (Direct detection of tuberculosis and resistance to isor
Lecture 20 - Radiology in diagnosis of Tuberculosis-Session - 1
Lecture 21 - Radiology in diagnosis of Tuberculosis-Session - 2
Lecture 22 - Radiology in diagnosis of Tuberculosis-Session - 3
Lecture 23 - Radiology in diagnosis of Tuberculosis-Session - 4
Lecture 24 - Approach to diagnosis of Pulmonary TB
Lecture 25 - Case Discussion-Approach to diagnosis of TB in a person with presumptive pulmonary TB
Lecture 26 - Case Discussion-Approach to diagnosis of pulmonary TB in a patient with negative sputum smear fo
Lecture 27 - Approach to diagnosis of Extra-pulmonary TB
Lecture 28 - Case Discussion-Approach to diagnosis of TB in a person with swelling in the neck
Lecture 29 - Case Discussion-Approach to diagnosis of TB spine

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Lecture 30 - Diagnosis of Childhood Tuberculosis-Session - 1
Lecture 31 - Diagnosis of Childhood Tuberculosis-Session - 2
Lecture 32 - Video demonstration of gastric fluid aspiration technique in a child
Lecture 33 - Case Discussion-Approach to diagnosis of TB in a child with presumptive pulmonary TB
Lecture 34 - Case Discussion-Approach to diagnosis of TB meningitis in a child
Lecture 35 - Drugs for treating Tuberculosis and Principles of Chemotherapy-Session - 1
Lecture 36 - Drugs for treating Tuberculosis and Principles of Chemotherapy-Session - 2
Lecture 37 - Treatment of Drug Sensitive Pulmonary Tuberculosis
Lecture 38 - Case discussion-Approach to treatment of drug sensitive TB
Lecture 39 - Management of drug resistant Tuberculosis-Session - 1
Lecture 40 - Management of drug resistant Tuberculosis-Session - 2
Lecture 41 - Case discussion-Approach to treatment of Multi-drug resistant TB (MDR-TB)/ Extensively drug resi
Lecture 42 - Management of Extra-pulmonary Tuberculosis-Session - 1
Lecture 43 - Management of Extra-pulmonary Tuberculosis-Session - 2
Lecture 44 - Panel discussion-Practical difficulties in the management of Extra-pulmonary TB
Lecture 45 - Management of patients with HIV-TB coinfection-Session - 1
Lecture 46 - Management of patients with HIV-TB coinfection-Session - 2
Lecture 47 - Case discussion-Approach to management of HIV-TB
Lecture 48 - Management of TB in special situations
Lecture 49 - Case discussion-Approach to management of TB in pregnancy
Lecture 50 - Treatment of Pediatric Tuberculosis-Session - 1
Lecture 51 - Treatment of Pediatric Tuberculosis-Session - 2
Lecture 52 - Management of Adverse effects to anti-TB drugs-Session - 1
Lecture 53 - Management of Adverse effects to anti-TB drugs-Session - 2
Lecture 54 - Case discussion-Approach to management of jaundice during anti-TB treatment
Lecture 55 - Case discussion-Approach to management of skin rashes during anti-TB treatment
Lecture 56 - Non-tuberculous Mycobacteria- Diagnosis and Clinical management-Session - 1
Lecture 57 - Non-tuberculous Mycobacteria - Diagnosis and Clinical Management Session - 2
Lecture 58 - Newer Anti-TB drugs and regimens-Session - 1
Lecture 59 - Newer Anti-TB drugs and regimens-Session - 2
Lecture 60 - Management of Latent TB Infection-Session - 1
Lecture 61 - Management of Latent TB Infection-Session - 2
Lecture 62 - Airborne infection control in tuberculosis-Session - 1
Lecture 63 - Airborne infection control in tuberculosis-Session - 2
Lecture 64 - Vaccine for Tuberculosis-Session - 1
Lecture 65 - Vaccine for Tuberculosis-Session - 2
Lecture 66 - Services offered by Revised National TB Control Programme (RNTCP)-Session - 1
Lecture 67 - Services offered by Revised National TB Control Programme (RNTCP)-Session - 2
Lecture 68 - Services offered by Revised National TB Control Programme (RNTCP)-Session - 3

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Lecture 69 - Services offered by Revised National TB Control Programme (RNTCP)-Session - 4
Lecture 70 - Tuberculosis notification-Session - 1
Lecture 71 - Tuberculosis notification-Session - 2
Lecture 72 - Addressing Social Barriers in Tuberculosis Control-Session - 1
Lecture 73 - Addressing Social Barriers in Tuberculosis Control-Session - 2
Lecture 74 - Standards for TB Care in India-Session - 1
Lecture 75 - Standards for TB Care in India-Session - 2
Lecture 76 - Global Tuberculosis Control Strategies

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NPTEL Video Course - Multi Disciplinary - NOC:Ecology and Environment

Subject Co-ordinator - Dr. Abhijit P. Deshpande

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sustainability
Lecture 2 - Dams
Lecture 3 - Dams
Lecture 4 - Adayar River
Lecture 5 - Adayar River
Lecture 6 - Urbanisation in Western Ghats and Biodiesel
Lecture 7 - Use And Throw Plastic
Lecture 8 - Nano Materials Information Technologhy
Lecture 9 - Definition of Health Risk
Lecture 10 - Transport Of Pollutants in the Environment
Lecture 11 - Assesment of Risk
Lecture 12 - Remediation and Liability
Lecture 13 - Remendiation and Liability
Lecture 14 - Life Cycle Analysis
Lecture 15 - Energy and Environment module - 1
Lecture 16 - Energy and Environment module - 2
Lecture 17 - Energy and Environment module - 3
Lecture 18 - Energy and Environment module - 4
Lecture 19 - Energy and Environment module - 5
Lecture 20 - Energy and Environment module - 6
Lecture 21 - Energy and Environment module - 7
Lecture 22 - Drinking Water Supply
Lecture 23 - Drinking Water Supply
Lecture 24 - Water Quality Standards And Philosophy of Water Treatment
Lecture 25 - Water Treatment
Lecture 26 - Wastewater Management in Developing Urban Environments
Lecture 27 - Wastewater Recycling
Lecture 28 - Sustainable Water Management In Urban Areas - Part 1
Lecture 29 - Sustainable Water Management In Urban Areas - Part 2

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Lecture 30 - Ground Water Contamination
Lecture 31 - Groundwater - Sanitation Nexus
Lecture 32 - Chasing Sustainability - The Challenge - Part 1
Lecture 33 - Chasing Sustainability - The Challenge - Part 2
Lecture 34 - Devoloping Frame Works Of Action
Lecture 35 - Devoloping Frame Works Of Action
Lecture 36 - Social And sanitation
Lecture 37 - Promoting Policies For Eco-Productive Cities in the global House - Part 1
Lecture 38 - Promoting Policies For Eco-Productive Cities in the global House - Part 2
Lecture 39 - The need to study ecology
Lecture 40 - Ecosystem functions and services
Lecture 41 - What is studied in ecology?
Lecture 42 - Ecological footprint
Lecture 43 - Energy and Material flow in ecosystems and ecological efficiency
Lecture 44 - Energy flow, productivity and Biodiversity
Lecture 45 - Biodiversity, population and ecological principles

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NPTEL Video Course - Multi Disciplinary - NOC:Current Regulatory Requirements for Conducting Clinical Trials

Subject Co-ordinator - Prof. Nandini K Kumar, Prof. Sucheta Banerjee Kurundkar, Prof. A. B. Ramteke

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - C1 - L00
Lecture 2 - C1 - Introduction Assorted Interviews
Lecture 3 - C1 - L01
Lecture 4 - C1 - L02
Lecture 5 - C1 - L03
Lecture 6 - C1 - L04
Lecture 7 - C1 - L05
Lecture 8 - C1 - L06
Lecture 9 - C1 - L07
Lecture 10 - C1 - L08
Lecture 11 - C1 - L09
Lecture 12 - C1 - L10A
Lecture 13 - C1 - L10B

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NPTEL Video Course - Multi Disciplinary - NOC:Regulatory Requirements for Medical Devices and IVD kits in Ind

Subject Co-ordinator - Prof. A. B. Ramteke, Prof. Malay Mitra

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - C2 - Introduction Assorted Interviews
Lecture 2 - C2 - L00
Lecture 3 - C2 - L01
Lecture 4 - C2 - L02
Lecture 5 - C2 - L03
Lecture 6 - C2 - L04
Lecture 7 - C2 - L05
Lecture 8 - C2 - L06
Lecture 9 - C2 - L07
Lecture 10 - C2 - L08
Lecture 11 - C2 - L09

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NPTEL Video Course - Multi Disciplinary - NOC:Numerical Methods for Engineers

Subject Co-ordinator - Dr. Niket S.Kaisare

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Overview of Learning Modules
Lecture 3 - Course Plan
Lecture 4 - Tutorial
Lecture 5 - Errors and Approximations
Lecture 6 - Truncation and Round-Off Errors
Lecture 7 - Binary Numbers
Lecture 8 - Floating Point
Lecture 9 - Floating Point in Binary system
Lecture 10 - Iterative Method
Lecture 11 - Direct Method
Lecture 12 - Sequential Method
Lecture 13 - Linear Algebra
Lecture 14 - Introduction to Linear Equations
Lecture 15 - Rank Condition for Solving Linear Equations
Lecture 16 - Motivating Gauss Elimination
Lecture 17 - Gauss Elimination
Lecture 18 - Tutorial Recap
Lecture 19 - Back Substitution to find solution
Lecture 20 - Gauss Jordan and LU Decomposition
Lecture 21 - Partial Pivoting in Gauss Elimination
Lecture 22 - Analysis of Gauss Elimination
Lecture 23 - Tri-Diagonal Systems
Lecture 24 - Thomas Algorithm for Tri-Diagonal Systems
Lecture 25 - Gauss Siedel Method
Lecture 26 - Analysis of Gauss Siedel Method
Lecture 27 - Gauss Siedel vs. Jacobi Methods
Lecture 28 - Bonus
Lecture 29 - Summary

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Lecture 30 - Introduction to Nonlinear Equations
Lecture 31 - Bisection Method
Lecture 32 - Analysis of Bisection Method
Lecture 33 - Bonus
Lecture 34 - Regula-Falsi Method
Lecture 35 - Bonus
Lecture 36 - Regula-Falsi vs. Secant Method
Lecture 37 - Bonus
Lecture 38 - Some special cases
Lecture 39 - Fixed-Point Iteration
Lecture 40 - Newton-Raphson Method
Lecture 41 - Analysis of Fixed-Point Iteration
Lecture 42 - Analysis of Newton-Raphson
Lecture 43 - Problems with Newton-Raphson
Lecture 44 - Multi-Variable Fixed-Point Iteration
Lecture 45 - Multi-Variable Newton-Raphson
Lecture 46 - Out of Syllabus
Lecture 47 - Out of Syllabus
Lecture 48 - Summary
Lecture 49 - Introduction
Lecture 50 - Linear Regression in One Variable
Lecture 51 - Recap
Lecture 52 - Bonus
Lecture 53 - Linear Regression in Multiple Variables
Lecture 54 - Matrix Method for Multi-Linear Regression
Lecture 55 - Polynomial Regression
Lecture 56 - Functional Regression
Lecture 57 - Bonus
Lecture 58 - Interpolation
Lecture 59 - Bonus
Lecture 60 - Lagrange Interpolating Polynomials
Lecture 61 - Newton's Forward Difference Polynomial
Lecture 62 - Newton's Divided Differences
Lecture 63 - Interpolation Examples
Lecture 64 - Bonus
Lecture 65 - Summary
Lecture 66 - Numerical Differentiation
Lecture 67 - Numerical Differentiation Formula and Analysis
Lecture 68 - Derivation using Method of undetermined coefficients

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Lecture 69 - Three-point differentiation formulae
Lecture 70 - Bonus
Lecture 71 - Truncation vs. Round-Off Errors
Lecture 72 - Numerical Differentiation Examples
Lecture 73 - Summary of Numerical Differentiation
Lecture 74 - Numerical Integration
Lecture 75 - Trapezoidal rule and Derivation
Lecture 76 - Simpson's Rules for Integration
Lecture 77 - Bonus
Lecture 78 - Error Analysis for Simpson's Rules
Lecture 79 - Numerical Integration Examples
Lecture 80 - Bonus
Lecture 81 - Summary of Newton Cotes Formulae
Lecture 82 - Richardson's Extrapolation
Lecture 83 - Gauss Quadrature
Lecture 84 - Summary of Numerical Integration
Lecture 85 - Introduction to ODE-IVP
Lecture 86 - Motivation using an Example (Bonus)
Lecture 87 - Euler's Methods and Second-Order Methods
Lecture 88 - Second-Order Runge-Kutta Methods
Lecture 89 - Summary of RK-2
Lecture 90 - Higher order RK Methods
Lecture 91 - Bonus
Lecture 92 - Bonus
Lecture 93 - Summary and Recap
Lecture 94 - Introduction to Predictor-Corrector Methods
Lecture 95 - Stability of Implicit Methods
Lecture 96 - Stability Analysis of Euler's Methods
Lecture 97 - Extension to multiple variables
Lecture 98 - Local vs. Global Truncation Errors
Lecture 99 - Richardson's Extrapolation
Lecture 100 - Stiff System of ODEs
Lecture 101 - Adaptive Step-sizing
Lecture 102 - Adaptive step-sizing and Embedded Methods
Lecture 103 - Bonus
Lecture 104 - Summary and Recap (Weeks 10 and 11)
Lecture 105 - Introduction to ODE-BVP
Lecture 106 - Shooting Method
Lecture 107 - Finite Difference Method

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Lecture 108 - Solution using Shooting Method
Lecture 109 - Algorithm for Shooting Method
Lecture 110 - Problems with Shooting Method
Lecture 111 - Solving ODE-BVP using Finite Difference Method
Lecture 112 - Microsoft Excel based Solution
Lecture 113 - Recap of Week-12 (ODE-BVP)

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NPTEL Video Course - Multi Disciplinary - Basic Course in Biomedical Research

Subject Co-ordinator - Dr. Sanjay Mehendale

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to health research
Lecture 2 - Formulating research question
Lecture 3 - Literature review
Lecture 4 - Measures of disease frequency
Lecture 5 - Descriptive study designs
Lecture 6 - Analytical study designs
Lecture 7 - Experimental study designs
Lecture 8 - Validity of epidemiological studies
Lecture 9 - Qualitative research methods
Lecture 10 - Measurement of study variables
Lecture 11 - Sampling methods
Lecture 12 - Calculating sample size and power
Lecture 13 - Selection of study population
Lecture 14 - Study plan and project management
Lecture 15 - Designing data collection tools
Lecture 16 - Principles of data collection
Lecture 17 - Data management
Lecture 18 - Overview of data analysis
Lecture 19 - Ethical framework for health research
Lecture 20 - Conducting clinical trails
Lecture 21 - Preparing a concept paper for research projects
Lecture 22 - Elements of a protocol for research studies

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NPTEL Video Course - Multi Disciplinary - NOC:Thermodynamics

Subject Co-ordinator - Prof. Anand T. N. C

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts and definitions - Part 1
Lecture 2 - Basic concepts and definitions - Part 2
Lecture 3 - Basic concepts and definitions - Part 3
Lecture 4 - Tutorial problems on exact and inexact differential
Lecture 5 - Basic concepts and definitions - Part 4
Lecture 6 - Work - Part 1
Lecture 7 - Work - Part 2
Lecture 8 - Work - Part 3
Lecture 9 - Work - Part 4
Lecture 10 - Work - Part 5
Lecture 11 - Tutorial problem on 'Work' - Part 1
Lecture 12 - Tutorial problem - Part 2
Lecture 13 - Tutorial problem on 'Work' - Part 3
Lecture 14 - Tutorial problem on 'Work' - Part 4
Lecture 15 - Zeroth law of thermodynamics
Lecture 16 - Methods of temperature measurement
Lecture 17 - Modes of heat transfer
Lecture 18 - Tutorial problem on 'Modes of heat transfer'
Lecture 19 - Tutorial problem on 'Methods of temperature measurement'
Lecture 20 - First law of thermodynamics
Lecture 21 - Tutorial problem
Lecture 22 - Tutorial problem
Lecture 23 - Heat and work interactions for a system
Lecture 24 - Tutorial problem - Part 1
Lecture 25 - Pure substance
Lecture 26 - Tutorial problem - Part 2
Lecture 27 - Ideal gas - Part 1
Lecture 28 - Ideal gas - Part 2
Lecture 29 - Tutorial problem - Part 3

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Lecture 30 - Tutorial problem - Part 4
Lecture 31 - Tutorial problem - Part 5
Lecture 32 - Specific heats at constant pressure and constant volume
Lecture 33 - Tutorial problem - Part 6
Lecture 34 - Tutorial problem - Part 7
Lecture 35 - Ideal gas - Part 3
Lecture 36 - Ideal gas - Part 4
Lecture 37 - Ideal gas - Part 5
Lecture 38 - Tutorial problem - Part 1
Lecture 39 - Tutorial problem - Part 2
Lecture 40 - Tutorial problem - Part 3
Lecture 41 - Tutorial problem - Part 4
Lecture 42 - Beyond ideal gases - Part 1
Lecture 43 - Beyond ideal gases - Part 2
Lecture 44 - Two phase system - Part 1
Lecture 45 - Two phase system - Part 2
Lecture 46 - Two phase system
Lecture 47 - Tutorial problems (2 numbers)
Lecture 48 - Tutorial problem - Part 1
Lecture 49 - Tutorial problem - Part 2
Lecture 50 - Tutorial problem - Part 3
Lecture 51 - Tutorial problems on two-phase systems (2 numbers)
Lecture 52 - Tutorial problem (1 number)
Lecture 53 - Rate equation of the first law of thermodynamics for a control mass and a control volume
Lecture 54 - Energy equation for a steady-state, steady-flow process in selected engineering devices
Lecture 55 - Tutorial problems (3 numbers)
Lecture 56 - Tutorial problem - Part 1
Lecture 57 - Tutorial problem - Part 2
Lecture 58 - Quasi-static process revisited
Lecture 59 - Second law of thermodynamics
Lecture 60 - Second law of thermodynamics
Lecture 61 - Second law of thermodynamics
Lecture 62 - Second law of thermodynamics
Lecture 63 - Second law of thermodynamics
Lecture 64 - Second law of thermodynamcis
Lecture 65 - Tutorial problems (2 numbers)
Lecture 66 - Tutorial problem (1 number)
Lecture 67 - Tutorial problem (1 number)
Lecture 68 - Tutorial problem (2 numbers)

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Lecture 69 - Second law of thermodynamics
Lecture 70 - Entropy - Part 1
Lecture 71 - Tutorial problem (1 number)
Lecture 72 - Entropy - Part 2
Lecture 73 - Entropy - Part 3
Lecture 74 - Entropy - Part 4
Lecture 75 - Tutorial problem (1 number)
Lecture 76 - Tutorial problem (1 number)
Lecture 77 - Tutorial problems (2 numbers)
Lecture 78 - Entropy - Part 5
Lecture 79 - Entropy - Part 6
Lecture 80 - Entropy - Part 7
Lecture 81 - Exergy - Part 1
Lecture 82 - Exergy - Part 2
Lecture 83 - Exergy - Part 3
Lecture 84 - Thermodynamics cycles
Lecture 85 - Tutorial problem (1 number)
Lecture 86 - Thermodynamics cycles
Lecture 87 - Tutorial problem (1 number)
Lecture 88 - Thermodynamics cycles
Lecture 89 - Tutorial problem (1 number)

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NPTEL Video Course - Multi Disciplinary - NOC:Regulatory Requirements for Medical Devices including in Vitro

Subject Co-ordinator - Prof. Malay Mitra, Prof. Aseem Sahu, Prof. Arun B.Ramteke

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Courses Overview
Lecture 2 - Medical device and in vitro diagnostics
Lecture 3 - Medical Device Rules, 2017
Lecture 4 - Classification of medical devices
Lecture 5 - Labelling of medical devices and in vitro diagnostics
Lecture 6 - Standards of medical device, quality assurance and testing
Lecture 7 - Regulatory requirements of biocompatibility of medical devices and ISO 10993
Lecture 8 - Clinical investigation of medical devices, regulation of investigational medical devices
Lecture 9 - Quality assurance and quality management system
Lecture 10 - How to obtain a licence to manufacture a medical device?
Lecture 11 - ISO 14971 (Medical devices
Lecture 12 - Inspection of medical device and IVD establishments
Lecture 13 - Import and export of medical devices and IVDs
Lecture 14 - Medical device regulation

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NPTEL Video Course - Multi Disciplinary - NOC:Current Regulatory Requirements for Conducting Clinical Trials

Subject Co-ordinator - Prof. Nandini K Kumar, Prof. Y. K. Gupta, Prof. D. K. Sable, Prof. Arun B. Ramteke, Pr

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Courses Overview
Lecture 2 - Overview of Indian regulatory system
Lecture 3 - Overview of Drugs and Cosmetics Act and Rules thereunder
Lecture 4 - Overview of New Drugs and Clinical Trials Rules, 2019
Lecture 5 - Pre-Clinical Data Requirements
Lecture 6 - Rules Governing Clinical Trials
Lecture 7 - Phases of clinical trial, forms, and fees
Lecture 8 - Regulatory pathway and data requirements for NDCT, 2019
Lecture 9 - BA/BE study and study centers
Lecture 10 - Guidelines to conduct BA/BE studies
Lecture 11 - Ethics Committee registration and re-registration
Lecture 12 - Ethical Considerations
Lecture 13 - Good Clinical Practice
Lecture 14 - Requirements for import/manufacture of new drug/IND for conducting clinical trials in India
Lecture 15 - Requirements for import/manufacture of new drug/IND for sale/ distribution and unapproved new dr
Lecture 16 - Important issues
Lecture 17 - Special concern
Lecture 18 - Clinical trial related guidelines (NDCT Rules)
Lecture 19 - Content of Proposed Clinical Trial Protocol
Lecture 20 - Content of a Clinical Trial Report
Lecture 21 - Post Marketing Assessment and Clinical Trial Compensation
Lecture 22 - Common observations during submission of CT/BA/BE protocol
Lecture 23 - Common observations during CT/BA/BE centre inspections
Lecture 24 - Drug development process
Lecture 25 - Salient feature of NDCT 2019 - what's new in NDCT?
Lecture 26 - Online Submission 23A
Lecture 27 - Online Submission (CTRI)
Lecture 28 - Tables Given in NDCT 2019 and its Content

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NPTEL Video Course - Multi Disciplinary - NOC:Model Predictive Control: Theory and Applications

Subject Co-ordinator - Dr. Niket S.Kaisare

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Background: Model Predictive Control
Lecture 2 - Course Outline
Lecture 3 - Additional MATLAB Video - Array Operations
Lecture 4 - Additional MATLAB Video - Array Operations
Lecture 5 - Recap: Linear Algebra
Lecture 6 - Recap: Differential and Difference Equations
Lecture 7 - Recap: Process Control Basics
Lecture 8 - Introduction to Model Predictive Control
Lecture 9 - MPC: Salient Features
Lecture 10 - MPC: Historical Perspective
Lecture 11 - Vectors and Matrices
Lecture 12 - Vector Spaces
Lecture 13 - Linear Operation
Lecture 14 - Null and Image Spaces
Lecture 15 - Eigenvalues and Eigenvectors
Lecture 16 - Eigenvalue Decomposition and Tutorial
Lecture 17 - Recap of Week-2
Lecture 18 - Model Classification
Lecture 19 - Discrete-Time Models Overview
Lecture 20 - Discrete-Time Models
Lecture 21 - Finite Impulse Response Models
Lecture 22 - Finite Step Response Models
Lecture 23 - Recap and Plan for Week-4
Lecture 24 - State Space and Step Response Models
Lecture 25 - Nonlinear Models and Model Linearization
Lecture 26 - Model Types and Model Conversion
Lecture 27 - Model Conversion - 2
Lecture 28 - Model Conversion: TF to SS
Lecture 29 - How to handle MIMO systems

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Lecture 30 - Discretization of State-Space Models
Lecture 31 - Introduction to Dynamic Matrix Control (DMC)
Lecture 32 - The DMC Algorithm: Future Predictions
Lecture 33 - The DMC Algorithm: Objective and Constraints
Lecture 34 - The DMC Algorithm: Optimization
Lecture 35 - Coding for DMC Algorithm: Setup
Lecture 36 - Coding for DMC Algorithm: Populate Matrices
Lecture 37 - Recap of DMC Algorithm
Lecture 38 - Extensions of DMC Algorithm
Lecture 39 - LTI Models and Coordinate Transform
Lecture 40 - LTI Models: Stability
Lecture 41 - LTI Models: Controllability
Lecture 42 - LTI Models: Conditions for controllability
Lecture 43 - Tutorial by Arvind (Recap of Controllability)
Lecture 44 - LTI Models: Observability
Lecture 45 - Linear Control: Introduction
Lecture 46 - Pole Placement Controller
Lecture 47 - Linear Quadratic Regulator: Batch Solution
Lecture 48 - LQR: Dynamic Programming Solution
Lecture 49 - State Estimation: Introduction
Lecture 50 - Stochastic Processes and Random Variables
Lecture 51 - State Estimation: Pole Placement Observer
Lecture 52 - Kalman Filter: Terminology
Lecture 53 - Kalman Filter: Derivation
Lecture 54 - Recap of Modules 7-9
Lecture 55 - Recap and Plan for this week
Lecture 56 - Linear Quadratic Gaussian
Lecture 57 - LQG Derivation and Separation Principle
Lecture 58 - Setpoint Tracking in LQ Control
Lecture 59 - Disturbance Rejection in LQ Control
Lecture 60 - Disturbance Modeling for Estimation
Lecture 61 - Estimation with Disturbance Modeling
Lecture 62 - Recap and Plan for this week
Lecture 63 - State-Space MPC: Deterministic case
Lecture 64 - Extension to Measured Disturbances
Lecture 65 - Offset-Free State Space MPC
Lecture 66 - Comparison of State-Space MPC with DMC
Lecture 67 - State-Space MPC: Disturbance Modeling
Lecture 68 - Disturbance Modeling: Background and Setup

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Lecture 69 - Stochastic Output-Feedback State-Space MPC
Lecture 70 - Bonus Video: Disturbance Modeling for State Space MPC
Lecture 71 - Self-Guided Tutorial of MPC Toolbox
Lecture 72 - Help Session: Using MPC Toolbox
Lecture 73 - Recap of LQ Control and Linear MPC
Lecture 74 - Linear MPC - Key Features and Results
Lecture 75 - Practical Issues: Inferential Control
Lecture 76 - Practical Issues: Measurement Delay
Lecture 77 - Other Practical Issues
Lecture 78 - Some Classical Examples of MPC

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NPTEL Video Course - Multi Disciplinary - NOC:Research Methodology

Subject Co-ordinator - Prof. Soumitro Banerjee

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Science? - Part 1
Lecture 2 - What is Science? - Part 2
Lecture 3 - Subjective Thinking Versus Objective Thinking
Lecture 4 - Idealism Versus Materialism
Lecture 5 - Causality - Part 1
Lecture 6 - Causality - Part 2
Lecture 7 - Logical Reasoning: Inductive Logic
Lecture 8 - Logical Reasoning: Deductive Logic - Part 1
Lecture 9 - Logical Reasoning: Deductive Logic - Part 2
Lecture 10 - Logical Reasoning: Syllogistic Logic - Part 1
Lecture 11 - Logical Reasoning: Syllogistic Logic - Part 2
Lecture 12 - Logical Reasoning: Syllogism Logic, Truth and Validity
Lecture 13 - Historical Perspective: Emergence of Materialism and Idealism - Part 1
Lecture 14 - Historical Perspective: Emergence of Materialism and Idealism - Part 2
Lecture 15 - Historical Perspective:Renaissance to the Development of Mechanical Materialism - Part 1
Lecture 16 - Historical Perspective:Renaissance to the Development of Mechanical Materialism - Part 2
Lecture 17 - Historical Perspective: The Advent of Empiricism and the Idea of Evolution
Lecture 18 - Historical Perspective: Science in Ancient India
Lecture 19 - Historical Perspective: The Advent of Scientific Materialism - Part 1
Lecture 20 - Historical Perspective: The Advent of Scientific Materialism - Part 2
Lecture 21 - Historical Perspective: The Rise and Fall of Positivism - Part 1
Lecture 22 - Historical Perspective: The Rise and Fall of Positivism - Part 2
Lecture 23 - What Scientists Actually Do - Part 1
Lecture 24 - What Scientists Actually Do - Part 2
Lecture 25 - Falsifiability and Reproducibility - Part 1
Lecture 26 - Falsifiability and Reproducibility - Part 2
Lecture 27 - Proposing a Hypothesis - Part 1
Lecture 28 - Proposing a Hypothesis - Part 2
Lecture 29 - Elements of Scientific Measurement - Part 1

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Lecture 30 - Elements of Scientific Measurement - Part 2
Lecture 31 - The Central Limit Theorem and its Applications - Part 1
Lecture 32 - The Central Limit Theorem and its Applications - Part 2
Lecture 33 - Error Bars and Confidence Interval - Part 1
Lecture 34 - Error Bars and Confidence Interval - Part 2
Lecture 35 - Measurement of a Proportion - Part 1
Lecture 36 - Measurement of a Proportion - Part 2
Lecture 37 - Examples of Proportion Measurement
Lecture 38 - Box and Whisker Plot
Lecture 39 - Propagation of Errors - Part 1
Lecture 40 - Propagation of Errors - Part 2
Lecture 41 - Issues in Hypothesis Testing - Part 1
Lecture 42 - Issues in Hypothesis Testing - Part 2
Lecture 43 - Statistical Methods in Hypothesis Testing: Z-Test and T-Test - Part 1
Lecture 44 - Statistical Methods in Hypothesis Testing: Z-Test and T-Test - Part 2
Lecture 45 - Hypothesis Testing: The Chi-Square Test - Part 1
Lecture 46 - Hypothesis Testing: The Chi-Square Test - Part 2
Lecture 47 - Hypothesis Testing: The Chi-Square Test - Part 3
Lecture 48 - Hypothesis Testing: The Chi-Square Test - Part 4
Lecture 49 - Theoretical Research: Functional Relationships from Experimental Data - Part 1
Lecture 50 - Theoretical Research: Functional Relationships from Experimental Data - Part 2
Lecture 51 - Theoretical Research: Mathematical Models of Physical Systems
Lecture 52 - Order of Magnitude Calculations
Lecture 53 - Theoretical Research: Modeling Using Dimensional Analysis - Part 1
Lecture 54 - Theoretical Research: Modeling Using Dimensional Analysis - Part 2
Lecture 55 - An Example of Mathematical Modeling
Lecture 56 - Importance of Theory-Building in Science
Lecture 57 - Scientific Writing: Journal Papers - Part 1
Lecture 58 - Scientific Writing: Journal Papers - Part 2
Lecture 59 - Scientific Writing: Journal Papers - Part 3
Lecture 60 - Scientific Writing: Journal Papers - Part 4
Lecture 61 - Scientific Writing: PhD Thesis
Lecture 62 - Scientific Writing: Text Stylistics
Lecture 63 - Presentation in Scientific Conferences - Part 1
Lecture 64 - Presentation in Scientific Conferences - Part 2
Lecture 65 - Writing Grant Proposals - Part 1
Lecture 66 - Writing Grant Proposals - Part 2
Lecture 67 - Ethical Conduct in Science: Aspects of Scientific Ethics
Lecture 68 - Ethical Conduct in Science: Research Misconduct

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Lecture 69 - Ethical Conduct in Science: Ethics in Scientific Publication - Part 1
Lecture 70 - Ethical Conduct in Science: Ethics in Scientific Publication - Part 2
Lecture 71 - Ethical Conduct in Science: Cases of Scientific Misconduct - Part 1
Lecture 72 - Ethical Conduct in Science: Cases of Scientific Misconduct - Part 2

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NPTEL Video Course - Multi Disciplinary - NOC:Management of Medical Emergencies in Dental Practice

Subject Co-ordinator - Multifaculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vasovagal Syncope
Lecture 2 - Vasovagal Syncope - Clinical Scenario
Lecture 3 - Postural Hypotension
Lecture 4 - Postural Hypotension - Clinical Scenario
Lecture 5 - Hyperventilation
Lecture 6 - Hyperventilation - Clinical Scenario
Lecture 7 - Asthma - Status Asthmaticus - Part 1
Lecture 8 - Asthma - Status Asthmaticus - Part 2
Lecture 9 - Asthma - Clinical Scenario
Lecture 10 - Chest Pain Of Cardiac Origin - Myocardial Infarction And Anigina Pectoris - Part 1
Lecture 11 - Chest Pain Of Cardiac Origin - Myocardial Infarction And Anigina Pectoris - Part 2
Lecture 12 - Chest Pain - Clinical Scenario
Lecture 13 - Acute Adrenal Insufficiency
Lecture 14 - Acute Adrenal Insufficiency - Clinical Scenario
Lecture 15 - Diabetes Mellitus
Lecture 16 - Diabetes Mellitus - Clinical Scenario
Lecture 17 - Throid Dysfunction
Lecture 18 - Allergies/Hypersensitivity Reaction - Part 1
Lecture 19 - Allergies/Hypersensitivity Reaction - Part 2
Lecture 20 - Epilepsy- Status Epilepticus
Lecture 21 - Chronic Kidney Disease
Lecture 22 - Hepatic Dysfunction
Lecture 23 - Basic Life Support - Part 1
Lecture 24 - Basic Life Support - Part 2

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NPTEL Video Course - Multi Disciplinary - NOC:Basic Course in Ornithology

Subject Co-ordinator - Prof. Mousumi Ghosh, Prof. Manjari Jain, Prof. R Jayapal, Prof. Anand Krishnan, Prof.

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ornithology
Lecture 2 - Diversity and Classification - Part 1
Lecture 3 - Diversity and Classification - Part 2
Lecture 4 - Evolution and Speciation - Part 1
Lecture 5 - Evolution and Speciation - Part 2
Lecture 6 - Anatomy
Lecture 7 - Physiology
Lecture 8 - Colour
Lecture 9 - Life History
Lecture 10 - Foraging Behaviour
Lecture 11 - Mating and Breeding Behaviour
Lecture 12 - Social Behaviour
Lecture 13 - Methods of Science and Research Questions
Lecture 14 - Vocal Behaviour: Mechanisms - Part 1
Lecture 15 - Vocal Behaviour: Mechanisms - Part 2
Lecture 16 - Vocal Behaviour: Ecology and Evolution - Part 1
Lecture 17 - Vocal Behaviour: Ecology and Evolution - Part 2
Lecture 18 - Vocal Mimicry in Birds
Lecture 19 - Basics of Research Design
Lecture 20 - Bird Migration - LIVE Guest Lecture
Lecture 21 - Bird Populations: Concepts
Lecture 22 - Bird Communities: Concepts - Part 1
Lecture 23 - Bird Communities: Concepts - Part 2
Lecture 24 - Interactive Session by Dr Mousumi Ghosh (NCF) and Dr Umesh Srinivasan (IISc)
Lecture 25 - Studying bird populations and communities - Part 1
Lecture 26 - Studying bird populations and communities - Part 2
Lecture 27 - Mixed Species Flocks - Live Session
Lecture 28
Lecture 29 - Introduction to Data Visualisation Analysis - Part 1

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Lecture 30 - Introduction to Data Visualisation Analysis - Part 2
Lecture 31 - Basic Course in Ornithology - Guest Session on Avian Diseases
Lecture 32 - Biogeography
Lecture 33 - Macroecology
Lecture 34 - Macroecology - Case Study - LIVE
Lecture 35 - Week 10 Interactive session with Dr VV Robin and Dr Umesh Srinivasan
Lecture 36 - Bird Conservation - Concepts
Lecture 37 - Avian Conservation: Case study 1
Lecture 38 - Avian Conservation: Case study 2
Lecture 39 - Avian Conservation: Case study 3
Lecture 40 - Avian Conservation: Case study 4
Lecture 41 - Avian Conservation: Case study 5
Lecture 42
Lecture 43 - Molecular Techniques - Part 1
Lecture 44 - Molecular Techniques - Part 2

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NPTEL Video Course - Multi Disciplinary - NOC:Oral Biology

Subject Co-ordinator - Multifaculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Craniofacial anatomy - Part 1
Lecture 2 - Craniofacial anatomy - Part 2
Lecture 3 - Tooth and It's Supporting Structures - Part 1
Lecture 4 - Tooth and It's Supporting Structures - Part 2
Lecture 5 - Specialised mucosa
Lecture 6 - Saliva-Composition and functions
Lecture 7 - Saliva Diagnostics
Lecture 8 - Stem cells in the oro-dental region
Lecture 9 - Stem cell isolation
Lecture 10 - Mineralization dynamics - Part 1
Lecture 11 - Mineralization dynamics - Part 2
Lecture 12 - TMJ Anatomy and Function
Lecture 13 - Oral defense mechanisms
Lecture 14 - Mucosal and regional immunology
Lecture 15 - Oral microbiome
Lecture 16 - Evaluation of Oral microbiome
Lecture 17 - Dysbiosis
Lecture 18 - Molecular mechanisms in oral cancer
Lecture 19 - Flow cytometry in cell and molecular biology
Lecture 20 - Basics of Biomaterial science and engineering
Lecture 21 - Biomimetics - Part 1
Lecture 22 - Biomimetics - Part 2
Lecture 23 - Biomaterials - Polymers
Lecture 24 - Biomaterials - Metals
Lecture 25 - Biomaterials - Ceramics and Colloids
Lecture 26 - 3-D Bioprinting
Lecture 27 - Protein mediated biomaterials
Lecture 28 - Immune response to biomaterials
Lecture 29 - Biomaterial Applications

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Lecture 30 - Biocompatible assays
Lecture 31 - Immunoassay

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NPTEL Video Course - Multi Disciplinary - NOC:Introduction to Biomimicry

Subject Co-ordinator - Prof. Sivakumar Srinivasan, Prof. Satya Seshadri, Prof. Mrinalini, Prof. Shiva Subrama

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course overview
Lecture 2 - What is biomimicry ?
Lecture 3 - Why is biomimicry important ?
Lecture 4 - Nature's unifying patterns - Introduction
Lecture 5 - Case study
Lecture 6 - How to do biomimicry ?
Lecture 7 - Learning resources - Biomimicry Institute
Lecture 8 - Skills, attitudes and mindset for a biomimic
Lecture 9 - Course activity
Lecture 10 - Recap of Week 1
Lecture 11 - What are we mimicking ?
Lecture 12 - Function and Strategy
Lecture 13 - Approaches to biomimicry
Lecture 14 - From Problem to Solution
Lecture 15 - Using the UNSDG to identify challenges
Lecture 16 - Recap of Week 2
Lecture 17 - Step 1 - Define the problem
Lecture 18 - Step 2 - Biologize the problem
Lecture 19 - Step 3 - Discover strategies in nature
Lecture 20 - Applying the Biomimicry Design Spiral
Lecture 21 - Step 4 - Abstract design strategies from nature
Lecture 22 - Step 5 - Emulate nature's strategies in your solution
Lecture 23 - Step 6 - Evaluate feasibility
Lecture 24 - How to apply the biomimicry process ?
Lecture 25 - Recap of Week 4
Lecture 26 - Nature's Unifying Patterns I
Lecture 27 - Systems Thinking - Introduction
Lecture 28 - Systems Thinking - Understanding consequences
Lecture 29 - Nature's Unifying Patterns II

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Lecture 30 - Tools - Mind mapping
Lecture 31 - Using biomimicry to design a solution
Lecture 32 - Recap of Week 6
Lecture 33 - Developing creative confidence
Lecture 34 - Learning from the biomimicry process
Lecture 35 - The need for creativity in our lives
Lecture 36 - Unlocking your creativity
Lecture 37 - Taking your biomimicry ideas to market
Lecture 38 - The journey so far
Lecture 39 - Finding the hero in you
Lecture 40 - Course wrap-up

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NPTEL Video Course - Multi Disciplinary - NOC:Electrocardiogram - Interpretation and Application in Clinical

Subject Co-ordinator - Multi-faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Electrocardiogram - Interpretation and application in clinical practice
Lecture 2 - Basic Conduction of Heart
Lecture 3 - ECG Lead system
Lecture 4 - Recording of a Standard ECG (Lead placements and measurements)
Lecture 5 - Waveforms, Intervals and Segments
Lecture 6 - Vector Electrocardiography
Lecture 7 - From Action Potentials to Arrhythmias
Lecture 8 - Pathophysiology, Myocardial Ischemia / Injury
Lecture 9 - Myocardial Infarction (MI), Pathophysiology
Lecture 10 - Drug effects on ECG
Lecture 11 - Patient identification, preparation and interpretation of ECG
Lecture 12 - Sinus rhythms and Bradyarrythmias
Lecture 13 - Approach to tachyarrhythmias
Lecture 14 - AV Blocks and Bundle Branch Block
Lecture 15 - Chamber enlargement and Heart Failure
Lecture 16 - Electrolyte Abnormalities on ECG
Lecture 17 - Recognizing signs and ECG changes in Myocardial Ischemia/Injury
Lecture 18 - ECG changes in myocardial infarction
Lecture 19 - Miscellaneous ECG findings and cardiac arrest
Lecture 20 - Pacemaker Rhythms

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NPTEL Video Course - Multi Disciplinary - NOC:One Health

Subject Co-ordinator - Multi Faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the One Health Concept and National and International health/public health agenci
Lecture 2 - Global Health vs One Health
Lecture 3 - Basics of Research Ethics
Lecture 4 - Integrated human and animal disease surveillance systems
Lecture 5 - Emerging infectious diseases
Lecture 6 - Process of disease emergence and assessment of the risk factors
Lecture 7 - Mechanisms of pathogen cross over across species boundaries
Lecture 8 - Importance of disease detection, Identification and monitoring in public health
Lecture 9 - Introduction to disease vectors and basics of Medical Entomology
Lecture 10 - The factors influencing an emerging disease
Lecture 11 - Antimicrobial resistance a global threat and Importance of antibiotic stewardship program
Lecture 12 - Introduction of Food safety and food borne diseases
Lecture 13 - What are zoonotic diseases and its role in our changing world
Lecture 14 - The integration of human, animal and ecosystem health in control and prevention of these disease
Lecture 15 - Community engagement for zoonotic disease control in humans and animals through One Health
Lecture 16 - Basics of Epidemiological Studies
Lecture 17 - Rapid Response system, Disaster Management and Outbreak Investigation Plans
Lecture 18 - Basic statistical methods and their application and the measurement of disease frequency
Lecture 19 - Principles of survey design and the concepts of sampling and Mixed method research
Lecture 20 - Introduction to health policy
Lecture 21 - Risk Communication and Pandemic Preparedness
Lecture 22 - Role of community in disease control and ways for community engagement
Lecture 23 - Uses of different types of media for communication

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NPTEL Video Course - Multi Disciplinary - NOC:Canning Technology, Value Addition of Seafood (Fish Processing)

Subject Co-ordinator - Dr. Abhilash Sasidharan, Dr. Maya Raman

Co-ordinating Institute - KUFOS Panangad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course overview Canning technology and Value addition of sea food
Lecture 2 - Introduction and the concept of canning technology
Lecture 3 - History of canning technology - Part 1
Lecture 4 - History of canning technology - Part 2
Lecture 5 - Canning Technology and Value Addition Containers and their Properties - Part 1
Lecture 6 - Canning Technology and Value Addition Containers and their Properties - Part 2
Lecture 7 - Canning Technology and Value Addition Containers and their Properties - Part 3
Lecture 8 - Canning Technology and Value Addition Containers and their Properties - Part 4
Lecture 9 - Canning Technology and Value Addition - Canning process - Part 1
Lecture 10 - Canning Technology and Value Addition - Canning process - Part 2
Lecture 11 - Canning Technology and Value Addition - Thermal process calculations - Part 1
Lecture 12 - Canning Technology and Value Addition - Thermal process calculations - Part 2
Lecture 13 - Microbiology and spoilage of canned food - Part 1
Lecture 14 - Microbiology and spoilage of canned food - Part 2
Lecture 15 - Process of seafood canning - Part 1
Lecture 16 - Process of seafood canning - Part 2
Lecture 17 - Seafood pre-processing - Part 1
Lecture 18 - Seafood pre-processing - Part 2
Lecture 19 - Additives - Part 1
Lecture 20 - Additives - Part 2
Lecture 21 - SOP for seafood canning - Part 1
Lecture 22 - SOP for seafood canning - Part 2
Lecture 23 - SOP for seafood canning - Part 3
Lecture 24 - Nutritional quality of seafood
Lecture 25 - Muscle structure of seafood
Lecture 26 - Spoilage in seafood
Lecture 27 - Preservation methods
Lecture 28 - Value addition in thermally processed foods
Lecture 29 - Quality standards for seafood value added products - Part 1

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Lecture 30 - Quality standards for seafood value added products - Part 2
Lecture 31 - Quality standards for seafood value added products - Part 3

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NPTEL Video Course - Multi Disciplinary - NOC:Food Packaging Technology

Subject Co-ordinator - Dr. Jenny Ann John, Dr. Maya Raman

Co-ordinating Institute - KUFOS Panangad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course overview
Lecture 2 - Introduction
Lecture 3 - Paper as packaging material - Part 1
Lecture 4 - Paper as packaging material - Part 2
Lecture 5 - Paper as packaging material - Part 3
Lecture 6 - Glass as packaging material
Lecture 7 - Metal as packaging material - Part 1
Lecture 8 - Metal as packaging material - Part 2
Lecture 9 - Plastic as packaging material - Part 1
Lecture 10 - Plastic as packaging material - Part 2
Lecture 11 - Introduction to packaging system
Lecture 12 - Product characteristics and packaging requirements
Lecture 13 - Rigid, semi-rigid, flexible packaging forms - Part 1
Lecture 14 - Rigid, semi-rigid, flexible packaging forms - Part 2
Lecture 15 - Designing of packaging material
Lecture 16 - Testing of packaging material - Part 1
Lecture 17 - Testing of packaging material - Part 2
Lecture 18 - Testing of packaging material - Part 3
Lecture 19 - Testing of packaging material - Part 4
Lecture 20 - Testing of package performance
Lecture 21 - Principles developing safe and protective packing
Lecture 22 - Transport worthiness test - Part 1
Lecture 23 - Transport worthiness test - Part 2
Lecture 24 - Transport worthiness test - Part 3
Lecture 25 - Safety aspects of food packaging
Lecture 26 - Packaging accessories and advances in packaging
Lecture 27 - Active packaging - Part 1
Lecture 28 - Active packaging - Part 2
Lecture 29 - MA and Aseptic packaging

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Lecture 30 - Edible packaging - Part 1
Lecture 31 - Edible packaging - Part 2
Lecture 32 - Vacuum packing machine
Lecture 33 - CA and MA packing machine
Lecture 34 - Gas packing machine
Lecture 35 - Seal and shrink packing machine
Lecture 36 - Form fill sealing machine
Lecture 37 - Aseptic packaging systems
Lecture 38 - Retort pouches
Lecture 39 - Bottling machine - Part 1
Lecture 40 - Bottling machine - Part 2
Lecture 41 - Carton making machine
Lecture 42 - Package printing machines - Part 1
Lecture 43 - Package printing machines - Part 2

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NPTEL Video Course - Multi Disciplinary - NOC:Vulnerability Studies: An Introduction

Subject Co-ordinator - Prof. Pramod K Nayar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fragility
Lecture 3 - Resilience
Lecture 4 - Interpreting Vulnerability, precarity of work and Access Equality for Equal Opportunity - Part I
Lecture 5 - Interpreting Vulnerability, precarity of work and Access Equality for Equal Opportunity - Part II
Lecture 6 - Social Vulnerability and Group Vulnerability
Lecture 7 - Willed Vulnerability - Endurance Sports
Lecture 8 - Illness, Storytelling and Embodiment
Lecture 9 - Illness, Storytelling and Embodiment Reading - Audre Lordeâ s : The Cancer Journals
Lecture 10 - Group Discussion - Vulnerable Bodies
Lecture 11 - The Aesthetics of Vulnerability - I
Lecture 12 - The Aesthetics of Vulnerability - II Traumatic Materialism
Lecture 13 - The Aesthetics of Vulnerability - III Melodrama
Lecture 14 - Vulnerability Aesthetics The Sublime
Lecture 15 - The Aesthetics of Vulnerability - Discussion
Lecture 16 - Biopolitics, biopower and vulnerability - I
Lecture 17 - Biopolitics, biopower and vulnerability - II
Lecture 18 - Pandemics and Biopolitics
Lecture 19 - Biopolitics and vulnerable populations in Contemporary Literature
Lecture 20 - Discussion on Biopolitics
Lecture 21 - Ecoprecarity
Lecture 22 - Ecodystopia - I
Lecture 23 - Ecodystopia - II
Lecture 24 - Discussion on Ecoprecarity and Ecodystopias - I
Lecture 25 - Discussion on Ecoprecarity and Ecodystopias - II
Lecture 26 - Aging and Vulnerability in Literature
Lecture 27 - Aging and Vulnerability - 2
Lecture 28 - Aging and Vulnerability - 3
Lecture 29 - Discussion on Vulnerability and Aging - 1

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Lecture 30 - Discussion on Vulnerability and Aging - 2
Lecture 31 - Childhood and Vulnerability - 1
Lecture 32 - Childhood and Vulnerability - 2
Lecture 33 - Childhood and Vulnerability - 3
Lecture 34 - Discussion on Childhood and Vulnerability - I
Lecture 35 - Discussion on Childhood and Vulnerability - II
Lecture 36 - Imperial Vulnerability - I
Lecture 37 - Imperial Vulnerability - II
Lecture 38 - Posthuman Vulnerability
Lecture 39 - Contemporary Genres of Resilience - The Graphic Novel - I
Lecture 40 - Contemporary Genres of Resilience - The Graphic Novel - II

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NPTEL Video Course - Multi Disciplinary - NOC:Pulmonary Function Tests - Interpretation and Application in Cl

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - Chettinad Hospital and Research Institute

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Functional Anatomy of the Respiratory Tract
Lecture 2 - Mechanics of Respiration - Section 1
Lecture 3 - Mechanics of Respiration - Section 2
Lecture 4 - Ventilation, Perfusion Ventilation Perfusion Relationship
Lecture 5 - Essential Principles of Spirometer
Lecture 6 - Types of Pulmonary function tests
Lecture 7 - Obstructive Lung Diseases: Pathophysiology
Lecture 8 - Restrictive lung Diseases: Pathophysiology
Lecture 9 - Drug Effects on Pulmonary Function
Lecture 10 - Lung Disorders in Children
Lecture 11 - Assessment of Lung Functions in Children
Lecture 12 - Static and Dynamic lung function tests
Lecture 13 - Interpretation of Normal Pulmonary Function Tests
Lecture 14 - Indications for Pulmonary Function Testing
Lecture 15 - Obstructive Airway Diseases - Approach
Lecture 16 - Clinical Diagnosis of Restrictive Lung Disease - Part 1
Lecture 17 - Clinical Diagnosis of Restrictive Lung Disease - Part 1
Lecture 18 - Essential Criteria For a Good Pulmonary Function Testing
Lecture 19 - Interpretation of pulmonary function tests in Restrictive lung disease
Lecture 20 - Interpretation of PFT in Obstructive lung diseases
Lecture 21 - Diffusion Capacity of Lungs for Carbon Monoxide DLCO
Lecture 22 - Radiological assessment of obstructive and restrictive lung disorders
Lecture 23 - Laboratory Video - Pulmonary Function tests - Interpretation and application in clinical practic

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NPTEL Video Course - Multi Disciplinary - NOC:Making Learning Engaging Through Interactive Games

Subject Co-ordinator - Prof. Kartic Vaidyanathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Need for interactive gamified learning
Lecture 2 - Learnings from the Master Class titled Confessions of a Converted Lectuer by Prof Eric Mazur
Lecture 3 - Understanding Play and its context in learning in 21st century
Lecture 4 - Benefits of Game Based Learning Scientific Evidences
Lecture 5 - Learning Stoichiometry calculations using board game Case Study
Lecture 6 - Benefits of Game Based Learning across age groups and subjects
Lecture 7 - Benefits of Puzzle Games
Lecture 8 - Game Based Learning Adoption by Countries Overview
Lecture 9 - Yu Kai Chow Psychology of gamification
Lecture 10 - Board Card Game Activity Game Sources
Lecture 11 - Board Card Game Mechanics Across Subjects - Part 1
Lecture 12 - Board Card Game Mechanics Across Subjects - Part 2
Lecture 13 - Growth Mindset Card Game Game Play of UNO adaptation
Lecture 14 - How Play Game Mechanics Enhance Learning in the UNO Game
Lecture 15 - Tools for bulding Board Card Games Snake and Ladder
Lecture 16 - Sample Games Created Inspired by Snake and Ladder Mechanics
Lecture 17 - Sample Card Games Created Across Subjects and Different Mechanics by Students
Lecture 18 - Tools for building Bingo Games
Lecture 19 - Puzzle Game Design Tools
Lecture 20 - Mentimeter
Lecture 21 - Quizizz
Lecture 22 - Wordwall
Lecture 23 - GIMKIT - Part 1
Lecture 24 - GIMKIT - Part 2
Lecture 25 - Raptivity Digital Tool Demo
Lecture 26 - Example scenarios of student and faculty created digital games across topic
Lecture 27 - Dr. Preeti AghalayamÃ¢'s - Experience narration with interactive games
Lecture 28 - Interview with Dr. Anuradha Prashant
Lecture 29 - Interview with Dr. Ankur Gera and her faculty team

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Lecture 30 - Interview with Dr. GK SuraishKumar
Lecture 31 - Interview with Dr. Jacey Lynn Minoi
Lecture 32 - Interview with Dr. Kirupa Priyadarshini
Lecture 33 - Dave Eng Interviews Prof. Silviana Falcon Who has Written Lectuers and Play

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NPTEL Video Course - Multi Disciplinary - NOC:Local Anaesthesia in Dentistry

Subject Co-ordinator - Prof. Ramakrishna Shenoi, Prof. Sobhan Mishra, Prof. Kannan Balaraman, Prof. S. Jimsor

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Drug; Pharmacology; Neurophysiology; Action of Vasoconstrictors - Part 1
Lecture 2 - The Drug; Pharmacology; Neurophysiology; Action of Vasoconstrictors - Part 2
Lecture 3 - Anatomic Considerations - Panel Discussion
Lecture 4 - Dosage and Clinical Actions of Specific Agents - Part 1
Lecture 5 - Dosage and Clinical Actions of Specific Agents - Part 2
Lecture 6 - Dosage and Clinical Actions of Specific Agents - Panel Discussion
Lecture 7 - Armamentarium - Part 1
Lecture 8 - Armamentarium - Part 2
Lecture 9 - Armamentarium - Part 3
Lecture 10 - Armamentarium - Part 4
Lecture 11 - Anatomic Considerations - Part 1
Lecture 12 - Anatomic Considerations - Part 2
Lecture 13 - Anatomic Considerations - Part 3
Lecture 14 - Anatomy of Trigeminal Nerve - Video Demonstration
Lecture 15 - Maxillary Injection Techniques - Part 1
Lecture 16 - Maxillary Injection Techniques - Part 2
Lecture 17 - Demonstration of Maxillary Injection Techniques
Lecture 18 - Maxillary Injection Techniques - Panel Discussion
Lecture 19 - Mandibular Injection Techniques - Part 1
Lecture 20 - Mandibular Injection Techniques - Part 2
Lecture 21 - Demonstration of Mandibular Injection Techniques
Lecture 22 - Mandibular Injection Techniques - Panel Discussion
Lecture 23 - Local Complications
Lecture 24 - Local Complications - Panel Discussion
Lecture 25 - Systemic Complications - Part 1
Lecture 26 - Systemic Complications - Part 2
Lecture 27 - Systemic Complications - Part 3
Lecture 28 - Demonstration of Systemic Complications

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NPTEL Video Course - Multi Disciplinary - NOC:Social Theory: Concepts and Debates

Subject Co-ordinator - Prof. Anu Sabhlok

Co-ordinating Institute - IISER Mohali

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Social
Lecture 2 - The Sociological Imagination
Lecture 3 - The Spatial imagination
Lecture 4 - Social Theory - a genealogy
Lecture 5 - Socio-spatial Imagination
Lecture 6 - Karl Marx - Influences and trajectory of thought
Lecture 7 - Alienation - From philosophical concept to social theory
Lecture 8 - Historical Materialism
Lecture 9 - Capital - A Critique of Political Economy
Lecture 10 - Capital - Understanding Exploitation, Crises and Primitive Accumulation
Lecture 11 - Rules of the Sociological Method
Lecture 12 - The Division of Labour in Society
Lecture 13 - Suicide: A Sociological Study
Lecture 14 - The Colour Line, Double-Conciousness and the Veil
Lecture 15 - Situating Gender
Lecture 16 - Ideal type and value-free social science
Lecture 17 - The Protestant Ethic and the Spirit of Capitalism - 1
Lecture 18 - The Protestant Ethic and the Spirit of Capitalism - 2
Lecture 19 - Power, Authority and Domination
Lecture 20 - Debates in Classical Social Theory
Lecture 21 - Critique of Everyday Life
Lecture 22 - The Production of Space
Lecture 23 - Spatialising Capital
Lecture 24 - For Space
Lecture 25 - Spatial imagination in practice
Lecture 26 - Michele Foucault - From archaeology to genealogy
Lecture 27 - Discipline and Punish
Lecture 28 - Michele Foucault - Governmentality
Lecture 29 - Nationalism in the colonial world

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Lecture 30 - The Politics of the Governed
Lecture 31 - Social Reproduction Theory
Lecture 32 - Regimes of Accumulation
Lecture 33 - What would a non-sexist city be like ?
Lecture 34 - The Managed Heart
Lecture 35 - Social Reproduction in our Everyday Life
Lecture 36 - What is Feminist Theory
Lecture 37 - Feminist Standpoint Theory
Lecture 38 - Intersectionality
Lecture 39 - Gender Trouble
Lecture 40 - Dalit Feminism in India
Lecture 41 - Critical Theory
Lecture 42 - Structural Transformation of the Public Sphere
Lecture 43 - An Introduction to Actor-Network Theory
Lecture 44 - An Introduction to Actor-Network Theory (Continued...)
Lecture 45 - Public Sphere in India
Lecture 46 - Symbolic Interactionism
Lecture 47 - A Theory of Practice
Lecture 48 - Graded Inequality
Lecture 49 - Village Studies - then and now
Lecture 50 - Hegemony
Lecture 51 - Southern Theory
Lecture 52 - Necropolitics
Lecture 53 - Urban Political Ecology
Lecture 54 - Prespectives on Urbanisation
Lecture 55 - Urban Theory from the Global South
Lecture 56 - Perspective on Globalization
Lecture 57 - Perspectives on Infrastructure Studies
Lecture 58 - Perspectives on Artifical Intelligence
Lecture 59 - Perspectives on Climate Change
Lecture 60 - Perspectives on Social Theory and the Future

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NPTEL Video Course - Multi Disciplinary - NOC:Intellectual Property Portfolio Management

Subject Co-ordinator - Prof. Rajat Agrawal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Understanding Basics
Lecture 2 - Types of IPR and Their Applications
Lecture 3 - Innovation and Intellectual Property
Lecture 4 - Understanding Various Portfolios
Lecture 5 - International and National Scenario of IP
Lecture 6 - Patent Filing Strategies
Lecture 7 - Patent Filing
Lecture 8 - Country Selection for Patent Filing in Foreign Countries
Lecture 9 - International Filing - 1
Lecture 10 - International Filing - 2
Lecture 11 - Ranking Based Tier Strategies
Lecture 12 - Centralization of Patent Renewals and Translations
Lecture 13 - Budgeting for Patent Portfolio
Lecture 14 - Monitoring Based Countermeasures
Lecture 15 - General Cost Saving Measures
Lecture 16 - Various IP Strategies (Patent)
Lecture 17 - Various IP Strategies (Trademark, Copyright, Trade secret)
Lecture 18 - Understanding Elements of IP Strategies
Lecture 19 - IP Valuation Strategy
Lecture 20 - IP SWOT (Strength, Weaknesses, Opportunities, Threats) Analysis
Lecture 21 - Generations of Innovation
Lecture 22 - Idea Generation
Lecture 23 - Innovation Management
Lecture 24 - Innovation Management System ISO 56000
Lecture 25 - Strategies to Protect Innovation
Lecture 26 - Ensuring Quality and Extracting Values from the Patent Portfolio
Lecture 27 - International Patent Classification (IPC) System
Lecture 28 - Patent Landscape
Lecture 29 - Patent Infringement

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Lecture 30 - PATENTSCOPE Search System
Lecture 31 - IP Incubating
Lecture 32 - IP Accounting
Lecture 33 - IP Commercialization
Lecture 34 - IP and Taxation
Lecture 35 - Lean IP Management
Lecture 36 - National IP Strategies
Lecture 37 - Significance of IP Audit
Lecture 38 - IP and SDGs
Lecture 39 - IP Enforcement
Lecture 40 - Case Studies

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NPTEL Video Course - Multi Disciplinary - NOC:Electrochemical and Economic Aspects of Hydrogen Energy

Subject Co-ordinator - Prof. Pratham Arora, Prof. Amit C. Bhosale

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Challenges with Fossil Fuels
Lecture 3 - Renewable Energy and Hydrogen
Lecture 4 - Energy Consumption in Different Countries
Lecture 5 - Energy Consumption in Different Sectors
Lecture 6 - Economic Modelling
Lecture 7 - The Current Market for Hydrogen - I
Lecture 8 - The Current Market for Hydrogen - II
Lecture 9 - Hydrogen Production from Fossil Fuels - I
Lecture 10 - Hydrogen Production from Fossil Fuels - II
Lecture 11 - The Cost of Hydrogen Production from Fossil Fuels - I
Lecture 12 - The Cost of Hydrogen Production from Fossil Fuels - II
Lecture 13 - Carbon Capture from Fossil Fuel-based Hydrogen
Lecture 14 - The Production of Hydrogen from Renewable Sources
Lecture 15 - The Economics of Hydrogen Production by Electrolysis
Lecture 16 - Hydrogen Production from Biomass
Lecture 17 - Economics of Hydrogen Production from Biomass
Lecture 18 - Biomass Lab
Lecture 19 - Introduction to fuel cell and electrolyzers
Lecture 20 - Thermodynamics of fuel cell and electrolyzers - I
Lecture 21 - Thermodynamics of fuel cell and electrolyzers - II
Lecture 22 - Variation in reversible potential and the Nernst Equation
Lecture 23 - Nernst equation and Numerical Problems - I
Lecture 24 - Numerical Problems - II
Lecture 25 - Numerical Problems - III
Lecture 26 - Characteristic curve (I-V) of a fuel cell
Lecture 27 - Potential losses in fuel cells and electrolyzers
Lecture 28 - Fuel cell efficiency and numerical problems
Lecture 29 - Significance of current and power density

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Lecture 30 - Significance of cell components
Lecture 31 - Cell stacking
Lecture 32 - Fabrication of the membrane electrode assembly
Lecture 33 - Introduction to Reaction kinetics of fuel cell - I
Lecture 34 - Reaction kinetics of fuel cell - II
Lecture 35 - Butler-Volmer equation - I
Lecture 36 - Butler-Volmer equation - II
Lecture 37 - Butler-Volmer and Taffel Equation - III
Lecture 38 - Charge Transport mechanism in fuel cell and electrolyzers
Lecture 39 - Charge Transport mechanism and numerical problems
Lecture 40 - Ohmic losses and significance of interfacial contact resistance
Lecture 41 - Mass transport in fuel cell and electrolyzers - 1
Lecture 42 - Mass Transport: Relationship Between Current and Diffusive Flux
Lecture 43 - Concentration loss and numerical problems
Lecture 44 - Bipolar plates and different flow field designs
Lecture 45 - Scale-up issues in fuel cell and electrolyzers
Lecture 46 - Laboratory Demonstrations
Lecture 47 - Hydrogen Storage and Transport - I
Lecture 48 - Hydrogen Storage and Transport - II
Lecture 49 - Cost of Hydrogen Storage
Lecture 50 - Cost of Hydrogen Storage and Transport
Lecture 51 - Mass Shipping of Hydrogen - I
Lecture 52 - Mass Shipping of Hydrogen - II
Lecture 53 - Mass Shipping of Hydrogen - III
Lecture 54 - Competitive Position of Hydrogen versus Fossil Fuels
Lecture 55 - Case Studies for Hydrogen Economy
Lecture 56 - Process Simulation of Hydrogen Energy Systems
Lecture 57 - Introduction to Life-cycle Assessment - I
Lecture 58 - Introduction to Life-cycle Assessment - II
Lecture 59 - Introduction to Life-cycle Assessment - III
Lecture 60 - LCA of Hydrogen Energy Systems
Lecture 61 - Case Study

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NPTEL Video Course - Multi Disciplinary - NOC:Environmental Planning and Management

Subject Co-ordinator - Prof. Sonal K. Thengane

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Part 1
Lecture 2 - Introduction - Part 2
Lecture 3 - Planning - Part 1
Lecture 4 - Planning - Part 2
Lecture 5 - Planning - Part 3
Lecture 6 - Planning - Part 4
Lecture 7 - Environmental Management - Part 1
Lecture 8 - Environmental Management - Part 2
Lecture 9 - Environmental Management - Part 3
Lecture 10 - Environmental Management - Part 4
Lecture 11 - Environmental Management - Part 5
Lecture 12 - Environmental Management - Part 6
Lecture 13 - Environmental Acts and Laws - Part 1
Lecture 14 - Environmental Acts and Laws - Part 2
Lecture 15 - Environmental Clearance - Part 1
Lecture 16 - Environmental Clearance - Part 2
Lecture 17 - Environmental Impact Assessment - Part 1
Lecture 18 - Environmental Impact Assessment - Part 2
Lecture 19 - Environmental Impact Assessment - Part 3
Lecture 20 - Environmental Impact Assessment - Part 4
Lecture 21 - Environmental Impact Assessment - Part 5
Lecture 22 - Environmental Impact Assessment - Part 6
Lecture 23 - Environmental Impact Assessment - Part 7
Lecture 24 - Sustainable Development - Part 1
Lecture 25 - Sustainable Development - Part 2
Lecture 26 - Circular Economy
Lecture 27 - Life Cycle Assessment - Part 1
Lecture 28 - Life Cycle Assessment - Part 2
Lecture 29 - Life Cycle Assessment - Part 3

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Lecture 30 - Life Cycle Assessment - Part 4
Lecture 31 - Strategic Environmental Assessment - Part 1
Lecture 32 - Strategic Environmental Assessment - Part 2
Lecture 33 - Analytic Hierarchy Process - Part 1
Lecture 34 - Analytic Hierarchy Process - Part 2
Lecture 35 - Analytic Hierarchy Process - Part 3
Lecture 36 - Analytic Hierarchy Process - Part 4
Lecture 37 - Environmental Social Governance - Part 1
Lecture 38 - Environmental Social Governance - Part 2
Lecture 39 - Environmental Social Governance - Part 3
Lecture 40 - Environment Compatible Growth

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NPTEL Video Course - Multi Disciplinary - NOC:Teaching and Learning in Engineering (TALE)

Subject Co-ordinator - Prof. N.J. Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of TALE and Good Engineer
Lecture 2 - Education and Teaching
Lecture 3 - Learning, Instruction and Assessment
Lecture 4 - What is OBE?
Lecture 5 - Accreditation
Lecture 6 - Outcomes
Lecture 7 - Program Outcomes - 1
Lecture 8 - Program Outcomes - 2
Lecture 9 - Taxonomy of Learning
Lecture 10 - Cognitive Levels
Lecture 11 - General Categories of Knowledge
Lecture 12 - Metacognitive Knowledge
Lecture 13 - Vincenti Categories of Engineering Knowledge
Lecture 14 - Affective and Psychomotor Domains
Lecture 15 - Taxonomy Table
Lecture 16 - Course Outcomes - 1
Lecture 17 - Course Outcomes - 2
Lecture 18 - Course Outcomes - POs and PSOs
Lecture 19 - Attainment of COs
Lecture 20 - Attainment of POs and PSOs

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NPTEL Video Course - Multi Disciplinary - NOC:Teaching and Learning in General Programs

Subject Co-ordinator - Prof. N.J. Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Teaching and Learning in General Programs (TALG)
Lecture 2 - Education and Teaching
Lecture 3 - Learning, Assessment and Instruction
Lecture 4 - Outcome Based Education (OBE)
Lecture 5 - Accreditation
Lecture 6 - Program Outcomes
Lecture 7 - POs and PSOs
Lecture 8 - Taxonomy of Learning
Lecture 9 - Taxonomy of Learning
Lecture 10 - Taxonomy of Learning
Lecture 11 - Taxonomy of Learning
Lecture 12 - Affective Domain
Lecture 13 - Psychomotor Domain
Lecture 14 - Taxonomy Tables
Lecture 15 - Course Outcomes - 1
Lecture 16 - Course Outcomes - 2
Lecture 17 - Tagging the Course Outcomes
Lecture 18 - Attainment of Course Outcomes
Lecture 19 - Attainment of POs and PSOs

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NPTEL Video Course - Multi Disciplinary - NOC:TALE 2 - Course Design and Instruction of Engineering Courses

Subject Co-ordinator - Prof K Rajani Kanth

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Engineering Programs, NBA Accreditation and Engineering Courses
Lecture 2 - Course Design
Lecture 3 - ISD and ADDIE
Lecture 4 - Analysis Phase - 1
Lecture 5 - Analysis Phase - 2
Lecture 6 - Design Phase
Lecture 7 - Technology and Targets
Lecture 8 - Assessment Pattern and Assessment Instruments
Lecture 9 - Item Banks
Lecture 10 - Development Phase
Lecture 11 - Instruction Material and Learning Material
Lecture 12 - Implement Phase - 1
Lecture 13 - Implement Phase - 2
Lecture 14 - Evaluate Phase
Lecture 15 - Course Exit Survey
Lecture 16 - Evaluating Laboratories and Electives
Lecture 17 - Exit Surveys for Projects
Lecture 18 - Summary Feedback
Lecture 19 - Instruction
Lecture 20 - Instructional Situations
Lecture 21 - How Brains Learn - 1
Lecture 22 - How Brains Learn - 2
Lecture 23 - How Brains Learn - 3
Lecture 24 - Instructional Components - 1
Lecture 25 - Instructional Components - 2
Lecture 26 - Merrillâ s Principles of Learning
Lecture 27 - ID based on Merrillâ s Principles
Lecture 28 - Direct Approach to Instruction
Lecture 29 - Project Based Approach to Instruction

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Lecture 30 - Problem Based Approach to Instruction
Lecture 31 - Experiential Approach to Instruction
Lecture 32 - Simulation Approach to Instruction
Lecture 33 - Instruction for Design
Lecture 34 - Instruction for Metacognitive Learning
Lecture 35 - So, what should a teacher do?

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NPTEL Video Course - Multi Disciplinary - NOC:NBA Accreditation and Teaching Learning in Engineering (NATE)

Subject Co-ordinator - Prof. N J Rao, Prof. K. Rajanikanth

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - NATE
Lecture 2 - NBA Accreditation
Lecture 3 - Outcome Based Education
Lecture 4 - Self Assessment Report
Lecture 5 - Education, Teaching, Learning, Instruction, and Assessment
Lecture 6 - PEOs and POs (1-5)
Lecture 7 - POs (6-9)
Lecture 8 - POs (10-12)
Lecture 9 - PSOs
Lecture 10 - Taxonomy of Learning
Lecture 11 - Cognitive Processes - 1
Lecture 12 - Cognitive Processes - 2
Lecture 13 - Categories of Knowledge - 1
Lecture 14 - Categories of Knowledge - 2
Lecture 15 - Taxonomy Table
Lecture 16 - Affective and Psychomotor Domains
Lecture 17 - Course Outcomes - 1
Lecture 18 - Course Outcomes - 2
Lecture 19 - Tagging Course Outcomes
Lecture 20 - Computing Attainment of COs
Lecture 21 - Computing PO and PSO Attainment
Lecture 22 - Course Design Component of Teaching as per Finkâ s Model
Lecture 23 - ISD and ADDIE Models
Lecture 24 - ADDIE - Analysis Phase 1
Lecture 25 - ADDIE - Analysis Phase 2
Lecture 26 - ADDIE - Design Phase
Lecture 27 - Technology for Assessment; Setting Targets
Lecture 28 - Assessment Plan and Assessment Instruments
Lecture 29 - Item Banks

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Lecture 30 - ADDIE- Development Phase
Lecture 31 - ADDIE - Implement Phase 1
Lecture 32 - ADDIE - Implement Phase 2
Lecture 33 - Exit Surveys - 1
Lecture 34 - Exit Surveys - 2
Lecture 35 - ADDIE - Evaluate Phase
Lecture 36 - Instruction An Overview
Lecture 37 - Instructional Situations
Lecture 38 - How Brains Learn
Lecture 39 - Instructional Components
Lecture 40 - Principles of Instruction Design
Lecture 41 - Direct Instruction - 1
Lecture 42 - Direct Instruction - 2
Lecture 43 - Project Based Approach to Instruction
Lecture 44 - Problem Based Approach to Instruction
Lecture 45 - Instruction for Design thinking
Lecture 46 - Simulation Approach to Instruction
Lecture 47 - Instruction for Metacognitive Learning
Lecture 48 - So, What Should the teacher do?
Lecture 49 - NBA Criterion 1 Vision, Mission, PEOs - 1
Lecture 50 - NBA Criterion 1 Vision, Mission, PEOs - 2
Lecture 51 - NBA Criterion 2 Teaching-Learning Processes - 1
Lecture 52 - NBA Criterion 2 Teaching-Learning Processes - 2
Lecture 53 - NBA Criterion 3 COs and POs - 1
Lecture 54 - NBA Criterion 3 COs and POs - 2
Lecture 55 - NBA Criterion 4 Students' Performance
Lecture 56 - NBA Criterion 5 Faculty Information and Contributions
Lecture 57 - NBA Criterion 6 Facilities and Technical Support
Lecture 58 - NBA Criterion 7 Continuous Improvement
Lecture 59 - NBA Criterion 8 First Year Academics
Lecture 60 - NBA Criterion 9 Student Support Systems
Lecture 61 - NBA Criterion 10 Governance, Institutional Support and Financial Resources
Lecture 62 - Summary

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NPTEL Video Course - Multi Disciplinary - NOC:Fundamentals of Ecology

Subject Co-ordinator - Prof. Vishwesha Guttal, Prof. Kavita Isvaran, Prof. Kartik Shanker, Prof. Umesh Srinivasan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals in Ecology
Lecture 2 - Evolutionary Ecology
Lecture 3 - How animals and plants sense and navigate the world
Lecture 4 - Accessing resources
Lecture 5 - Competing for resources
Lecture 6 - Movement ecology
Lecture 7 - Adaptations in predator-prey interactions
Lecture 8 - Social behaviour
Lecture 9 - Mating systems
Lecture 10 - Life history theory
Lecture 11 - General intro to population dynamics
Lecture 12 - Math Refresher
Lecture 13 - Density independent growth
Lecture 14 - Tutorial/Numerical Examples
Lecture 15 - Density dependent growth (Continuous time; logistic model)
Lecture 16 - Lotka-Volterra competition models
Lecture 17 - Competitive Exclusion and Coexistence
Lecture 18 - Summary and recap
Lecture 19 - Spatial population structure and dynamics
Lecture 20 - Metapopulation case study: butterflies
Lecture 21 - Study design - Part 1
Lecture 22 - Study design - Part 2
Lecture 23 - Study design - Part 3
Lecture 24 - Quantitative thinking - Part 1
Lecture 25 - Quantitative thinking - Part 2
Lecture 26 - Introduction
Lecture 27 - Conditions and resources
Lecture 28 - Fundamental and realised niches
Lecture 29 - Distribution of communities

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Lecture 30 - Community assembly
Lecture 31 - Introduction to species interactions
Lecture 32 - Competition
Lecture 33 - Predation
Lecture 34 - Parasitim and Infectious disease
Lecture 35 - Positive interspecies interactions
Lecture 36 - Food webs
Lecture 37 - Food web case study
Lecture 38 - Plant-animal interactions
Lecture 39 - Species invasion as an ecological process - I
Lecture 40 - Species invasion as an ecological process - II
Lecture 41 - Species concepts
Lecture 42 - Species diversity - 1
Lecture 43 - Species diversity - 2
Lecture 44 - Diversity and distribution
Lecture 45 - Relative abundance
Lecture 46 - Macroecology - 1
Lecture 47 - Macroecology - 2
Lecture 48 - Biogeography
Lecture 49 - The Changing Earth
Lecture 50 - Ecosystems and Biogeochemistry - 1
Lecture 51 - Ecosystems and Biogeochemistry - 2
Lecture 52 - Introduction to the Anthropocene
Lecture 53 - Climate change

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NPTEL Video Course - Multi Disciplinary - NOC:Machine Learning for Core Engineering Disciplines

Subject Co-ordinator - Prof. Ananth Govind Rajan

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Data Science, Artificial Intelligence, and Machine Learning
Lecture 2 - Fundamentals of Machine Learning
Lecture 3 - Probability and Statistical Foundations for Machine Learning - I
Lecture 4 - Probability and Statistical Foundations for Machine Learning - II
Lecture 5 - Probability Distributions for Discrete and Continuous Random Variables
Lecture 6 - Transforming Random Variables and Their Distributions
Lecture 7 - Understanding Population and Sample Statistics - I
Lecture 8 - Understanding Population and Sample Statistics - II
Lecture 9 - Multivariate Linear Regression and Model Evaluation
Lecture 10 - Hypothesis Testing and Confidence Intervals: Z-Test and T-Test
Lecture 11 - Overfitting, Underfitting, and Ridge Regression
Lecture 12 - LASSO and Elastic Net Regularization Techniques
Lecture 13 - Bias-Variance TradeOff in Machine Learning
Lecture 14 - Logistic Regression and Evaluation of Binary Classification Models
Lecture 15 - ROC Analysis and Multiclass Classification
Lecture 16 - Tutorial - I (Introduction to Python)
Lecture 17 - Loss Functions - I
Lecture 18 - Loss Functions - II
Lecture 19 - Loss Functions - III
Lecture 20 - Loss Functions - IV
Lecture 21 - Training ML Models: Gradient Descent
Lecture 22 - Training ML Models: Gradient Descent and Hessian Matrix Analysis
Lecture 23 - Practical Aspects of ML Model Training and Stochastic Gradient Descent
Lecture 24 - Variants of Stochastic Gradient Descent for ML Model Training
Lecture 25 - Gradient Descent Applied to Toy Quadratic Regression
Lecture 26 - Cross Validation in Machine Learning
Lecture 27 - Hyperparameter Tuning for ML Models
Lecture 28 - Tutorial - II (Linear Regression using Python)
Lecture 29 - Tutorial - III (Ridge and LASSO Regression, Cross Validation and Hyperparameter tuning using Pyt

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Lecture 30 - Unsupervised Learning: Principal Component Analysis (PCA)
Lecture 31 - Singular Value Decomposition and PCA
Lecture 32 - Fundamentals of Clustering with K-means
Lecture 33 - Advanced Clustering Techniques
Lecture 34 - Nonlinear Dimensionality Reduction Techniques - I
Lecture 35 - Nonlinear Dimensionality Reduction Techniques - II
Lecture 36 - Unsupervised Learning on Toy Datasets
Lecture 37 - Decision Trees in Supervised ML
Lecture 38 - Decision Trees for Regression and Classification
Lecture 39 - Classification using Simple Decision Trees
Lecture 40 - Ensemble Learning
Lecture 41 - Random Forest and Boosting of Decision Trees
Lecture 42 - Adaptive Boosting (AdaBoost)
Lecture 43 - Unsupervised Learning in Python (Tutorial 1)
Lecture 44 - Unsupervised Learning in Python (Tutorial 2)
Lecture 45 - Gradient Boosted Decision Trees and Advanced Boosting Libraries
Lecture 46 - Decision Stump
Lecture 47 - Support Vector Machines (SVM)
Lecture 48 - Mathematics of SVM Margins
Lecture 49 - Support Vector Regression (SVR)
Lecture 50 - Kernel Ridge Regression (KRR)
Lecture 51 - Gaussian Process Regression (GPR)
Lecture 52 - Supervised Machine Learning Tutorial with Python (Tutorial I)
Lecture 53 - Supervised Machine Learning Tutorial with Python (Tutorial II)
Lecture 54 - Supervised Machine Learning Tutorial with Python (Tutorial III)
Lecture 55 - Introduction to Deep Learning and Neural Networks
Lecture 56 - Overview of Advanced Neural Network Architectures: From CNNs to GANs and GNNs
Lecture 57 - Mathematical Foundation and Activation Functions of Neural Networks
Lecture 58 - Training an Artificial Neural Network: Forward Propagation, Backpropagation, and Hyperparameters
Lecture 59 - Challenges in Training Neural Networks and their Mitigation
Lecture 60 - Neural Network Challenges (Gradients, Overfitting) and Logic Gate Implementation
Lecture 61 - Recurrent Neural Networks and Sequential Data Processing
Lecture 62 - Graph Neural Networks and Generative AI Fundamentals
Lecture 63 - Variational Autoencoders and Bayesian Generative Modeling
Lecture 64 - Neural Networks with Tensorflow (Tutorial I)
Lecture 65 - Neural Networks with Tensorflow (Tutorial II)

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NPTEL Video Course - Multi Disciplinary - NOC:OBE and Accreditation

Subject Co-ordinator - Prof. N. J. Rao, Prof. K. Rajanikanth

Co-ordinating Institute - IISc Bangalore, MSRIT

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of the course OBEA
Lecture 2 - Evolution of Engineering Education
Lecture 3 - Engineering Programs in India
Lecture 4 - Accreditation
Lecture 5 - What is OBE ?
Lecture 6 - Outcomes of engineering programs
Lecture 7 - Program Outcomes PO1 - PO2
Lecture 8 - Program Outcomes PO3 - PO5
Lecture 9 - Program Outcomes PO6 - PO8
Lecture 10 - Program Outcomes PO9 - PO11
Lecture 11 - Taxonomies of Learning
Lecture 12 - Cognitive Processes: Remember and Understand
Lecture 13 - Cognitive Processes: Apply and Analyse
Lecture 14 - Cognitive Processes: Evaluate and Create
Lecture 15 - Scope and Limitations of Cognitive Processes
Lecture 16 - Knowledge Categories: General
Lecture 17 - What is Engineering ?
Lecture 18 - Categories of Engineering Knowledge
Lecture 19 - Taxonomy Table
Lecture 20 - Psychomotor and Affective Domains
Lecture 21 - Affective Domain, and Emotional and Social Intelligence
Lecture 22 - Spiritual Domain
Lecture 23 - Program Educational Objectives and Program Specific Outcomes
Lecture 24 - Structure of Outcomes
Lecture 25 - Course Outcomes
Lecture 26 - Tagging the Course Outcomes
Lecture 27 - Attainment of COs
Lecture 28 - Attainment of POs and PSOs
Lecture 29 - Criterion 1 - Part 1

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Lecture 30 - Criterion 1 - Part 2
Lecture 31 - Criterion 1 - Part 3
Lecture 32 - Criterion 1 - Part 4
Lecture 33 - Criterion 2
Lecture 34 - Criterion 3
Lecture 35 - Criterion 4 - Part 1
Lecture 36 - Criterion 4 - Part 2
Lecture 37 - Criterion 5
Lecture 38 - Criterion 6 - Part 1
Lecture 39 - Criterion 6 - Part 2
Lecture 40 - Criterion 7
Lecture 41 - Criterion 8
Lecture 42 - Criterion 9 - Part 1
Lecture 43 - Criterion 9 - Part 2
Lecture 44 - Criterion 9 - Part 3
Lecture 45 - Criterion 9 - Part 4
Lecture 46 - SAR Part A - Institutional Information
Lecture 47 - Pro-Forma for Pre-Qualifiers
Lecture 48 - NBA Accreditation
Lecture 49 - General Process of Accreditation by NBA
Lecture 50 - General Process of Accreditation by NAAC
Lecture 51 - Proposed Transformative Reforms in Accreditation
Lecture 52 - Summary of the Course 'Outcome Based Education and Accreditation' (OBEA) - Part I
Lecture 53 - Summary of the Course 'Outcome Based Education and Accreditation' (OBEA) - Part II

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NPTEL Video Course - Multi Disciplinary - NOC:Instruction for Good Learning

Subject Co-ordinator - Prof. N. J. Rao, Prof. K. Rajanikanth, Prof. R. Chandrashekar

Co-ordinating Institute - IISc Bangalore, MSRIT, IIIT - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of Instruction for Good Learning
Lecture 2 - Features of Good Learning
Lecture 3 - Review of Taxonomy of Learning
Lecture 4 - How Brains Learn
Lecture 5 - Instruction
Lecture 6 - Merrill's Principles of Instruction - 1
Lecture 7 - Merrill's Principles of Instruction - 2
Lecture 8 - Experiential Learning
Lecture 9 - Gagneâ s Events of Instruction - Part I
Lecture 10 - Gagneâ s Events of Instruction - Part II
Lecture 11 - Instructional Components
Lecture 12 - Analogies, Metaphors, and Graphic Organizers
Lecture 13 - Concept Maps and Mind Maps
Lecture 14 - ePortfolios, Reflection Journals, and Learning Journals
Lecture 15 - Peer Teaching, Peer Review, Critical Incident Analysis, and Small Group Analysis
Lecture 16 - Project-Based Approach to Instruction - 1
Lecture 17 - Project-Based Approach to Instruction - 2
Lecture 18 - Problem-Based Approach to Instruction
Lecture 19 - Implementaiton of BIP (part 2) and Comparison with PjBI
Lecture 20 - Scaffolding in Instruction
Lecture 21 - Direct Instruction - I
Lecture 22 - Direct Instruction - II
Lecture 23 - Instruction for Engineering Design Thinking - 1
Lecture 24 - Instruction for Engineering Design Thinking - 2
Lecture 25 - Simulation in Instruction
Lecture 26 - Instruction for Understanding
Lecture 27 - Instruction for Metacognition
Lecture 28 - What is Critical Thinking
Lecture 29 - Instruction for Critical Thinking

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Lecture 30 - Instruction for Applying
Lecture 31 - Instruction for Analyzing
Lecture 32 - Instruction for Evaluate
Lecture 33 - Instruction for Communication
Lecture 34 - Instruction for Service Learning
Lecture 35 - Digital Literacy Skills and Generative AI in Instruction
Lecture 36 - Generative AI in Instruction and Digital Literacy Skills
Lecture 37 - Digital Literacy for Educators
Lecture 38 - Digital Literacy for Educators: Digital Assets
Lecture 39 - Digital Literacy for Educators: Information Assets
Lecture 40 - Basics of data handling with spreadsheets
Lecture 41 - Generative AI for Educators
Lecture 42 - Teacherâ s Needs and Introduction to MOODLE
Lecture 43 - Navigating MOODLE and Set up MOODLE site
Lecture 44 - Demonstrate creating courses and users, enrolling students to a course, Grouping the students
Lecture 45 - Illustrate Adding Resources - 1
Lecture 46 - Illustrate Adding Resources - 2
Lecture 47 - Illustration of Adding Forum and Assignment
Lecture 48 - Illustration of Creating Question/Item
Lecture 49 - Illustration of Creating Quiz
Lecture 50 - Management of Communication
Lecture 51 - Management of Course
Lecture 52 - Introduction to Online Courses
Lecture 53 - Planning Online Courses
Lecture 54 - Tools and Techniques for delivering online courses
Lecture 55 - Introduction to Blended Mode Courses
Lecture 56 - Delivering Blended Mode Courses
Lecture 57 - Collaborative Learning
Lecture 58 - Game-based Learning
Lecture 59 - Integrating Games and Collaboration
Lecture 60 - Practical Application and Implementation

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NPTEL Video Course - Multi Disciplinary - NOC:Assessment of Student Performance

Subject Co-ordinator - Prof. R. Chandrashekar, Prof. Shilpi Banerjee, Prof. N. J. Rao

Co-ordinating Institute - IIIT Bangalore, Azim Premji University, IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts in assessments
Lecture 2 - Purposes of assessments
Lecture 3 - Approaches of assessments - Part 1
Lecture 4 - Approaches of assessments - Part 2
Lecture 5 - Principles of good practice in assessing student learning
Lecture 6 - Unpacking the meaning of quality in assessments
Lecture 7 - Validity in assessments
Lecture 8 - Reliability in assessments
Lecture 9 - Fairness in assessments
Lecture 10 - Difficulty of assessments
Lecture 11 - Theory of formative assessment
Lecture 12 - Methods of formative assessments for classroom teaching - Part 1
Lecture 13 - Methods of formative assessments for classroom teaching - Part 2
Lecture 14 - Methods of formative assessments for lab sessions
Lecture 15 - Methods of formative assessments for projects
Lecture 16 - Meaning of competency based summative assessments
Lecture 17 - Revised Bloom's Taxonomy - Part 1
Lecture 18 - Revised Bloom's Taxonomy - Part 2
Lecture 19 - Designing summative assessment instrument - Part 1
Lecture 20 - Designing summative assessment instrument - Part 2
Lecture 21 - Principles of designing quality MCQs
Lecture 22 - Forms of MCQs
Lecture 23 - Designing constructed response questions and marking schemes - Part 1
Lecture 24 - Designing constructed response questions and marking schemes - Part 2
Lecture 25 - Authentic assignments in higher education
Lecture 26 - What Rubrics are ?
Lecture 27 - Rubrics for Presentations
Lecture 28 - Rubrics for Technical Papers and Project Reports
Lecture 29 - Rubrics for Projects

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Lecture 30 - Rubrics for PBL
Lecture 31 - Foundations of Internship Design
Lecture 32 - Additional Dimensions of Internship Design
Lecture 33 - Structuring Effective Internship Programmes
Lecture 34 - Assessing Internship Learning Outcomes
Lecture 35 - Review of Assessment Lifecyle
Lecture 36 - Introduction to Moodle for Assessments
Lecture 37 - Assessment Instruments in Moodle
Lecture 38 - Quiz Module in Moodle
Lecture 39 - Assignment Module in Moodle
Lecture 40 - Using Generative AI for Assessments

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NPTEL Video Course - Nanotechnology - Nano structured materials-synthesis, properties, self assembly and appl

Subject Co-ordinator - Prof. A.K. Ganguli

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Nanotechnology
Lecture 2 - Introduction to Nanotechnology (Continued...)
Lecture 3 - Synthetic Methodologies
Lecture 4 - Synthetic Methodologies (Continued...)
Lecture 5 - Synthetic Methodologies (Continued...)
Lecture 6 - Synthetic Methodologies (Continued...)
Lecture 7 - Synthetic Methodologies (Continued...)
Lecture 8 - Synthetic Methodologies (Continued...)
Lecture 9 - Template Methods - I
Lecture 10 - Template Methods - II
Lecture 11 - Spray Pyrolysis
Lecture 12 - V-L-S Method
Lecture 13 - Lithography - I
Lecture 14 - Lithography - II
Lecture 15 - Fullerences and Carbon Nanotubes - I
Lecture 16 - Fullerences and Carbon Nanotubes - II
Lecture 17 - Fullerences and Carbon Nanotubes - III
Lecture 18 - Metal and Metal Oxide Nanowires - I
Lecture 19 - Metal and Metal Oxide Nanowires - II
Lecture 20 - Metal and Metal Oxide Nanowires - III
Lecture 21 - Self Assembly of Nanostructures - I
Lecture 22 - Self Assembly of Nanostructures - II
Lecture 23 - Self Assembly of Nanostructures - III
Lecture 24 - Core Shell Nanostructures - I
Lecture 25 - Core Shell Nanostructures - II
Lecture 26 - Core Shell Nanostructures - III
Lecture 27 - Nanocomposites - I
Lecture 28 - Nanocomposites - II
Lecture 29 - Photocatalysis - I

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Lecture 30 - Photocatalysis - II
Lecture 31 - Photocatalysis - III
Lecture 32 - Dielectric Properties - I
Lecture 33 - Dielectric Properties - II
Lecture 34 - Magnetic Properties - I
Lecture 35 - Magnetic Properties - II
Lecture 36 - Magnetic Properties - III
Lecture 37 - Optical Properties - I
Lecture 38 - Optical Properties - II
Lecture 39 - Mechanical Properties
Lecture 40 - Concluding Lecture

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NPTEL Video Course - Nanotechnology - Nanostructures and Nanomaterials: Characterization and Properties

Subject Co-ordinator - Dr. Anandh Subramaniam, Dr. Kantesh Balani

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Nanomaterials
Lecture 2 - Introduction to Nanomaterials
Lecture 3 - Introduction to Nanomaterials
Lecture 4 - Introduction to Nanomaterials
Lecture 5 - Introduction to Nanomaterials
Lecture 6 - Introduction to Nanomaterials
Lecture 7 - Introduction to Nanomaterials
Lecture 8 - Introduction to Nanomaterials
Lecture 9 - Introduction to Nanomaterials
Lecture 10 - Introduction to Nanomaterials
Lecture 11 - Surface Effects and Physical properties of nanomaterials
Lecture 12 - Surface Effects and Physical properties of nanomaterials
Lecture 13 - Surface Effects and Physical properties of nanomaterials
Lecture 14 - Surface Effects and Physical properties of nanomaterials
Lecture 15 - Surface Effects and Physical properties of nanomaterials
Lecture 16 - Defect Structure & Mechanical Behaviour of Nanomaterials
Lecture 17 - Defect Structure & Mechanical Behaviour of Nanomaterials
Lecture 18 - Defect Structure & Mechanical Behaviour of Nanomaterials
Lecture 19 - Defect Structure & Mechanical Behaviour of Nanomaterials
Lecture 20 - Defect Structure & Mechanical Behaviour of Nanomaterials
Lecture 21 - Electrical, Magnetic and Optical Properties of Nanomaterials
Lecture 22 - Electrical, Magnetic and Optical Properties of Nanomaterials
Lecture 23 - Electrical, Magnetic and Optical Properties of Nanomaterials
Lecture 24 - Electrical, Magnetic and Optical Properties of Nanomaterials
Lecture 25 - Electrical, Magnetic and Optical Properties of Nanomaterials
Lecture 26 - Atomic Bonding
Lecture 27 - Overview of Nano structures and Nano materials
Lecture 28 - Carbon Nanostructures
Lecture 29 - Multi-Scale Hierarchy

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Lecture 30 - Self Assembly
Lecture 31 - Nanomaterials in Nature
Lecture 32 - Surfaces and Interfaces
Lecture 33 - Non-wetting
Lecture 34 - Nanomaterials Science and Nanomanufacturing
Lecture 35 - Surface Adsorption Isotherms (Langmuir/Bet)
Lecture 36 - Reciprocal Lattice
Lecture 37 - Transmission Electron Microscopy
Lecture 38 - Transmission Electron Microscopy
Lecture 39 - Auger Electron Spectroscopy
Lecture 40 - X-Ray Photoelectron Spectroscopy (XPS)
Lecture 41 - Electron Energy Loss Spectroscopy (EELS)
Lecture 42 - Deformation Behavior of Nanomaterials
Lecture 43 - Fracture and Creep
Lecture 44 - Nanomechanics
Lecture 45 - Nanotribology

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NPTEL Video Course - Ocean Engineering - Elements of Ocean Engineering

Subject Co-ordinator - Dr. Ashoke Bhar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Physical Oceanography - I
Lecture 3 - Physical Oceanography - II
Lecture 4 - Physical Oceanography - III
Lecture 5 - Physical Oceanography - IV
Lecture 6 - Sediments & Open Ocean
Lecture 7 - Open Ocean - I
Lecture 8 - Open Ocean - II
Lecture 9 - Physical Properties of Water
Lecture 10 - Water and Waves
Lecture 11 - Waves - I
Lecture 12 - Waves - II
Lecture 13 - Waves - III
Lecture 14 - Introduction to Offshore Structures - I
Lecture 15 - Introduction to Offshore Structures - II
Lecture 16 - Waves - IV
Lecture 17 - The Wave Spectra
Lecture 18 - The Wave Spectra (Continued...1)
Lecture 19 - The Wave Spectra (Continued...2)
Lecture 20 - Offshore Structures - I
Lecture 21 - Offshore Structures - II
Lecture 22 - Offshore Structures - III
Lecture 23 - Floating Offshore Structures
Lecture 24 - Drilling from Platforms
Lecture 25 - Drilling and Topsides
Lecture 26 - Topsides
Lecture 27 - Mooring Systems
Lecture 28 - Mooring Systems (Continued...1)
Lecture 29 - Static Analysis of Mooring Cable

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Lecture 30 - Static Analysis of Mooring Cable (Continued...)
Lecture 31 - Mooring Systems (Continued...2)
Lecture 32 - Mooring Systems (Continued...3)
Lecture 33 - Mooring Systems (Continued...4)
Lecture 34 - Mooring Systems (Continued...5)
Lecture 35 - Mooring Systems (Continued...6)
Lecture 36 - Fixed Offshore Structures
Lecture 37 - Fixed Offshore Structures (Continued...)
Lecture 38 - Structural Analysis of Jacket Platforms
Lecture 39 - Structural Analysis of Jacket Platforms (Continued...1)
Lecture 40 - Structural Analysis of Jacket Platforms (Continued...2)
Lecture 41 - Jacket Pile Selection
Lecture 42 - Jacket Pile Selection (Continued...1)
Lecture 43 - Jacket Pile Selection (Continued...2)
Lecture 44 - Floating Platform Design
Lecture 45 - Semi-Submersibles
Lecture 46 - Semi-Submersibles & TLPs
Lecture 47 - Tension Leg Platform
Lecture 48 - Tension Leg Platform (Continued...)
Lecture 49 - SPAR Platform

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NPTEL Video Course - Ocean Engineering - Hydrostatics and Stability

Subject Co-ordinator - Dr. Hari V. Warrior

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Archimedes Principle
Lecture 3 - Archimedes Principle (Continued...)
Lecture 4 - Numerical Integration
Lecture 5 - Problems in Stability - I
Lecture 6 - Problems in Stability - II
Lecture 7 - Problems in Stability - III
Lecture 8 - Problems in Integration
Lecture 9 - Free Surface Effect
Lecture 10 - Inclining Experiment
Lecture 11 - Hydrostatic Curves - I
Lecture 12 - Hydrostatic Curves - II
Lecture 13 - Stability Curve
Lecture 14 - Dynamical Stability - I
Lecture 15 - Dynamical Stability - II
Lecture 16 - Healing Moment - I
Lecture 17 - Healing Moment - II
Lecture 18 - Healing Moment - III
Lecture 19 - Dynamical Stability - III
Lecture 20 - Discussion
Lecture 21 - Righting Stability - I
Lecture 22 - Righting Stability - II
Lecture 23 - Trim Calculations - I
Lecture 24 - Trim Calculations - II
Lecture 25 - Trim Stability - I
Lecture 26 - Trim Stability - II
Lecture 27 - Dry Docking - I
Lecture 28 - Dry Docking - II
Lecture 29 - Bilging - I

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Lecture 30 - Bilging - II
Lecture 31 - Bilging - III
Lecture 32 - Bilging - IV
Lecture 33 - Safety Regulations
Lecture 34 - Safety Regulations (Continued...)
Lecture 35 - Safety Regulations (Continued...)
Lecture 36 - Ship Stability on Waves
Lecture 37 - Ship Stability on Waves (Continued...)
Lecture 38 - Ship Stability on Waves (Continued...)
Lecture 39 - Wave Theory
Lecture 40 - Conclusion

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NPTEL Video Course - Ocean Engineering - Marine Construction and Welding

Subject Co-ordinator - Prof. N.R. Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to ships & offshore structures
Lecture 2 - Characteristics of shipbuilding industry
Lecture 3 - Structural Requirement
Lecture 4 - Basic Structural Components
Lecture 5 - Structural Subassemblies
Lecture 6 - Bulkheads
Lecture 7 - Decks & Shells
Lecture 8 - Structural Assemblies Double Bottom Construction
Lecture 9 - Wing Tanks & Duct Keels
Lecture 10 - Fore & Altend Construction
Lecture 11 - General Cargo Carrier
Lecture 12 - Bulk Carrier
Lecture 13 - Structural Details
Lecture 14 - Container Ship
Lecture 15 - RO-RO Ship
Lecture 16 - Oil Tanker
Lecture 17 - Structural Alignment & Continuity
Lecture 18 - Steel Material Preparation
Lecture 19 - Shot Blasting
Lecture 20 - Acid Pickling
Lecture 21 - Plate Cutting
Lecture 22 - Plate & Section Forming - I
Lecture 23 - Plate & Section Forming - II
Lecture 24 - Line Heating
Lecture 25 - Fusion Welding & Power Source
Lecture 26 - Welding Parameters & their Effects
Lecture 27 - Welding Methods
Lecture 28 - Shielded Metal Arc Welding
Lecture 29 - Gas Metal Arc Welding - I

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Lecture 30 - Gas Metal Arc Welding - II
Lecture 31 - Gas Tungsten Arc Welding
Lecture 32 - Submerged Arc Welding
Lecture 33 - Electroslag Welding
Lecture 34 - Electrogas Welding
Lecture 35 - Friction Stir Welding
Lecture 36 - FSW Metallurgy
Lecture 37 - Welding Defects & NDT
Lecture 38 - Welding Distortions
Lecture 39 - Distortion Mechanism & Types of Distortion
Lecture 40 - Distortion Control & Mitigation
Lecture 41 - Welding Sequence

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NPTEL Video Course - Ocean Engineering - Marine Hydrodynamics

Subject Co-ordinator - Dr. T. Sahoo

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Marine Hydrodynamics
Lecture 2 - Law of Conservation of Mass - Continuity of Equation
Lecture 3 - Streamlines and Flow Direction
Lecture 4 - Worked Examples on Various Types of Flow
Lecture 5 - Equation of Motion (Law of Conservation of Momentum)
Lecture 6 - Applications of Equations of Motion
Lecture 7 - Applications of Equations of Motion (Continued...)
Lecture 8 - Two Dimensional Flows
Lecture 9 - Two Dimensional Flows (Continued...)
Lecture 10 - Source, Sink and Doublet
Lecture 11 - Worked Examples on Two Dimensional Flows
Lecture 12 - Conformal Mapping and Joukowsky Transformation
Lecture 13 - Uniform Flow Past an Elliptic Cylinder
Lecture 14 - Aerofoil theory
Lecture 15 - Aerofoil theory (Continued...)
Lecture 16 - Aerofoil theory (Continued...)
Lecture 17 - Schwarz - Christoffel Transformation
Lecture 18 - Motion of a cylinder
Lecture 19 - Vertex Motion
Lecture 20 - Irrotational Flow - A Bird's eyeview
Lecture 21 - Introduction to Water Waves
Lecture 22 - Basic Equation and Conditions of Water Waves
Lecture 23 - Water particle kinematics in wave motion
Lecture 24 - Capillary Gravity Waves
Lecture 25 - Linearised Long Wave Equation
Lecture 26 - Linearised Long Wave Equation (Continued...)
Lecture 27 - Wave motion in two layer fluids
Lecture 28 - Worked Examples on Wave Motion
Lecture 29 - Worked Examples on Wave Motion (Continued...)

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Lecture 30 - Gravity wave transformation and energy rotation
Lecture 31 - Gravity wave transformation and energy rotation (Continued...)
Lecture 32 - Gravity wave transformation and energy rotation (Continued...)
Lecture 33 - Navier - Stokes equation of motion
Lecture 34 - Analysis of Basic Flow Problems
Lecture 35 - Analysis of Basic Flow Problems (Continued...)
Lecture 36 - Unsteady unidirectional flows
Lecture 37 - Unsteady unidirectional flows (Continued...)
Lecture 38 - An introduction to Boundary Layer Theory
Lecture 39 - Solution methods for Boundary Layer Equations
Lecture 40 - Solutions Methods for Boundary Layer Equations (Continued...)

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NPTEL Video Course - Ocean Engineering - Seakeeping and Manoeuvring

Subject Co-ordinator - Prof. Debabrata Sen

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Regular Water Waves - I
Lecture 2 - Regular Water Waves - II
Lecture 3 - Definition of Ship Motions & Encounter Frequency
Lecture 4 - Single Degree of Freedom Motions in Regular Waves
Lecture 5 - Uncoupled Heave, Pitch and Roll - I
Lecture 6 - Uncoupled Heave, Pitch and Roll - II
Lecture 7 - Uncoupled Heave, Pitch and Roll - III
Lecture 8 - Uncoupled Heave, Pitch and Roll - IV
Lecture 9 - Uncoupled Heave, Pitch and Roll - V
Lecture 10 - Coupled Motions
Lecture 11 - Irregular Waves
Lecture 12 - Description of Irregular Waves by Spectrum
Lecture 13 - Theoretical Wave Spectrum
Lecture 14 - Ship Motion in Irregular Waves - I
Lecture 15 - Ship Motion in Irregular Waves - II
Lecture 16 - Ship Motion in Irregular Waves - III
Lecture 17 - Description of Short-Crested Sea
Lecture 18 - Motions in Short-Crested Sea
Lecture 19 - Derived Responses & Dynamic Effects - I
Lecture 20 - Derived Responses & Dynamic Effects - II
Lecture 21 - Derived Responses & Dynamic Effects - III
Lecture 22 - Seakeeping Considerations in Design
Lecture 23 - Manoeuvring
Lecture 24 - Dynamic Equations of Motion - I
Lecture 25 - Dynamic Equations of Motion - II
Lecture 26 - Hydrodynamic Derivatives
Lecture 27 - Controls-Fixed Stability
Lecture 28 - Stability & Cotrollability
Lecture 29 - Definitive Manoeuvres - I

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Lecture 30 - Definitive Manoeuvres - II
Lecture 31 - Definitive Manoeuvres - III
Lecture 32 - Non-linear Equations of Motion
Lecture 33 - Non-linear Equations & Model Tests
Lecture 34 - Captive Model Tests and Experimental Determination of Hydrodynamic Derivatives
Lecture 35 - PMM Tests - I
Lecture 36 - PMM Tests - II
Lecture 37 - Rudder & Control Surfaces - I
Lecture 38 - Rudder & Control Surfaces - II
Lecture 39 - Theoretical Determination of Hydrodynamic Derivatives - I
Lecture 40 - Theoretical Determination of Hydrodynamic Derivatives - II

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NPTEL Video Course - Ocean Engineering - Applied Thermodynamics for Marine Systems

Subject Co-ordinator - Prof. P.K. Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction & Some Definitions
Lecture 2 - First Law of Thermodynamics (Closed System)
Lecture 3 - First Law of Thermodynamics (Open System)
Lecture 4 - Second Law of Thermodynamics
Lecture 5 - Second Law and Carnot Principle
Lecture 6 - Property of Pure Substance, Steam Table
Lecture 7 - Ideal Gas Laws, Different Processes
Lecture 8 - Introduction to Vapour Power Cycle
Lecture 9 - Vapour Power Cycle
Lecture 10 - Steam Power Cycle, Steam Nozzle
Lecture 11 - Basic Concept of Turbine, Velocity Diagram
Lecture 12 - Steam Turbine-Impulse
Lecture 13 - Reaction Turbine Compounding
Lecture 14 - Comparison of Different Staging Arrangement
Lecture 15 - Basics Laws of Fluid Mechanics
Lecture 16 - Pipe Friction, Major Loss, Minor Loss
Lecture 17 - Pipeline & Pipe Network
Lecture 18 - Refrigeration Vapour Compression Cycle
Lecture 19 - Psychometrics
Lecture 20 - Psychometrics (Continued...)
Lecture 21 - Psychometric Processes
Lecture 22 - Psychometric Processes (Continued...), Air Conditioning
Lecture 23 - Summer & Winter Air Conditioning
Lecture 24 - Gas Power Cycles, Cycles for IC Engines
Lecture 25 - Gas Turbine Cycles
Lecture 26 - Modification of Brayton Cycle
Lecture 27 - Introduction to Convective Heat Transfer Forced & Free Convection

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NPTEL Video Course - Ocean Engineering - Performance of Marine Vehicles at Sea

Subject Co-ordinator - Prof. Debabrata Sen, Prof. S.C. Misra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Components of Resistance - I
Lecture 2 - Components of Resistance - II
Lecture 3 - Dimensional Analysis
Lecture 4 - Frictional Resistance
Lecture 5 - Wave Making Resistance
Lecture 6 - Other Components of Resistance
Lecture 7 - Model Experiments
Lecture 8 - Shallow Water Effects
Lecture 9 - Ship hull form and Resistance
Lecture 10 - Propeller Geometry - Part I
Lecture 11 - Propeller Geometry - Part II
Lecture 12 - Introduction to High Speed Crafts - Part I
Lecture 13 - Introduction to High Speed Crafts - Part II
Lecture 14 - Propeller in Open Water - Part I
Lecture 15 - Propeller in Open Water - Part II
Lecture 16 - Propeller 'behind' a ship
Lecture 17 - Propeller experiments
Lecture 18 - Propeller theories - Part I
Lecture 19 - Propeller Theories
Lecture 20 - Cavitation
Lecture 21 - Regular Sea Waves - I
Lecture 22 - Regular Sea Waves - II
Lecture 23 - Irregular sea Waves - I
Lecture 24 - Irregular Sea Waves - II
Lecture 25 - Ship Motion in Regular Waves - I
Lecture 26 - Ship Motion in Regular Waves - II
Lecture 27 - Ship Motion in Regular Waves - III
Lecture 28 - Ship Motion in irregular Waves - I
Lecture 29 - Ship Motion in irregular Waves - II

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Lecture 30 - Ship Motion in irregular Waves - III
Lecture 31 - Motion in Short Crested Sea,Coupled Motions
Lecture 32 - Derived Responses
Lecture 33 - Ship Controllability
Lecture 34 - Equation of Motion in Horizontal Plane
Lecture 35 - Hydrodynamic Derivatives and Stability
Lecture 36 - Hydrodynamic Derivatives and Stability
Lecture 37 - Ship Trials and Maneuvers - I
Lecture 38 - Ship Trials and Maneuvers - II
Lecture 39 - Heel During Turn, IMO Requirements
Lecture 40 - Rudder Hydrodynamics

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NPTEL Video Course - Ocean Engineering - Strength and Vibration of Marine Structures

Subject Co-ordinator - Prof. S.K. Satsangi, Prof. A.H. Sheikh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Ship Structures - I
Lecture 2 - Introduction to Ship Structures - II
Lecture 3 - Deflection of Structure Beam - I
Lecture 4 - Deflection of Structure Beam - II
Lecture 5 - Deflection of Structure Beam - III
Lecture 6 - Deflection of Structure Beam - IV
Lecture 7 - Statically Indeterminate Structures - I
Lecture 8 - Statically Indeterminate Structures - II
Lecture 9 - Statically Indeterminate Structures - III
Lecture 10 - Statically Indeterminate Structures - IV
Lecture 11 - Statically Indeterminate Structures - V
Lecture 12 - Statically Indeterminate Structures - VI
Lecture 13 - Longitudinal Bending of Hull Girder - I
Lecture 14 - Longitudinal Bending of Hull Girder - II
Lecture 15 - Longitudinal Bending of Hull Grider - III
Lecture 16 - Theory of Column - I
Lecture 17 - Theory of Column - II
Lecture 18 - Theory of Column - III
Lecture 19 - Theory of Column - IV
Lecture 20 - Calculation of Momentum of Inertia of Main Section
Lecture 21 - Bending in Inclined Condition
Lecture 22 - Calculation of Deflection/Shear Stress
Lecture 23 - Ship Vibration - I
Lecture 24 - Ship Vibration - II
Lecture 25 - Ship Vibration - III
Lecture 26 - Ship Vibration - IV
Lecture 27 - Ship Vibration - V
Lecture 28 - Propeller Induced Vibration & Hull Frequency Estimation
Lecture 29 - Hull Frequency Estimation from Basic Group (Continued...)

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Lecture 30 - Analysis of Bulkhead - I
Lecture 31 - Analysis of Bulkhead - II
Lecture 32 - Stress Concentration/Structural Discontinuities
Lecture 33 - Composite Construction
Lecture 34 - Method of Plastic Analysis
Lecture 35 - Calculation of Natural Frequency of Hull Girder
Lecture 36 - Hull Resonance Diagram

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NPTEL Video Course - Ocean Engineering - NOC:Water Economics and Governance

Subject Co-ordinator - Prof. Manoj Kumar Tiwari

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Global Water Availability and Uses
Lecture 3 - Water Availability and Uses in India
Lecture 4 - Surface Water and Ground Water Resources
Lecture 5 - Water Use Practices and Major Challenges
Lecture 6 - Background to Water Rights
Lecture 7 - Water Rights
Lecture 8 - Right to Sanitation
Lecture 9 - Rights to Water and Sanitation - Underline Principals and Implementation
Lecture 10 - Water Rights
Lecture 11 - Water Sustainability
Lecture 12 - The Dublin Statement on Water Sustainability
Lecture 13 - Action Agenda in the Dublin Statement on Water Sustainability
Lecture 14 - Water Sustainability
Lecture 15 - Water Sustainability
Lecture 16 - Valuing Water
Lecture 17 - Valuing Water
Lecture 18 - Valuing Water
Lecture 19 - Valuing Water
Lecture 20 - Valuing Water
Lecture 21 - Pricing Water
Lecture 22 - Pricing Water
Lecture 23 - Pricing Water
Lecture 24 - Pricing Water
Lecture 25 - Pricing Water
Lecture 26 - Water Pricing
Lecture 27 - Conflicts in Water Pricing
Lecture 28 - Conflicts in Water Pricing
Lecture 29 - Conflicts in Water Pricing

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Lecture 30 - Water Pricing Case Studies
Lecture 31 - Economics of Water Projects
Lecture 32 - Economics of Water Projects
Lecture 33 - Economics of Water Projects
Lecture 34 - Economics of Water Projects
Lecture 35 - Economics of Demand and Sectoral Allocation
Lecture 36 - Economics Evaluation of Water Projects
Lecture 37 - Evaluation of Water Projects
Lecture 38 - Evaluation of Water Projects
Lecture 39 - Evaluation of Water Projects
Lecture 40 - Evaluation of Water Projects
Lecture 41 - Evaluation of Water Projects
Lecture 42 - Evaluation of Water Projects
Lecture 43 - Water Governance
Lecture 44 - Elements, Dimensions and Principles of Water Governance
Lecture 45 - Principles of Water Governance
Lecture 46 - Principles of Water Governance and Effective Water Governance Schemes
Lecture 47 - Effective Water Governance Schemes and its Benchmarking
Lecture 48 - Decision Making and Implementation in Water Governance and its Benchmarking
Lecture 49 - Water Governance in India
Lecture 50 - Water Governance in India
Lecture 51 - Water Governance in India
Lecture 52 - Water Governance in India
Lecture 53 - Water Governance in India
Lecture 54 - Water Dispute Management
Lecture 55 - Water Dispute Management
Lecture 56 - Water Dispute Management
Lecture 57 - Water Dispute Management
Lecture 58 - Global Water Diplomacy
Lecture 59 - Global Water Diplomacy
Lecture 60 - Global Water Diplomacy
Lecture 61 - Course Summary
Lecture 62 - Course Summary (Continued...)
Lecture 63 - Live Session-1
Lecture 64 - Live Session-2
Lecture 65 - Live Session-2 (April 20, 2018)

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NPTEL Video Course - Ocean Engineering - NOC:Marine Propulsion

Subject Co-ordinator - Prof. Anirban Bhattacharyya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Propeller Geometry
Lecture 3 - Propeller Geometry (Continued...)
Lecture 4 - Propeller Theory - I
Lecture 5 - Propeller Theory - II
Lecture 6 - Propeller Theory - III
Lecture 7 - Propeller Theory - IV
Lecture 8 - Propeller Theory - V
Lecture 9 - Propeller Theory - VI
Lecture 10 - Propeller Theory - VII
Lecture 11 - Propeller in Open Water
Lecture 12 - Dimensional Analysis and Similarity
Lecture 13 - Propeller Open Water Characteristics
Lecture 14 - Propeller Open Water Characteristics (Continued...)
Lecture 15 - Methodical Propeller Series
Lecture 16 - Hull-Propeller Interaction
Lecture 17 - Hull-Propeller Interaction (Continued...)
Lecture 18 - Ship Powering and Efficiency Components
Lecture 19 - Engine-Propeller Matching - Part I
Lecture 20 - Engine-Propeller Matching - Part II
Lecture 21 - Propeller Model Tests - Part I
Lecture 22 - Propeller Model Tests - Part II
Lecture 23 - Propeller Model Tests - Part III
Lecture 24 - Propeller Cavitation - Part I
Lecture 25 - Propeller Cavitation - Part II
Lecture 26 - Propeller Strength - Part I
Lecture 27 - Propeller Strength - Part II
Lecture 28 - Propeller Design - Part I
Lecture 29 - Propeller Design - Part II

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Lecture 30 - Propeller Design - Part III
Lecture 31 - Controllable Pitch Propeller
Lecture 32 - Ducted Propeller
Lecture 33 - Ducted Propeller (Continued...)
Lecture 34 - Problems on Propeller Performance
Lecture 35 - Surface Piercing Propeller, Podded Propeller, Thruster
Lecture 36 - Waterjet Propulsion
Lecture 37 - Unconventional Propulsors
Lecture 38 - Unconventional Propulsors (Continued...)
Lecture 39 - Miscellaneous Topics
Lecture 40 - Energy Saving Devices

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NPTEL Video Course - Ocean Engineering - NOC:Numerical Ship and Offshore Hydrodynamics

Subject Co-ordinator - Prof. Ranadev Datta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Seakeeping - 1
Lecture 3 - Introduction to Seakeeping - 2
Lecture 4 - Seakeeping - 3
Lecture 5 - Seakeeping - 4
Lecture 6 - Seakeeping - 5
Lecture 7 - Seakeeping - 6
Lecture 8 - Seakeeping - 7
Lecture 9 - Hydrodynamics - 1
Lecture 10 - Hydrodynamics - 2
Lecture 11 - Wave and Wave Effect
Lecture 12 - Waves - 2
Lecture 13 - Waves - 3
Lecture 14 - Introduction to BEM
Lecture 15 - Introduction to BEM (Continued...)
Lecture 16 - Lower Order Panel Method
Lecture 17 - Lower Order Panel Method (Continued...)
Lecture 18 - Case Study - Part 1
Lecture 19 - Case Study - Part 2
Lecture 20 - Demonstration of Panel Method Code
Lecture 21 - Frequency Domain Panel Method
Lecture 22 - Frequency Domain Panel Method (Continued...)
Lecture 23 - Frequency Domain Panel Method (Continued...)
Lecture 24 - Frequency Domain Panel Method (Continued...)
Lecture 25 - Frequency Domain Panel Method (Continued...)
Lecture 26 - Frequency Domain Panel Method (Continued...)
Lecture 27 - Frequency Domain Panel Method (Continued...)
Lecture 28 - Frequency Domain Panel Method (Continued...)
Lecture 29 - Cummins Equation

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Lecture 30 - IRF Based Solution - Part 1
Lecture 31 - IRF Based Solution - Part 2
Lecture 32 - Time Domain Solution Using IRF
Lecture 33 - Time Domain Solution Using IRF (Continued...)
Lecture 34 - Numerical Computation of IRF Based Method
Lecture 35 - Numerical Computation of IRF Based Method (Continued...)
Lecture 36 - Forward Speed Effects
Lecture 37 - Strip Theory - Part 1
Lecture 38 - Strip Theory - Part 2
Lecture 39 - Strip Theory - Part 3
Lecture 40 - Strip Theory - Part 4
Lecture 41 - Strip Theory - Part 5
Lecture 42 - Strip Theory - Part 6
Lecture 43 - Strip Theory - Part 7
Lecture 44 - Time Domain Panel Method
Lecture 45 - Time Domain Panel Method (Continued...)
Lecture 46 - Time Domain Panel Method (Continued...)
Lecture 47 - Time Domain Panel Method (Continued...)
Lecture 48 - Time Domain Panel Method (Continued...)
Lecture 49 - Non Linear Time Domain Panel Method
Lecture 50 - Non Linear Time Domain Panel Method (Continued...)
Lecture 51 - Time Domain Panel Method - Code Development
Lecture 52 - Ship Hydroelasticity
Lecture 53 - Hydroelasticity
Lecture 54 - Hydroelasticity (Continued...)
Lecture 55 - Hydroelasticity (Continued...)
Lecture 56 - Semi Analytic Method
Lecture 57 - Semi Analytic Method (Continued...)
Lecture 58 - Including Non linear Forces in BEM Code
Lecture 59 - Including Non linear Forces in BEM Code (Continued...)
Lecture 60 - Closer

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NPTEL Video Course - Ocean Engineering - NOC:Seakeeping of Ships and Offshore Structures

Subject Co-ordinator - Prof. Ranadev Datta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic Hydrodynamics - Part 1
Lecture 3 - Basic Hydrodynamics - Part 2
Lecture 4 - Basic Water Wave Theory
Lecture 5 - Water Wave - Part II
Lecture 6 - Non-linear Wave
Lecture 7 - Ir-regular Waves
Lecture 8 - Sea Spectrum
Lecture 9 - Encounter Frequency
Lecture 10 - Problem Solving
Lecture 11 - Coupled and Uncoupled Motion
Lecture 12 - Uncoupled Heave Motion - Part I
Lecture 13 - Uncoupled Heave Motion - Part II
Lecture 14 - Uncoupled Heave Motion - Part III
Lecture 15 - Uncoupled Heave Motion - Part IV
Lecture 16 - Uncoupled Heave Motion - Part V
Lecture 17 - Uncoupled Heave Motion - Part VI
Lecture 18 - Basic Strip Theory Code
Lecture 19 - Problem Discussion on Uncoupled Heave Motion
Lecture 20 - Uncoupled Pitch Motion
Lecture 21 - Uncoupled Pitch and Roll Motion
Lecture 22 - Discussion Uncoupled Roll Motion
Lecture 23 - Problem Solving
Lecture 24 - Coupled Equation of Motion
Lecture 25 - Brief Discussion on Industry Standards Commercial Software for Seakeeping
Lecture 26 - Loads Under Extreme Waves - Part 1
Lecture 27 - Loads Under Extreme Waves - Part 2
Lecture 28 - Motion Stabilizer
Lecture 29 - General Discussion on Various Offshore Structures

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Lecture 30 - Morison's Equation - Part I
Lecture 31 - Morison's Equation - Part II
Lecture 32 - Mooring Analysis - Part I
Lecture 33 - Mooring Analysis - Part II
Lecture 34 - Mooring Analysis - Part III
Lecture 35 - Discussion on Orcaflex Software
Lecture 36 - Revision Ir-regular Waves
Lecture 37 - Problem Solving
Lecture 38 - Short Crested Wave
Lecture 39 - Encounter Wave Spectrum
Lecture 40 - Encounter Wave Spectrum (Continued...)
Lecture 41 - Response Spectrum - Part I
Lecture 42 - Response Spectrum - Part II
Lecture 43 - Problem Solving
Lecture 44 - Derived Motion - Part II
Lecture 45 - Vertical Bow Motion - Part II
Lecture 46 - Relative Bow Motion and Deck Wetness
Lecture 47 - Deck Wetness
Lecture 48 - Derived Responses : Slamming
Lecture 49 - Problem Solving
Lecture 50 - Sea Sickness and Others
Lecture 51 - 2nd Order Forces - Part I
Lecture 52 - 2nd Order Forces - Part II
Lecture 53 - Added Resistance and Sloshing
Lecture 54 - Dynamic Positioning - Part I
Lecture 55 - Dynamic Positioning - Part II
Lecture 56 - Seakeeping Design Consideration - Part I
Lecture 57 - Seakeeping Design Consideration - Part II
Lecture 58 - Discussion on Gate Paper
Lecture 59 - Problems Solving
Lecture 60 - Problem and Closer

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NPTEL Video Course - Ocean Engineering - Design of Offshore Structures

Subject Co-ordinator - Dr. S. Nallayarasu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Loads On Offshore Structures - 1
Lecture 2 - Loads On Offshore Structures - 2
Lecture 3 - Loads On Offshore Structures - 3
Lecture 4 - Loads On Offshore Structures - 4
Lecture 5 - Loads On Offshore Structures - 5
Lecture 6 - Loads On Offshore Structures - 6
Lecture 7 - Loads On Offshore Structures - 7
Lecture 8 - Concepts of Fixed Offshore Platform Deck and Jacket - 1
Lecture 9 - Concepts of Fixed Offshore Platform Deck and Jacket - 2
Lecture 10 - Concepts of Fixed Offshore Platform Deck and Jacket - 3
Lecture 11 - Concepts of Fixed Offshore Platform Deck and Jacket - 4
Lecture 12 - Concepts of Fixed Offshore Platform Deck and Jacket - 5
Lecture 13 - Steel Tubular Member Design - 1
Lecture 14 - Steel Tubular Member Design - 2
Lecture 15 - Steel Tubular Member Design - 3
Lecture 16 - Steel Tubular Member Design - 4
Lecture 17 - Steel Tubular Member Design - 5
Lecture 18 - Tubular Joint Design for Static and Cyclic Loads - 1
Lecture 19 - Tubular Joint Design for Static and Cyclic Loads - 2
Lecture 20 - Tubular Joint Design for Static and Cyclic Loads - 3
Lecture 21 - Tubular Joint Design for Static and Cyclic Loads - 4
Lecture 22 - Tubular Joint Design for Static and Cyclic Loads - 5
Lecture 23 - Tubular Joint Design for Static and Cyclic Loads - 6
Lecture 24 - Tubular Joint Design for Static and Cyclic Loads - 7
Lecture 25 - Tubular Joint Design for Static and Cyclic Loads - 8
Lecture 26 - Tubular Joint Design for Static and Cyclic Loads - 9
Lecture 27 - Tubular Joint Design for Static and Cyclic Loads - 10
Lecture 28 - Tubular Joint Design for Static and Cyclic Loads - 11
Lecture 29 - Tubular Joint Design for Static and Cyclic Loads - 12

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Lecture 30 - Jackup RIGS-Analysis and Design - 1
Lecture 31 - Jackup RIGS-Analysis and Design - 2
Lecture 32 - Jackup RIGS-Analysis and Design - 3
Lecture 33 - Jackup RIGS-Analysis and Design - 4
Lecture 34 - Jackup RIGS-Analysis and Design - 5
Lecture 35 - Design Against Accidental Loads - 1
Lecture 36 - Design Against Accidental Loads - 2
Lecture 37 - Design Against Accidental Loads - 3
Lecture 38 - Design Against Accidental Loads - 4
Lecture 39 - Design Against Accidental Loads - 5
Lecture 40 - Design Against Accidental Loads - 6
Lecture 41 - Design Against Accidental Loads - 7
Lecture 42 - Design Against Accidental Loads - 8

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NPTEL Video Course - Ocean Engineering - Foundation for Offshore Structures

Subject Co-ordinator - Dr. S. Nallayarasu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Soil Mechanics - I
Lecture 2 - Basics of Soil Mechanics - II
Lecture 3 - Basics of Soil Mechanics - III
Lecture 4 - Basics of Soil Mechanics - IV
Lecture 5 - Basics of Soil Mechanics - V
Lecture 6 - Basics of Soil Mechanics - VI
Lecture 7 - Basics of Soil Mechanics - VII
Lecture 8 - Bearing Capacity of Foundations - I
Lecture 9 - Bearing Capacity of Foundations - II
Lecture 10 - Pile Foundation - I
Lecture 11 - Pile Foundation - II
Lecture 12 - Pile Foundation - III
Lecture 13 - Pile Foundation - IV
Lecture 14 - Pile Foundation - V
Lecture 15 - Pile Foundation - VI
Lecture 16 - Pile Installation - I
Lecture 17 - Pile Installation - II
Lecture 18 - Pile Driveability Analysis - I
Lecture 19 - Pile Driveability Analysis - II
Lecture 20 - Pile Driveability Analysis - III
Lecture 21 - Pile Driveability Analysis - IV
Lecture 22 - Pile Driveability Analysis - V
Lecture 23 - Onbottom Stability of Jackets - I
Lecture 24 - Onbottom Stability of Jackets - II
Lecture 25 - Pile Load Test - I
Lecture 26 - Pile Load Test - II
Lecture 27 - Pile Load Test - III
Lecture 28 - Special Topics
Lecture 29 - Special Foundations - I

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Lecture 30 - Special Foundations - II
Lecture 31 - Special Foundations - III
Lecture 32 - Pile Group Effects
Lecture 33 - Two Pile Group Effect For Axial Load

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NPTEL Video Course - Ocean Engineering - Health,Safety and Environmental Management in Petroleum and Offshore Engineering

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Terminologies
Lecture 2 - Introduction to HSE
Lecture 3 - Safety assurance and assessment
Lecture 4 - Safety assurance and assessment (Continued...)
Lecture 5 - Safety in design and operations
Lecture 6 - Organizing for safety
Lecture 7 - Hazard classification and assessment, Hazard evaluation and hazard control
Lecture 8 - HaZOP
Lecture 9 - HaZOP (Continued...)
Lecture 10 - Hazard evaluation and hazard control
Lecture 11 - Hazard Identification and Management in Oil & Gas Industry using HAZOP
Lecture 12 - FMEA
Lecture 13 - FMEA (Continued...)
Lecture 14 - Environmental Issues and Management
Lecture 15 - Impact of Oil and Gas Industry on Marine Environment
Lecture 16 - Oil Hydrocarbon in Marine Environment
Lecture 17 - Chemicals and Wastes from Offshore and Oil Industry
Lecture 18 - Dispersion Models â Atmospheric Pollution
Lecture 19 - Atmospheric Pollution (Continued...)
Lecture 20 - Hazard Assessment and Accident Scenario
Lecture 21 - Dose Assessment, Safety Regulation
Lecture 22 - Toxic Release and Dispersion Modeling
Lecture 23 - Chemical Exposure Index (CEI)
Lecture 24 - Chemical Exposure Index (Continued.)
Lecture 25 - Quantitative Risk Assessment
Lecture 26 - Quantitative Risk Assessment (Liquid Release Models Case Study - Continued...)
Lecture 27 - Fire and Explosion Modeling
Lecture 28 - Fire and Explosion Modeling Flammability Diagrams

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Lecture 29 - Explosion Modeling
Lecture 30 - Fire and Explosion Preventive Measures
Lecture 31 - Probabilistic Risk Analysis
Lecture 32 - Safety Measures in Design and Process Operations
Lecture 33 - Case Studies
Lecture 34 - Case Studies (Continued...)
Lecture 35 - Software Used in HSE â an Over View

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NPTEL Video Course - Ocean Engineering - Port and Harbour Structures

Subject Co-ordinator - Prof. R. Sundaravadivelu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Layout of ports
Lecture 2 - Continuation of layout of ports
Lecture 3 - Visakhapatnam port
Lecture 4 - Ships and size of ships
Lecture 5 - Port planning
Lecture 6 - Harbour layout
Lecture 7 - Site characteristics & navigation channel
Lecture 8 - Bathymetric survey
Lecture 9 - Tide, surge, tsunami and wave
Lecture 10 - Wave rose diagram
Lecture 11 - Breakwater
Lecture 12 - Design of breakwater - Part-1
Lecture 13 - Design of breakwater - Part-2
Lecture 14 - Berm breakwater
Lecture 15 - Dredging & methods of disposal
Lecture 16 - Berthing structures modelling
Lecture 17 - Berthing structures - analyses
Lecture 18 - Loads
Lecture 19 - Types of berthing structures
Lecture 20 - Design of berthing, structures-1
Lecture 21 - Design of offshore berthing, structures-1
Lecture 22 - Estimation of mooring, berthing and seismic forces
Lecture 23 - Estimation seismic forces
Lecture 24 - Active and passive earth pressure and differential water pressure
Lecture 25 - Load combinations and design
Lecture 26 - Fenders
Lecture 27 - Mechanical handling system
Lecture 28 - Single buoy mooring and open sea jetty - Part 1
Lecture 29 - Single buoy mooring and open sea jetty - Part 2

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Lecture 30 - Slipway, drydock,floating dock, shiplift
Lecture 31 - Soil structure interaction
Lecture 32 - Calulation of fixity depth
Lecture 33 - Pile load test
Lecture 34 - Ground improvement techniques
Lecture 35 - Analysis of pile with spring support
Lecture 36 - UPV,Half cell potential, Low high Integrity Test
Lecture 37 - Mooring Dolphin at KPT
Lecture 38 - Coastal structures and environmental management
Lecture 39 - BOQ and Cost Estimate
Lecture 40 - Proposed Mega Terminal Chennai
Lecture 41 - Preliminary Project Report on Shipyard
Lecture 42 - Procedures & clearances before implementation of a project
Lecture 43 - Detailed project report
Lecture 44 - Environmental studies of a project
Lecture 45 - Design of pile
Lecture 46 - Design and construction of diaphragm wall
Lecture 47 - Emprical relationship between spt and several soil properties
Lecture 48 - Model studies for a deep water port_case study

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NPTEL Video Course - Ocean Engineering - Ship Resistance and Propulsion

Subject Co-ordinator - Dr. P. Krishnankutty, Prof. V. Anantha Subramanian

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Syllabus and Introduction
Lecture 2 - Seaway Effects on Resistance
Lecture 3 - Ship Types and Powering Aspects
Lecture 4 - Frictional Resistance and Turbulence Stimulation
Lecture 5 - Wave Making Resistance
Lecture 6 - Bulbous Bow on Ship Resistance
Lecture 7 - Air and Wind Resistance Dimensional Analysis - I
Lecture 8 - Dimensional Analysis - II, Model Tests and Ship Resistance Prediction Methods - I
Lecture 9 - Model Tests and Ship Resistance Prediction Methods - II
Lecture 10 - Model Tests and Ship Resistance Prediction Methods - III
Lecture 11 - Resistance in Shallow Water
Lecture 12 - Canal Effects on Resistance Holtrap-Mennen Method for Ship Resistance Prediction
Lecture 13 - Ship Resistance Prediction Methods - I
Lecture 14 - Ship Resistance Prediction Methods - II
Lecture 15 - Resistance of Advanced Marine Vehicles - I
Lecture 16 - Resistance of Advanced Marine Vehicles - II
Lecture 17 - Resistance of Advanced Marine Vehicles - III

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NPTEL Video Course - Ocean Engineering - Coastal Engineering

Subject Co-ordinator - Prof. V. Sundar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Wave deformation - I
Lecture 2 - Wave deformation - II
Lecture 3 - wave deformation (problems - I)
Lecture 4 - wave deformation (problems - II)
Lecture 5 - wave deformation (problems - III)
Lecture 6 - Sediment charecteristics - I
Lecture 7 - Sediment charecteristics - II
Lecture 8 - Radiation stresses - I
Lecture 9 - Radiation stresses - II
Lecture 10 - Longshore sediment transport - I
Lecture 11 - Longshore sediment transport - II
Lecture 12 - Longshore sediment transport (problems - I)
Lecture 13 - Longshore sediment transport (problems - II)
Lecture 14 - Coastal erosion protection measures - I
Lecture 15 - Coastal erosion protection measures - II
Lecture 16 - Coastal erosion protection measures - III
Lecture 17 - Coastal erosion protection measures - IV
Lecture 18 - Coastal erosion protection measures - V
Lecture 19 - Coastal erosion protection measures - VI
Lecture 20 - Coastal erosion protection measures - VII
Lecture 21 - Coastal erosion protection measures - VIII
Lecture 22 - Coastal erosion protection measures - IX
Lecture 23 - Coastal erosion protection measures - X
Lecture 24 - Cheaper CEP methods - XI
Lecture 25 - Geosynthetics - I
Lecture 26 - Geosynthetics - II
Lecture 27 - Breakwaters - I
Lecture 28 - Breakwaters - II
Lecture 29 - Breakwaters - III

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Lecture 30 - Breakwaters - IV
Lecture 31 - Forces on coastal structures - I
Lecture 32 - Forces on coastal structures - II
Lecture 33 - Scour under marine structures
Lecture 34 - Physical modelling of coastal structures - I
Lecture 35 - Physical modelling of coastal structures - II
Lecture 36 - Tsunami - I
Lecture 37 - Tsunami - II

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NPTEL Video Course - Ocean Engineering - Wave Hydrodynamics

Subject Co-ordinator - Prof. V. Sundar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Fluid Dynamics - I
Lecture 2 - Basic Fluid Dynamics - II
Lecture 3 - Introduction
Lecture 4 - Wave Motion - I
Lecture 5 - Wave Motion - II
Lecture 6 - Wave Motion - III
Lecture 7 - Wave Motion Problems
Lecture 8 - Standing Wave Theory
Lecture 9 - Wave Deformation - I
Lecture 10 - Wave Deformation - II
Lecture 11 - Wave Deformation and Problems
Lecture 12 - Random Waves
Lecture 13 - Random Waves and Problems - I
Lecture 14 - Random Waves and Problems - II
Lecture 15 - Random Waves and Problems - III
Lecture 16 - Simulation of Random Waves
Lecture 17 - Directional waves
Lecture 18 - Wave Loads on Structures - I
Lecture 19 - Wave Loads on Structures - II
Lecture 20 - Wave Loads on Structures and Problems - I
Lecture 21 - Wave Loads on Structures and Problems - II
Lecture 22 - Wave loads on Large Boides
Lecture 23 - Finite Amplitude Wave Theories
Lecture 24 - Hydrodynamic Testing Facility
Lecture 25 - Hydrodynamic Testing Facility at IITM

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NPTEL Video Course - Ocean Engineering - Ocean Structures and Materials

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and objectives
Lecture 2 - Fixed type offshore structures
Lecture 3 - Compliant type offshore structures - I
Lecture 4 - Compliant type offshore structures - II
Lecture 5 - Drill ships and basics of drilling
Lecture 6 - Subsea production systems
Lecture 7 - Environmental loads - I
Lecture 8 - Environmental loads - II
Lecture 9 - Types of coastal structures - I
Lecture 10 - Types of coastal structures - II
Lecture 11 - Summary of coastal structures
Lecture 12 - Tutorials on Module - I
Lecture 13 - Outline of planning of ocean structures
Lecture 14 - Introduction to design
Lecture 15 - Construction techniques
Lecture 16 - Dredging - I
Lecture 17 - Dredging - II
Lecture 18 - Uncertainties in analysis and design
Lecture 19 - Design adequacy - Example I
Lecture 20 - Design adequacy - Example II
Lecture 21 - Dredging equipments' specifications
Lecture 22 - Ocean Pollution
Lecture 23 - Foundation and sea bed anchors
Lecture 24 - Introduction to materials - I
Lecture 25 - Introduction to materials - II
Lecture 26 - Concrete in marine environment
Lecture 27 - Concrete
Lecture 28 - Repair materials for marine structures
Lecture 29 - Corrosion in concrete - I

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Lecture 30 - Corrosion in concrete - II
Lecture 31 - Material sin repair and rehabilitation
Lecture 32 - Materials for special repair
Lecture 33 - New materials for coastal embankments - I
Lecture 34 - New materials for coastal embankments - II
Lecture 35 - Non-destructive testing
Lecture 36 - Structural health monitoring
Lecture 37 - Wireless sensor networking
Lecture 38 - Repair and rehabilitation-Fenders

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NPTEL Video Course - Ocean Engineering - Dynamics of Ocean Structures

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to different types of ocean structures - I
Lecture 2 - Introduction to different types of ocean structures - II
Lecture 3 - Introduction to different types of ocean structures - III
Lecture 4 - Types of Compliant towers
Lecture 5 - New Generation offshore and Coastal structures
Lecture 6 - Environmental forces
Lecture 7 - Wave forces, Current
Lecture 8 - Introduction to Structural dynamics
Lecture 9 - Characteristics of single degree - of - freedom model
Lecture 10 - Methods of writing equation of motion
Lecture 11 - Free and forced vibration of single degree - of - freedom systems
Lecture 12 - Undamped and damped systems - I
Lecture 13 - Undamped and damped systems - II
Lecture 14 - Undamped and damped systems - III
Lecture 15 - Comparison of methods
Lecture 16 - Examples
Lecture 17 - Numerical problems in single degree - of - freedom systems
Lecture 18 - Two degrees - of - freedom systems
Lecture 19 - Eigenvalues and Eigenvectors
Lecture 20 - Orthogonality of modes
Lecture 21 - Study of Multi degrees - of - freedom systems
Lecture 22 - Equations of motion
Lecture 23 - Natural frequencies and mode shapes
Lecture 24 - Stodla, Rayleigh - Ritz and influence coefficient methods, Dunkerley
Lecture 25 - Continuous system
Lecture 26 - Structural action of offshore structures
Lecture 27 - Fluid - Structure interaction - I
Lecture 28 - Fluid - Structure interaction - II Dynamic analysis of offshore jacket platforms
Lecture 29 - Steps of analysis using software

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Lecture 30 - Steps of analysis using software (Continued...)
Lecture 31 - Dynamic analysis of articulated towers
Lecture 32 - Iterative frequency domain - I
Lecture 33 - Iterative frequency domain - II
Lecture 34 - Multi - legged articulated towers
Lecture 35 - Response control of multi-legged articulated towers using tuned mass dampers Experimental and ar
Lecture 36 - Development of Tension Leg Platforms and geometric optimization
Lecture 37 - Dynamic analyses of TLPs
Lecture 38 - Development of Mass, stiffness and damping matrices of TLP from first principles
Lecture 39 - Estimate of classical damping
Lecture 40 - TLPs under seismic excitation
Lecture 41 - Direct Integration method
Lecture 42 - Development of new generation offshore structures
Lecture 43 - Introduction to stochastic dynamics of ocean structures
Lecture 44 - Response spectrum
Lecture 45 - Narrow band process
Lecture 46 - Return period, Fatigue prediction
Lecture 47 - Modal response method, Modal mass contribution
Lecture 48 - Missing mass correction, Example problems
Lecture 49 - Duhamel's integral

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NPTEL Video Course - Ocean Engineering - Advanced Marine Structures

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Scope
Lecture 2 - Fixed type structures
Lecture 3 - Compliant type structures
Lecture 4 - New generation marine structures
Lecture 5 - Environmental loads - I
Lecture 6 - Environmental loads - II
Lecture 7 - Environmental loads - III
Lecture 8 - Environmental loads - IV
Lecture 9 - Other loads - I
Lecture 10 - Other loads - II
Lecture 11 - Ultimate load design principles - I
Lecture 12 - Ultimate Limit State - I
Lecture 13 - Ultimate Limit State - II
Lecture 14 - Ultimate Limit State - III
Lecture 15 - Partial safety factor
Lecture 16 - Plastic design - I
Lecture 17 - Plastic design - II
Lecture 18 - Plastic design - III
Lecture 19 - Plastic design - IV - Example problems - I
Lecture 20 - Plastic analysis - Example problems - II
Lecture 21 - Plastic analysis - Example problems - III
Lecture 22 - Theories of failure - I
Lecture 23 - Theories of failure - II
Lecture 24 - Theories of failure - III
Lecture 25 - Theories of failure - IV
Lecture 26 - Shear centre - I
Lecture 27 - Shear centre - II - Examples
Lecture 28 - Plastic capacity of sections under combined loads - I
Lecture 29 - Plastic capacity of sections under combined loads - II

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Lecture 30 - Impact analysis- fundamentals - I
Lecture 31 - Impact analysis- fundamentals - II
Lecture 32 - Ultimate capacity of tubular joints
Lecture 33 - Fluid structure interaction - I
Lecture 34 - Fluid structure interaction - II
Lecture 35 - Fluid induced vibration - I
Lecture 36 - Fluid induced vibration - II
Lecture 37 - Flow through perforated members - I
Lecture 38 - Flow through perforated members - numerical studies - II
Lecture 39 - Flow through perforated members - III - Analytical studies
Lecture 40 - Introduction to Reliability - I
Lecture 41 - Introduction to Reliability - II
Lecture 42 - Introduction to Reliability - III
Lecture 43 - Reliability framework in Marine structures
Lecture 44 - Ultimate Limit state and Reliability approach - I
Lecture 45 - Ultimate limit state and Reliability approach - II
Lecture 46 - Levels of Reliability
Lecture 47 - FOSM and AFOSM methods of Reliability
Lecture 48 - Fracture and Fatigue
Lecture 49 - Fatigue failure
Lecture 50 - Fatigue loading and fatigue analysis
Lecture 51 - Deterministic fatigue analysis
Lecture 52 - Spectral fatigue analysis
Lecture 53 - Stress concentration and fatigue analysis

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NPTEL Video Course - Ocean Engineering - NOC:Dynamics of Ocean Structures

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Offshore structures
Lecture 2 - Introduction to Offshore structures (Continued...)
Lecture 3 - Environmental Loads
Lecture 4 - Structural action of Ocean structures
Lecture 5 - Single Degree of Freedom
Lecture 6 - Equations of Motion
Lecture 7 - Free Vibration of SDOF systems
Lecture 8 - Damped and Undamped Forced Vibration
Lecture 9 - Damped Forced Vibration
Lecture 10 - Response building
Lecture 11 - Numerical Example (SDOF)
Lecture 12 - Numerical Example II
Lecture 13 - Numerical Example
Lecture 14 - Numerical Example - MDOF
Lecture 15 - Numerical Example - Eigen value problems
Lecture 16 - Orthogonality of modes - MDOF system models
Lecture 17 - Numerical Methods for MDOF systems
Lecture 18 - Influence Coefficient Method - MDOF
Lecture 19 - STODLA Method - MDOF
Lecture 20 - Stodla Method - Examples
Lecture 21 - Rayleighs Method
Lecture 22 - Modal Response Analysis for MDOF
Lecture 23 - Rayleigh Damping
Lecture 24 - Caughey Damping
Lecture 25 - Damping Matrix by Super Positioning Method
Lecture 26 - Duhamels Integral
Lecture 27 - Modal superposition and truncation
Lecture 28 - Modal participation and missing mass corrections
Lecture 29 - Fluid Structure Interaction

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Lecture 30 - Fluid Structure Interaction - II
Lecture 31 - Retrofitting and Rehabilitation - Application through Dynamics
Lecture 32 - Drag and Earthquake Forces
Lecture 33 - Articulated Towers
Lecture 34 - Fluid Structure Interaction Application in Ocean Structure
Lecture 35 - Response Control of Compliant Structures (MLAT)
Lecture 36 - MLATs with Passive Dampers
Lecture 37 - Tension Leg Platforms
Lecture 38 - Tension Leg Platforms - II
Lecture 39 - Fluid Structure Interaction.
Lecture 40 - Dynamic Analysis of TLPs under Springing and Ringing Waves
Lecture 41 - Numerical Integration
Lecture 42 - Dynamic Analysis of Offshore Triceratops
Lecture 43 - Stochastic Process
Lecture 44 - Stochastic Process (Continued...)
Lecture 45 - Response Spectrum - I
Lecture 46 - Response Spectrum - II
Lecture 47 - Return Period and Fatigue Damage

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NPTEL Video Course - Ocean Engineering - NOC:Health, Safety and Environmental Management in Offshore and Petr

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
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Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
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Lecture 28
Lecture 29

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Lecture 30
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Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37

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NPTEL Video Course - Ocean Engineering - NOC:Risk and Reliability of offshore structures

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Uncertainties
Lecture 3 - Uncertainties - II
Lecture 4 - Probability and Plausibility
Lecture 5 - Rules of Probability
Lecture 6 - Plausible Reasoning - I
Lecture 7 - Plausible Reasoning - Quantitative rules
Lecture 8 - Quantitative Rules
Lecture 9 - Probability Distribution
Lecture 10 - Random Variables
Lecture 11 - Random Variables - II
Lecture 12 - Sampling Estimates
Lecture 13 - Modelling of Environmental Loads
Lecture 14 - Exercises - I
Lecture 15 - Introduction
Lecture 16 - Components of Reliability analysis
Lecture 17 - Levels of Reliability
Lecture 18 - Error Estimation
Lecture 19 - Reliability methods - I
Lecture 20 - Reliability methods - II
Lecture 21 - Reliability methods - III
Lecture 22 - Reliability methods - IV
Lecture 23 - System Reliability - I
Lecture 24 - System Reliability - II
Lecture 25 - System Reliability - III
Lecture 26 - Failure domains
Lecture 27 - Failure domains II
Lecture 28 - Application Problem - I
Lecture 29 - Application Problem - I (Continued...)

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Lecture 30 - Application Problem II
Lecture 31 - Application Problem II (Continued...)
Lecture 32 - Application Problem II (Continued...)
Lecture 33 - Risk and Reliability
Lecture 34 - Reliability analysis of structural systems
Lecture 35 - Codes on structural reliability
Lecture 36 - Variables in Reliability analysis
Lecture 37 - Mechanical models in Reliability analysis
Lecture 38 - Mechanical modes in Reliability analysis - II
Lecture 39 - Stochastic Process - I
Lecture 40 - Stochastic Process - II
Lecture 41 - Fatigue Reliability
Lecture 42 - Design SN curve
Lecture 43 - Simplified Fatigue Assessment
Lecture 44 - Short term fatigue damage
Lecture 45 - Behaviour of tubular joints
Lecture 46 - Tubular Joints - Experimental studies on T-Joints
Lecture 47 - Risk Assessment
Lecture 48 - Logical Risk analysis
Lecture 49 - Risk analysis of Mechanical Systems
Lecture 50 - FMEA II
Lecture 51 - Design FMEA for Offshore Triceratops
Lecture 52 - Fault Tree Analysis
Lecture 53 - Event Tree Analysis
Lecture 54 - Consequence Analysis
Lecture 55 - Risk Acceptability
Lecture 56 - Risk and Hazard assessment
Lecture 57 - Risk Picture
Lecture 58 - Risk Management

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NPTEL Video Course - Ocean Engineering - NOC:HSE for offshore and petroleum engineers-Practices

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Drilling Operation and Consequences
Lecture 3 - Drilling Accidents
Lecture 4 - Oil Spills
Lecture 5 - Ecological Monitoring
Lecture 6 - Pollution Modeling - I
Lecture 7 - Pollution Modeling - II
Lecture 8 - Pollution Modeling - III
Lecture 9 - Hazard Management
Lecture 10 - Introduction
Lecture 11 - HSE Practices
Lecture 12 - Lessons learnt from accidents
Lecture 13 - HSE guidelines
Lecture 14 - HSE lessons
Lecture 15 - Risk Assessment - I
Lecture 16 - Financing Risk
Lecture 17 - Financing Risk Example Problem
Lecture 18 - Risk Assessment and Accident Analysis
Lecture 19 - Accident analysis
Lecture 20 - Hazard assessment - I
Lecture 21 - Hazard Analysis - I
Lecture 22 - Hazop - I
Lecture 23 - Hazop - II
Lecture 24 - Hazop - III
Lecture 25 - Hazop - IV
Lecture 26 - Hazop - V
Lecture 27 - Hazop (Case study)
Lecture 28 - Accidents in offshore platforms
Lecture 29 - Hazard Control

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Lecture 30 - FMEA
Lecture 31 - FMEA Example
Lecture 32 - FMEA Example - II
Lecture 33 - Excercises
Lecture 34 - Dose Response Assessment
Lecture 35 - Flammability characteristics
Lecture 36 - Flammability diagram
Lecture 37 - Explosions
Lecture 38 - Chemical Explosions
Lecture 39 - Fire and Explosion Prevention - I
Lecture 40 - Explosion and Prevention
Lecture 41 - Fire Prevention Practices
Lecture 42 - Industrial Hygiene control
Lecture 43 - Chemical Risk Analysis
Lecture 44 - Chemical Risk Analysis - II
Lecture 45 - CEI - Examples
Lecture 46 - QRA Application
Lecture 47 - Hazard Identification Practices
Lecture 48 - Risk in Marine Systems - I
Lecture 49 - Risk in Marine Systems - II
Lecture 50 - Safety measures in design and operation
Lecture 51 - Safety measures in design and operation - II
Lecture 52 - Safety factors for confined spaces - I
Lecture 53 - Safety practices for confined spaces - II
Lecture 54 - Safety practices for Fire protection
Lecture 55 - Process safety management

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NPTEL Video Course - Ocean Engineering - NOC:Offshore Structures Under Special Loads Including Fire Resistanc

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Novelty of fixed platforms
Lecture 3 - Novelty of compliant platforms
Lecture 4 - Novelty of floating platforms
Lecture 5 - New generation offshore platforms - I
Lecture 6 - New generation offshore platforms - II
Lecture 7 - Offshore Triceratops
Lecture 8 - Offshore Regasification platforms
Lecture 9 - Environmental loads - I
Lecture 10 - Environmental loads - II
Lecture 11 - Wind loads
Lecture 12 - Ice loads - I
Lecture 13 - Ice loads - II
Lecture 14 - Response spectrum - I
Lecture 15 - Response spectrum - II
Lecture 16 - Uncertainties
Lecture 17 - Earthquake loads - I
Lecture 18 - Earthquake loads - II
Lecture 19 - Earthquake loads - III
Lecture 20 - General design requirements
Lecture 21 - Impact and Non-impact wave loads - I
Lecture 22 - Impact and Non-impact wave loads - II
Lecture 23 - Unsymmetrical bending - I
Lecture 24 - Unsymmetrical bending - II
Lecture 25 - Unsymmetrical bending - III
Lecture 26 - Shear centre - I
Lecture 27 - Shear centre - II
Lecture 28 - Shear centre - III
Lecture 29 - Shear centre - IV

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Lecture 30 - Curved beams - I
Lecture 31 - Curved beams - II
Lecture 32 - Curved beams - III
Lecture 33 - Curved beams - IV
Lecture 34 - Curved beams - V
Lecture 35 - Rings and chain links - I
Lecture 36 - Rings and chain links - II
Lecture 37 - Marine risers
Lecture 38 - Marine risers under VIM
Lecture 39 - Fire safety overview
Lecture 40 - Explosion - I
Lecture 41 - Explosion and fire protection - I
Lecture 42 - Explosion and fire protection - II
Lecture 43 - Blast Resistance - I
Lecture 44 - Blast Resistance - II
Lecture 45 - Blast Resistance - III
Lecture 46 - Blast Resistance - IV
Lecture 47 - Material Strength - I
Lecture 48 - Material Strength - II
Lecture 49 - Material Strength - III
Lecture 50 - Fire resistant design overview
Lecture 51 - Types of fire
Lecture 52 - Design Approach - I
Lecture 53 - Design Approach - II

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NPTEL Video Course - Ocean Engineering - NOC:Computer Methods Of Structural Analysis of Offshore Structures

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to structural analysis - Part 1
Lecture 2 - Introduction to structural analysis - Part 2
Lecture 3 - System of linear equations - Part 1
Lecture 4 - System of linear equations - Part 2
Lecture 5 - Matrices - Part 1
Lecture 6 - Matrices - Part 2
Lecture 7 - Beam Element 1 - Part 1
Lecture 8 - Beam Element 1 - Part 2
Lecture 9 - Beam Element 2 - Part 1
Lecture 10 - Beam Element 2 - Part 2
Lecture 11 - Stiffness matrix of beam element - Part 1
Lecture 12 - Stiffness matrix of beam element - Part 2
Lecture 13 - Stiffness method of analysis of planar orthogonal structures - Part 1
Lecture 14 - Stiffness method of analysis of planar orthogonal structures - Part 2
Lecture 15 - Example on continuous beam - Part 1
Lecture 16 - Example on continuous beam - Part 2
Lecture 17 - Example - II - Part 1
Lecture 18 - Example - II - Part 2
Lecture 19 - Example - II (Continued...)
Lecture 20 - Example - III - Part 1
Lecture 21 - Example - III - Part 2
Lecture 22 - Planar non-orthogonal frame - Part 1
Lecture 23 - Planar non-orthogonal frame - Part 2
Lecture 24 - Non-orthogonal structures - II
Lecture 25 - Planar non-orthogonal frame
Lecture 26 - Non-orthogonal structures - III - Part 1
Lecture 27 - Non-orthogonal structures - III - Part 2
Lecture 28 - Example problem
Lecture 29 - Example problem

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Lecture 30 - Planar non-orthogonal frame using computer code - Part 1
Lecture 31 - Planar non-orthogonal frame using computer code - Part 2
Lecture 32 - Planar non-orthogonal frame - Example 3 - Part 1
Lecture 33 - Planar non-orthogonal frame - Example 3 - Part 2
Lecture 34 - Planar truss system
Lecture 35 - Planar truss system examples - Part 1
Lecture 36 - Planar truss system examples - Part 2
Lecture 37 - 3D structures - analysis by stiffness method - Part 1
Lecture 38 - 3D structures - analysis by stiffness method - Part 2
Lecture 39 - 3D structures - transformation matrix - Part 1
Lecture 40 - 3D structures - transformation matrix - Part 2
Lecture 41 - Y-Z-X transformation for 3d analysis
Lecture 42 - Z-Y-X transformation for 3d analysis - Part 1
Lecture 43 - Z-Y-X transformation for 3d analysis - Part 2
Lecture 44 - Analysis of space frames - Example 1 - Part 1
Lecture 45 - Analysis of space frames - Example 1 - Part 2
Lecture 46 - Analysis of space frames - Example 1 - Part 3
Lecture 47 - Analysis of space frame structures
Lecture 48 - 3d analysis of space frames - Example 1 - Part 1
Lecture 49 - 3d analysis of space frames - Example 1 - Part 2
Lecture 50 - 3d analysis - Example 2 - Part 1
Lecture 51 - 3d analysis - Example 2 - Part 2
Lecture 52 - 3d truss analysis
Lecture 53 - Special elements
Lecture 54 - Non-prismatic members - Part 1
Lecture 55 - Non-prismatic members - Part 2
Lecture 56 - Offshore structures - 1 - Part 1
Lecture 57 - Offshore structures - 1 - Part 2
Lecture 58 - Offshore structures - 2 - Part 1
Lecture 59 - Offshore structures - 2 - Part 2
Lecture 60 - Offshore structures - 3 - Part 1
Lecture 61 - Offshore structures - 3 - Part 2
Lecture 62 - Offshore compliant structures - 1 - Part 1
Lecture 63 - Offshore compliant structures - 1 - Part 2
Lecture 64 - Offshore compliant structures - 2 - Part 1
Lecture 65 - Offshore compliant structures - 2 - Part 2
Lecture 66 - New generation platforms - Part 1
Lecture 67 - New generation platforms - Part 2
Lecture 68 - Environmental loads - 1 - Part 1

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Lecture 69 - Environmental loads - 1 - Part 2
Lecture 70 - Wave spectra - Part 1
Lecture 71 - Wave spectra - Part 2
Lecture 72 - Wind loads - Part 1
Lecture 73 - Wind loads - Part 2
Lecture 74 - Wind loads - 2 - Part 1
Lecture 75 - Wind loads - 2 - Part 2
Lecture 76 - Ice load and Earthquake load - Part 1
Lecture 77 - Ice load and Earthquake load - Part 2
Lecture 78 - Dynamic analysis - 1 - Part 1
Lecture 79 - Dynamic analysis - 1 - Part 2
Lecture 80 - Dynamic analysis - 2 - Part 1
Lecture 81 - Dynamic analysis - 2 - Part 2
Lecture 82 - Dynamic analysis - 3 - Part 1
Lecture 83 - Dynamic analysis - 3 - Part 2
Lecture 84 - Computer methods of dynamic analysis - Part 1
Lecture 85 - Computer methods of dynamic analysis - Part 2
Lecture 86 - Damping estimate - Part 1
Lecture 87 - Damping estimate - Part 2
Lecture 88 - Damping estimate - 2 - Part 1
Lecture 89 - Damping estimate - 2 - Part 2
Lecture 90 - Newmark's method - Part 1
Lecture 91 - Newmark's method - Part 2
Lecture 92 - Articulated towers - Part 1
Lecture 93 - Articulated towers - Part 2
Lecture 94 - Tension leg platforms - Part 1
Lecture 95 - Tension leg platforms - Part 2
Lecture 96 - Tension leg platforms - 2 - Part 1
Lecture 97 - Tension leg platforms - 2 - Part 2
Lecture 98 - New generation offshore structures - Part 1
Lecture 99 - New generation offshore structures - Part 2
Lecture 100 - Triceratops-2 - Part 1
Lecture 101 - Triceratops-2 - Part 2
Lecture 102 - Random process - 1 - Part 1
Lecture 103 - Random process - 1 - Part 2
Lecture 104 - Random process - 2 - Part 1
Lecture 105 - Random process - 2 - Part 2
Lecture 106 - Response spectrum - Part 1
Lecture 107 - Response spectrum - Part 2

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Lecture 108 - Return period and Stochastic process - Part 1
Lecture 109 - Return period and Stochastic process - Part 2
Lecture 110 - Stochastic modelling - Part 1
Lecture 111 - Stochastic modelling - Part 2
Lecture 112 - Fatigue damage - 1 - Part 1
Lecture 113 - Fatigue damage - 1 - Part 2
Lecture 114 - Fatigue damage - 2 - Part 1
Lecture 115 - Fatigue damage - 2 - Part 2
Lecture 116 - Fatigue estimate of offshore platform - Part 1
Lecture 117 - Fatigue estimate of offshore platform - Part 2
Lecture 118 - Live Session

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NPTEL Video Course - Ocean Engineering - NOC:Structural Health Monitoring

Subject Co-ordinator - Dr. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to SHM - Part 1
Lecture 2 - Introduction to SHM - Part 2
Lecture 3 - Necessity of SHM - Part 1
Lecture 4 - Necessity of SHM - Part 2
Lecture 5 - Components of SHM - Part 1
Lecture 6 - Components of SHM - Part 2
Lecture 7 - Challenges in SHM - Part 1
Lecture 8 - Challenges in SHM - Part 2
Lecture 9 - Advantages of SHM - Part 1
Lecture 10 - Advantages of SHM - Part 2
Lecture 11 - Components of SHM process - Part 1
Lecture 12 - Components of SHM process - Part 2
Lecture 13 - SHM issues applied to concrete structures - Part 1
Lecture 14 - SHM issues applied to concrete structures - Part 2
Lecture 15 - Level of uncertainties in SHM process - Part 1
Lecture 16 - Level of uncertainties in SHM process - Part 2
Lecture 17 - Short term and long term Structural Health Monitoring (SHM) - Part 1
Lecture 18 - Short term and long term Structural Health Monitoring (SHM) - Part 2
Lecture 19 - Local and Global Health Monitoring
Lecture 20 - Data Evaluation and Assessment
Lecture 21 - Estimation of Structural Health i.e. Structural Health Monitoring (SHM)
Lecture 22 - Estimation of Structural Health using Static SHM
Lecture 23 - Structural Health Monitoring (SHM) Planning and Management - Part 1
Lecture 24 - Structural Health Monitoring (SHM) Planning and Management - Part 2
Lecture 25 - Vibration based health monitoring scheme - Part 1
Lecture 26 - Vibration based health monitoring scheme - Part 2
Lecture 27 - Structural Health monitoring methods
Lecture 28 - Structural Health monitoring methods
Lecture 29 - Damage identification using lumped mass and Element modal stiffness - Part 1

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Lecture 30 - Damage identification using lumped mass and Element modal stiffness - Part 2
Lecture 31 - Damage identification by visual Inspection method - Part 1
Lecture 32 - Damage identification by visual Inspection method - Part 2
Lecture 33 - Various vibration based method in SHM-1 - Part 1
Lecture 34 - Various vibration based method in SHM-1 - Part 2
Lecture 35 - Comparison of Damage Detection Method - II
Lecture 36 - Damage Detection Method - II
Lecture 37 - Structural Health Monitoring (SHM) and Statistical Pattern Recognition (SPR)
Lecture 38 - Long term SHM (Structural Health Monitoring)
Lecture 39 - Non-Destructive evaluation - I - Part 1
Lecture 40 - Non-Destructive evaluation - I - Part 2
Lecture 41 - Non-Destructive evaluation - II
Lecture 42 - Non-Destructive evaluation - III
Lecture 43 - Crack detection in Composites
Lecture 44 - Various sensor technologies - Part 1
Lecture 45 - Various sensor technologies - Part 2
Lecture 46 - Fibre Optic sensors - Part 1
Lecture 47 - Fibre Optic sensors - Part 2
Lecture 48 - Smart sensing for SHM - Part 1
Lecture 49 - Smart sensing for SHM - Part 2
Lecture 50 - Sensing requirements in special structures
Lecture 51 - The sensor requirements and Data acquisition - Part 1
Lecture 52 - The sensor requirements and Data acquisition - Part 2
Lecture 53 - Acquisition system and Networking for SHM - Part 1
Lecture 54 - Acquisition system and Networking for SHM - Part 2
Lecture 55 - Wireless Sensor Networking (WSN) - Part 1
Lecture 56 - Wireless Sensor Networking (WSN) - Part 2
Lecture 57 - SHM layout design of offshore structures
Lecture 58 - Vibration Based damage detection
Lecture 59 - SHM design - Part 1
Lecture 60 - SHM design - Part 2
Lecture 61 - Artificial Intelligence (AI) in structural health monitoring (SHM)
Lecture 62 - Plausibility of errors in SHM
Lecture 63 - Artificial Neural Network (ANN) in the SHM process.
Lecture 64 - Damage detection
Lecture 65 - Application of SHM in Infrastructure Engieering - Part 1
Lecture 66 - Application of SHM in Infrastructure Engieering - Part 2
Lecture 67 - Design of sensor layout for SHM - Part 1
Lecture 68 - Design of sensor layout for SHM - Part 2

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Lecture 69 - SHM applied to BSLRP - Part 1
Lecture 70 - SHM applied to BSLRP - Part 2
Lecture 71 - SHM design for BSLRP - Part 1
Lecture 72 - SHM design for BSLRP - Part 2
Lecture 73 - SHM design-2 for BSLRP - Part 1
Lecture 74 - SHM design-2 for BSLRP - Part 2
Lecture 75 - SHM design by experimental investigations for lab scale model of TLP-I - Part 1
Lecture 76 - SHM design by experimental investigations for lab scale model of TLP-I - Part 2
Lecture 77 - SHM design by experimental investigations for lab scale model of TLP-II - Part 1
Lecture 78 - SHM design by experimental investigations for lab scale model of TLP-II - Part 2
Lecture 79 - Structural Health Monitoring (SHM) of lab scale model of TLP-III - Part 1
Lecture 80 - Structural Health Monitoring (SHM) of lab scale model of TLP-III - Part 2
Lecture 81 - Structural Health Monitoring (SHM) of lab scale model of TLP-IV - Part 1
Lecture 82 - Structural Health Monitoring (SHM) of lab scale model of TLP-IV - Part 2
Lecture 83 - Future Scope of SHM - Part 1
Lecture 84 - Future Scope of SHM - Part 2

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NPTEL Video Course - Ocean Engineering - NOC:Advanced Design of Steel Structures

Subject Co-ordinator - Prof. Srinivasan Chandrasekaran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Form-dominant design - I
Lecture 2 - Form-dominant design - II
Lecture 3 - Failure theories - 1
Lecture 4 - Failure theories - 2
Lecture 5 - Failure theories - 3
Lecture 6 - Material properties - 1
Lecture 7 - Material properties - 2
Lecture 8 - Material properties - 3
Lecture 9 - FGM
Lecture 10 - FGM for marine application - 1
Lecture 11 - FGM for marine application - 2
Lecture 12 - Design methods - 1
Lecture 13 - Design methods - 2
Lecture 14 - Load combinations
Lecture 15 - Dynamic material strength
Lecture 16 - Material properties variations
Lecture 17 - Plastic design - 1
Lecture 18 - Plastic design - 2
Lecture 19 - Plastic design - 3
Lecture 20 - Shape factor examples
Lecture 21 - Plastic analysis - 1
Lecture 22 - Plastic analysis - 2
Lecture 23 - Plastic design - 1
Lecture 24 - Plastic design - 2
Lecture 25 - Plastic design - 2
Lecture 26 - Structural Stability
Lecture 27 - EulerÃ¢â ¬â ¢s load
Lecture 28 - Rotation coefficients for stability functions
Lecture 29 - Stability functions - 1

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Lecture 30 - Stability functions - 2
Lecture 31 - Stability functions - 3
Lecture 32 - Buckling and stability
Lecture 33 - Critical buckling load- Numerical examples
Lecture 34 - Stability problems- numerical examples
Lecture 35 - Stability of shells
Lecture 36 - Unsymmetric bending - 1
Lecture 37 - Unsymmetric bending - example problems
Lecture 38 - Shear center - 1
Lecture 39 - Shear center - 2
Lecture 40 - Shear center - 3
Lecture 41 - Curved section
Lecture 42 - Shear center for curved sections
Lecture 43 - Shear center for unsymmetric section
Lecture 44 - Curved beam - 1
Lecture 45 - Curved beam with large curvature - 1
Lecture 46 - Curved beam with large curvature - 2
Lecture 47 - Modified area factor for curved section
Lecture 48 - M factor for curved beams
Lecture 49 - Crane hook
Lecture 50 - Thin-walled section
Lecture 51 - Open thin-walled section
Lecture 52 - Lateral torsional buckling
Lecture 53 - Design for LTB-1
Lecture 54 - Design check for LTB-2
Lecture 55 - LTB example problem
Lecture 56 - Ice loads
Lecture 57 - Ice spectrum
Lecture 58 - Blast resistant design - 1
Lecture 59 - Blast resistant design - 2
Lecture 60 - Blast-resistant design - 3
Lecture 61 - Blast-resistant design - 4
Lecture 62 - Fire-resistant design - 1
Lecture 63 - Fire-resistant design - 2
Lecture 64 - Analysis under impact loads

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NPTEL Video Course - Ocean Engineering - Marine Instrumentation - Laboratory

Subject Co-ordinator - Prof. Tharun

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Oscilloscope, Function Generator and Tilt meter
Lecture 2 - Strain Gauges and Load Cells
Lecture 3 - Wheatstone Bridge Circuit and RC Circuits on a Breadboard Design and Testing of Wheat - 1
Lecture 4 - Wheatstone Bridge Circuit and RC Circuits on a Breadboard Passive Low Pass RC Filter - 2
Lecture 5 - Wheatstone Bridge Circuit and RC Circuits on a Breadboard Rc High Pass Filter Lab - 3
Lecture 6 - Opamps, Differentiator and Integrator Circuits Design and Testing Integrator and Differ - 1
Lecture 7 - Opamps, Differentiator and Integrator Circuits Design and Testing Integrated and Differ - 2

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NPTEL Video Course - Ocean Engineering - NOC:Surface Facilities for Oil and Gas Handling

Subject Co-ordinator - Prof. Abdus Samad

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Oil and Gas - 1
Lecture 2 - Introduction to Oil and Gas - 2
Lecture 3 - Drilling and Completion - 1
Lecture 4 - Drilling and Completion - 2
Lecture 5 - Well Completion
Lecture 6 - Basics of Surface Facilities
Lecture 7 - Fluid Properties
Lecture 8 - Introduction to Separators - 1
Lecture 9 - Introduction to Sepratаors - 2
Lecture 10 - Flow Control - 1
Lecture 11 - Flow Control - 2
Lecture 12 - Principle of Separation - 1
Lecture 13 - Principle of Separation - 2
Lecture 14 - Heat calculations for separation
Lecture 15 - Fluid Properties and Two-Phase Separator - 1
Lecture 16 - Fluid Properties and Two-Phase Separator - 2
Lecture 17 - Introduction to Separators
Lecture 18 - Horizontal Separator and Sizing - 1
Lecture 19 - Horizontal Separator and Sizing - 2
Lecture 20 - Horizontal Separator and Sizing: Numerical
Lecture 21 - Three Phase Separation - 1
Lecture 22 - Three Phase Separation - 2
Lecture 23 - Vertical Separator Sizing - 1
Lecture 24 - Vertical Separator Sizing - 2
Lecture 25 - Horizontal and Vertical Separator: Numerical
Lecture 26 - Heater Treater - 1
Lecture 27 - Heater Treater - 2
Lecture 28 - Gunbarrel
Lecture 29 - Gunbarrel: Numericals

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Lecture 30 - Heat Calculation - 1
Lecture 31 - Heat Calculation - 2
Lecture 32 - Introduction to Electrostatic Treater - 1
Lecture 33 - Introduction to Electrostatic Treater - 2
Lecture 34 - Heater Treater and Gunbarrel - 1
Lecture 35 - Heater Treater and Gunbarrel - 2
Lecture 36 - Heater Treater and Gunbarrel: Numerical - Part 1
Lecture 37 - Heater Treater and Gunbarrel: Numerical - Part 2
Lecture 38 - Desalting of Crude Oil - 1
Lecture 39 - Desalting of Crude Oil - 2
Lecture 40 - Water Treatment - 1
Lecture 41 - Water Treatment - 2
Lecture 42 - Produced Water Treatment - 1
Lecture 43 - Produced Water Treatment - 2
Lecture 44 - Produced Water Treatment - 3
Lecture 45 - Produced Water Treament: Numerical
Lecture 46 - Natural Gas Processing - 1
Lecture 47 - Natural Gas Processing - 2
Lecture 48 - Acid Gas Treating
Lecture 49 - Amine System for Gas Sweetening - 1
Lecture 50 - Amine System for Gas Sweetening - 2
Lecture 51 - Gas Dehydration
Lecture 52 - Crude Oil Storage Facilities - 1
Lecture 53 - Crude Oil Storage Facilities - 2
Lecture 54 - Crude Oil Storage Facilities - 3
Lecture 55 - Flow Measurement Techniques - 1
Lecture 56 - Flow Measurement Techniques - 2
Lecture 57 - Heat Transfer Mechanisms
Lecture 58 - Thermodynamic Laws
Lecture 59 - Introduction to Heat Exchanger - 1
Lecture 60 - Introduction to Heat Exchanger - 2
Lecture 61 - Introduction to Heat Exchanger - 3
Lecture 62 - Introduction to Heat Exchanger - 4
Lecture 63 - Pressure Vessel - 1
Lecture 64 - Pressure Vessel - 2
Lecture 65 - Pressure Vessel - 3
Lecture 66 - Wall Thickness Criteria
Lecture 67 - Introduction to Pumps - 1
Lecture 68 - Introduction to Pumps - 2

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Lecture 69 - Introduction to Pumps - 3
Lecture 70 - Introduction to Reciprocating Pumps
Lecture 71 - Introduction to Compressor
Lecture 72 - Introduction to IC/CI Engine - 1
Lecture 73 - Introduction to IC/CI Engine - 2

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NPTEL Video Course - Ocean Engineering - NOC:Marine Engineering

Subject Co-ordinator - Prof. Abdus Samad

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Basics of Thermodynamics
Lecture 3 - Work and Heat transfer
Lecture 4 - Second law of thermodynamics
Lecture 5 - Reversible Heat Engine
Lecture 6 - Basic mode of heat transfer
Lecture 7 - Conduction
Lecture 8 - Convection
Lecture 9 - Radiation
Lecture 10 - Concept of Resistance
Lecture 11 - Heat flow through pipes and walls
Lecture 12 - Heat Exchangers
Lecture 13 - Fins
Lecture 14 - LMTD
Lecture 15 - Pumps and its types
Lecture 16 - Centrifugal pump
Lecture 17 - Characteristic curves of pumps
Lecture 18 - Cavitation
Lecture 19 - Positive displacement pump
Lecture 20 - Pumps in series/parallel
Lecture 21 - Compressors
Lecture 22 - Intercooler
Lecture 23 - Rankine cycle
Lecture 24 - Injectors and Pumps
Lecture 25 - Numerical problem
Lecture 26 - Boilers
Lecture 27 - Fouling and Scaling
Lecture 28 - Fuel and method of firing
Lecture 29 - Boiler efficiency

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Lecture 30 - Turbine Basics
Lecture 31 - Turbine aerodynamics
Lecture 32 - Cascade view and Meridional view
Lecture 33 - Impulse and Reaction Turbine
Lecture 34 - Steam Turbine
Lecture 35 - Regenerative thermal power plant
Lecture 36 - Mollier diagram
Lecture 37 - IC Engines
Lecture 38 - Otto/Diesel Cycle
Lecture 39 - Components of IC engines - Part 1
Lecture 40 - Components of IC engines - Part 2
Lecture 41 - Fuel Injection/Scavenging
Lecture 42 - IC engine: Numerical problems
Lecture 43 - IC Engine - Fuel
Lecture 44 - Marine Fuel and Properties
Lecture 45 - Combustion
Lecture 46 - Fuel Oil properties
Lecture 47 - Lubrication/Cooling
Lecture 48 - IC engine-Numerical Problems
Lecture 49 - Gas turbine - Basics
Lecture 50 - Gas turbine - Basics (Continued...)
Lecture 51 - Gas turbine, formula, calculations
Lecture 52 - Gas turbine: Regeneration, Reheat, Intercooling
Lecture 53 - Numerical Problems
Lecture 54 - Binary cycle/Rankine-Brayton cycle
Lecture 55 - Numerical problems
Lecture 56 - HVAC- Heating, ventilation, and air conditioning
Lecture 57 - Refrigerants
Lecture 58 - Vapor compression Reffrigeration system
Lecture 59 - HVAC - VCRC components
Lecture 60 - HVAC - Psychrometric
Lecture 61 - HVAC - Numerical problems
Lecture 62 - Fire Fighting Machinery
Lecture 63 - Desalination
Lecture 64 - Energy recovery device (ERD)
Lecture 65 - Desalination/Fire fighting/Numerical problems
Lecture 66 - Numerical problems
Lecture 67 - Steering gear/propeller/rudder/incin
Lecture 68 - Power transmission system, shafting, bearing, gear, lubrication, Electric propulsion

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Lecture 69 - Stern Tube Bearings and Misalignment
Lecture 70 - Shaft
Lecture 71 - Shaft Design
Lecture 72 - Gears
Lecture 73 - Seals and Bearings
Lecture 74 - Oil water separation, electrical systems
Lecture 75 - Bilge water flocculant
Lecture 76 - Gravity OWS
Lecture 77 - Centrifuge
Lecture 78 - Membrane Technologies
Lecture 79 - Electrical systems
Lecture 80 - Motor

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NPTEL Video Course - Ocean Engineering - FEM Applied to Ocean Engineering

Subject Co-ordinator - Prof. S. A. Sannasiraj

Co-ordinating Institute - IIT Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the basic concept of Finite Element Metric and application
Lecture 2 - Formulation of FEM model and approaches to FEM
Lecture 3 - Rayleigh Ritz method and Galerkin method
Lecture 4 - Relation between force and displacement
Lecture 5 - Beam element and plane stress element
Lecture 6 - Plane strain element and Rayleigh Ritz method
Lecture 7 - Galerkin method and formulation of displacement function
Lecture 8 - Formulation of shape function-Shape function approach-Lagragian formulation-Hermilian formulatior
Lecture 9 - Natural coordinate system
Lecture 10 - Stiffness matrix for quadratic element
Lecture 11 - Guassian Quadrature rule (Continued...)
Lecture 12 - FEM solution for beam
Lecture 13 - Two dimensional problem
Lecture 14 - Isoparametric element problem (Continued...)
Lecture 15 - Variational formulation: Beam buckling
Lecture 16 - Problems
Lecture 17 - Problem - Formulation of shape function
Lecture 18 - FEM system of equations and stiffness matrix
Lecture 19 - Solving a truss using FEM
Lecture 20 - Partial differential equation; Classification of physical problems
Lecture 21 - IVP, BVP, Variational principle
Lecture 22 - Fluid flow problem
Lecture 23 - Steady state flow around a circular cylinder (Full Solution)
Lecture 24 - Steady state flow around a circular cylinder (full solution) (Continued...)
Lecture 25 - Wave Diffraction : Wave interaction with the vertical wall
Lecture 26 - FEM Analysis by software Application
Lecture 27 - Analysis of Jacket using SACS
Lecture 28 - Diffraction-radiation problem
Lecture 29 - Solution of heave added mass

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Lecture 30 - Solution of heave added mass (Continued...)
Lecture 31 - Oblique long wave interaction
Lecture 32 - Wave propagation in shallow water
Lecture 33 - Combined refraction-diffraction
Lecture 34 - Solution of mild slope equation using FEM
Lecture 35 - Sloshing, fluid Structure Interaction
Lecture 36 - Sloshing, fluid structure interaction (Continued...)
Lecture 37 - Non-linear free surface wave interaction with a body
Lecture 38 - Non-linear sloshing and unstructured mesh
Lecture 39 - Non-linear wave simulation in 3D tank

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NPTEL Video Course - Physics - Electromagnetic Theory (Prof. D.K. Ghosh)

Subject Co-ordinator - Prof. D.K. Ghosh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Scalar field and its Gradient
Lecture 2 - Line and Surface Integrals
Lecture 3 - Divergence and Curl of Vector Fields
Lecture 4 - Conservative Field, Stoke's Theorem
Lecture 5 - Laplacian
Lecture 6 - Electric Field Potential
Lecture 7 - Gauss's Law, Potential
Lecture 8 - Electric Field and Potential
Lecture 9 - Potential and Potential Energy - I
Lecture 10 - Potential and Potential Energy - II
Lecture 11 - Potential and Potential Energy - III
Lecture 12 - Coefficients of Potential and Capacitance
Lecture 13 - Poission and Laplace Equation
Lecture 14 - Solutions of Laplace Equation - I
Lecture 15 - Solutions of Laplace Equation - II
Lecture 16 - Solutions of Laplace Equation - III
Lecture 17 - Special Techniques - I
Lecture 18 - Special Techniques - II
Lecture 19 - Special Techniques - III
Lecture 20 - Dielectrics - I
Lecture 21 - Dielectrics - II
Lecture 22 - Dielectrics - III
Lecture 23 - Equation of Continuity
Lecture 24 - a) Force between current loops b) Magnetic Vector Potential
Lecture 25 - Magnetic Vector Potential
Lecture 26 - Boundary Conditions
Lecture 27 - Magnetized Material
Lecture 28 - Magentostatics (Continued...), Time Varying Field (Introduction)
Lecture 29 - Faraday's Law and Inductance

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Lecture 30 - Maxwell's Equations
Lecture 31 - Maxwell's Equations and Conservation Laws
Lecture 32 - Conservation Laws
Lecture 33 - a) Angular Momentum Conservation b) Electromagnetic Waves
Lecture 34 - Electromagnetic Waves
Lecture 35 - Propagation of Electromagnetic Waves in a metal
Lecture 36 - Waveguides - I
Lecture 37 - Waveguides - II
Lecture 38 - Resonating Cavity
Lecture 39 - Radiation - I
Lecture 40 - Radiation - II

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NPTEL Video Course - Physics - Special Theory of Relativity

Subject Co-ordinator - Prof. Shiva Prasad

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Problem with Classical Physics
Lecture 2 - Michelson-Morley Experiment
Lecture 3 - Postulates of Special Theory of Relativity and Galilean Transformation
Lecture 4 - Look out for a New Transformation
Lecture 5 - Lorentz Transformation
Lecture 6 - Length Contraction and Time Dilation
Lecture 7 - Examples of Length Contraction and Time Dilation
Lecture 8 - Velocity Transformation and Examples
Lecture 9 - A Three Event Problem
Lecture 10 - A Problem involving Light and Concept of Casuality
Lecture 11 - Problems involving Casuality and Need to Redefine Momentum
Lecture 12 - Minikowski Space and Four Vectors
Lecture 13 - Proper Time a Four Scalar
Lecture 14 - Velocity Four Vector
Lecture 15 - Momentum Energy Four Vector
Lecture 16 - Relook at Collision Problems
Lecture 17 - Zero Rest Mass Particle and Photon
Lecture 18 - Doppler Effect in Light
Lecture 19 - Example in C-Frame
Lecture 20 - Force in Relativity
Lecture 21 - Force Four-Vector
Lecture 22 - Electric & Magnetic Field Transformation
Lecture 23 - Example of EM Field Transformation
Lecture 24 - Current Density Four Vector and Maxwell Equation

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NPTEL Video Course - Physics - NOC:Quantum Information and Computing

Subject Co-ordinator - Prof.Dipan Ghosh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why Quantum Computing?
Lecture 2 - Postulates of Quantum Mechanics - I
Lecture 3 - Postulates of Quantum Mechanics - II
Lecture 4 - Qubit - The smallest unit
Lecture 5 - Qubit - Bloch sphere representation
Lecture 6 - Multiple Qubit States and Quantum Gates
Lecture 7 - Quantum Gates
Lecture 8 - Quantum Circuts
Lecture 9 - No-Cloning Theorem and Quantum Teleportation
Lecture 10 - Super Dense Coding
Lecture 11 - Density Matrix - I
Lecture 12 - Density Matrix - II
Lecture 13 - Bloch Sphere and Density Matrix
Lecture 14 - Measurement Postulates - I
Lecture 15 - Measurement Postulates - II
Lecture 16 - Simple Algorithms-Deutsch Algorithm
Lecture 17 - Deutsch-Josza and Bernstein - Vazirani Algorithms
Lecture 18 - Simon Problem
Lecture 19 - Grover's Search Algorithm - I
Lecture 20 - Grover's Search Algorithm - II
Lecture 21 - Grover's Search Algorithm - III
Lecture 22 - Grover's Search Algorithm - IV
Lecture 23 - Quantum Fourier Transform
Lecture 24 - Period Finding and QFT
Lecture 25 - Implementing QFT
Lecture 26 - Implementing QFT-3 qubits (and more)
Lecture 27 - Shor's Factorization Algorithm
Lecture 28 - Shor's Factorization Algorithm-Implementation
Lecture 29 - Shor's Algorithm-Continued Fraction

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Lecture 30 - Quantum Error Correction - I
Lecture 31 - Quantum Error Correction - II Three Qubit Code
Lecture 32 - Quantum Error Correction - III Shor's 9 Qubit Code - I
Lecture 33 - Quantum Error Correction - IV Shor's 9 Qubit Code - II
Lecture 34 - Classical Information Theory
Lecture 35 - Shannon Entropy
Lecture 36 - Shannon's Noiseless Coding Theorem
Lecture 37 - Ven Neumann Entropy
Lecture 38 - EPR and Bell's Inequalities - I
Lecture 39 - EPR and Bell's Inequalities - II
Lecture 40 - EPR and Bell's Inequalities - III
Lecture 41 - Cryptography-RSA Algorithm - I
Lecture 42 - Cryptography-RSA Algorithm - II
Lecture 43 - Quantum Cryptography - I
Lecture 44 - Quantum Cryptography - II
Lecture 45 - Experimental Aspects of Quantum Computing - I
Lecture 46 - Experimental Aspects of Quantum Computing - II

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NPTEL Video Course - Physics - NOC:Theory of Groups for Physics Applications

Subject Co-ordinator - Prof. Urjit A. Yajnik

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Algebraic Preliminaries
Lecture 3 - Basic Group Concepts and Low Order Groups - I
Lecture 4 - Basic Group Concepts and Low Order Groups - II
Lecture 5 - Lagrange's Theorem and Cayley's Theorem - I
Lecture 6 - Lagrange's Theorem and Cayley's Theorem - II
Lecture 7 - Factor Group Conjugacy Classes - I
Lecture 8 - Factor Group Conjugacy Classes - II
Lecture 9 - Cycle Structures and Molecular Notation - I
Lecture 10 - Cycle Structures and Molecular Notation - II
Lecture 11 - Cycle Structures and Classification - I
Lecture 12 - Cycle Structures and Classification - II
Lecture 13 - Point Group Notation and Factor Group - I
Lecture 14 - Point Group Notation and Factor Group - II
Lecture 15 - Representation Theory - I
Lecture 16 - Representation Theory - II
Lecture 17 - Representation Theory - III
Lecture 18 - Representation Theory - IV
Lecture 19 - Schur's Lemma and Orthogonality Theorem - I
Lecture 20 - Schur's Lemma and Orthogonality Theorem - II
Lecture 21 - Orthogonality For Characters - I
Lecture 22 - Orthogonality For Characters - II
Lecture 23 - Character Tables and Molecular Applications - I
Lecture 24 - Character Tables and Molecular Applications - II
Lecture 25 - Preliminaries About The Continuum - I
Lecture 26 - Preliminaries About The Continuum - II
Lecture 27 - Classical Groups - I
Lecture 28 - Classical Groups - II
Lecture 29 - Classical Groups-Topology - I

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Lecture 30 - Classical Groups-Topology - II
Lecture 31 - SO(3) And Matrix Exponent - I
Lecture 32 - SO(3) And Matrix Exponent - II
Lecture 33 - Generators, Discussion Of Lie's Theorems - I
Lecture 34 - Generators, Discussion Of Lie's Theorems - II
Lecture 35 - Group Algebras; SO(3)-SU(2) Correspondence - I
Lecture 36 - Group Algebras; SO(3)-SU(2) Correspondence - II
Lecture 37 - SO(3), SU(2) Representations - I
Lecture 38 - SO(3), SU(2) Representations - II
Lecture 39 - Representation On Function Spaces - I
Lecture 40 - Representation On Function Spaces - II
Lecture 41 - Lorentz Boosts, SO(3,1) Algebra - I
Lecture 42 - Lorentz Boosts, SO(3,1) Algebra - II
Lecture 43 - Representation Of Lorentz Group And Clifford Algebra - I
Lecture 44 - Representation Of Lorentz Group And Clifford Algebra - II
Lecture 45 - SU(3) And Lie's Classification - I
Lecture 46 - SU(3) And Lie's Classification - II
Lecture 47 - Fundamental Symmetries Of Physics - I
Lecture 48 - Fundamental Symmetries Of Physics - II

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NPTEL Video Course - Physics - NOC:Quantum Mechanics-I

Subject Co-ordinator - Prof. Ramadevi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Quantum Mechanics - I
Lecture 2 - Introduction to Quantum Mechanics - II
Lecture 3 - Review of Particle in Box, Potential Well, Barrier, Harmonic Oscillator - I
Lecture 4 - Review of Particle in Box, Potential Well, Barrier, Harmonic Oscillator - II
Lecture 5 - Tutorial 1 - Part I
Lecture 6 - Tutorial 1 - Part II
Lecture 7 - Bound States - I
Lecture 8 - Bound States - II
Lecture 9 - Conditions and Solutions for one Dimensional Bound States - I
Lecture 10 - Conditions and Solutions for one Dimensional Bound States - II
Lecture 11 - Tutorial 2
Lecture 12 - Linear Vector Space (LVS) - I
Lecture 13 - Linear Vector Space (LVS) - II
Lecture 14 - Linear Vector Space (LVS) - III
Lecture 15 - Basis for Operators and States in LVS - I
Lecture 16 - Basis for Operators and States in LVS - II
Lecture 17 - Tutorial 3 - Part I
Lecture 18 - Tutorial 3 - Part II
Lecture 19 - Function Spaces - I
Lecture 20 - Function Spaces - II
Lecture 21 - Postulates of Quantum Mechanics - I
Lecture 22 - Postulates of Quantum Mechanics - II
Lecture 23 - Tutorial 4 - Part I
Lecture 24 - Tutorial 4 - Part II
Lecture 25 - Classical vs Quantum Mechanics - I
Lecture 26 - Classical vs Quantum Mechanics - II
Lecture 27 - Compatible vs Incompatible Observable - I
Lecture 28 - Compatible vs Incompatible Observable - II
Lecture 29 - Tutorial 5 - Part I

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Lecture 30 - Tutorial 5 - Part II
Lecture 31 - Tutorial 5 - Part III
Lecture 32 - Schrodinger and Heisenberg Pictures - I
Lecture 33 - Schrodinger and Heisenberg Pictures - II
Lecture 34 - Solutions to other Coupled Potential Energies - I
Lecture 35 - Solutions to other Coupled Potential Energies - II
Lecture 36 - Tutorial 6 - Part I
Lecture 37 - Tutorial 6 - Part II
Lecture 38 - Hydrogen Atom and Wave Functions, Angular Momentum Operators, Identical Particles - I
Lecture 39 - Hydrogen Atom and Wave Functions, Angular Momentum Operators, Identical Particles - II
Lecture 40 - Identical Particles and Quantum Computer - I
Lecture 41 - Identical Particles and Quantum Computer - II
Lecture 42 - Tutorial 7 - Part I
Lecture 43 - Tutorial 7 - Part II
Lecture 44 - Harmonic Oscillator - I
Lecture 45 - Harmonic Oscillator - II
Lecture 46 - Ladder Operators - I
Lecture 47 - Ladder Operators - II
Lecture 48 - Tutorial 8 - Part I
Lecture 49 - Tutorial 8 - Part II
Lecture 50 - Stern-Gerlach Experiment - I
Lecture 51 - Stern-Gerlach Experiment - II
Lecture 52 - Oscillator Algebra
Lecture 53 - Tutorial 9 - Part I
Lecture 54 - Tutorial 9 - Part II
Lecture 55 - Angular Momentum - I
Lecture 56 - Angular Momentum - II
Lecture 57 - Rotations Groups - I
Lecture 58 - Rotations Groups - II
Lecture 59 - Tutorial 10 - Part I
Lecture 60 - Tutorial 10 - Part II
Lecture 61 - Addition of Angular Momentum - I
Lecture 62 - Addition of Angular Momentum - II
Lecture 63 - Clebsch-Gordan Coe cients - I
Lecture 64 - Clebsch-Gordan Coe cients - II
Lecture 65 - Tutorial 11 - Part I
Lecture 66 - Tutorial 11 - Part II
Lecture 67 - Clebsch-Gordan Coe cients - III
Lecture 68 - Tensor Operators and Wigner-Eckart Theorem - I

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Lecture 69 - Tensor Operators and Wigner-Eckart Theorem - II
Lecture 70 - Tensor Operators and Wigner-Eckart Theorem - III
Lecture 71 - Tutorial 12

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NPTEL Video Course - Physics - NOC:Path Integral and Functional Methods in Quantum Field Theory

Subject Co-ordinator - Prof. Urjit A. Yajnik

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quantum Theory Fundamental Quantisation - I
Lecture 2 - Quantum Theory Fundamental Quantisation - II
Lecture 3 - Path Integral Formulation - I
Lecture 4 - Path Integral Formulation - II
Lecture 5 - Path Integral Formulation - III
Lecture 6 - Path Integral Formulation - IV
Lecture 7 - Correlation Functions - I
Lecture 8 - Correlation Functions - II
Lecture 9 - Generating Functional, Forced Harmonic Oscillator - I
Lecture 10 - Generating Functional, Forced Harmonic Oscillator - II
Lecture 11 - Generating Function in Field Theory - I
Lecture 12 - Generating Function in Field Theory - II
Lecture 13 - Effective Potential - I
Lecture 14 - Effective Potential - II
Lecture 15 - Effective Potential - III
Lecture 16 - Effective Potential - IV
Lecture 17 - Asymptotic Theory - I
Lecture 18 - Asymptotic Theory - II
Lecture 19 - Asymptotic Condition Kallen-Lehmann representation - I
Lecture 20 - Asymptotic Condition Kallen-Lehmann representation - II
Lecture 21 - Gauge Invariance - Minimal Coupling
Lecture 22 - Gauge Invariance - Geometric Picture
Lecture 23 - Gauge Invariance - Abelian Case
Lecture 24 - Gauge Invariance - Non-abelian case
Lecture 25 - Yang Mills Theory - Coupling to Matter
Lecture 26 - Yang Mills Theory - Physical Content
Lecture 27 - Yang Mills Theory Constraint Dynamics - I
Lecture 28 - Yang Mills Theory Constraint Dynamics - II
Lecture 29 - Gauge Fixing and Faddeev Popov Ghosts - I

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Lecture 30 - Gauge Fixing and Faddeev Popov Ghosts - II
Lecture 31 - Topological Vacuum of Yang Mills Theories - I
Lecture 32 - Topological Vacuum of Yang Mills Theories - II

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NPTEL Video Course - Physics - NOC:Physics of Biological Systems

Subject Co-ordinator - Prof. Mithun Mitra

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - DNA packing and structure
Lecture 3 - Shape and function
Lecture 4 - Numbers and sizes
Lecture 5 - Spatial scales and System variation
Lecture 6 - Timescales in Biology
Lecture 7 - Random walks and Passive diffusion
Lecture 8 - Random walks to model Biology
Lecture 9 - Derivation of FRAP equations
Lecture 10 - Drift-diffusion equations
Lecture 11 - Solutions of the drift-diffusion equations
Lecture 12 - The cell signaling problem
Lecture 13 - Cell Signalling and Capture Probability of absorbing sphere
Lecture 14 - Capture probability of reflecting sphere
Lecture 15 - Mean capture time
Lecture 16 - Introduction to fluids, viscosity and reynolds number
Lecture 17 - Introduction to the navier stokes equation
Lecture 18 - Understanding reynolds number
Lecture 19 - Life at low reynolds number
Lecture 20 - Various phenomena at low reynolds number
Lecture 21 - Bacterial flagellar motion
Lecture 22 - Rotating flagellum
Lecture 23 - Energy and equilibrium
Lecture 24 - Binding problems
Lecture 25 - Transcription and translation
Lecture 26 - Internal states of macromolecules
Lecture 27 - Protein modification problem
Lecture 28 - Haemoglobin-Oxygen binding problem
Lecture 29 - Freely jointed polymer model

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Lecture 30 - Entropic springs and persistence length
Lecture 31 - Freely rotating chain model and radius of gyration
Lecture 32 - The hierarchical chromatin packing model
Lecture 33 - FISH and DNA looping
Lecture 34 - Nucleosomes as barriers, Hi-C, and contact probabilities
Lecture 35 - Deriving the full force extension curve
Lecture 36 - Random walk models for proteins
Lecture 37 - Hydrophobic polar protein model
Lecture 38 - Diffusion in crowded environments
Lecture 39 - Depletion interactions
Lecture 40 - Examples and implications of depletion interactions
Lecture 41 - Introduction to Biological dynamics
Lecture 42 - Introduction to rate equations
Lecture 43 - Separation of timescales in enzyme kinetics
Lecture 44 - Structure and treadmilling of actins and microtubules
Lecture 45 - Average length of polymers in equilibrium
Lecture 46 - Growth rate of polymers
Lecture 47 - Dynamic treadmilling in microtubules
Lecture 48 - Introduction to molecular motors
Lecture 49 - Force generation by molecular motors
Lecture 50 - Models of motor motion
Lecture 51 - molecular motors
Lecture 52 - Free energies of motor for stepping
Lecture 53 - Two state models
Lecture 54 - cooperative transport of cargo
Lecture 55 - Cytoskeleton as a motor
Lecture 56 - translocation ratchet
Lecture 57 - Spatial pattern in biology
Lecture 58 - Some common spatial patterns in biology
Lecture 59 - reaction diffusion and spatial pattern
Lecture 60 - Pattern formation in reaction diffusion system with stability
Lecture 61 - Condition for destablization in pattern formation
Lecture 62 - Schnakenberg kinetics

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NPTEL Video Course - Physics - NOC:Group Theory Methods in Physics

Subject Co-ordinator - Prof. Ramadevi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - I
Lecture 2 - Introduction - II
Lecture 3 - Normal subgroup, Coset, Conjugate group
Lecture 4 - Factor group, Homomorphism, Isomorphism
Lecture 5 - Factor group, Homomorphism, Isomorphism
Lecture 6 - Conjugacy Classes
Lecture 7 - Permutation Groups
Lecture 8 - Cycle Structure
Lecture 9 - Cycle Structure (Continued...)
Lecture 10 - Young Diagram and Molecular Symmetry
Lecture 11 - Point Groups
Lecture 12 - Symmetries of Molecules, Schoenflies Notation
Lecture 13 - Symmetries of Molecules, Stereographic Projection
Lecture 14 - Examples of Molecular Symmetries and Proof of Cayley Theorem
Lecture 15 - Matrix Representation of Groups - I
Lecture 16 - Matrix Representation of Groups - II
Lecture 17 - Reducible and Irreducible Representation - I
Lecture 18 - Reducible and Irreducible Representation - II
Lecture 19 - Great Orthogonality Theorem and Character Table - I
Lecture 20 - Great Orthogonality Theorem and Character Table - II
Lecture 21 - Mulliken Notation, Character Table and Basis
Lecture 22 - Tensor Product of Representation
Lecture 23 - Tensor Product and Projection Operator - I
Lecture 24 - Tensor Product and Projection Operator - II
Lecture 25 - Tensor Product and Projection Operator with an example
Lecture 26 - Binary Basis and Observables
Lecture 27 - Selection Rules
Lecture 28 - Selection Rules and Molecular Vibrations
Lecture 29 - Molecular vibration normal modes

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Lecture 30 - Molecular vibration normal modes
Lecture 31 - Molecular vibration modes using projection operator
Lecture 32 - Vibrational representation of character
Lecture 33 - Infrared Spectra and Raman Spectra
Lecture 34 - Introduction to continuous group
Lecture 35 - Generators of translational and rotational transformation
Lecture 36 - Generators of Lorentz transformation
Lecture 37 - Introduction to O(3) and SO(3) group
Lecture 38 - SO(n) and Lorentz group
Lecture 39 - Generalised orthogonal group and Lie algebra
Lecture 40 - Subalgebra of Lie algebra
Lecture 41 - gl(2,C) and sl(2,C) group
Lecture 42 - U(n) and SU(n) group
Lecture 43 - Symplectic group
Lecture 44 - SU(2) and SU(3) groups
Lecture 45 - Rank, weight and weight vector
Lecture 46 - Weight vector, root vector, comparison between SU(2) and SU(3) algebra
Lecture 47 - Root diagram, simple roots, adjoint representation
Lecture 48 - SU(2) sub-algebra, Dynkin diagrams
Lecture 49 - Fundamental weights, Young diagrams, dimension of irreducible representation
Lecture 50 - Young diagrams and tensor products
Lecture 51 - Tensor product, Wigner - Eckart theorem
Lecture 52 - Tensor product of irreducible representation 1
Lecture 53 - Tensor product of irreducible representation 2
Lecture 54 - Clebsch - Gordan coefficients
Lecture 55 - 1) Quadrupole moment tensor (Wigner-Eckart theorem) 2) Decimet Baryon wavefunction
Lecture 56 - Higher dimensional multiplets in the quark model
Lecture 57 - Symmetry breaking in continuous groups
Lecture 58 - Dynamical symmetry in hydrogen atom
Lecture 59 - Hydrogen atom energy spectrum and degeneracy using Runge-Lenz vector

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NPTEL Video Course - Physics - NOC:Neutron Scattering for Condensed Matter Studies

Subject Co-ordinator - Prof. Saibal Basu

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Neutrons as Probe of Condensed Matter
Lecture 2 - Sources for thermal neutrons used in neutron scattering
Lecture 3
Lecture 4 - Calculating Neutron Scattering cross-section
Lecture 5
Lecture 6 - Scattering theory and introducing dynamics in the formalism
Lecture 7 - Scattering theory and introducing dynamics in the formalism
Lecture 8 - Scattering theory and introducing dynamics in the formalism
Lecture 9 - Scattering law's correlation with double-Fourier transform of real space correlation function
Lecture 10 - Scattering law's correlation with double-Fourier transform of real space correlation function
Lecture 11 - Correlation function to resolution and accessible(Q,Ã•â °). Introducing experimental facilities
Lecture 12 - Correlation function to resolution and accessible(Q,Ã•â °). Introducing experimental facilities
Lecture 13 - Correlation function to resolution and accessible(Q,Ã•â °). Introducing experimental facilities
Lecture 14 - Correlation function to resolution and accessible(Q,Ã•â °). Introducing experimental facilities
Lecture 15 - Introducing resolution and components of neutron scattering facilities.
Lecture 16 - Introducing resolution and components of neutron scattering facilities.
Lecture 17 - Continue with neutron scattering set up and its components like collimators, filters, detectors
Lecture 18 - Continue with neutron scattering set up and its components like collimators, filters, detectors
Lecture 19 - Describe the operation of various kinds of neutron detectors
Lecture 20 - Describe the operation of various kinds of neutron detectors
Lecture 21 - Introducing neutron choppers, velocity selectors and polarizers, some important components of be
Lecture 22 - Introducing neutron choppers, velocity selectors and polarizers, some important components of be
Lecture 23 - Neutron polarizers and spin-flippers
Lecture 24 - Neutron polarizers and spin-flippers
Lecture 25 - Diffraction at various length scales at a reactor and at a spallation neutron source
Lecture 26 - Diffraction at various length scales at a reactor and at a spallation neutron source
Lecture 27 - Application of neutron crystallography
Lecture 28 - Application of neutron crystallography
Lecture 29 - Magnetism in solids

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Lecture 30 - Magnetism in solids
Lecture 31 - Magnetic interaction in solids and magnetic neutron diffarction
Lecture 32 - Magnetic interaction in solids and magnetic neutron diffarction
Lecture 33 - Magnetic interaction in solids and magnetic neutron diffarction
Lecture 34 - Magnetic neutron diffraction
Lecture 35 - Magnetic neutron diffraction
Lecture 36 - Neutron diffraction from liquid and amorphous systems
Lecture 37 - Neutron diffraction from liquid and amorphous systems
Lecture 38 - Small Angle Neutron Scattering (SANS) for mesoscopic structure
Lecture 39 - Small Angle Neutron Scattering (SANS) for mesoscopic structure
Lecture 40 - Small Angle Neutron Scattering (SANS) for mesoscopic structure
Lecture 41 - Small Angle Neutron Scattering (SANS) for mesoscopic structure
Lecture 42 - SANS for soft condensed matter
Lecture 43 - SANS for soft condensed matter
Lecture 44 - SANS for polymers, biological systems, nanoparticle aggregates, rocks, Superconducting vortex la
Lecture 45 - SANS for polymers, biological systems, nanoparticle aggregates, rocks, Superconducting vortex la
Lecture 46 - Neutron reflectometry for thin films
Lecture 47 - Neutron reflectometry for thin films
Lecture 48 - Neutron reflectometry for thin films
Lecture 49 - Details formalism to evaluate specular neutron reflectivity and comparison with x-ray reflectome
Lecture 50 - Details formalism to evaluate specular neutron reflectivity and comparison with x-ray reflectome
Lecture 51 - Neutron reflectometry data analysis and reflectometers at various sources
Lecture 52 - Neutron reflectometry data analysis and reflectometers at various sources
Lecture 53 - Neutron reflectometry data analysis and reflectometers at various sources
Lecture 54 - Examples of PNR with and without spin analysis and introduction to off-specular reflectometry
Lecture 55 - Examples of PNR with and without spin analysis and introduction to off-specular reflectometry
Lecture 56 - Examples of PNR with and without spin analysis and introduction to off-specular reflectometry
Lecture 57 - Off-specular neutron reflectometry and introduction to inelastic neutron scattering
Lecture 58 - Off-specular neutron reflectometry and introduction to inelastic neutron scattering
Lecture 59 - Off-specular neutron reflectometry and introduction to inelastic neutron scattering
Lecture 60 - Phonon measurements with neutrons
Lecture 61 - Phonon measurements with neutrons
Lecture 62 - Phonon measurements; single crystals
Lecture 63
Lecture 64 - Phonon: Density of States measurements
Lecture 65 - Stochastic dynamics with neutrons
Lecture 66 - Stochastic motion and various types of diffusion
Lecture 67 - Stochastic motion and various types of diffusion
Lecture 68 - Spin echo spectrometer, Summary of the course

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Lecture 69 - Spin echo spectrometer, Summary of the course

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NPTEL Video Course - Physics - NOC:Accelerator Physics

Subject Co-ordinator - Prof. Rajni Pande, Prof. Amalendu Sharma, Prof. Pitamber Singh

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why accelerators
Lecture 2 - Accelerator as a microscope
Lecture 3 - Charging and Discharging of capacitors
Lecture 4 - Charging and Discharging of capacitors (Continued...)
Lecture 5 - Introduction to DC accelerators
Lecture 6 - Cockcroft Walton Accelerator (1929)
Lecture 7 - Van-de-Graaff accelerator and Tandem and Pelletron accelerators
Lecture 8 - Van-de-Graaff accelerator and Tandem and Pelletron accelerators
Lecture 9 - Voltage measurement and stabilisation
Lecture 10 - Voltage measurement and stabilisation
Lecture 11 - Beam energy calibration/measurement
Lecture 12 - Beam energy calibration/measurement
Lecture 13 - Beam focussing using electrostatic and magnetic lenses and beam optics
Lecture 14 - Beam focussing using electrostatic and magnetic lenses and beam optics
Lecture 15 - Beam focussing using electrostatic and magnetic lenses and beam optics
Lecture 16 - Ion Sources
Lecture 17 - Ion Sources
Lecture 18 - Introduction and Basic concepts of linear accelerators
Lecture 19 - Introduction and Basic concepts of linear accelerators
Lecture 20 - RF Acceleration - 1
Lecture 21 - RF Acceleration - 1
Lecture 22 - RF Acceleration - 2
Lecture 23 - RF Acceleration - 2
Lecture 24 - RF Acceleration - 3 - Waveguides and cavities
Lecture 25 - RF Acceleration - 3 - Waveguides and cavities
Lecture 26 - Accelerating structures - Pillbox cavity and DTL
Lecture 27 - Accelerating structures - Pillbox cavity and DTL
Lecture 28 - Accelerating structures - Travelling wave linacs and periodic accelerating structures
Lecture 29 - Accelerating structures - Travelling wave linacs and periodic accelerating structures

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Lecture 30 - Superconducting cavities
Lecture 31 - Superconducting cavities
Lecture 32 - Transverse Dynamics - 1
Lecture 33 - Transverse Dynamics - 1
Lecture 34 - Transverse Dynamics - 2
Lecture 35 - Transverse Dynamics - 2
Lecture 36 - Transverse Dynamics - 3
Lecture 37 - Transverse Dynamics - 3
Lecture 38 - Longitudinal Dynamics - 1
Lecture 39 - Longitudinal Dynamics - 1
Lecture 40 - Longitudinal Dynamics - 2
Lecture 41 - Longitudinal Dynamics - 2
Lecture 42 - Radio Frequency Quadrupole
Lecture 43 - Radio Frequency Quadrupole
Lecture 44 - Cyclic accelerators: Some basic principles
Lecture 45 - Cyclic accelerators: Some basic principles
Lecture 46 - About the cyclotron
Lecture 47 - About the cyclotron
Lecture 48 - Microtron
Lecture 49 - Equation of motion, Focusing
Lecture 50 - Equation of motion, Focusing
Lecture 51 - Strong focusing, Edge focusing, AG principle
Lecture 52 - Strong focusing, Edge focusing, AG principle
Lecture 53 - Matrix methods
Lecture 54 - Matrix methods
Lecture 55 - Hill's equation and parameterization - 1
Lecture 56 - Hill's equation and parameterization - 1
Lecture 57 - Hill's equation and parameterization - 2
Lecture 58 - Hill's equation and parameterization - 2
Lecture 59 - Hill's equation and parameterization - 3
Lecture 60 - Hill's equation and parameterization - 3
Lecture 61
Lecture 62
Lecture 63
Lecture 64
Lecture 65
Lecture 66
Lecture 67 - Proton synchrotron for spallation source
Lecture 68 - Proton synchrotron for spallation source

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Lecture 69 - Colliders
Lecture 70 - Colliders
Lecture 71 - Laser Plasma accelerators and Accelerator Driven Systems (ADS)
Lecture 72 - Laser Plasma accelerators and Accelerator Driven Systems (ADS)

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NPTEL Video Course - Physics - NOC:An Introduction to Lasers and Laser Systems

Subject Co-ordinator - Prof. Dhruba J. Biswas, Prof. J. Padma Nilaya

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lasers at a Glance
Lecture 2 - Light Amplifier and the Concept of Cavity
Lecture 3 - Laser: An Integration of a Population Inverted Medium and a Cavity
Lecture 4 - The Invention of Lasers by Maiman
Lecture 5 - Population Inversion vis-Ã -vis Boltzmann Distribution
Lecture 6 - Different Methods of Pumping to Effect Population Inversion
Lecture 7 - Population Inversion vis-Ã -vis No. of Participating Energy Levels in the process of Lasing
Lecture 8 - Behaviour of Light
Lecture 9 - Behaviour of Light (Continued...)
Lecture 10 - Youngs Doble Slit Experiment and Interference of Light
Lecture 11 - Interference of Light and Fabrication of Laser Windows and Mirrors
Lecture 12 - Fabrication of Laser Windows and Mirrors (Continued...)
Lecture 13 - Diffraction of Light
Lecture 14 - Scattering of Light
Lecture 15 - Light Scattering (Continued...) and Polarisation of Light
Lecture 16 - Polarisation of Light (Continued...) and Brewster Angle of Incidence
Lecture 17 - Continuous and Pulsed Operation of Lasers
Lecture 18 - The Maximum Achievable Power from a Pulsed Laser
Lecture 19 - Continuous and Pulsed Pumping of Lasers
Lecture 20 - Continuous and Pulsed Pumping of Lasers (Continued...)
Lecture 21 - Optical Pumping : Coupling of Pump Laser Beam into the Cavity
Lecture 22 - Electrical Pumping
Lecture 23 - Different Kinds of Lasers
Lecture 24 - Atomic Gas Lasers: He-Ne Laser
Lecture 25 - He-Ne Laser (Continued...)
Lecture 26 - Emission Features of He-Ne Laser
Lecture 27 - Ion Lasers: Argon Ion Laser
Lecture 28 - Argon Ion Lasers: Emission Feature
Lecture 29 - Liquid Lasers: Dye Laser

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Lecture 30 - Dye Lasers: Working Principle and Emission Features
Lecture 31 - Solid State Lasers: Nd-YAG Laser
Lecture 32 - Pumping of Nd-YAG Lasers
Lecture 33 - Diode Pumped Solid State Lasers and Continuously Tunable Solid State Lasers
Lecture 34 - Excimer Lasers: Importance
Lecture 35 - Excimer Lasers: Working Principle, Rare Gas Halide Lasers
Lecture 36 - Introduction to CO2 lasers and molecular spectroscopy
Lecture 37 - Molecular Spectroscopy: Ro-vibrational Transitions
Lecture 38 - Modes of molecular vibration, Vibrational modes and 4 level lasing scheme in a CO2 laser
Lecture 39 - Mechanism of lasing in a CO2 laser
Lecture 40 - Low pressure, CW Operation of a CO2 laser
Lecture 41 - Limitations of CW-CO2 Lasers and remedy
Lecture 42 - Pulsed Operation of CO2 Lasers; TEA CO2 Lasers and their Temporal Emission Profile
Lecture 43 - TEA CO2 Lasers: Operation, Gain Broadening and Emission Features
Lecture 44 - Gain Broadening and Emission Features (Continued...)
Lecture 45 - Discrete and Continuously Tunable Operation of a CO2 laser
Lecture 46 - Chemical Lasers: Underlying Physics
Lecture 47 - Principle of Operation of HF, DF Chemical Oxygen Iodine Lasers
Lecture 48 - Gas Dynamic Lasers: Principle of Operation
Lecture 49 - Operation of Gas Dynamic CO2 Lasers
Lecture 50 - Fiber Lasers: Its Advantages over Conventional Solid State Lasers
Lecture 51 - Fiber Laser (Continued...)
Lecture 52 - The Acceptance Angle, Pumping of Fiber Lasers and their Operation
Lecture 53 - Scaling up of Output Power of Fiber Laser and Operation of Fiber Amplifiers
Lecture 54 - Semiconductor Lasers: An Introduction and Basics of Semiconductor Physics
Lecture 55 - Metals, Insulators and Semiconductors, Concept of Holes
Lecture 56 - Concept of Holes (Continued...), Intrinsic and Extrinsic Semiconductors
Lecture 57 - n-type and p-type semiconductors, Semiconductor Diodes, Light Emitting Diodes (LED)
Lecture 58 - Diode Laser from the LED
Lecture 59 - Homojunction and Hetrojunction Diode Lasers
Lecture 60 - Edge Emitting Diode Lasers, Surface Emitting Diode Lasers, Diode Bars and Arrays

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NPTEL Video Course - Physics - NOC:The Science of Light Amplification: An Extensive Laser course

Subject Co-ordinator - Prof. Paramita Deb

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Lasers and the Electromagnetic Spectrum
Lecture 2 - Stimulated Emission and Spontaneous Emission and Properties of Laser
Lecture 3 - Population Inversion in a Laser medium
Lecture 4 - Laser Oscillations and the Optical Resonator
Lecture 5 - Line Broadening Mechanism - 1
Lecture 6 - Line Broadening Mechanism - 2
Lecture 7 - Laser Resonators - 1
Lecture 8 - Laser Resonators - 2
Lecture 9 - Gas laser examples
Lecture 10 - Gas lasers and Solid State Lasers
Lecture 11 - Solid State Lasers
Lecture 12 - Pulsed Lasers and Optical shutters
Lecture 13 - Modes and Mode Locking
Lecture 14 - The technique of Mode Locking
Lecture 15 - Time Bandwidth product and Ultra short pulse
Lecture 16 - Non-linear phenomenon in optics
Lecture 17 - Self-focusing and Self-phase-modulation
Lecture 18 - Second Harmonic Generation (SHG)
Lecture 19 - Phase matching and SHG
Lecture 20 - Anisotropic medium and SHG
Lecture 21 - Birefringent Crystals and Phase Matching
Lecture 22 - Semiconductor Basics
Lecture 23 - Photon Absorption and Emission in Semiconductors
Lecture 24 - p-n Junction and the Semiconductor Laser
Lecture 25 - Types of Semiconductor Laser
Lecture 26 - Nuclear Fusion
Lecture 27 - Inertial Confinement Fusion
Lecture 28 - Master Oscillator and Power Amplifier Chain
Lecture 29 - Amplifier Chain

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Lecture 30 - Chirped Pulse Amplification - 1
Lecture 31 - Chirped Pulse Amplification - 2
Lecture 32 - Ultra-Short-Pulse Oscillator
Lecture 33 - Ultra-Short-Pulse Amplification - 1
Lecture 34 - Ultra-Short-Pulse Amplification - 2
Lecture 35 - Stretching and Compressing a Pulse
Lecture 36 - Stretching and Compressing a Pulse
Lecture 37 - The Auto-Correlation Technique for Temporal Pulse Measurement
Lecture 38 - Frequency Resolved Optical Gating for Temporal Pulse measurement
Lecture 39 - Light Detection And Ranging (LIDAR)
Lecture 40 - Remote Sensing
Lecture 41 - Optical Tweezers
Lecture 42 - Lasers in Spectroscopy
Lecture 43 - Dye Laser
Lecture 44 - Tuning a laser with a grating
Lecture 45 - Details of a grating
Lecture 46 - Multi-Photon Processes
Lecture 47 - Laser Enrichment Method
Lecture 48 - Laser Raman Spectroscopy
Lecture 49 - Polarization Of Electromagnetic Waves
Lecture 50 - Polarizer and Analyzer
Lecture 51 - Interference of Electromagnetic waves - 1
Lecture 52 - Interference Of Electromagnetic waves - 2
Lecture 53 - Interference Patterns - 1
Lecture 54 - Interference Patterns - 2
Lecture 55 - Interference Patterns - 3
Lecture 56 - Fabry - Perot Cavity
Lecture 57 - Holography - 1
Lecture 58 - Holography - 2
Lecture 59 - Holography - 3
Lecture 60 - Holography - 4

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NPTEL Video Course - Physics - NOC:Theory and Applications in Thermal and Cold Plasma

Subject Co-ordinator - Prof. Srikumar Ghorui

Co-ordinating Institute - IIT-Bombay - HBNI

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Fundamentals of Thermal and Cold Plasma
Lecture 3 - Theory and Applications in Thermal and Cold Plasma
Lecture 4 - Theory and Applications in Thermal and Cold Plasma
Lecture 5 - Saha Ionization Equation and That Follows
Lecture 6 - Tutorial-1: Theory and Applications in Thermal and Cold Plasma
Lecture 7 - Plasma Screening
Lecture 8 - Propagation of EM Waves in Plasma
Lecture 9 - Further Details on The Basics of EM Waves in Plasma
Lecture 10 - Collisions in Plasma: Plasma Temperature and Equilibria
Lecture 11 - Tutorial-2: Plasma Physics Fundamentals
Lecture 12 - Large Angle and Small Angle Scattering in Plasma
Lecture 13 - Small Angle Scattering in Plasma
Lecture 14 - Ambipolar Diffusion in Plasma
Lecture 15 - Description of Plasma Kinetics: Orbit Theory, Kinetic Theory and Fluid Model
Lecture 16 - Tutorial-3: Understanding Ionization, Gas Behavior, and Maxwell-Boltzmann Distribution
Lecture 17 - Description of Plasma Kinetics: Orbit Theory
Lecture 18 - Description of Plasma Kinetics: Orbit Theory-Plasma Confinement
Lecture 19 - Description of Plasma Kinetics: Plasma Kinetic Theory
Lecture 20 - Description of Plasma Kinetics: Electrostatic Waves in Plasma
Lecture 21 - Review of Key Concepts: Week 1-3 - Part A
Lecture 22 - Review of Key Concepts: Week 1-3 - Part B
Lecture 23 - Tutorial-4: Gas Ionization and Breakdown Mechanisms
Lecture 24 - Description of Plasma Kinetics: Langmuir Wave
Lecture 25 - Plasma Fluid Model
Lecture 26 - Some More Insights on High Frequency Electrostatic Waves in Plasma
Lecture 27 - Further Insights into Dispersion Relation
Lecture 28 - Tutorial-5: Plasma Kinetics, Thermodynamics and Excitation in Plasma
Lecture 29 - First Order Moment of Plasma Kinetic Equation

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Lecture 30 - Generalized Ohms Law
Lecture 31 - Expression for Generalized Ohms Law and Reduction to Ordinary Ohmâ s Law
Lecture 32 - Energy Conservation Equation
Lecture 33 - Tutorial-6: Plasma Devices, Characteristics and Plasma Parameters
Lecture 34 - Energy Conservation Equation: Solution technique
Lecture 35 - Navier Stokes Equation in Plasma
Lecture 36 - Numerical Solution of Fluid Equations: Thermodynamic and transport properties, an example
Lecture 37 - Finding Solution of Fluid Equations in a Plasma Torch: example of N2-O2 plasma
Lecture 38 - Tutorial-7: Thermodynamic and Transport Properties in Plasma
Lecture 39 - Review of Key Concepts: Week 4-6 - Part A
Lecture 40 - Review of Key Concepts: Week 4-6 - Part B
Lecture 41 - Actual Solutions of Fluid Equations in a Plasma Torch
Lecture 42 - Understanding the Solution of Fluid Equations in a Plasma Torch
Lecture 43 - Understanding the Solution Results and Designing a Plasma Torch
Lecture 44 - Designing Plasma Torches with Desired Electrothermal Efficiency and Jet Characteristics
Lecture 45 - Tutorial-8: RF and Cold Plasma Devices
Lecture 46 - Features of Plasma Jets in Practice
Lecture 47 - Plasma Production
Lecture 48 - Paschen Break Down Criteria
Lecture 49 - AC Breakdown
Lecture 50 - Tutorial-9: Plasma Thermodynamics and Radiation equilibrium
Lecture 51 - Review of Key Concepts: Week 7-9 - Part A
Lecture 52 - Review of Key Concepts: Week 7-9 - Part B
Lecture 53 - Plasma Sources
Lecture 54 - Typical Configuration of Arc Devices and Special Features
Lecture 55 - Plasma Power Supplies: Steady and Unsteady Operating Points, RF Thermal Plasma Sources
Lecture 56 - RF plasma-Thermal Plasma Sources
Lecture 57 - Non-Thermal Plasma Sources: Atmospheric pressure plasma jets (APPJ)
Lecture 58 - Tutorial-10: Advanced Plasma Diagnostics
Lecture 59 - Non-Thermal Plasma Sources: ECR Plasma and Plasma Sheath
Lecture 60 - Plasma Sheath-mathematical modelling
Lecture 61 - Plasma Diagnostics
Lecture 62 - Boltzmann Plot Technique
Lecture 63 - Plasma Diagnosis: Finding number density
Lecture 64 - Tutorial-11: Plasma Technology for Renewable Energy and Environment
Lecture 65 - Plasma Diagnosis: Langmuir Probe Principles
Lecture 66 - Plasma Application
Lecture 67 - Plasma Application: Waste Management Capacity, Efficacy and Empowerment, thermal plasma for mate
Lecture 68 - Atmospheric Pressure Plasma Spray (APS), Plasma Metallurgy and Novel Materials

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Lecture 69 - Plasma Medicine and Plasma in Agriculture
Lecture 70 - Tutorial-12: Plasma Technology for Industrial Applications: Options, Efficacy and Benefits
Lecture 71 - Review of Key Concepts: Week 10-12 - Part A
Lecture 72 - Review of Key Concepts: Week 10-12 - Part B

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NPTEL Video Course - Physics - Electronics

Subject Co-ordinator - Prof. D.C. Dube

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - p-n diode
Lecture 2 - p-n Junction/Diode (Continued...)
Lecture 3 - p-n diode (Continued...)
Lecture 4 - Diode Application
Lecture 5 - Transistors
Lecture 6 - Reverse - bias (Continued...)
Lecture 7 - Transistors (Continued...)
Lecture 8 - Transistors (Continued...)
Lecture 9 - Biasing a transistor unit 2 (Continued...)
Lecture 10 - Biasing of transistor
Lecture 11 - H and R Parameters and their use in small amplifiers
Lecture 12 - Small signal amplifiers analysis using H - Parameters
Lecture 13 - Small signal amplifiers analysis using R - Parameters
Lecture 14 - R - analysis (Continued...)
Lecture 15 - Common Collector(CC) amplifier (Continued...)
Lecture 16 - Feedback in amplifiers, Feedback Configurations and multi stage amplifiers
Lecture 17 - Reduction in non-linear distortion
Lecture 18 - Input/Output impedances in negative feedback amplifiers (Continued...)
Lecture 19 - RC Coupled Amplifiers
Lecture 20 - RC Coupled Amplifiers (Continued...)
Lecture 21 - RC Coupled Amplifiers (Continued...)
Lecture 22 - FETs ans MOSFET
Lecture 23 - FETs ans MOSFET (Continued...)
Lecture 24 - Depletion - MOSFET
Lecture 25 - Drain and transfer characteristic of E - MOSFET
Lecture 26 - Self Bias (Continued...) Design Procedure
Lecture 27 - FET/MOSFET Amplifiers and their Analysis
Lecture 28 - CMOS Inverter
Lecture 29 - CMOS Inverter (Continued...)

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Lecture 30 - Power Amplifier
Lecture 31 - Power Amplifier (Continued...)
Lecture 32 - Power Amplifier (Continued...)
Lecture 33 - Power Amplifier (Continued...)
Lecture 34 - Differential and Operational Amplifier
Lecture 35 - Differential and Operational Amplifier (Continued...) dc and ac analysis
Lecture 36 - Differential and Operational Amplifier dc and ac analysis (Continued...)
Lecture 37 - Operational Amplifiers
Lecture 38 - Operational amplifiers in open loop (Continued...)
Lecture 39 - Summing Amplifiers
Lecture 40 - Frequency response of an intigration
Lecture 41 - Filters
Lecture 42 - Specification of OP Amplifiers

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NPTEL Video Course - Physics - Plasma Physics: Fundamentals and Applications

Subject Co-ordinator - Prof. Vijayshri, Prof. V.K. Tripathi

Co-ordinating Institute - IIT - Delhi | IGNOU - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Plasmas
Lecture 2 - Plasma Response to fields
Lecture 3 - DC Conductivity and Negative Differential Conductivity
Lecture 4 - RF Conductivity of Plasma
Lecture 5 - RF Conductivity of Plasma (Continued...)
Lecture 6 - Hall Effect, Cowling Effect and Cyclotron Resonance Heating
Lecture 7 - Electromagnetic Wave Propagation in Plasma
Lecture 8 - Electromagnetic Wave Propagation in Plasma (Continued...)
Lecture 9 - Electromagnetic Wave Propagation Inhomogeneous Plasma
Lecture 10 - Electrostatic Waves in Plasmas
Lecture 11 - Energy Flow with an Electrostatic Wave
Lecture 12 - Two Stream Instability
Lecture 13 - Relativistic electron Beam- Plasma Interaction
Lecture 14 - Cerenkov Free Electron Laser
Lecture 15 - Free Electron Laser
Lecture 16 - Free Electron Laser
Lecture 17 - Free Electron Laser
Lecture 18 - Weibel Instability
Lecture 19 - Rayleigh Taylor Instability
Lecture 20 - Single Particle Motion in Static Magnetic and Electric Fields
Lecture 21 - Plasma Physics Grad B and Curvature Drifts
Lecture 22 - Adiabatic Invariance of Magnetic Moment and Mirror confinement
Lecture 23 - Mirror machine
Lecture 24 - Thermonuclear fusion
Lecture 25 - Tokamak
Lecture 26 - Tokamak operation
Lecture 27 - Auxiliary heating and current drive in tokamak
Lecture 28 - Electromagnetic waves propagation in magnetise plasma
Lecture 29 - Longitudinal electromagnetic wave propagation cutoffs, resonances and faraday rotation

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Lecture 30 - Electromagnetic propagation at oblique angles to magnetic field in a plasma
Lecture 31 - Low frequency EM waves magnetized plasma
Lecture 32 - Electrostatic waves in magnetized plasma
Lecture 33 - Ion acoustic, ion cyclotron and magneto sonic waves in magnetized plasma
Lecture 34 - VIasov theory of plasma waves
Lecture 35 - Landau damping and growth of waves
Lecture 36 - Landau damping and growth of waves (Continued...)
Lecture 37 - Anomalous resistivity in a plasma
Lecture 38 - Diffusion in plasma
Lecture 39 - Diffusion in magnetized plasma
Lecture 40 - Surface plasma wave
Lecture 41 - Laser interaction with plasmas embedded with clusters
Lecture 42 - Current trends and epilogue

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NPTEL Video Course - Physics - Quantum Electronics

Subject Co-ordinator - Prof. K. Thyagarajan

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Anisotropic Media
Lecture 3 - Anisotropic Media (Continued...)
Lecture 4 - Anisotropic Media (Continued...)
Lecture 5 - Nonlinear optical effects and nonlinear polarization
Lecture 6 - Non - Linear Optics (Continued...)
Lecture 7 - Non - Linear Optics (Continued...)
Lecture 8 - Non - Linear Optics (Continued...)
Lecture 9 - Non - Linear Optics (Continued...)
Lecture 10 - Non - Linear Optics - Quasi Phase Matching
Lecture 11 - Non - Linear Optics
Lecture 12 - Non Linear Optics (Continued...)
Lecture 13 - Non Linear Optics (Continued...)
Lecture 14 - Non Linear Optics (Continued...)
Lecture 15 - Non Linear Optics (Continued...)
Lecture 16 - Non Linear Optics (Continued...)
Lecture 17 - Non Linear Optics (Continued...)
Lecture 18 - Non Linear Optics (Continued...)
Lecture 19 - Non Linear Optics (Continued...)
Lecture 20 - Third Order Non - Linear Effects
Lecture 21 - Third Order Non - Linear Effects (Continued...)
Lecture 22 - Third Order Non - Linear Effects (Continued...)
Lecture 23 - Third Order Non - Linear Effects (Continued...)
Lecture 24 - Review of Quantum Mechanics
Lecture 25 - Review of Quantum Mechanics (Continued...)
Lecture 26 - Review of Quantum Mechanics (Continued...)
Lecture 27 - Quantization of EM Field
Lecture 28 - Quantization of EM Field (Continued...)
Lecture 29 - Quantization of EM Field (Continued...)

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Lecture 30 - Quantum States of EM Field
Lecture 31 - Quantum States of EM Field (Continued...)
Lecture 32 - Quantization of EM Field (Continued...)
Lecture 33 - Quantization of EM Field (Continued...)
Lecture 34 - Quantization of EM Field (Continued...)
Lecture 35 - Quantization of EM Field (Continued...)
Lecture 36 - Quantization of EM Field (Continued...)
Lecture 37 - Beam Splitter
Lecture 38 - Beam Splitter (Continued...)
Lecture 39 - Beam Splitter and Balanced Homodyning
Lecture 40 - Balanced Homodyning
Lecture 41 - Quantum Picture of Parametric Down Conversion
Lecture 42 - Questions

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NPTEL Video Course - Physics - Quantum Mechanics and Applications

Subject Co-ordinator - Prof. Ajoy Ghatak

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Quantum Mechanics I
Lecture 2 - Basic Quantum Mechanics II
Lecture 3 - Dirac Delta Function & Fourier Transforms
Lecture 4 - The Free Particle
Lecture 5 - Physical Interpretation of The Wave Function
Lecture 6 - Expectation Values & The Uncertainty Principle
Lecture 7 - The Free Particle (Continued...)
Lecture 8 - Interference Experiment & The Particle in a Box Problem
Lecture 9 - On Eigen Values and Eigen Functions of the 1 Dimensional Schrodinger Equation
Lecture 10 - Linear Harmonic Oscillator
Lecture 11 - Linear Harmonic Oscillator (Continued...1)
Lecture 12 - Linear Harmonic Oscillator (Continued...2)
Lecture 13 - Linear Harmonic Oscillator (Continued...3)
Lecture 14 - Tunneling through a Barrier
Lecture 15 - The 1-Dimensional Potential Wall & Particle in a Box
Lecture 16 - Particle in a Box and Density of States
Lecture 17 - The Angular Momentum Problem
Lecture 18 - The Angular Momentum Problem (Continued...)
Lecture 19 - The Hydrogen Atom Problem
Lecture 20 - The Two Body Problem
Lecture 21 - TheTwo Body Problem
Lecture 22 - Two Body Problem
Lecture 23 - 3d Oscillator & Dirac's Bra and Ket Algebra
Lecture 24 - Diracâ s Bra and Ket Algebra
Lecture 25 - Diracâ s Bra and Ket Algebra
Lecture 26 - The Linear Harmonic Oscillator using Bra and Ket Algebra (Continued...)
Lecture 27 - The Linear Harmonic Oscillator
Lecture 28 - Coherent State and Relationship with the Classical Oscillator
Lecture 29 - Angular Momentum Problem using Operator Algebra

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Lecture 30 - Angular Momentum Problem (Continued...)
Lecture 31 - Pauli Spin Matrices and The Stern Gerlach Experiment
Lecture 32 - The Larmor Precession and NMR Spherical Harmonics using Operator Algebra
Lecture 33 - Addition of Angular Momentum
Lecture 34 - Clebsch Gordon Coefficients
Lecture 35 - The JWKB Approximation
Lecture 36 - The JWKB Approximation
Lecture 37 - The JWKB Approximation
Lecture 38 - The JWKB Approximation
Lecture 39 - The JWKB Approximation
Lecture 40 - Time Independent Perturbation Theory
Lecture 41 - Time Independent Perturbation Theory (Continued...1)
Lecture 42 - Time Independent Perturbation Theory (Continued...2)

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NPTEL Video Course - Physics - Semiconductor Optoelectronics

Subject Co-ordinator - Prof. M.R. Shenoy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Context and Scope of the Course
Lecture 2 - Energy Bands in Solids
Lecture 3 - E-K Diagram
Lecture 4 - The Density of States
Lecture 5 - The Density of States (Continued...)
Lecture 6 - The Density of states in a Quantum well Structure
Lecture 7 - Occupation Probability and Carrier Concentration
Lecture 8 - Carrier Concentration and Fermi Level
Lecture 9 - Quasi Fermi Levels
Lecture 10 - Semiconductor Materials
Lecture 11 - Semiconductor Hetrostructures-Lattice-Matched Layers
Lecture 12 - Strained -Layer Epitaxy and Quantum Well Structures
Lecture 13 - Bandgap Engineering
Lecture 14 - Hetrostructure p-n junctions
Lecture 15 - Schottky Junction and Ohmic Contacts
Lecture 16 - Fabrication of Heterostructure Devices
Lecture 17 - Interaction od Photons with Electrons and Holes in a Semiconductor
Lecture 18 - Optical Joint Density of States
Lecture 19 - Rates of Emission and Absorption
Lecture 20 - Amplication by Stimulated Emission
Lecture 21 - The Semiconductor (Laser) Amplifier
Lecture 22 - Absorption Spectrum of Semiconductor
Lecture 23 - Gain and Absorption Spectrum of Quantum Well Structures
Lecture 24 - Electro-absorption Modulator
Lecture 25 - Electro-absorption Modulator - II Device Configuration
Lecture 26 - Mid-Term Revision Question and Discussion
Lecture 27 - Part - III Semiconductor Light Sources
Lecture 28 - Light Emitting Diode-I Device Structure and Parameters
Lecture 29 - Light Emitting Diode-II Device Chracteristics

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Lecture 30 - Light Emitting Diode-III Output Characteristics
Lecture 31 - Light Emitting Diode-IV Modulation Bandwidth
Lecture 32 - Light Emitting Diode-V materials and Applications
Lecture 33 - Laser Basics
Lecture 34 - Semiconductor Laser-I Device Structure
Lecture 35 - Semiconductor Laser-II Output Characteristics
Lecture 36 - Semiconductor Laser-III Single Frequency Lasers
Lecture 37 - Vertical Cavity Surface Emitting Laser (VCSEL)
Lecture 38 - Quantum Well Laser
Lecture 39 - Practical Laser Diodes and Handling
Lecture 40 - General Characteristics of Photodetectors
Lecture 41 - Responsivity and Impulse Response
Lecture 42 - Photoconductors
Lecture 43 - Semiconductor Photo-Diodes
Lecture 44 - Semiconductor Photo-Diodes-II
Lecture 45 - Other Photodectors
Lecture 46 - Photonic Integrated Circuits

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NPTEL Video Course - Physics - NOC:Semiconductor Optoelectronics

Subject Co-ordinator - Prof. M. R. Shenoy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Context, Scope and Contents of the Course
Lecture 2 - Energy Bands in Solids
Lecture 3 - E-k Diagram - The Band Structure
Lecture 4 - The Density of States
Lecture 5 - The Density of States Ï•(k), Ï•(E)
Lecture 6 - Density of States in a Quantum Well Structure
Lecture 7 - Occupation Probability and Carrier Concentration
Lecture 8 - Carrier Concentration and Fermi Level
Lecture 9 - Quasi Fermi Levels
Lecture 10 - Semiconductor Materials
Lecture 11 - Semiconductor Heterostructures-Lattice-Matched Layers
Lecture 12 - Strained-Layer Epitaxy and Quantum Well Structures
Lecture 13 - Bandgap Engineering
Lecture 14 - Heterostructure p-n junctions
Lecture 15 - Schottky Junctions and Ohmic Contacts
Lecture 16 - Fabrication of Heterostructure Devices
Lecture 17 - Interaction of Photons with Electrons and Holes in a Semiconductor
Lecture 18 - Optical Joint Density of States, and Probabilities of Emission and Absorption
Lecture 19 - Rates of Emission and Absorption
Lecture 20 - Amplification by Stimulated Emission
Lecture 21 - The Semiconductor (Laser) Amplifier
Lecture 22 - Absorption Spectrum of Semiconductors
Lecture 23 - Gain and Absorption Spectrum of Quantum Well Structures
Lecture 24 - Electro-absorption Modulator-I Principle of Operation
Lecture 25 - Electro-absorption Modulator-II Device Configuration
Lecture 26 - Injuction Electroluminescence
Lecture 27 - Light emitting diode-1 Device structure and parameters
Lecture 28 - Light emitting diode-II Device Characteristics
Lecture 29 - Light emitting diode-III Output Characteristics

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Lecture 30 - Light emitting diode-IV Modulation Bandwidth
Lecture 31 - Light emitting diode-V Material and Applications
Lecture 32 - Laser Basics
Lecture 33 - Semiconductor Laser-I Device Structure
Lecture 34 - Semiconductor Laser-II Output Characteristics
Lecture 35 - Semiconductor Laser-III Single Frequency Lasers
Lecture 36 - Vertical cavity Surface Emitting Laser (VCSEL)
Lecture 37 - Quantum Well Laser
Lecture 38 - Practical Laser Diodes and Handling
Lecture 39 - General Characteristics of Photodetectors
Lecture 40 - Responsivity and Impulse Response
Lecture 41 - Photoconductors
Lecture 42 - Semiconductor Photo-Diodes-I
Lecture 43 - Semiconductor Photo-Diodes-II
Lecture 44 - Other Photodetectors
Lecture 45 - Photonic Integrated Circuits

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NPTEL Video Course - Physics - NOC:Introduction to LASER

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction, Scope and Contents
Lecture 2 - Interaction of Radiation with Matter
Lecture 3 - The Einstein Coefficients
Lecture 4 - Atomic Lineshape Function, g(Î½)
Lecture 5 - Amplification by Stimulated Emission
Lecture 6 - Line Broadening Mechanisms - 1
Lecture 7 - Line Broadening Mechanisms - 2
Lecture 8 - Laser Rate Equations: 2-Level System
Lecture 9 - Laser Rate Equations: 3-Level System
Lecture 10 - Laser Rate Equations: 4-Level System
Lecture 11 - Laser Amplifiers
Lecture 12 - Er-Doped Fiber Amplifier
Lecture 13 - Resonance Frequencies
Lecture 14 - Spectral Response of an Optical Resonator
Lecture 15 - Resonator Loss and Cavity Lifetime
Lecture 16 - Spherical Mirror Resonators
Lecture 17 - Resonator Stability Condition
Lecture 18 - Ray Paths in Spherical Mirror Resonators
Lecture 19 - Tranverse Modes of a Spherical Mirror Resonator
Lecture 20 - Gaussian Mode of the Spherical Mirror Resonator
Lecture 21 - Longitudinal Modes of a Spherical Mirror Resonator
Lecture 22 - Laser Oscillations and The Threshold Condition
Lecture 23 - Spectral Hole Burning
Lecture 24 - Variation of Laser Power around Threshold
Lecture 25 - Optimum Output Coupling
Lecture 26 - Laser Output Characteristics
Lecture 27 - Laser Beam Properties
Lecture 28 - Ultimate Linewidth of a Laser
Lecture 29 - Pulsed Lasers

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Lecture 30 - Q-Switching
Lecture 31 - Mode Locking
Lecture 32 - Methods of Mode Locking
Lecture 33 - Some Common Lasers
Lecture 34 - Fiber Lasers
Lecture 35 - Semiconductor Lasers
Lecture 36 - Lasers and Laser Amplifiers in Optical Fiber Communication
Lecture 37 - Lasers in Nonlinear Optics
Lecture 38 - Laser Safety

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NPTEL Video Course - Physics - NOC:Energy Materials and Devices

Subject Co-ordinator - Prof. Santanu Ghosh

Co-ordinating Institute - IIT Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solar energy conversion and silicon solar cell
Lecture 2 - Solar energy conversion and silicon solar cell (Continued...)
Lecture 3 - Tutorial session on solar energy conversion and silicon solar cell
Lecture 4 - Wide band gap semiconductor based thin film solar cell: CdTe-CdS
Lecture 5 - Wide band gap semiconductor based thin film solar cell: Tutorial session
Lecture 6 - Dye sensitized solar cell
Lecture 7 - Quantum dot sensitized solar cell and Perovskite solar cell
Lecture 8 - DSCC and QDSSC: Tutorial session
Lecture 9 - Tandem Solar Cell
Lecture 10 - Tandem Solar Cell: Tutorial session
Lecture 11 - Thermoelectric Energy and materials
Lecture 12 - Thermoelectric Energy and materials (Continued...)
Lecture 13 - TEG Materials and devices
Lecture 14 - TEG Materials and devices (Continued...)
Lecture 15 - Tutorial session of Thermoelectric generator materials and devices
Lecture 16 - Thermionic emission fundamentals
Lecture 17 - Thermionic energy and materials
Lecture 18 - Tutorial of Thermionic energy and Materials
Lecture 19 - Materials for energy storage and devices: Battery and Capacitor
Lecture 20 - Materials for energy storage and devices: Supercapacitor
Lecture 21 - Materials for energy storage and devices: Lithium ion battery
Lecture 22 - Materials for energy storage and devices: Lithium ion battery (Continued...)
Lecture 23 - Materials for energy storage and devices: Tutorial-I
Lecture 24 - Materials for energy storage and devices: Fuel cell
Lecture 25 - Materials for energy storage and devices: Fuel cell (Continued...)
Lecture 26 - Materials for energy storage and devices: Fuel Cell (Tutorial)
Lecture 27 - Hydrogen production by PEC water splitting
Lecture 28 - PEC water splitting (Continued...)
Lecture 29 - PEC water splitting: Materials and Applications

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Lecture 30 - PEC water splitting: Materials and Applications (Continued...)
Lecture 31 - 5PEC water splitting tutorial
Lecture 32 - Conclusion of the Lecture Series Energy Materials and Devices

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NPTEL Video Course - Physics - NOC:Nuclear and Particle Physics

Subject Co-ordinator - Dr. P. Poulose

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Nuclear Properties
Lecture 3 - Properties of Nuclear Force
Lecture 4 - Deuteron
Lecture 5 - Nucleons Scattering
Lecture 6 - Nuclear Models - I
Lecture 7 - Nuclear Models - II
Lecture 8 - Radioactive Decay - General Properties
Lecture 9 - Nuclear Alpha Decay
Lecture 10 - Nuclear Beta decay
Lecture 11 - Beta-decay details
Lecture 12 - Gamma decay
Lecture 13 - Nuclear Scattering - Preliminaries
Lecture 14 - Types of Reactions
Lecture 15 - Particle Accelerators - I
Lecture 16 - Particle Accelerators - II
Lecture 17 - Detectors
Lecture 18 - Elementary Particles - Introduction and Overview
Lecture 19 - Quark Model - I
Lecture 20 - Quark Model - II
Lecture 21 - Quark Model - III
Lecture 22 - Structure of the Hadron - Nucleus
Lecture 23 - Structure of the Hadron - Proton
Lecture 24 - Deep Inelastic Scattering
Lecture 25 - Relativistic Kinematics
Lecture 26 - Klein-Gordon Equation
Lecture 27 - Interaction of charged scalar with EM field
Lecture 28 - Relativistic Electrodynamics
Lecture 29 - Quantum Electrodynamics

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Lecture 30 - Interaction between charged scalars
Lecture 31 - Dirac Equation - 1
Lecture 32 - Dirac Equation - 2
Lecture 33 - Interacting charged fermions - 1
Lecture 34 - Interacting charged fermions - 2
Lecture 35 - Interacting charged fermions - 3
Lecture 36 - Scattering Cross Section Revisited - 1
Lecture 37 - Scattering Cross Section Revisited - 2
Lecture 38 - Weak Interactions - 1
Lecture 39 - Weak Interactions - 2
Lecture 40 - Lagrangian Framework
Lecture 41 - Gauge Symmetry - U(1)
Lecture 42 - Electroweak Theory - 1
Lecture 43 - Electroweak Theory - 2
Lecture 44 - SSB and the Higgs Mechanism

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NPTEL Video Course - Physics - NOC:Advanced Condensed Matter Physics

Subject Co-ordinator - Dr. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Propagators - I
Lecture 2 - Propagators - II
Lecture 3 - Second quantization - I
Lecture 4 - Second quantization - II
Lecture 5 - Second quantized Hamiltonian
Lecture 6 - Tight Binding Hamiltonian, Hubbard model
Lecture 7 - Magnetism
Lecture 8 - Singlet and Triplet State
Lecture 9 - Antiferromagnetism in Hubbard model
Lecture 10 - Green's function and representations in quantum mechanics
Lecture 11 - S matrix and free electron Green's function
Lecture 12 - Wick's theorem and normal ordering
Lecture 13 - Green's function and Feynman diagrams
Lecture 14 - Feynman diagram
Lecture 15 - phonon Green' function and Hartree Fock approaximation
Lecture 16 - Finite temperature Green's function and Matsubara frequencies
Lecture 17 - Dyson's equation and disorder in electronic systems
Lecture 18 - Introduction to electrodynamics, Meissner effect
Lecture 19 - London penetration depth, Type I and II superconductors
Lecture 20 - Cooper's problem, BCS gap equation
Lecture 21 - BCS theory, Transition temperature
Lecture 22 - Ginzburg Landau Theory, Coherence length and penetration depth
Lecture 23 - Quantum Hall Effect
Lecture 24 - Spin Hall effect, 2D topological insulator
Lecture 25 - Bose-Einstein condensation

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NPTEL Video Course - Physics - NOC:Advanced Quantum Mechanics with Applications

Subject Co-ordinator - Dr. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Postulates of Quantum Mechanics
Lecture 2 - Stern Gerlach Experiment, Spin Quantization, Young's Double Slit Experiment
Lecture 3 - The Mathematical Formalism of Quantum Mechanics, Uncertainty Principle
Lecture 4 - The Density Matrix Formalism, Expectation values of Operators
Lecture 5 - Qunatum Harmonic Oscillator, Creation and annihilation Operators
Lecture 6 - Coherent States and their Properties
Lecture 7 - Applications of Coherent States, squeezed states
Lecture 8 - Symmetries and Conservational Principles in Quantum Mechanics
Lecture 9 - Rotation Operator and Invariance of Angular Momentum, Parity
Lecture 10 - Spherically Symmetric System and Applications to quantum dots
Lecture 11 - Spin Angular Momentum, Addition of Angular Momentum, Clebsch gordan coefficients
Lecture 12 - Magnetic Hamiltonian, Heisenberg Model
Lecture 13 - Nuclear Magnetic Resonance (NMR)
Lecture 14 - Applications of NMR, time evolution of Magnetic Moments
Lecture 15 - Introduction to Quantum Computing
Lecture 16 - Qubits,EPR Paradox
Lecture 17 - Quantum Entanglement (QE)
Lecture 18 - Teleportation, Quantum Teleportation for one spin
Lecture 19 - Entangled state for two spins
Lecture 20 - Quantum Gates, Walsh Hadamard Transportation, No cloning theorem
Lecture 21 - Perturbation Theory
Lecture 22 - Stark Effect
Lecture 23 - Stark Effect
Lecture 24 - Variational method, Variation of constants, Upper bound on ground state energy
Lecture 25 - Application of Variational method,Hydrogen,Helium atom,Comparison with perturbation theory
Lecture 26 - WKB Approximation, Bohr Sommerfeld quantization condition
Lecture 27 - Summary of Approximation methods, Time dependent Perturbation Theory
Lecture 28 - Time dependent Perturbation Theory, Fermi's Golden rule, Einstein's A and B coefficients
Lecture 29 - Scattering Theory

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Lecture 30 - Linear Response Theory
Lecture 31 - Quantum Dynamics
Lecture 32 - Examples
Lecture 33 - Interaction of Radiation with matter, Landau levels

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NPTEL Video Course - Physics - NOC:A Brief Course on Superconductivity

Subject Co-ordinator - Dr. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical introduction of superconductivity
Lecture 2 - Meissner effect, Electrodynamics of Superconductors, coherence length and penetration depth
Lecture 3 - Electron Pairing, Basics of BCS Theory
Lecture 4 - BCS ground state, variational calculation, expression for Tc
Lecture 5 - Order parameter, Free energy functional, Ginzburg-Landau (GL) Theory, GL equations
Lecture 6 - London Equations, Flux quantization
Lecture 7 - Thermodynamic properties of superconductors, specific heat
Lecture 8 - Experimental determination of Superconducting properties
Lecture 9 - Unconventional Superconductivity, Uemura plot, High-Tc superconductivity, d-wave pairing, ARPES
Lecture 10 - Singlet and triplet states of two s =1/2, magnetic Hamiltonian
Lecture 11 - t-J model, discrete symmetry groups, example square lattice
Lecture 12 - Cuprate Superconductors, electron vs hole doped superconductors
Lecture 13 - Non-Fermi Liquid Theory, Adiabatic continuity
Lecture 14 - Quasiparticle lifetime, breakdown of Fermi Liquid Theory in cuprate superconductors
Lecture 15 - Josephson junctions, Josephson equations
Lecture 16 - Numerical Differentiation
Lecture 17 - Richardson's extrapolation

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NPTEL Video Course - Physics - NOC:Introduction to Statistical Mechanics

Subject Co-ordinator - Prof.Girish S. Setlur

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Prerequisites and Introduction
Lecture 2 - Combinatorics and Entropy
Lecture 3 - Method of steepest descent
Lecture 4 - Bose and Fermi gases
Lecture 5 - Maxwell Boltzmann distribution
Lecture 6 - Thermodynamic potentials
Lecture 7 - Legendre transformation
Lecture 8 - Specific heats of quantum gases
Lecture 9 - Low and high temperature equations of state
Lecture 10 - Chandrasekhar Limit
Lecture 11 - Radiation thermodynamics
Lecture 12 - Thermodyamics of black holes
Lecture 13 - Van der Waals fluid
Lecture 14 - Landau Diamagnetism
Lecture 15 - Relations between ensembles and Pauli paramagnetism
Lecture 16 - Ferromagnetism
Lecture 17 - Correlations and Mean Field
Lecture 18 - Theories of Specific Heat of Solids
Lecture 19 - Tutorial - I
Lecture 20 - Tutorial - II
Lecture 21 - Tutorial - III
Lecture 22 - Tutorial - IV
Lecture 23 - Tutorial - V
Lecture 24 - RG method Ising model
Lecture 25 - Introduction to Second Quantisation
Lecture 26 - Quantum Theory of EM Field - I
Lecture 27 - Quantum Theory of EM Field - II
Lecture 28 - Creation and Annihilation in Fock Space - I
Lecture 29 - Creation and Annihilation in Fock Space - II

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Lecture 30 - Green functions in many particle systems
Lecture 31 - Second quantised hamiltonians
Lecture 32 - Current algebra

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NPTEL Video Course - Physics - NOC:Numerical Methods and Simulation Techniques for Scientists and Engineers

Subject Co-ordinator - Dr. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Error analysis and estimates, significant digits, convergence
Lecture 2 - Roots of Non-linear equations, Bisection method
Lecture 3 - Newton Raphson method, Secant method
Lecture 4 - Newton Raphson Method
Lecture 5 - Newton Raphson Method (example), Curve fitting and interpolation of data
Lecture 6 - Newtonâ s interpolation formula, statistical interpolation of data
Lecture 7 - Linear and Polynomial regression
Lecture 8 - Numerical differentiation
Lecture 9 - Numerical differentiation, Error analysis
Lecture 10 - Numerical integration, Trapezoidal rule
Lecture 11 - Simpsonâ s 1/3rd rule
Lecture 12 - Simpsonâ s 1/3rd rule, Gaussian integration
Lecture 13 - Ordinary Differential equations
Lecture 14 - Solution of differential equation, Taylor series and Euler method
Lecture 15 - Heunâ s method
Lecture 16 - Runge Kutta method
Lecture 17 - Examples of differential equation
Lecture 18 - Introduction to Monte Carlo technique
Lecture 19 - Details of the Monte Carlo method
Lecture 20 - Importance sampling
Lecture 21 - Applications
Lecture 22 - Introduction to Molecular Dynamics
Lecture 23 - Verlet algorithm
Lecture 24 - Applications of Molecular dynamics

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NPTEL Video Course - Physics - NOC:Theoretical Mechanics

Subject Co-ordinator - Dr. Charudatt Y. Kadolkar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, Constraints
Lecture 2 - Generalized Coordinates, Configuration Space
Lecture 3 - Principle of Virtual Work
Lecture 4 - D'Alembert's Principle
Lecture 5 - Lagrange's Equations
Lecture 6 - Hamilton's Principle
Lecture 7 - Variational Calculus, Lagrange's Equations
Lecture 8 - Conservation Laws and Symmetries
Lecture 9 - Velocity Dependent Potentials, Non-holonomic Constraints
Lecture 10 - An Example
Lecture 11 - Phase Space
Lecture 12 - Legendre Transforms
Lecture 13 - Hamilton's Equations
Lecture 14 - Conservation Laws, Routh's procedure
Lecture 15 - An Example
Lecture 16 - Canonical Transformations
Lecture 17 - Symplectic Condition
Lecture 18 - Canonical Invariants, Harmonic Oscillator
Lecture 19 - Poisson Bracket Formulation
Lecture 20 - Infinitesimal Canonical Transformations
Lecture 21 - Symmetry Groups of Mechanical Systems
Lecture 22 - Hamilton Jacobi Theory
Lecture 23 - Action-Angle Variables
Lecture 24 - Separation of Variables and Examples
Lecture 25 - Continuous Systems and Fields
Lecture 26 - The Stress-Energy Tensor
Lecture 27 - Hamiltonian Formulation

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NPTEL Video Course - Physics - NOC:Solar Energy Engineering and Technology

Subject Co-ordinator - Prof. Pankaj Kalita

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy Scenarios
Lecture 2 - Overview of solar energy conversion devices and applications
Lecture 3 - Physics of propagation of solar radiation from the sun to the earth
Lecture 4 - Solar radiation and sunshine measuring instruments
Lecture 5 - Geometry, angles and measurement - I
Lecture 6 - Geometry, angles and measurement - II
Lecture 7 - Estimation of radiation under different climatic conditions
Lecture 8 - Estimation of radiation in horizontal and inclined surface
Lecture 9 - Fundamentals of PV cells
Lecture 10 - Semiconductor physics
Lecture 11 - Performance characterization of PV cells
Lecture 12 - Photovoltaic modules and arrays
Lecture 13 - Components of standalone PV system
Lecture 14 - Design of standalone PV system
Lecture 15 - Functioning and components of PV system
Lecture 16 - Design of a grid connected PV system
Lecture 17 - Performance analysis of a grid connected PV system
Lecture 18 - Basics of thermal collectors
Lecture 19 - Basics of heat transfer
Lecture 20 - Solar collector losses and loss estimation
Lecture 21 - Analysis of flat plate collector
Lecture 22 - Influence of various parameters on the performance of LFPC
Lecture 23 - Testing and application of LFPC
Lecture 24 - Basics and performance analysis of solar air heaters
Lecture 25 - Testing and application of solar air heaters
Lecture 26 - Fundamentals of concentrating collectors
Lecture 27 - Concentrating collector technologies and working principle
Lecture 28 - Tutorial
Lecture 29 - Sensible heat, latent heat and thermochemical energy storage

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Lecture 30 - Solar pond
Lecture 31 - Tutorial
Lecture 32 - Emerging technologies
Lecture 33 - Solar energy applications in cooking, desalination, refrigeration and electricity generation
Lecture 34 - Tutorial

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NPTEL Video Course - Physics - NOC:Quantum Technology and Quantum Phenomena in Macroscopic Systems

Subject Co-ordinator - Prof. Amarendra Kumar Sarma

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Basic Quantum Mechanics
Lecture 2 - Problem Solving Session - 1
Lecture 3 - Two-level System - I
Lecture 4 - Bloch Sphere: Supplementary Lecture - I
Lecture 5 - Two-level Systems - II
Lecture 6 - Two-level Systems - III
Lecture 7 - Dressed States;Introduction to Density Matrix
Lecture 8 - Problem Solving Session - 2
Lecture 9 - Density-matrix formalism
Lecture 10 - Quantum Harmonic Oscillators
Lecture 11 - Quantization of Electromagnetic Radiation
Lecture 12 - Quantization of Standing EM Waves;Quantum States of Radiation Fields - I
Lecture 13 - Problem Solving Session - 3
Lecture 14 - Quantum States of Radiation Fields-II: Squeezed States
Lecture 15 - Problem Solving Session - 4
Lecture 16 - Introduction and Basics of Superconductivity
Lecture 17 - Cooper Pair Box as TLS;Introduction to Transmission Line
Lecture 18 - Quantization of Transmission Line - I
Lecture 19 - Quantization of Transmission Line - II
Lecture 20 - The Jaynes Cummings Model - I
Lecture 21 - Problem Solving Session - 5
Lecture 22 - The Jaynes Cummings Model - II
Lecture 23 - Josephson Junctions - I
Lecture 24 - Josephson Junctions - II
Lecture 25 - Problem Solving Session - 6
Lecture 26 - Transmon;Introduction to Dissipation in Quantum Systems
Lecture 27 - Quantum Master Equation
Lecture 28 - Pure dephasing and Dissipative Bloch Equations
Lecture 29 - Derivation of Fermi-Golden Rule

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Lecture 30 - Introduction to Cavity Optomechanics;Fabry-Perot Cavity
Lecture 31 - Cavity Optomechanics: Basic Physics - I
Lecture 32 - Problem Solving Session - 7
Lecture 33 - Cavity Optomechanics: Basic Physics - II
Lecture 34 - Classical Regime - I
Lecture 35 - Classical Regime - II; Classical Langevin Equation
Lecture 36 - Problem Solving Session - 8
Lecture 37 - Langevin Equation
Lecture 38 - Quantum Langevin Noise
Lecture 39 - Problem Solving Session - 9
Lecture 40 - Input-Output Relation
Lecture 41 - Cavity Quantum Optomechanics
Lecture 42 - Linearized Cavity Optomechanics; Ground state cooling
Lecture 43 - Normal-Mode Splitting
Lecture 44 - Quantum Optomechanics: Squeezed States

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NPTEL Video Course - Physics - NOC:Dynamics of Classical and Quantum Fields

Subject Co-ordinator - Prof. Girish S. Setlur

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Lagrangian Formalism
Lecture 3 - Hamiltonian Mechanics
Lecture 4 - Flows and Symmetries
Lecture 5 - Examples of Continuum Systems
Lecture 6 - Symmetries and Noether's Theorem
Lecture 7 - Dynamical Symmetries
Lecture 8 - Symmetries in Field Theories
Lecture 9 - The Relativistic Electromagnetic Field
Lecture 10 - Stress-Energy (Energy-Momentum) Tensor
Lecture 11 - Green's Theorem and Green's Functions
Lecture 12 - Diffraction Theory
Lecture 13 - Introduction to Elasticity Theory
Lecture 14 - Solution of the rubber band problem
Lecture 15 - The Stress Function Method
Lecture 16 - Strain Energy
Lecture 17 - The Euler Equation
Lecture 18 - Bernoulli's Principle
Lecture 19 - Matter, Momentum and Energy Transport
Lecture 20 - Stokes' Drag - I
Lecture 21 - Stokes' Drag - II
Lecture 22 - Towards Quantum Fields
Lecture 23 - Right and Left Movers
Lecture 24 - Functional Integration - I
Lecture 25 - Functional Integration - II
Lecture 26 - Perturbation theory
Lecture 27 - Quantum Mechanics using Lagrangians
Lecture 28 - Path Integrals - Formalism
Lecture 29 - Path Integrals - Free particles

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Lecture 30 - Path Integrals - Harmonic oscillator
Lecture 31 - Creation and annihilation operators - Excitations
Lecture 32 - Creation and annihilation operators - Photons
Lecture 33 - Creation and annihilation operators - Many-body physics
Lecture 34 - Particle and Hole Green functions
Lecture 35 - Current Algebra
Lecture 36 - Tight Binding Models - I
Lecture 37 - Tight Binding Models - II
Lecture 38 - Order Parameters
Lecture 39 - Schrieffer Wolff Transformation
Lecture 40 - Matsubara Green functions - I
Lecture 41 - Matsubara Green functions - II
Lecture 42 - Self Energy and Spectral Functions
Lecture 43 - S-Matrix Perturbation Theory
Lecture 44 - Keldysh Contour
Lecture 45 - Bosonic Coherent States
Lecture 46 - Fermionic Coherent States
Lecture 47 - Nonlocal particle hole operators - Bosons
Lecture 48 - Nonlocal particle hole operators - Fermions

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NPTEL Video Course - Physics - NOC:Quantum Hall Effects

Subject Co-ordinator - Prof. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Conductance in Nanostructures
Lecture 2 - S-Matrix, Reflection and Transmission
Lecture 3 - Introduction to Classical and Quantum Hall Effect
Lecture 4 - Quantum Hall Effect
Lecture 5 - Landau Levels
Lecture 6 - Degenracy of Landau levels
Lecture 7 - Shubnikov de Haas Oscillations
Lecture 8 - Kubo Formula
Lecture 9 - Symmetric gauge
Lecture 10 - Tight binding model, Hofstadter Butterfly
Lecture 11 - Topological Invariant, Chern number
Lecture 12 - Electronic structure of Graphene
Lecture 13 - Low energy Dispersion
Lecture 14 - Dirac Hamiltonian, Hofstadter Butterfly
Lecture 15 - QHE, Landau Levels
Lecture 16 - Properties of Spin angular Momentum, Spin Hall Effect
Lecture 17 - Quantum spin Hall insulator, Kene-Mele Model
Lecture 18 - Kene-Mele Model
Lecture 19 - Landau gauge in fractional quantum Hall effect
Lecture 20 - Laughlin States, Properties
Lecture 21 - Plasma analogy
Lecture 22 - Composite Fermions, Hierarchy

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NPTEL Video Course - Physics - NOC:Quantum Entanglement: Fundamentals, Measures and Applications

Subject Co-ordinator - Prof. Amarendra Kumar Sarma

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Review of Quantum Mechanics
Lecture 3 - Mathematical Tools: Density Matrix - Part 1
Lecture 4 - Mathematical Tools: Density Matrix - Part 2
Lecture 5 - Problem solving session - 1
Lecture 6 - Basic Technical Introduction to Quantum Entanglement
Lecture 7 - Schmidt Decomposition Method
Lecture 8 - The EPR Paradox and Bell Inequalities
Lecture 9 - Problem solving session - 2
Lecture 10 - Quantum Measurements
Lecture 11 - Properties of Quantum Entanglement
Lecture 12 - Quantum Entanglement Measures - I
Lecture 13 - Problem solving session - 3
Lecture 14 - Quantum Entanglement Measures - II
Lecture 15 - Applications of Quantum Entanglement - I
Lecture 16 - Applications of Quantum Entanglement - II
Lecture 17 - Problem solving session - 4

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NPTEL Video Course - Physics - NOC:Topology and Condensed Matter Physics

Subject Co-ordinator - Prof. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Topology
Lecture 2 - Topological invariant, Berry phase
Lecture 3 - Second quantization
Lecture 4 - Ten Fold Classification
Lecture 5 - Symmetries and SSH - model
Lecture 6 - SSH - model, Introduction to superconductivity
Lecture 7 - Kitaev model
Lecture 8 - Introduction to Classical and Quantum Hall effect
Lecture 9 - Quantum Hall Effect
Lecture 10 - Landau Levels
Lecture 11 - Properties of Landau Levels
Lecture 12 - Edge modes of Landau levels, Incompressibility of Quantum Hall States
Lecture 13 - Kubo formula
Lecture 14 - Hall quantization and Topological invariant
Lecture 15 - Electronic structure of Graphene
Lecture 16 - Symmetries and QHE in Graphene
Lecture 17 - Haldane model
Lecture 18 - Anomalous quantum Hall effect in Haldane model
Lecture 19 - Introduction of spin Hall effect
Lecture 20 - Spin current, quantum spin Hall effect
Lecture 21 - Quantum spin Hall insulator, Kane Mele model
Lecture 22 - Kane Mele model with Rashba spin-orbit coupling, spin Hall conductivity
Lecture 23 - Symmetric gauge in FQHE
Lecture 24 - Laughlin States
Lecture 25 - Plasma analogy
Lecture 26 - Composite Fermions, Hierarchy picture
Lecture 27 - Topological Consideration of FQHE
Lecture 28 - 3D Topological Insulators

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NPTEL Video Course - Physics - NOC:Statistical Physics of Non-Interacting and Interacting Systems

Subject Co-ordinator - Prof. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Thermodynamics
Lecture 2 - Laws of Thermodynamics, Entropy
Lecture 3 - Maxwell's relations, velocity distribution
Lecture 4 - Thermodynamic Potentials
Lecture 5 - Binomial expansion, Random Walk
Lecture 6 - Ensemble Theory, Micro and Macrostates and Liouvilles's Theorem
Lecture 7 - Ergodic Hypothesis, Phase Space
Lecture 8 - Microcanonical Ensemble and Its Applications
Lecture 9 - Canonical Ensemble, Parition Function, Central Limit Theorem
Lecture 10 - Applications of Canonical Ensemble
Lecture 11 - Bounded System, Negative Temparature, Specific Heat of Solids
Lecture 12 - Virial Theorem, Grand Canonical Distribution
Lecture 13 - Grand Canonical Distribution, Photon Gas
Lecture 14 - Canonical Ensemble, Parition Function, Central Limit Theorem
Lecture 15 - Applications of Canonical Ensemble
Lecture 16 - Bounded System, Negative Temparature, Specific Heat of Solids
Lecture 17 - Virial Theorem, Grand Canonical Distribution
Lecture 18 - Grand Canonical Distribution, Photon Gas
Lecture 19 - Quantum Statistical Mechanics, Indistinguishability of Particles, Ensembles
Lecture 20 - Density Matrix, Exchange Statistics, Bosons and Fermions
Lecture 21 - MB, BE, FD Statistics
Lecture 22 - Bose Statistics, Bose Einstein Condensation
Lecture 23 - Properties of BEC, Phase Transition
Lecture 24 - Experimental Aspects of BEC, Black Body Radiation, Phonons
Lecture 25 - FD Statistics, Properties of Fermi Systems
Lecture 26 - Bethe Ansatz
Lecture 27 - Cluster expansion, Critical Isotherms
Lecture 28 - Virial Coefficients, Equation of State for real gases
Lecture 29 - de Haas-van Alphen effect

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Lecture 30 - Black Hole Thermodynamics

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NPTEL Video Course - Physics - NOC:Elements of Modern Physics

Subject Co-ordinator - Prof. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Reviews of Classical Physics - Newtons Laws of Motion
Lecture 2 - Lagrangian Mechanics
Lecture 3 - Special Theory of Relativity
Lecture 4 - Postulates of Quantam Mechanics, Old Quantam Theory
Lecture 5 - Hydrogen Spectra, Stern Gerlach, Compton Effect
Lecture 6 - Wavefunction, Operators, Representations in QM
Lecture 7 - Solution of Schroedinger Equation for 1D potentials
Lecture 8 - Harmonic Oscillator, Hydrogen Atom
Lecture 9 - Spin Angular Momentum, Perturbation Theory
Lecture 10 - Degenerate Perturbation Theory, Stark Effect
Lecture 11 - Zeeman Effect
Lecture 12 - Operator Methods for Harmonic Oscillator
Lecture 13 - Variational Theory
Lecture 14 - Time Dependent Perturbation Theory
Lecture 15 - Clebsch-Gordon Coefficients
Lecture 16 - Electrostatics
Lecture 17 - Dielectrics
Lecture 18 - Laplaces Equation, Magnetostatics, Maxwell's Equations
Lecture 19 - Ensembles, Microstates and Macrostates
Lecture 20 - Sackur-Tetrode Equation, Density Matrices
Lecture 21 - Identical Particles
Lecture 22 - Quantum Statistics
Lecture 23 - Crystal Structure, Bragg's Law
Lecture 24 - Lattice Vibrations, Specific Heat
Lecture 25 - Free Electron Theory
Lecture 26 - Magnetism and Magnetic Materials
Lecture 27 - Superconductivity, Meissner Effect, Type I and II Superconductors
Lecture 28 - Nuclear Models
Lecture 29 - Radioactive Decay, Half Life

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Lecture 30 - Binding Energy, Shell Model, Liquid drop model
Lecture 31 - Klein-Gordon and Dirac Equations
Lecture 32 - Elementary Particles, Detectors
Lecture 33 - Periodic Table of Elementary Particles, Quark Model

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NPTEL Video Course - Physics - NOC:Essentials of Quantum Optics

Subject Co-ordinator - Prof. Amarendra Kumar Sarma

Co-ordinating Institute - IIT Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quantum Mechanics of Two-level Atom - I
Lecture 2 - Quantum Mechanics of Two-level Atom - II
Lecture 3 - Problem Solving Session - 1
Lecture 4 - Interaction of classical light with two-level atom - I
Lecture 5 - Interaction of classical light with two-level atom - II
Lecture 6 - Problem Solving Session - 2
Lecture 7 - Quantum States: Density Operator - I
Lecture 8 - Quantum States: Density Operator - II
Lecture 9 - Problem Solving Session - 3
Lecture 10 - Quantum States of Composite Systems
Lecture 11 - Quantum Computation Fundamentals - I
Lecture 12 - Quantum Computation Fundamentals - II
Lecture 13 - Problem Solving Session - 4
Lecture 14 - The Quantum Master Equation - I
Lecture 15 - The Quantum Master Equation - II
Lecture 16 - Problem Solving Session - 5
Lecture 17 - Electromagnetically Induced Transparency
Lecture 18 - Quantization of Light
Lecture 19 - Photon Statistics
Lecture 20 - Coherent States of Light
Lecture 21 - Squeezed States of Light
Lecture 22 - Problem Solving Session - 6
Lecture 23 - Circuit QED - I
Lecture 24 - Circuit QED - II
Lecture 25 - The Jaynes Cummings Model
Lecture 26 - Problem Solving Session - 7
Lecture 27 - Cavity Quantum Optomechanics - I
Lecture 28 - Cavity Quantum Optomechanics - II
Lecture 29 - Cavity Quantum Optomechanics - III

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Lecture 30 - Problem Solving Session - 8

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NPTEL Video Course - Physics - Nuclear Physics: Fundamentals and Applications

Subject Co-ordinator - Prof. H.C. Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Overview of the course
Lecture 2 - Nuclear Size
Lecture 3 - Nuclear Size (Continued...)
Lecture 4 - Nuclear Size (Continued...)
Lecture 5 - Semi empirical Mass Formula
Lecture 6 - Semi empirical Mass Formula (Continued...)
Lecture 7 - Semi empirical Mass Formula (Continued...)
Lecture 8 - Semi empirical Mass Formula (Continued...)
Lecture 9 - Semi empirical Mass Formula (Continued...)
Lecture 10 - How are Neutron stars bound
Lecture 11 - Deuteron
Lecture 12 - Deuteron (Continued...)
Lecture 13 - Deuteron (Continued...)
Lecture 14 - Scattering of nucleons
Lecture 15 - Low energy n-p scattering
Lecture 16 - Theories of nuclear forces
Lecture 17 - Shell model
Lecture 18 - Shell model (Continued...)
Lecture 19 - Shell model (Continued...)
Lecture 20 - Shell model (Continued...)
Lecture 21 - Shell model (Continued...)
Lecture 22 - Collective models
Lecture 23 - Vibrational and Rotational levels
Lecture 24 - Radioactivity, Alpha Decay
Lecture 25 - Alpha decay (Continued...)
Lecture 26 - Beta decay
Lecture 27 - Beta decay (Continued...)
Lecture 28 - Beta decay (Continued...)
Lecture 29 - Gamma decay

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Lecture 30 - Nuclear Reactions
Lecture 31 - Nuclear reaction (Continued...)
Lecture 32 - Nuclear reaction (Continued...)
Lecture 33 - Nuclear Fission basics
Lecture 34 - Nuclear fission of uranium
Lecture 35 - Nuclear Fission Reactor
Lecture 36 - Nuclear Energy Programme of India
Lecture 37 - Nuclear Fusion
Lecture 38 - Nuclear fusion (Continued...)
Lecture 39 - Thermonuclear fusion reactors
Lecture 40 - Fusion reactions in Stars and stellar neutrinos
Lecture 41 - Nucleosynthesis of elements in Stars
Lecture 42 - Mossbauer Spectroscopy
Lecture 43 - RBS, PIXE, NAA, Summary

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NPTEL Video Course - Physics - NOC:Introduction to Electromagnetism

Subject Co-ordinator - Prof. Manoj K Harbola

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Coloumb's Law
Lecture 2 - Coloumb's Force due to several Point charges
Lecture 3 - Force due to distribution of Charges
Lecture 4 - What is an Electric Field?
Lecture 5 - Electric Field due to a Charged Distribution
Lecture 6 - Helmholtz's Theorem for Electric Field
Lecture 7 - Divergence of a Field
Lecture 8 - Divergence of Electric Field & Gauss's Law
Lecture 9 - Curl Of a Field - I
Lecture 10 - Curl of a Field - II & Stokes' Theorem
Lecture 11 - Line surface area & volume elements in Cartesian & Cylindrical Coordinates
Lecture 12 - Line surface area & volume elements in Spherical Polar Coordinates
Lecture 13 - Examples of application of the divergence and stokes' theorems
Lecture 14 - Electrostatic Potential
Lecture 15 - Electric field as the gradient of electrostatic potential
Lecture 16 - Laplace's and Poisson's equations for electrostatic potential
Lecture 17 - Elecrostatic potential due to a charge distribution - I; a line charge of finite length
Lecture 18 - Elecrostatic potential due to a charge distribution - II;a ring and a spherical shell of charge
Lecture 19 - Uniqueness of the solution of Laplace's and Poisson's equations
Lecture 20 - Method of images I
Lecture 21 - Method of imagesII
Lecture 22 - Laplaces equations in some other physical phenomena
Lecture 23 - Energy of a charge distribution - I
Lecture 24 - Energy of a charge distribution - II An example
Lecture 25 - Energy of a charge distribution - III Energy density in terms of electric field
Lecture 26 - Electric field and potential in a conductor
Lecture 27 - Reciprocity theorem for conductors - I
Lecture 28 - Reciprocity theorem for conductors - II
Lecture 29 - Electric polarization and bound charges - I

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Lecture 30 - Electric polarization and bound charges - II
Lecture 31 - Electric Displacement
Lecture 32 - Elecrostatics in presence of Dielectric Materials - I
Lecture 33 - Elecrostatics in presence of Dielectric Materials - II
Lecture 34 - Introduction to Magnetostatics; The BiO-Savart law
Lecture 35 - Divergence and curl of Magnetic Field
Lecture 36 - Amperes law for Magnetic Fields
Lecture 37 - Vector Potential for Magnetic Fields
Lecture 38 - Calculation of Vector Potential for a given magnetic field
Lecture 39 - Equation for the Vector Potentialin terms of current density
Lecture 40 - Vector potential from Current Densities - I
Lecture 41 - Vector potential from Current Densities - II
Lecture 42 - Magnetic Materials - I
Lecture 43 - Magnetic Materials - II Bound Current Densities
Lecture 44 - The Auxiliary Field - H
Lecture 45 - Solving for Magnetic Field of a magnet - I
Lecture 46 - Solving for Magnetic Field of a magnet in presence of Magnetic Materials
Lecture 47 - Faradays Law
Lecture 48 - Induced Electric field due to changing Magnetic Field
Lecture 49 - Demonstrations on faradays law, Lenzs law and Nonconservative nature of Induced electric field
Lecture 50 - Energy stord in a magnetic Field-I
Lecture 51 - Energy stord in a magnetic Field-I;solved examples
Lecture 52 - Displacement Current
Lecture 53 - Quasistatic approximation
Lecture 54 - Energy transport by electromagnetic fields; The Poynting Vector
Lecture 55 - The Poynting Vector;solved examples
Lecture 56 - Linear Momentum and Angular Momentum carried by Electromagnetic Fields
Lecture 57
Lecture 58
Lecture 59
Lecture 60
Lecture 61
Lecture 62
Lecture 63
Lecture 64
Lecture 65
Lecture 66 - Solution Assignment 1 - Problems 1 to 3
Lecture 67 - Solution Assignment 1 - Problems 4 to 9
Lecture 68 - Solution Assignment 2 - Problems 1 to 4

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Lecture 69 - Solution Assignment 2 - Problems 5 to 11
Lecture 70 - Solution Assignment 3 - Problems 1 to 5
Lecture 71 - Solution Assignment 3 - Problems 6 to 10
Lecture 72 - Solution Assignment 4- Problems 1 to 5
Lecture 73 - Solution Assignment 4- Problems 6 to 10
Lecture 74 - Solution Assignment 5- Problems 6 to 11
Lecture 75 - Solution Assignment 5- Problems 1to 5
Lecture 76 - Solution Assignment 6- Problems 1 to 4
Lecture 77 - Solution Assignment 6- Problems 5 to 8
Lecture 78 - Solution Problem Set 7

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NPTEL Video Course - Physics - NOC:Engineering Mechanics

Subject Co-ordinator - Prof. Manoj K Harbola

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Vectors
Lecture 2 - Addition and subtraction of vectors
Lecture 3 - Multiplying vectors
Lecture 4 - Introduction to vectors
Lecture 5 - Transformation of vectors under rotation
Lecture 6 - Vector products and their geometric interpretation
Lecture 7 - Vector Product
Lecture 8 - Vector Product
Lecture 9 - Introduction to vectors
Lecture 10 - Equilibrium of rigid bodies Â Forces and torques
Lecture 11 - Calculating torques and couple moments - I
Lecture 12 - Calculating torques and couple moments - II
Lecture 13 - Finding a force and a couple equivalent to an applied force
Lecture 14 - Different elements and associated forces and torques - I
Lecture 15 - Different elements and associated forces and torques - II
Lecture 16 - Solved examples; equilibrium of bodies Â I
Lecture 17 - Solved examples; equilibrium of bodies Â II
Lecture 18 - Forces in different geometric configuration
Lecture 19 - Plane trusses I - building a truss and condition for it to be statically determinate
Lecture 20 - Plane trusses II - calculating forces in a simple truss and different types of trusses
Lecture 21 - Plane trusses III - calculating forces in a simple truss by method of joints
Lecture 22 - Plane trusses IV- Solved examples for calculating forces in a simple truss by method of joints
Lecture 23 - Plane trusses V - Solved examples for calculating forces in a simple truss by method of joints
Lecture 24 - Plane trusses VI - method of sections for calculating forces in a simple truss
Lecture 25 - Dry friction I - introduction with an example
Lecture 26 - Dry friction II - a solved example
Lecture 27 - Dry friction III - Dry thrust bearing and belt friction with demonstration
Lecture 28 - Dry friction IV - Screw friction and rolling friction
Lecture 29 - Dry friction V - Solved examples

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Lecture 30 - Properties of plane surfaces I - First moment and centroid of an area
Lecture 31 - Properties of plane surfaces II - Centroid of an area made by joining several plane surfaces
Lecture 32 - Properties of plane surfaces III - Centroid of a distributed force and its relation with centre
Lecture 33 - Properties of plane surfaces IV - solved examples of calculation of first moment and centroid of
Lecture 34 - Properties of plane surfaces V- Second moment and product of an area and radius of gyration
Lecture 35 - Properties of plane surfaces VI - Parallel axis transfer theorem for second moment and product o
Lecture 36 - Properties of plane surfaces VII - transformation of second moment and product of an area under
Lecture 37 - Properties of plane surfaces VIII - second moment and product of an area, solved examples
Lecture 38 - Method of virtual work I - degrees of freedom, constraints and constraint forces
Lecture 39 - Method of virtual work II - virtual displacement, virtual work and equilibrium condition in term
Lecture 40 - Method of virtual work III - solved examples
Lecture 41 - Motion of a particle in a plane in terms of planar polar coordinates
Lecture 42 - Planar polar coordinates
Lecture 43 - Description of motion in cylindrical and spherical coordinate systems
Lecture 44 - Using planar polar, cylindrical and spherical coordinate systems
Lecture 45 - Motion with constraints, constraint forces and free body diagram
Lecture 46 - Motion with constraints Â solved examples
Lecture 47 - Motion with dry friction Â solved examples
Lecture 48 - Motion with drag Â solved examples
Lecture 49 - Equation of motion in terms of linear momentum and the principle of conservation of linear momen
Lecture 50 - Linear momentum and centre of mass
Lecture 51 - Momentum transfer, impulse and force due to a stream of particles hitting an object
Lecture 52 - Momentum and the variable mass problem
Lecture 53 - Linear momentum Â solved examples
Lecture 54 - Work and energy I - work energy theorem; conservative and non-conservative force fields
Lecture 55 - Work and energy II - Definition of potential energy for conservative forces; total mechanical en
Lecture 56 - Work and energy III - Two solved examples using conservation principles
Lecture 57 - Work and energy IV Â Further discussion on potential energy
Lecture 58 - Work and energy V - Solved examples
Lecture 59 - Work and energy VI Â Applying conservation principles to solve a collision problem
Lecture 60 - Work and energy VII - Solved examples
Lecture 61 - Rigid body motion I - degrees of freedom and number of variables required to describe motion of
Lecture 62 - Rigid body motion II - Equation of motion for a single particle in terms of angular momentum and
Lecture 63 - Rigid body motion III - Conservation of angular momentum; angular momentum for a collection of p
Lecture 64 - Rigid body motion IV - applying angular momentum conservation, a solved example
Lecture 65 - Rigid body motion V (fixed axis rotation) - some demonstrations of conservation of angular momen
Lecture 66 - Rigid body motion VI (fixed axis rotation) - Some more demonstrations and related problems
Lecture 67 - Rigid body motion VII (fixed axis rotation) - Kinetic energy and moment of inertia for fixed axi
Lecture 68 - Rigid body motion VIII (fixed axis rotation) - solved examples for calculating moment of inertia

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Lecture 69 - Rigid body motion IX (fixed axis rotation) - solved examples
Lecture 70 - Rigid body motion X - rotation and translation with axis moving parallel to itself
Lecture 71 - Rigid body motion XI - solved examples for rotation and translation with axis moving parallel to
Lecture 72 - Rigid-body dynamics XII - Some demonstrations on general motion of rigid bodies
Lecture 73 - Rigid-body dynamics XIII - Infinitesimal angles as vector quantities and change of a vector when
Lecture 74 - Rigid-body dynamics XIV - Angular velocity and the rate of change of a rotating vector; relating
Lecture 75 - Rigid-body dynamics XV - Relationship between angular momentum and angular velocity Â the momen
Lecture 76 - Rigid-body dynamics XVI - Solved examples
Lecture 77 - Rigid body motion XVII Â A review of the relation between angular momentum and angular velocity
Lecture 78 - Rigid body motion XVIII- Solved examples for calculating rate of change of angular momentum and
Lecture 79 - Rigid body dynamics XIX - understanding demonstrations shown earlier using equation of motion
Lecture 80 - Rigid body dynamics XX - understanding demonstrations shown earlier using equation of motion (Eu
Lecture 81 - Rigid body dynamics XXI - Euler equations, solved examples
Lecture 82 - Simple harmonic motion I - expanding potential energy about the equilibrium point and the corres
Lecture 83 - Simple harmonic motion II - solving the equation of motion with given initial conditions
Lecture 84 - Simple harmonic motion III - solved examples
Lecture 85 - Simple harmonic motion IV - representing simple harmonic motion on a phasor diagram; energy of a
Lecture 86 - Simple harmonic motion V - solved examples
Lecture 87 - Simple harmonic motion VI - solving the equation of motion with constant friction in the system
Lecture 88 - Simple harmonic motion VII - harmonic oscillator with velocity-dependent damping (heavy damping)
Lecture 89 - Simple harmonic motion VIII - harmonic oscillator with velocity-dependent damping (critical damp
Lecture 90 - Simple harmonic motion IX - solved examples
Lecture 91 - Simple harmonic motion X - harmonic oscillator with velocity-dependent damping (light damping)
Lecture 92 - Simple harmonic motion XI - solved examples
Lecture 93 - Simple harmonic motion XII - oscillations of an un-damped harmonic oscillator subjected to an os
Lecture 94 - Simple harmonic motion XIII - oscillations of a forced damped harmonic oscillator - I
Lecture 95 - Simple harmonic oscillator XIV - oscillations of a forced damped harmonic oscillator - II
Lecture 96 - Simple harmonic oscillator XV - Energy and power in a forced damped harmonic oscillator
Lecture 97 - Simple harmonic oscillator XVI - Solved examples
Lecture 98 - Equation of motion in a uniformly accelerating frame
Lecture 99 - Motion described in a uniformly accelerating frame; solved examples - I
Lecture 100 - Motion described in a uniformly accelerating frame; solved examples - II

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NPTEL Video Course - Physics - NOC:Computational Science and Engineering Using Python

Subject Co-ordinator - Prof. Mahendra Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1 - About Computers
Lecture 2 - Lecture 2 - Python
Lecture 3 - Lecture 3 - Python
Lecture 4 - Lecture 4 - Python
Lecture 5 - Lecture 5A - Python packages; Programming
Lecture 6 - Lecture 5B - Some suggestions on programming
Lecture 7 - Lecture 6 - Plotting in Python
Lecture 8 - Lecture 7 - Errors and Nondimensionalization
Lecture 9 - Lecture 8 - Data I/O and Mayavi
Lecture 10 - Lecture 9 - Lagrange interpolation
Lecture 11 - Lecture 10 - Interpolation II
Lecture 12 - Lecture 11 - Integration I
Lecture 13 - Lecture 12 - Integration II
Lecture 14 - Lecture 13 - Gaussian quadrature continued
Lecture 15 - Lecture 14 - Numerical Differentiation
Lecture 16 - Lecture 15 - ODE solvers
Lecture 17 - Lecture 16 - ODE solvers continued
Lecture 18 - Lecture 17 - Fourier transform
Lecture 19 - Lecture 18 - PDE solver
Lecture 20 - Lecture 19A - PDE solver
Lecture 21 - Lecture 19B - PDE solver
Lecture 22 - Lecture 20 - Linear algebra
Lecture 23 - Lecture 21 - Summary

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NPTEL Video Course - Physics - NOC:Introductory Quantum Mechanics

Subject Co-ordinator - Prof. Manoj K Harbola

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Black Body Radiation I - Relevant Definitions and Black Body as cavity
Lecture 2 - Black Body Radiation II - Intensity of radiation in terms of energy density
Lecture 3 - Black Body Radiation III - Spectral energy density and radiation pressure inside a black body rad
Lecture 4 - Black Body Radiation IV - Stephen's Boltzman law
Lecture 5 - Black Body Radiation V - Wein's Displacement law and analysis for spectral density
Lecture 6 - Black Body Radiation VI - Wein's distribution law and rayleigh - Jeans distribution law
Lecture 7 - Black Body Radiation VII - Quantum Hypothesis and plank's distribution Formula
Lecture 8 - Radiation as a collection of particles called photons
Lecture 9 - Quantum Hypothesis and specific heat of soilds
Lecture 10 - Bohr's Model of hydrogen spectrum
Lecture 11 - Wilson Sommerfeld quantum condition I - Harmonic oscillator and particle in a box
Lecture 12 - Wilson Sommerfeld quantum condition II - Particle moving in a coulomb potential in a plane and r
Lecture 13 - Wilson Sommerfeld quantum condition III - Particle moving in a coulomb potential in 3D and relat
Lecture 14 - Quantum conditions and atomic structure, electron spin and Pauli exclusion principle
Lecture 15 - Interaction of atoms with radiation
Lecture 16 - Stimulated emmision and amplification of light in a LASER
Lecture 17 - Brief description of a LASER
Lecture 18 - Introduction to the correspondence principle
Lecture 19 - General nature of the correspondence principle
Lecture 20 - Selection rules (for transitions) through the correspondence principle
Lecture 21 - Applications of the correspondence principle
Lecture 22 - Heisenberg's formulations of quantum mechanics
Lecture 23 - Heisenberg's formulation of quantum mechanics
Lecture 24 - Heisenberg's formulation of the quantum mechanics
Lecture 25 - Brief introduction to matrix mechanics and the quantum condition in matrix form
Lecture 26 - Introduction to waves and wave equation
Lecture 27 - Sationary waves eigen values and eigen functions
Lecture 28 - Matter waves and their experimental detection
Lecture 29 - Represenating a moving paticle by a wave packet

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Lecture 30 - Stationary-state Schrodinger equation and its solution for a particle in a box
Lecture 31 - Solution of the stationary-state Schrodinger equation for a simple harmonic oscillator
Lecture 32 - Equivalance of Heisenberg and the Schrodinger formulations
Lecture 33 - Equivalance of Heisenberg and Schrodinger formulations
Lecture 34 - Born interpretation of the wavefunction and expectation values of x and p operators
Lecture 35 - Uncertainty principle and its simple applications
Lecture 36 - Time dependent Schrodinger equation the probability current density and the continuity equation
Lecture 37 - Ehrenfest theorem for the expectation values of x and p operators
Lecture 38 - Solution of Schrodinger equation for a particle in one and two delta function potentials
Lecture 39 - Solution of Schrodinger equation for a particle in a finite well
Lecture 40 - Numerical solution of a one dimensional Schrodinger equation for bound states - I
Lecture 41 - Numerical solution of a one dimensional Schrodinger equation for bound states - II
Lecture 42 - Reflection and transmission of particles across a potential barrier
Lecture 43 - Quantum-tunneling and its examples
Lecture 44 - Solution of the Schrodinger for free paticles and periodic boundary conditions
Lecture 45 - Electrons in a metal
Lecture 46 - Schrodinger equation for particles in spherically symmetric potential, angular momentum operator
Lecture 47 - Angular momentum operator and its eigenfunctions
Lecture 48 - Equation for radial component of the wavefunction in spherically symmteric potentials and genera
Lecture 49 - Solution for radial component of the wavefunction for the hydrogen atom
Lecture 50 - Numerical solution for the radial component of wavefunction for spherically symmetric potentials
Lecture 51 - Solution of the Schrodinger equation for one dimensional periodic potential
Lecture 52 - Kroning-Penny model and energy bands
Lecture 53 - Kroning-Penny model with periodic Dirac delta function and energy bands
Lecture 54 - Discussion on bands
Lecture 55 - Summary of the course

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NPTEL Video Course - Physics - NOC:Introduction to Solid State Physics

Subject Co-ordinator - Prof. Satyajit Banerjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Drude's theory of electrons in a metal - Part 1
Lecture 2 - Introduction to Drude's theory of electrons in a metal - Part 2
Lecture 3 - Postulates of Drude's theory
Lecture 4 - Calculating electrical conductivity of metal using Drude's theory of electrons in metal - Part 1
Lecture 5 - Calculating the electrical conductivity of metal using Drude's Model - Part 2
Lecture 6 - Introduction to Hall effect in Metals - Part 1
Lecture 7 - Introduction to Hall effect in metals - Part 2
Lecture 8 - Introduction to Hall effect in metals - Part 3
Lecture 9 - Understanding thermal conductivity of a metal using Drude's model - Part 1
Lecture 10 - Understanding thermal conductivity of a metal using Drude's model - Part 2
Lecture 11 - Introduction to Sommerfeld's Theory of electrons in a metal - Part 1
Lecture 12 - Introduction to Sommerfeld's Theory of electrons in a metal - Part 2
Lecture 13 - Introduction to Sommerfeld's Theory of electrons in a metal - Part 3
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Lecture 19 - Electronic Contribution to the Specific heat of a Solid - Part 1
Lecture 20 - Electronic Contribution to the Specific heat of a Solid - Part 2
Lecture 21 - Electronic Contribution to the Specific heat of a Solid - Part 3
Lecture 22 - Electronic Contribution to the Specific heat of a Solid - Part 4
Lecture 23 - Understanding Thermal conductivity of Metals
Lecture 24 - Introduction to Magnetism in Metal - Part 1
Lecture 25 - Introduction to Magnetism in Metal - Part 2
Lecture 26
Lecture 27 - Introduction to crystals and bonding in crystals
Lecture 28 - Understanding crystal structure using Bravais Lattice
Lecture 29 - Bravais Lattice Types - Part 1

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Lecture 30 - Bravais Lattice Types - Part 2
Lecture 31 - Introduction to different crystal types - Part 1
Lecture 32 - Introduction to different crystal types - Part 2
Lecture 33 - Indexing crystal planes
Lecture 34 - Scattering of X rays from crystals - Part 1
Lecture 35 - Scattering of X rays from crystals - Part 2
Lecture 36 - Reciprocal lattice vectors - Part 1
Lecture 37 - Reciprocal lattice vectors - Part 2
Lecture 38 - Reciprocal lattice vectors and Laue's condition for diffraction of waves in crystals - Part 1
Lecture 39 - Reciprocal lattice vectors and Laue's condition for diffraction of waves in crystals - Part 2
Lecture 40 - Reciprocal lattice vectors, Laue's condition and Bragg's law for diffraction of waves by a cryst
Lecture 41 - Wave equation in a continuous medium and generalization to a discrete medium
Lecture 42 - Derivation of wave equation for motion of atoms in a crystal
Lecture 43 - Solution of the wave equation for a crystal and the relation between frequency Ã•â ° and waveved
Lecture 44 - Group velocity of waves and speed of sound in a crystal
Lecture 45 - Waves in a crystal considering interaction among atoms beyond their nearest neighbours
Lecture 46 - Normal modes in a crystal
Lecture 47 - Experimental determination of Phonon dispersion curves
Lecture 48 - Lattice with two atom basis
Lecture 49 - Displacement of the atoms for the acoustic and optical Phonons
Lecture 50 - Density of states of phonons
Lecture 51 - Calculating the density of states of Phonons
Lecture 52 - Average energy of Phonons at Temperature T
Lecture 53 - Debye's Model of specific heat of crystals
Lecture 54 - Anharmonic effects in crystals
Lecture 55 - Going beyond free electron model
Lecture 56 - Applying perturbation theory to free electron wavefunctions and nearly free electron model
Lecture 57 - Applying perturbation theory to free electron wavefunctions and creation of energy gap at zone b
Lecture 58 - Mixing of plane waves to get Bloch Wavefunction - I
Lecture 59 - Mixing of plane waves to get Bloch Wavefunction - II
Lecture 60 - Equivalence of wave vectors k and k+G and reduced zone scheme
Lecture 61 - Applying periodic boundary condition to Bloch wavefunction and counting the number of states
Lecture 62 - Band theory of metals, insulators and semiconductors
Lecture 63 - Kronig- Penney model
Lecture 64 - Bloch wavefunction as a linear combination of atomic orbitals
Lecture 65 - Tight Binding Model - II
Lecture 66 - Semiclassical dynamics of a particle in a band and Bloch oscillations
Lecture 67 - Experimental observations of Bloch oscillations
Lecture 68 - Concept of hole as a current carrier in semiconductors - I

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Lecture 69 - Concept of hole as a current carrier in semiconductors - II
Lecture 70 - Calculating carrier density in semiconductors - I
Lecture 71 - Calculating carrier density in semiconductors - II
Lecture 72 - Donor and acceptor energy levels in a semiconductor
Lecture 73 - charge carrier density in n-type and p-type semiconductors
Lecture 74 - Electrical conductivity and hall coefficient in semiconductors
Lecture 75 - Paramagnetism in solids I - Magnetic moment and Lande g factor for atoms
Lecture 76 - Paramagnetism in solids II - temperature dependence of paramagnetic susceptibility and Curie's L
Lecture 77 - Hund's rule for calculating the total angular momentum J, orbital angular momentum L and spin ar
Lecture 78 - Examples of performing paramagnetic susceptibility calculations
Lecture 79 - Diamagnetism in Solids
Lecture 80 - Understanding quenching of orbital angular momentum in transition metal ions
Lecture 81 - Ferromagnetism in solids
Lecture 82 - Introduction to Meissner state of superconductors and levitation
Lecture 83 - Superconducting materials and Type-I and Type-II superconductors
Lecture 84 - London's equation for superconductors
Lecture 85 - Application of London's equation, behavior
Lecture 86 - A qualitative introduction to BCS theory of superconductivity
Lecture 87 - Josephson's effect in superconductors and tunneling current across barriers

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NPTEL Video Course - Physics - NOC:Physics of Turbulence

Subject Co-ordinator - Prof. Mahendra Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The turbulence problem
Lecture 2 - Basic hydrodynamics - Governing equations
Lecture 3 - Basic hydrodynamics - Vorticity
Lecture 4 - Basic hydrodynamics - Quadratic quantities
Lecture 5 - Basic hydrodynamics - Example problems
Lecture 6 - Fourier space representation - Definitions
Lecture 7 - Fourier space representation - Flow equations
Lecture 8 - Fourier space representation - Kinetic energy
Lecture 9 - Fourier space representation - Vorticity, Kinetic Helicity, and Enstrophy
Lecture 10 - Fourier space representation - Examples
Lecture 11 - Fourier space representation - Examples (Continued...)
Lecture 12 - Craya-Herring Basis
Lecture 13 - Craya-Herring Basis
Lecture 14 - Craya-Herring Basis
Lecture 15 - Thermal Instability
Lecture 16 - Thermal Instabilities (Continued...)
Lecture 17 - Rotating Convection
Lecture 18 - Magnetoconvection
Lecture 19 - Nonlinear Saturation
Lecture 20 - Patterns, Chaos, and Turbulence
Lecture 21 - Energy Transfers
Lecture 22 - Energy Transfers
Lecture 23 - Energy Transfers
Lecture 24 - Energy Transfers
Lecture 25 - Energy Transfers
Lecture 26 - Energy Transfers
Lecture 27 - Kolmogorov's Theory
Lecture 28 - Kolmogorov's Theory
Lecture 29 - Kolmogorov's Theory

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Lecture 30 - Kolmogorov's four-fifth law
Lecture 31 - Kolmogorov's four-fifth law
Lecture 32 - Kolmogorov's four-fifth law
Lecture 33 - Enstrophy Spectrum and Flux
Lecture 34 - Two-dimensional Turbulence
Lecture 35 - Helical turbulence
Lecture 36 - Flow with a scalar
Lecture 37 - Passive scalar turbulence
Lecture 38 - Stably stratified turbulence
Lecture 39 - Turbulent thermal convection
Lecture 40 - Flow with a vector
Lecture 41 - MHD Turbulence
Lecture 42 - MHD Turbulence
Lecture 43 - MHD Turbulence
Lecture 44 - MHD Turbulence

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NPTEL Video Course - Physics - NOC:Introduction to Astrophysical Fluids

Subject Co-ordinator - Prof. Supratik Banerjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General introduction
Lecture 2 - Phase space and Liouville's theorem
Lecture 3 - Collisionless Boltzmann equation
Lecture 4 - Boltzmann equation for collisional system - I
Lecture 5 - Boltzmann equation for collisional system - II
Lecture 6 - Equilibrium distribution function - I
Lecture 7 - Equilibrium distribution function - II
Lecture 8 - Derivation of moment equations - I
Lecture 9 - Derivation of moment equations - II
Lecture 10 - Application of moment equations in collisionless systems
Lecture 11 - Derivation of ideal fluid equations
Lecture 12 - Macroscopic forces on an ideal fluid
Lecture 13 - Properties of ideal fluid
Lecture 14 - Kevin's vorticity theorem
Lecture 15 - Conservative form and invariants in ideal fluids
Lecture 16 - Steady flow, streamlines and stream function
Lecture 17 - Departure from Maxwellian distribution
Lecture 18 - Derivation of real fluid equations
Lecture 19 - Hydrostatics: Model of solar corona
Lecture 20 - Stellar/solar wind
Lecture 21 - Accretion disks - I
Lecture 22 - A small digression: Newtonian fluids
Lecture 23 - Accretion disk - II
Lecture 24 - Weak perturbation in a compressible fluid: sound wave
Lecture 25 - Effect of nonlinearity: shocks
Lecture 26 - Supernova explosion and spherical blast waves - I
Lecture 27 - Supernova explosion and spherical blast waves - II
Lecture 28 - de Laval nozzle and extragalactic jets
Lecture 29 - Convective instability and Swarzschild stability criterian

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Lecture 30 - Rayleigh Benard convection - I
Lecture 31 - Rayleigh Benard convection - II
Lecture 32 - Jeans instability
Lecture 33 - Waves and instabilities in a two-fluid interface - I
Lecture 34 - Waves and instabilities in a two-fluid interface - II
Lecture 35 - Oscillations of stars
Lecture 36 - Oscillation of stars (Continued...)
Lecture 37 - Rotation in astrofluids and Rayleigh criterion
Lecture 38 - Fluid dynamics in a rotating frame of reference
Lecture 39 - Vorticity theorem in rotating frame and Taylor-Proudman theorem
Lecture 40 - Effect of rotation on a self gravitating mass
Lecture 41 - Effect of rotation in stars
Lecture 42 - Introduction to Plasmas
Lecture 43 - Description of Plasma
Lecture 44 - Kinetic to fluid picture of plasmas
Lecture 45 - MHD fluids: magnetic pressure, magnetic tension and plasma beta
Lecture 46 - Inviscid invariants in MHD
Lecture 47 - Inviscid invariants in MHD (Continued...)
Lecture 48 - Elsasser variables in MHD
Lecture 49 - Linear wave modes in MHD
Lecture 50 - MHD in space plasmas
Lecture 51 - Introduction to turbulence in fluids
Lecture 52 - Richardson-Kolmogorov phenomenology of turbulence
Lecture 53 - Turbulent diffusion
Lecture 54 - Turbulent viscosity
Lecture 55 - Turbulence in MHD fluids
Lecture 56 - Introduction to astrophysical dynamos
Lecture 57 - Anti-dynamo theorem and turbulent dynamos

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NPTEL Video Course - Physics - NOC:Introduction to Electromagnetic Theory (Hindi)

Subject Co-ordinator - Prof. Manoj Harbola

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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NPTEL Video Course - Physics - NOC:Scientific Computing Using Python

Subject Co-ordinator - Prof. Mahendra K. Verma

Co-ordinating Institute - IIT - Kanpur

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NPTEL Video Course - Physics - NOC:Tapestry of Field theory: Classical and Quantum, Equilibrium and Nonequili

Subject Co-ordinator - Prof. Mahendra K. Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Field Theory and Course
Lecture 2 - Integration using Complex Analysis
Lecture 3 - Cauchy Principal Value Theorem
Lecture 4 - Fourier Transform
Lecture 5 - Green's Function and Examples
Lecture 6 - Green's Function in Fourier Space
Lecture 7 - Fourier Transform, Time Frequency
Lecture 8 - Green's Function for Helmholtz Equation and Wave Equation
Lecture 9 - Green's Function for Diffusion and Schrodinger Equation
Lecture 10 - Dimensional Analysis
Lecture 11 - Functionals - Part 1
Lecture 12 - Lagrangian Formalism - Part 2
Lecture 13 - Relativistic Fields
Lecture 14 - Hamiltonian Formalism
Lecture 15 - Principle of Least Action
Lecture 16 - Relativistic Fields and Hamiltonian Formalism
Lecture 17 - Noether's Theorem and Symmetries
Lecture 18 - Review of Quantum Mechanics
Lecture 19 - Second Quantization
Lecture 20 - Field Operators
Lecture 21 - Fock Space and Vaccum Energy
Lecture 22 - Quantization of Bosons and Fermions
Lecture 23 - Examples
Lecture 24 - Free Fermi Gas
Lecture 25 - Propagators and Perturbations
Lecture 26 - Relativistic Quantum Field Theory
Lecture 27 - Feynman Propagator
Lecture 28 - Review of Statistical Mechanics (Partition Function)
Lecture 29 - Feynman Path Integral

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Lecture 30 - Diagrammatic Field Theory (Wick's Theorem)
Lecture 31 - Wick's Theorem (Continued...)
Lecture 32 - Diagrammatic Perturbation Theory
Lecture 33 - Green's Function and Correlation Function
Lecture 34 - Feynman Diagrams
Lecture 35 - Phase Transition and Landau Theory
Lecture 36 - Failure of Landau's Theory
Lecture 37 - Scale Invariance
Lecture 38 - Renormalization Group - Preliminary
Lecture 39 - RG Steps
Lecture 40 - Pertubative Calculations
Lecture 41 - RG Fixed Points
Lecture 42 - Relevent and Irrelevant Variables
Lecture 43 - Behaviour Near Critical Points
Lecture 44 - Computing Critical Exponents
Lecture 45 - Mass and Charge Renormalization, Running Coupling const: Î¦4 Theory
Lecture 46 - Charge and Mass Renormalization: QED and QCD
Lecture 47 - Breaking a Continuous Symmetry (Goldstone Mode)
Lecture 48 - Covariant Electrodynamics (Gauge Interactions)
Lecture 49 - Higgs Mechanism
Lecture 50 - Introduction to Non-Equilibrium Field Theory (Langevin Equation)
Lecture 51 - Fluctuation Dissipation Theorem
Lecture 52 - Kolgomorov's Theory of Turbulence
Lecture 53 - Equilibrium and Non Equilibrium Solution of Navier Stokes
Lecture 54 - Energy Flux in Navier Stokes Equation
Lecture 55 - RG Analysis of Field Theory of Turbulence
Lecture 56 - Renormalized Viscosity and Discussion
Lecture 57 - Renormalization of the Coupling Constant for the Shell Model
Lecture 58 - Flux Computation for the Shell Model of Turbulence
Lecture 59 - Renormalization Group Analysis of Navier Stokes Equation
Lecture 60 - Flux Computation for the Navier Stokes Equation
Lecture 61 - Functional Form of a Dynamical Equation
Lecture 62 - Surface Growth Phenomena: Introduction
Lecture 63 - Surface Growth Phenomena: EW Equation
Lecture 64 - Surface Growth Phenomena: KPZ Equation
Lecture 65 - Surface Growth Phenomena: KPZ Equation (Continued...)
Lecture 66 - RG Procedure for KPZ Equation
Lecture 67 - Noise Renormalization
Lecture 68 - Fixed Point Solution

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Lecture 69 - Weak Turbulence Theory using Examples
Lecture 70 - Weak Turbulence Applications (Rotating Turbulence, Internal and Surface Gravity Waves)
Lecture 71 - Nonlinear Schodinger Equation
Lecture 72 - Field Theory of Passive Scalar Turbulence
Lecture 73 - Course Summary

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NPTEL Video Course - Physics - NOC:Coherence and Quantum Entanglement

Subject Co-ordinator - Prof. Anand Kumar Jha

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Main differences between classical and quantum mechanics
Lecture 2 - Introduction to Coherence and Stochastic Processes
Lecture 3 - The Joint Probability Function used in Classical Optics: The Correlation Functions
Lecture 4 - Second-order Coherence Theory (Temporal)
Lecture 5 - Quantifying the Temporal Correlations
Lecture 6 - Second-order Coherence Theory (Spatial); Spatial Correlations
Lecture 7 - Quantifying the Spatial Correlations
Lecture 8 - Second-order Coherence Theory (Angular); Angular Correlations
Lecture 9 - Second-order Coherence Theory (Polarization)
Lecture 10 - Degree of Polarization
Lecture 11 - Coherent Mode Representation of Optical Fields
Lecture 12 - Review of Quantum Mechanics
Lecture 13 - Quantum Mechanical Correlation Functions
Lecture 14 - Basics of Nonlinear Optics
Lecture 15 - Two-Photon State Produced by Parametric Down-Conversion
Lecture 16 - Coherence and Quantum Entanglement
Lecture 17 - Temporal Two-Photon Interference
Lecture 18 - Some example of Two-Photon Interference Effects
Lecture 19 - Spatial Two-Photon Interference
Lecture 20 - Quantum Measurements
Lecture 21 - Can the Quantum Mechanical Description of Physical Reality be Considered Complete ?
Lecture 22 - Hidden Variable Interpretation of Quantum Mechanics
Lecture 23 - Bell Inequalities
Lecture 24 - Entanglement Verification
Lecture 25 - Entanglement Quantification and Connection Between Coherence and Entanglement
Lecture 26 - 84 Quantum Cryptography
Lecture 27 - Quantum Teleportation

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NPTEL Video Course - Physics - NOC:Classical Motion of a Single Particle

Subject Co-ordinator - Prof. Supratik Banerjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Newton's laws of motion
Lecture 2 - From dynamics to Kinematics
Lecture 3 - Equations of dynamics and constants of motion
Lecture 4 - Constants of motion (Continued...), Wrok-energy theorem and conservative forces
Lecture 5 - Dynamics under constants and central forces
Lecture 6 - Derivation of gradient form from zero curl condition
Lecture 7 - Concept of equilibrium
Lecture 8 - Terminal velocity, stable and unstable equilibria
Lecture 9 - Stable and unstable equilibria in more than one dimensions
Lecture 10 - Motion in one-dimensional potential
Lecture 11 - Solving equations of motion in one dimension
Lecture 12 - Calculation of Work Done in a Force Field
Lecture 13 - Central forces, Velocity and Acceleration in Plane Polar Coordinates
Lecture 14 - Dynamics and Trajectories Under a Central Force
Lecture 15 - Equation For Trajectories Under a Central Force (Continued...) : Binet Equation
Lecture 16 - Trajectory of a Particle Under Attractive Inverse-Square Force Law
Lecture 17 - Energy Diagram in an Effective One-Dimensional Motion
Lecture 18 - Two Interesting Problems On the motion Under Central Forces
Lecture 19 - Motion Under an Attractive Inverse-Square Force
Lecture 20 - Motion Under an Attractive Inverse-Square Force (Continued...)
Lecture 21 - Trajectories Under Attractive Inverse-Square Force, Laws of Kepler
Lecture 22 - Laplace Runge-Lenz Vector
Lecture 23 - Simple harmonic oscillators
Lecture 24 - Two examples of simple harmonic oscillation
Lecture 25 - Forced harmonic oscillator
Lecture 26 - Forced harmonic oscillator at resonance
Lecture 27 - Damped harmonic oscillator
Lecture 28 - Nature of motion under a harmonic potential
Lecture 29 - Comparison among three types of damped oscillation

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Lecture 30 - Forced harmonic oscillator with damping
Lecture 31 - A problem on damped harmonic oscillator
Lecture 32 - Beats
Lecture 33 - Motion of a particle in electric and magnetic fields
Lecture 34 - E X B drift
Lecture 35 - Inertial frames of reference, Galilean transformation
Lecture 36 - Non-inertial frames of reference, pseudo forces
Lecture 37 - Motion of a particle in a rotating frame of reference
Lecture 38 - Motion of a particle relative to an observer on earth
Lecture 39 - Motion of a particle under various constraints
Lecture 40 - Principle of Virtual work, D'Alembert's principle
Lecture 41 - Lagrange's equation of first kind
Lecture 42 - Solving problems using Lagrange's equation of first kind
Lecture 43 - Generalized Coordinates and Generalized Velocities
Lecture 44 - Knetic Energy and Acceleration in Terms of Generalized Coordinates
Lecture 45 - Generalized Momentum and Generalized Force; Derivation of Euler-Lagrange Equation
Lecture 46 - Euler Lagrange Equation, Cyclic Coordinates and Other Properties
Lecture 47 - Properties of Euler-Lagrange equations (Continued...)
Lecture 48 - Lagrangian of various oscillating systems
Lecture 49 - Problem solving using Euler-Lagrange equations
Lecture 50 - Concept of Phase Space
Lecture 51 - Phase space trajectories and fixed points
Lecture 52 - Stability of fixed points
Lecture 53 - Different types of fixed points
Lecture 54 - Fixed points and their stability for mechanical systems
Lecture 55 - Linear two-dimensional phase space dynamics
Lecture 56 - Linear two-dimensional phase space dynamics (Continued...)
Lecture 57 - Concept of limit cycles
Lecture 58 - Lorenz equations and introduction to chaos

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NPTEL Video Course - Physics - Astrophysics and Cosmology

Subject Co-ordinator - Prof. S. Bharadwaj

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Keplers Law
Lecture 3 - The Solar System
Lecture 4 - The Solar System (Continued...)
Lecture 5 - Binary Systems
Lecture 6 - Binary Systems (Continued...)
Lecture 7 - Tidal Forces and the Earth Moon System
Lecture 8 - Fluid Mechanics
Lecture 9 - Hydrostatics and the Solar Wind
Lecture 10 - Radiative Transfer
Lecture 11 - Radiative Transfer (Continued...)
Lecture 12 - Thermal Radiation
Lecture 13 - Thermal Radiation and the Sun
Lecture 14 - Virial Theorem and Its Application to Stars
Lecture 15 - Stars
Lecture 16 - Stellar Physics - I
Lecture 17 - Stellar Physics - II
Lecture 18 - Stellar Physics - III
Lecture 19 - Stellar Physics - IV
Lecture 20 - Stellar Physics - V
Lecture 21 - White Dwarfs
Lecture 22 - White Dwarfs and Neutron Stars
Lecture 23 - Galaxies
Lecture 24 - Galaxies and the Expanding Universe
Lecture 25 - The Expanding Universe
Lecture 26 - Dynamics of the Expanding Universe
Lecture 27 - Dynamics of the Expanding Universe (Continued...)
Lecture 28 - The Expanding Universe and the Cosmological Metric
Lecture 29 - The Cosmological Space - Time

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Lecture 30 - Distances
Lecture 31 - Distances (Continued...)
Lecture 32 - Distances and the Hubble Parameter
Lecture 33 - Distances, the Hubble Parameter and Dark Energy (Continued...)
Lecture 34 - CMBR and Thermal History
Lecture 35 - CMBR and Thermal History (Continued...1)
Lecture 36 - CMBR and Thermal History (Continued...2)
Lecture 37 - Thermal History, Expansion Rate and Neutrino Mass
Lecture 38 - Thermal History
Lecture 39 - Big Bang Nucleosynthesis

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NPTEL Video Course - Physics - NOC:Mathematics Methods in Physics - I

Subject Co-ordinator - Prof. Samudra Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Set, Group, Field, Ring
Lecture 2 - Vector Space
Lecture 3 - Span, Linear combination of vectors
Lecture 4 - Linearly dependent and independent vector, Basis
Lecture 5 - Dual Space
Lecture 6 - Inner Product
Lecture 7 - Schwarz Inequality
Lecture 8 - Inner product space, Gram-Schmidt Ortho-normalization
Lecture 9 - Projection operator
Lecture 10 - Transformation of Basis
Lecture 11 - Transformation of Basis (Continued...)
Lecture 12 - Unitary transformation, Similarity Transformation
Lecture 13 - Eigen Value, Eigen Vectors
Lecture 14 - Normal Matrix
Lecture 15 - Diagonalization of a Matrix
Lecture 16 - Hermitian Matrix
Lecture 17 - Rank of a Matrix
Lecture 18 - Cayley - Hamilton Theorem, Function space
Lecture 19 - Metric Space, Linearly dependent - independent functions
Lecture 20 - Linearly dependent â independent functions (Continued...), Inner Product of functions
Lecture 21 - Orthogonal functions
Lecture 22 - Delta Function, Completeness
Lecture 23 - Fourier
Lecture 24 - Fourier Series (Continued...)
Lecture 25 - Parseval Theorem, Fourier Transform
Lecture 26 - Parseval Relation, Convolution Theorem
Lecture 27 - Polynomial space, Legendre Polynomial
Lecture 28 - Monomial Basis, Factorial Basis, Legendre Basis
Lecture 29 - Complex Numbers

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Lecture 30 - Geometrical interpretation of complex numbers
Lecture 31 - de Moivreâ s Theorem
Lecture 32 - Roots of a complex number
Lecture 33 - Set of complex no, Stereographic projection
Lecture 34 - Complex Function, Concept of Limit
Lecture 35 - Derivative of Complex Function, Cauchy-Riemann Equation
Lecture 36 - Analytic Function
Lecture 37 - Harmonic Conjugate
Lecture 38 - Polar form of Cauchy-Riemann Equation
Lecture 39 - Multi-valued function and Branches
Lecture 40 - Complex Line Integration, Contour, Regions
Lecture 41 - Complex Line Integration (Continued...)
Lecture 42 - Cauchy-Goursat Theorem
Lecture 43 - Application of Cauchy-Goursat Theorem
Lecture 44 - Cauchyâ s Integral Formula
Lecture 45 - Cauchyâ s Integral Formula (Continued...)
Lecture 46 - Series and Sequence
Lecture 47 - Series and Sequence (Continued...)
Lecture 48 - Circle and radius of convergence
Lecture 49 - Taylor Series
Lecture 50 - Classification of singularity
Lecture 51 - Laurent Series, Singularity
Lecture 52 - Laurent series expansion
Lecture 53 - Laurent series expansion (Continued...), Concept of Residue
Lecture 54 - Classification of Residue
Lecture 55 - Calculation of Residue for quotient from
Lecture 56 - Cauchyâ s Residue Theorem
Lecture 57 - Cauchyâ s Residue Theorem (Continued...)
Lecture 58 - Real Integration using Cauchyâ s Residue Theorem
Lecture 59 - Real Integration using Cauchyâ s Residue Theorem (Continued...)
Lecture 60 - Real Integration using Cauchyâ s Residue Theorem (Continued...)

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NPTEL Video Course - Physics - NOC:Classical Mechanics - from Newtonian to Lagrangian Formulation

Subject Co-ordinator - Prof. Debamalya Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6 - Systems with variable mass - 3
Lecture 7 - Systems with variable mass - 4
Lecture 8 - Central force - 1
Lecture 9 - Central force - 2
Lecture 10 - Central force - 3
Lecture 11 - Central force - 4
Lecture 12 - Central force - 5
Lecture 13 - Central force - 6
Lecture 14 - Central force - 7
Lecture 15 - Central force - 8
Lecture 16 - Central force - 9
Lecture 17 - Central force - 10
Lecture 18 - Central force - 11
Lecture 19 - Central force - 12
Lecture 20 - Central force - 13
Lecture 21 - Central force - 14
Lecture 22 - Central force - 15
Lecture 23 - Mooring Co-ordinate Systems - 1
Lecture 24 - Mooring Co-ordinate Systems - 2
Lecture 25 - Mooring Co-ordinate Systems - 3
Lecture 26 - Mooring Co-ordinate Systems - 4
Lecture 27 - Rigid body dynamics - 1
Lecture 28 - Rigid body dynamics - 2
Lecture 29 - Rigid body dynamics - 3

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Lecture 30 - Rigid body dynamics - 4
Lecture 31 - Rigid body dynamics - 5
Lecture 32 - Rigid body dynamics - 6
Lecture 33 - Rigid body dynamics - 7
Lecture 34 - Rigid body dynamics - 8
Lecture 35 - Rigid body dynamics - 9
Lecture 36 - Rigid body dynamics - 10
Lecture 37 - Rigid body dynamics - 11
Lecture 38 - Rigid body dynamics - 12
Lecture 39 - Rigid body dynamics - 13
Lecture 40 - Rigid body dynamics - 14
Lecture 41 - Rigid body dynamics - 15
Lecture 42 - Rigid body dynamics - 16
Lecture 43 - Lagrangian Formulation - 1
Lecture 44 - Lagrangian Formulation - 2
Lecture 45 - Lagrangian Formulation - 3
Lecture 46 - Lagrangian Formulation - 4
Lecture 47 - Lagrangian Formulation - 5
Lecture 48 - Lagrangian Formulation - 6
Lecture 49 - Lagrangian Formulation - 7
Lecture 50 - Lagrangian Formulation - 8
Lecture 51 - Lagrangian Formulation - 9
Lecture 52 - Lagrangian Formulation - 10
Lecture 53 - Small oscillation - 1
Lecture 54 - Small oscillation - 2
Lecture 55 - Small oscillation - 3
Lecture 56 - Small oscillation - 4
Lecture 57 - Small oscillation - 5
Lecture 58 - Small oscillation - 6
Lecture 59 - Small oscillation - 7
Lecture 60 - Small oscillation - 8

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NPTEL Video Course - Physics - NOC:Solid State Physics

Subject Co-ordinator - Prof. Amal Kumar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Atom to Solid Structure
Lecture 2 - Atom to Solid Structure (Continued...)
Lecture 3 - Structure of Solid
Lecture 4 - Structure of Solid (Continued...)
Lecture 5 - Crystal Structure
Lecture 6 - Crystal Structure (Continued...)
Lecture 7 - Crystal Structure (Continued...)
Lecture 8 - Crystal Structure (Continued...)
Lecture 9 - Crystal Structure (Continued...)
Lecture 10 - Crystal Structure (Continued...)
Lecture 11 - Crystal Structure (Continued...)
Lecture 12 - Crystal Structure (Continued...)
Lecture 13 - Crystal Structure (Continued...)
Lecture 14 - Crystal Structure (Continued...)
Lecture 15 - Crystal Structure (Continued...)
Lecture 16 - Crystal Structure (Continued...)
Lecture 17 - Crystal Structure (Continued...)
Lecture 18 - X-ray Diffraction from Crystal
Lecture 19 - X-ray Diffraction from Crystal (Continued...)
Lecture 20 - X-ray Diffraction from Crystal (Continued...)
Lecture 21 - X-ray Diffraction from Crystal (Continued...)
Lecture 22 - X-ray Diffraction from Crystal (Continued...)
Lecture 23 - X-ray Diffraction from Crystal (Continued...)
Lecture 24 - X-ray Diffraction from Crystal (Continued...)
Lecture 25 - Reciprocal Lattice
Lecture 26 - Reciprocal Lattice (Continued...)
Lecture 27 - Reciprocal Lattice (Continued...)
Lecture 28 - Reciprocal Lattice (Continued...)
Lecture 29 - Reciprocal Lattice (Continued...)

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Lecture 30 - Intensity of Bragg Diffraction
Lecture 31 - Intensity of Bragg Diffraction (Continued...)
Lecture 32 - Electrical Properties of Metal
Lecture 33 - Electrical Properties of Metal (Continued...)
Lecture 34 - Electrical Properties of Metal (Continued...)
Lecture 35 - Electrical Properties of Metal (Continued...)
Lecture 36 - Electrical Properties of Metal (Continued...)
Lecture 37 - Electrical Properties of Metal (Continued...)
Lecture 38 - Electrical Properties of Metal (Continued...)
Lecture 39 - Electrical Properties of Metal (Continued...)
Lecture 40 - Band Theory of Solids
Lecture 41 - Band Theory of Solids (Continued...)
Lecture 42 - Band Theory of Solids (Continued...)
Lecture 43 - Band Theory of Solids (Continued...)
Lecture 44 - Band Theory of Solids (Continued...)
Lecture 45 - Band Theory of Solids (Continued...)
Lecture 46 - Band Theory of Solids (Continued...)
Lecture 47 - Physics of Semiconductor
Lecture 48 - Physics of Semiconductor (Continued...)
Lecture 49 - Physics of Semiconductor
Lecture 50 - Electrical Conduction
Lecture 51 - Electrical Conduction
Lecture 52
Lecture 53
Lecture 54 - Thermal Properties of Solid (Continued...)
Lecture 55 - Thermal Properties of Solid (Continued...)
Lecture 56 - Thermal Properties of Solid (Continued...)
Lecture 57 - Thermal Properties of Solid (Continued...)
Lecture 58 - Magnetic Property of Solid
Lecture 59 - Magnetic Property of Solid (Continued...)
Lecture 60 - Magnetic Property of Solid (Continued...)
Lecture 61 - Magnetic Property of Solid (Continued...)
Lecture 62 - Magnetic Property of Solid (Continued...)
Lecture 63 - Magnetic Property of Solid (Continued...)
Lecture 64 - Magnetic Property of Solid (Continued...)
Lecture 65 - Magnetic Property of Solid (Continued...)
Lecture 66 - Magnetic Property of Solid (Continued...)
Lecture 67 - Magnetic Property of Solid (Continued...)
Lecture 68 - Magnetic Property of Solid (Continued...)

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Lecture 69 - Magnetic Property of Solid (Continued...)
Lecture 70 - Magnetic Property of Solid (Continued...)
Lecture 71 - Magnetic Property of Solids (Continued...)
Lecture 72 - Dielectric Properties of Solid
Lecture 73 - Dielectric Properties of Solid (Continued...)
Lecture 74 - Dielectric Properties of Solid (Continued...)
Lecture 75 - Superconductivity

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NPTEL Video Course - Physics - NOC:Atomic and Molecular Physics

Subject Co-ordinator - Prof. Amal Kumar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Experimental observations and theoretical development in discovery of constituents of an atom
Lecture 2 - Experimental observations and theoretical development in discovery of constituents of an atom (C
Lecture 3 - Experimental observations and theoretical development in discovery of constituents of an atom (C
Lecture 4 - Experimental observations and theoretical development in discovery of constituents of an atom (C
Lecture 5 - Experimental observations and theoretical development in discovery of constituents of an atom (C
Lecture 6 - Structure of an atom
Lecture 7 - Structure of an atom
Lecture 8 - Structure of an atom (Continued...)
Lecture 9 - Atomic structure of an atom
Lecture 10 - Atomic structure of an atom
Lecture 11 - Structure of an atom
Lecture 12 - Atomic structure of an atom
Lecture 13 - Atomic structure of an atom
Lecture 14 - Structure of an atom
Lecture 15 - Structure of an atom
Lecture 16 - Structure of an atom
Lecture 17 - Structure of an atom
Lecture 18 - Structure of an atom
Lecture 19 - Structure of an atom
Lecture 20 - Structure of an atom
Lecture 21 - Atomic spectra
Lecture 22 - Atomic spectra
Lecture 23 - Multielectron atoms
Lecture 24 - Multielectron atoms (Continued...)
Lecture 25 - Multielectron atoms (Continued...)
Lecture 26 - Multielectron atoms (Continued...)
Lecture 27 - Quantum mechanical treatment
Lecture 28 - Quantum mechanical treatment (Continued...)
Lecture 29 - Quantum mechanical treatment of H-like atom

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Lecture 30 - Quantum mechanical treatment of H-like atom (Continued...)
Lecture 31 - Quantum mechanical treatment of Hydrogen like atom
Lecture 32 - Quantum mechanical treatment of Hydrogen like atom (Continued...)
Lecture 33 - Quantum mechanical treatment of hydrogen like atom (Continued...)
Lecture 34 - Quantum mechanical treatment of hydrogen like atom (Continued...)
Lecture 35 - Quantum mechanical treatment of hydrogen like atom (Continued...)
Lecture 36 - Quantum Mechanical treatment of Hydrogen like atom (Continued...)
Lecture 37 - Quantum Mechanical treatment of Hydrogen like atom (Continued...)
Lecture 38 - Hydrogen like atom in magnetic field
Lecture 39 - Hydrogen like atom in magnetic field (Continued...)
Lecture 40 - Hydrogen like atom in electric field
Lecture 41 - Physics of molecules
Lecture 42 - Rotation of a molecule
Lecture 43 - Rotation of a molecule (Continued...)
Lecture 44 - Rotation of a molecule (Continued...)
Lecture 45 - Rotation of a molecule (Continued...)
Lecture 46 - Vibration of a molecule
Lecture 47 - Vibration of a molecule (Continued...)
Lecture 48 - Vibration of a molecule (Continued...)
Lecture 49 - Vibration of a molecule (Continued...)
Lecture 50 - Vibration of a molecule (Continued...)
Lecture 51 - Electronic spectra of a molecule
Lecture 52 - Electronic spectra of a molecule (Continued...)
Lecture 53 - Electronic structure of molecules
Lecture 54 - Electronic structure of molecules (Continued...)
Lecture 55 - Electronic structure of a molecule
Lecture 56 - Atomic and Molecular Spectroscopy
Lecture 57 - Raman Spectroscopy
Lecture 58 - Raman Spectroscopy (Continued...)
Lecture 59 - Raman Spectroscopy (Continued...)
Lecture 60 - Resonance spectroscopy

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NPTEL Video Course - Physics - NOC:Modern Optics

Subject Co-ordinator - Prof. Partha Roy Choudhuri

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Maxwells equations and electromagnetic waves
Lecture 2 - Maxwells equations and electromagnetic waves (Continued...)
Lecture 3 - Maxwells equations and electromagnetic waves (Continued...)
Lecture 4 - Maxwells equations and electromagnetic waves (Continued...)
Lecture 5 - Maxwells equations and electromagnetic waves (Continued...)
Lecture 6 - Maxwells equations and electromagnetic waves (Continued...)
Lecture 7 - Maxwells equations and electromagnetic waves (Continued...)
Lecture 8 - Wave propagation in anisotropic media
Lecture 9 - Wave propagation in anisotropic media (Continued...)
Lecture 10 - Wave propagation in anisotropic media (Continued...)
Lecture 11 - Wave propagation in anisotropic media (Continued...)
Lecture 12 - Wave propagation in anisotropic media (Continued...)
Lecture 13 - Wave propagation in layered structures
Lecture 14 - Wave propagation in layered structures (Continued...)
Lecture 15 - Wave propagation in layered structures (Continued...)
Lecture 16 - Wave propagation in layered structures (Continued...)
Lecture 17 - Wave propagation in layered structures (Continued...)
Lecture 18 - Waves in guided structures and modes
Lecture 19 - Waves in guided structures and modes (Continued...)
Lecture 20 - Waves in guided structures and modes (Continued...)
Lecture 21 - Waves in guided structures and modes (Continued...)
Lecture 22 - Waves in guided structures and modes (Continued...)
Lecture 23 - Waves in guided structures and modes (Continued...)
Lecture 24 - Coupling of waves and optical couplers
Lecture 25 - Coupling of waves and optical couplers (Continued...)
Lecture 26 - Coupling of waves and optical couplers (Continued...)
Lecture 27 - Coupling of waves and optical couplers (Continued...)
Lecture 28 - Coupling of waves and optical couplers (Continued...)
Lecture 29 - Electro-optic Effect

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Lecture 30 - Electro-optic Effect (Continued...)
Lecture 31 - Electro-optic Effect (Continued...)
Lecture 32 - Electro-optic Effect (Continued...)
Lecture 33 - Electro-optic Effect (Continued...)
Lecture 34 - Electro-optic Modulators and Devices
Lecture 35 - Electro-optic Modulators and Devices (Continued...)
Lecture 36 - Electro-optic Modulators and Devices (Continued...)
Lecture 37 - Electro-optic Modulators and Devices (Continued...)
Lecture 38 - Electro-optic Modulators and Devices (Continued...)
Lecture 39 - Electro-optic Modulators and Devices (Continued...)
Lecture 40 - Electro-optic Modulators and Devices (Continued...)
Lecture 41 - Acousto-optic Effect
Lecture 42 - Acousto-optic Effect (Continued...)
Lecture 43 - Acousto-optic Effect (Continued...)
Lecture 44 - Acousto-optic Effect (Continued...)
Lecture 45 - Acousto-optic Effect (Continued...)
Lecture 46 - Acousto-optic Effect (Continued...)
Lecture 47 - Acousto-optic Effect (Continued...)
Lecture 48 - Acousto-optic Effect (Continued...)
Lecture 49 - Acousto-optic Effect (Continued...)
Lecture 50 - Acousto-optic Effect (Continued...)
Lecture 51 - Acousto-optic Effect (Continued...)
Lecture 52 - Acousto-optic Effect (Continued...)
Lecture 53 - Acousto-optic Effect (Continued...)
Lecture 54 - Acousto-optic Modulators and Devices
Lecture 55 - Acousto-optic Modulators and Devices (Continued...)
Lecture 56 - Acousto-optic Modulators and Devices (Continued...)
Lecture 57 - Acousto-optic Modulators and Devices (Continued...)
Lecture 58 - Magneto-optic Effect
Lecture 59 - Magneto-optic Effect (Continued...)

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NPTEL Video Course - Physics - NOC:Introduction to Non-linear Optics and its Applications

Subject Co-ordinator - Prof. Samudra Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Linear Optics
Lecture 2 - Basic Linear Optics (Continued...)
Lecture 3 - Basic Linear Optics (Continued...)
Lecture 4 - Basic Linear Optics (Continued...)
Lecture 5 - Basic Linear Optics (Continued...)
Lecture 6 - Basic Linear Optics (Continued...)
Lecture 7 - Basic Linear Optics (Continued...)
Lecture 8 - Basic Linear Optics (Continued...)
Lecture 9 - Basic Linear Optics (Continued...)
Lecture 10 - Nonlinear Optics
Lecture 11 - Classical origin of optical nonlinearity
Lecture 12 - Millerâ s Rule
Lecture 13 - Second Harmonic Generation (SHG)
Lecture 14 - Optical Rectification, Linear electro-optic effect
Lecture 15 - Sum and Difference frequency generation
Lecture 16 - Nonlinear Maxwellâ s equation
Lecture 17 - Theory of SHG
Lecture 18 - Phase matching
Lecture 19 - Phase matching of SHG, Gain band width calculation
Lecture 20 - Manley-Rowe Relation, Energy conservation in SHG,
Lecture 21 - Birefringence phase-matching (BPM),Type I and Type II phase matching
Lecture 22 - Type II phase matching, Symmetry in nonlinear susceptibility
Lecture 23 - Kleinmanâ s Symmetry, Neumannâ s Principle
Lecture 24 - Neumannâ s Principle (Continued...) Centrosymmetric system
Lecture 25 - Matrix form
Lecture 26 - SHG in KDP crystal, Calculation of deff
Lecture 27 - SHG in LiNbO3
Lecture 28 - Quasi phase matching (QPM)
Lecture 29 - Quasi phase matching (QPM) (Continued...), Periodic d function

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Lecture 30 - 1st, 2nd, 3rd order QPM, SHG under depleted pump
Lecture 31 - Realistic calculation of SHG, 3 wave interaction
Lecture 32 - 3 wave interaction, Equation for pump, signal and idler wave, Non-collinear phase matching
Lecture 33 - Manley-Rowe Relation (3 wave mixing), Parametric down conversion
Lecture 34 - Parametric down conversion (Continued...), Optical Parametric Amplification (OPA)
Lecture 35 - Optical Parametric Amplification (OPA), Difference frequency generation under OPA
Lecture 36 - Sum frequency generation under OPA
Lecture 37 - OPA under non-phase matching condition, Expression of gain
Lecture 38 - Optical parametric Oscillator (OPO), Singly resonant oscillator
Lecture 39 - Doubly Resonant Oscillator (DRO)
Lecture 40 - Doubly Resonant Oscillator (DRO) (Continued...)
Lecture 41 - 3rd order nonlinear effect
Lecture 42 - Optical Kerr effect and Self-focusing, Symmetry in 3rd order susceptibility
Lecture 43 - Symmetry in 3rd order susceptibility (Continued...), Self Phase Modulation (SPM)
Lecture 44 - Self Phase Modulation (Continued...), Frequency Shift
Lecture 45 - Third Harmonic Generation(3HG), Energy conservation
Lecture 46 - Third Harmonic Generation (Continued...)
Lecture 47 - Third Harmonic Generation (Continued...), Cross Phase Modulation (XPM)
Lecture 48 - Cross Phase Modulation (Continued...), Nonlinear Absorption
Lecture 49 - Four Wave Mixing
Lecture 50 - Four Wave mixing (Continued...)
Lecture 51 - Parametric Amplification under FWM
Lecture 52 - Parametric Amplification under FWM (Continued...)
Lecture 53 - Optical Phase Conjugation
Lecture 54 - Raman Scattering
Lecture 55 - Stimulated Raman Scattering
Lecture 56 - Raman Amplification
Lecture 57 - Raman Amplification (Continued...)
Lecture 58 - Linear pulse propagation
Lecture 59 - Nonlinear Pulse propagation
Lecture 60 - Optical Soliton

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NPTEL Video Course - Physics - NOC:Upstream LNG Technology

Subject Co-ordinator - Prof. Pavitra Sandilya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Concentration
Lecture 3 - Sources and Process Overview of Natural Gas
Lecture 4 - Pure Component Phase Behavior
Lecture 5 - Mixture Phase Behavior
Lecture 6 - Phase Behaviour of Natural Gas
Lecture 7 - Dew Point and Bubble Point Calculations
Lecture 8 - Vapor Liquid Equilibrium
Lecture 9 - Problems on Vapor Pressure, Gibb's Phase Rule, Dew Point Bubble Point Temperatures
Lecture 10 - Thermophysical Properties of Natural Gas - I
Lecture 11 - Thermophysical Properties of Natural Gas - II
Lecture 12 - Thermodynamic and Chemical Properties
Lecture 13 - Combustion Properties
Lecture 14 - Flow in Natural Gas Systems
Lecture 15 - Flow Measurement In Natural Gas - I
Lecture 16 - Flow Measurement In Natural Gas - II
Lecture 17 - Temperature and Quality Measurement in Natural Gas Systems
Lecture 18 - Pressure measurement in natural gas systems
Lecture 19 - Tutorial on the estimation of thermophysical properties
Lecture 20 - Tutorial on the combustion and thermodynamic properties of natural gas
Lecture 21 - Tutorial on fluid mechanics
Lecture 22 - Tutorial on flow and pressure measurement in natural gas systems
Lecture 23 - Tutorial on temperature and quality measurement in natural gas
Lecture 24 - Heat transfer in natural gas systems
Lecture 25 - Tutorial on heat transfer in natural gas systems
Lecture 26 - Heat exchangers in natural gas systems
Lecture 27 - Analysis of heat exchangers in natural gas systems
Lecture 28 - Tutorial on heat exchanger analysis
Lecture 29 - Equillibrium vapour-liquid separation

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Lecture 30 - Equillibrium in multicomponent systems
Lecture 31 - Separation by distillation
Lecture 32 - Design of distillation column
Lecture 33 - Equillibrium fluid solid separation
Lecture 34 - Membrane separation in natural gas systems
Lecture 35 - Estimation of water content in natural gas
Lecture 36 - Multistage single component equillibrium separation
Lecture 37 - Tutorial on vapour liquid separation
Lecture 38 - Tutorial on ideal binary distillation
Lecture 39 - Tutorial on equillibrium gas- solid separation
Lecture 40 - Tutorial on membrane gas separation
Lecture 41 - Dehydration of natural gas
Lecture 42 - Natural gas Processing - hydrate removal
Lecture 43 - Acid gas removal in natural gas system - I
Lecture 44 - Acid gas removal in natural gas system - II
Lecture 45 - Nitrogen removal in natural gas system - I
Lecture 46 - Nitrogen removal in natural gas system - II
Lecture 47 - Compression in natural gas systems
Lecture 48 - Compressors used in natural gas systems
Lecture 49 - Tutorial on hydrate removal
Lecture 50 - Multicomponent distillation column design
Lecture 51 - Sulfur recovery in natural gas systems - I
Lecture 52 - Tutorial on compression
Lecture 53 - Pigging
Lecture 54 - Sulfur recovery in natural gas systems - II
Lecture 55 - Trace components in natural gas
Lecture 56 - Helium recovery, upgradation and purification
Lecture 57 - Fundamentals of absorption and stripping for natural gas processing
Lecture 58 - Tutorial on absorption and stripping
Lecture 59 - Gas liquid separation in natural gas systems - I
Lecture 60 - Gas liquid separation in natural gas systems - II
Lecture 61 - Tutorial on equillibrium in multicomponent systems
Lecture 62 - Tutorial on multicomponent distillation - I
Lecture 63 - Tutorial on multicomponent distillation - II
Lecture 64 - Pumps in natural gas systems - I
Lecture 65 - Pumps in natural gas systems - II
Lecture 66 - Pumps in natural gas systems - III
Lecture 67 - Tutorial on pumps - I
Lecture 68 - Tutorial on pumps - II

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Lecture 69 - Cryogenic refrigeration and liquefaction in natural gas systems - I
Lecture 70 - Cryogenic refrigeration and liquefaction in natural gas systems - II
Lecture 71 - Tutorial on refrigeration - I
Lecture 72 - Tutorial on refrigeration - II
Lecture 73 - Cryogenic refrigeration and liquefaction in natural gas systems - III
Lecture 74 - Cryogenic refrigeration and liquefaction in natural gas systems - IV
Lecture 75 - Cryogenic refrigeration and liquefaction in natural gas systems - V
Lecture 76 - Tutorial on refrigeration - III
Lecture 77 - Tutorial on refrigeration and liquefaction - IV
Lecture 78 - Tutorial on refrigeration and liquefaction - V
Lecture 79 - Hydrocarbon recovery in natural gas system - I
Lecture 80 - Hydrocarbon recovery in natural gas system - II
Lecture 81 - Hydrocarbon recovery in natural gas system - III
Lecture 82 - Tutorial on hydrocarbon recovery in natural gas
Lecture 83 - Piping in natural gas systems - I
Lecture 84 - Piping in natural gas systems - II
Lecture 85 - Tutorial on piping in natural gas systems - I
Lecture 86 - Tutorial on piping in natural gas systems - II

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NPTEL Video Course - Physics - NOC:Experimental Physics-I

Subject Co-ordinator - Prof. Amal Kumar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Basic tools and apparatus
Lecture 3 - Basic tools and apparatus (Continued...)
Lecture 4 - Basic tools and apparatus (Continued...)
Lecture 5 - Basic tools and apparatus (Continued...)
Lecture 6 - Basic tools and apparatus (Continued...)
Lecture 7 - Basic components
Lecture 8 - Basic apparatus
Lecture 9 - Basic apparatus (Continued...)
Lecture 10 - Basic analysis
Lecture 11 - Basics analysis (Continued...)
Lecture 12 - Basics analysis (Continued...)
Lecture 13 - Basics analysis (Continued...)
Lecture 14 - Basics analysis (Continued...)
Lecture 15 - Basics analysis (Continued...)
Lecture 16 - Basics analysis (Continued...)
Lecture 17 - Basics analysis (Continued...)
Lecture 18 - Basics analysis (Continued...)
Lecture 19 - Basics analysis (Continued...)
Lecture 20 - Determination of Young's modulus
Lecture 21 - Demonstration on the experiment of Young's modulus of mettalic bar and data collection
Lecture 22 - Calculate the value of young's modulus of given metallic bar form the recorded datas
Lecture 23 - Experimental demonstration to calculate the spring constant of a given spring
Lecture 24 - Calculate the value of calculate the spring constant of a given spring form the recorded datas
Lecture 25 - Theory regarding Moment of inertia of a flywheel
Lecture 26 - Experimental demonstration to calculate the moment of inertia of a given flywheel
Lecture 27 - How to calculate the value of moment of inertia of a flywheelform the recorded data
Lecture 28 - Theory regarding surface tension of the liquid
Lecture 29 - Demonstration on the experiment of surface tension and data collection

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Lecture 30 - How to calculate the value of surface tension of water from the recorded data
Lecture 31 - Theory regarding viscosity of liquid
Lecture 32 - Demonstration on the experiment of viscosity
Lecture 33 - Data analysis of recorded data on viscosity
Lecture 34 - Forced Oscillations Pohls pendulum
Lecture 35 - Coupled Pendulum
Lecture 36 - Demonstration on the experiment of compound pendulum
Lecture 37 - Theory regarding compound pendulum has been discussed
Lecture 38 - Experimental demonstration on the standing Waves on a String has been shown clearly how to deter
Lecture 39 - Linear expansion of metal
Lecture 40 - Expt. to study linear expansion
Lecture 41 - Determine the coefficient of thermal conductivity of a bad conductor
Lecture 42 - Determination of electrical equivalent of heat
Lecture 43 - Determination of specific heat of the given solid metals using Dulong-Petit's law
Lecture 44 - Determination of the calibration curve of a given (Type K chromelÃ¢â ¬â alumel) thermocouple ar
Lecture 45 - Theorey and Demonstartion Platinum Resistance thermometer
Lecture 46 - Experiment on Platinum Resistance thermometer
Lecture 47 - To study the current-voltage relationship of an L-R circuit
Lecture 48 - To study the variation in current and voltage in a series LCR circuit
Lecture 49 - Sensitivity of Blastic Galvanometer
Lecture 50 - Expt. for Sensitivity of Blastic Galvanometer
Lecture 51 - Theory on RC Circuit
Lecture 52 - Expt. on RC Circuit
Lecture 53 - Theory regarding the magnetic field along the axis of a circular coil
Lecture 54 - Experiment regarding the magnetic field along the axis of a circular coil
Lecture 55 - Study the induced e.m.f of inductance coil
Lecture 56 - Mutual inductance
Lecture 57 - Theory regarding permeability of air
Lecture 58 - Experiment to determination the permeability of air
Lecture 59 - Devices around us
Lecture 60 - Devices around us (Continued...)

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NPTEL Video Course - Physics - NOC:Experimental Physics-II

Subject Co-ordinator - Prof. Amal Kumar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Summary of Experimental Physics - I
Lecture 3 - Summary of Experimental Physics - I (Continued...)
Lecture 4 - Summary of Experimental Physics - I (Continued...)
Lecture 5 - Summary of Experimental Physics - I (Continued...)
Lecture 6 - Basic analysis
Lecture 7 - Basic analysis (Continued...)
Lecture 8 - Basic components
Lecture 9 - Basic components (Continued...)
Lecture 10 - Basic components (Continued...)
Lecture 11 - Basic idea on mirros and lenses and their applications
Lecture 12 - Determination of focal length of concave mirror
Lecture 13 - Determination of focal length of concave mirror (Continued...)
Lecture 14 - Determination of focal length of convex mirror
Lecture 15 - Determination of focal length of convex lens
Lecture 16 - Determination of focal length of concave lens
Lecture 17 - Determination of focal length of convex lens by diplacement method
Lecture 18 - Applications of mirrors and lenses
Lecture 19 - Determination of refractive index of liquid using travelling microscope
Lecture 20 - Basic discussion on spectrometer and prism
Lecture 21 - Basic discussion on spectrometer and prism (Continued...)
Lecture 22 - Basic discussion on spectrometer and prism (Continued...)
Lecture 23 - Schuster's method
Lecture 24 - Discussion on angle of the prism, angular dispersion and dispersive power of given prism
Lecture 25 - Determination of the angle of prism
Lecture 26 - Determination of the angle of minimum deviation for a given prism and hence to determine the ref
Lecture 27 - Discussion on the angle of incidence and corresponding deviation of light through a prism and de
Lecture 28 - Determination of the angle of minimum deviation from (i-D) plot for a given prism and hence to c
Lecture 29 - Determination of the calibration plot of deviation versus wavelength for a given prism and hence

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Lecture 30 - Determination of the dispersive power, Cauchy constant and resolving power of a given prism.
Lecture 31 - Interference Phenomena
Lecture 32 - Interference Phenomena (Continued...)
Lecture 33 - Interference Phenomena (Continued...)
Lecture 34 - Bi-prism
Lecture 35 - Bi-prism (Continued...)
Lecture 36 - Interference phenomena by Newton ring (Theory)
Lecture 37 - Interference phenomena by Newton ring (Experiment)
Lecture 38 - Michelson interferometer (Theory)
Lecture 39 - Michelson interferometer (Experiment)
Lecture 40 - Theory of diffraction
Lecture 41 - Theory of diffraction (Continued...)
Lecture 42 - Theory of diffraction (Continued...)
Lecture 43 - Single slit diffraction
Lecture 44 - Double slit diffraction
Lecture 45 - Plane transmission grating
Lecture 46 - Plane transmission grating (Continued...)
Lecture 47 - Theory of polarization
Lecture 48 - Theory of polarization (Continued...)
Lecture 49 - Experiment for Verification of Malus law
Lecture 50 - Experiment for brewester
Lecture 51 - Experiment for Brewester angle
Lecture 52 - Experiment on e-ray and o-ray
Lecture 53 - Polarimeter
Lecture 54 - Zone-plate Theory
Lecture 55 - Zone-plate Experiment
Lecture 56 - Theory of Photoelectric Effect
Lecture 57 - Experiment on Photoelectric Effect
Lecture 58 - Thomson experiment to determine the specific charge of an electron (e/m)
Lecture 59 - Frank-Hertz Experiment
Lecture 60 - Experiment on Rydberg constant
Lecture 61 - Experiment on Rydberg constant (Continued...)

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NPTEL Video Course - Physics - NOC:Experimental Physics-III

Subject Co-ordinator - Prof. Amal Kumar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Tools and Instruments in the Laboratory
Lecture 2 - Basic Tools and Instruments in the Laboratory (Continued...)
Lecture 3 - Cathode Ray Oscilloscope (CRO)
Lecture 4 - Cathode Ray Oscilloscope (CRO) (Continued...)
Lecture 5 - Electro Magnet and Constant Current Power Supply
Lecture 6 - Electro Magnet and Constant Current Power Supply (Continued...)
Lecture 7 - Electro Magnet and Constant Current Power Supply (Continued...)
Lecture 8 - Gaussmeter/Teslameter
Lecture 9 - Gaussmeter/Teslameter (Continued...)
Lecture 10 - Lock in Amplifier
Lecture 11 - Lock in Amplifier (Continued...)
Lecture 12 - Measurement of magneto resistance
Lecture 13 - Magneto resistance for Semiconductor
Lecture 14 - Hall Effect
Lecture 15 - Hall Effect as a function of magnetic Field
Lecture 16 - Hall Effect as a function of temperature
Lecture 17 - To study the variation of resistivity of metal and semiconductor at low temperature region (Cont
Lecture 18 - To study the variation of resistivity of metal and semiconductor at low temperature region (Cont
Lecture 19 - Measurement of magnetisation of ferromagnetic material
Lecture 20 - Measurement of magnetisation of ferromagnetic material (Continued...)
Lecture 21 - Susceptibility of paramagnetic substance by Quincke's tube method
Lecture 22 - Experiment of Quincke's Tube Method
Lecture 23 - Susceptibility of paramagnetic substance by Gouy's method
Lecture 24 - Dielectric constant of solid
Lecture 25 - Dielectric constant of non-conducting liquid
Lecture 26 - P-E Loop of Ferroelectric Material
Lecture 27 - Measurement of Ionic Conductivity
Lecture 28 - Measurement of Ionic Conductivity (Continued...)
Lecture 29 - Electron Spin Resonance (ESR)

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Lecture 30 - Electron Spin Resonance (ESR) Experiment
Lecture 31 - Superconductivity
Lecture 32 - Superconductivity (Continued...)
Lecture 33 - Superconductivity (Continued...)
Lecture 34 - Nuclear g-factor
Lecture 35 - Nuclear g-factor (Continued...)
Lecture 36 - P-N Junction
Lecture 37 - P-N Junction (Continued...)
Lecture 38 - P-N Junction (Continued...)
Lecture 39 - Zeeman Effect
Lecture 40 - Zeeman Effect (Continued...)
Lecture 41 - Zeeman Effect (Continued...)
Lecture 42 - Sodium Yellow Doublet
Lecture 43 - Sodium Yellow Doublet (Continued...)
Lecture 44 - Study of Absorption Spectrum of Iodine Vapour
Lecture 45 - Study of Absorption Spectrum of Iodine Vapour (Continued...)
Lecture 46 - Study of Absorption Spectrum of Iodine Vapour (Continued...)
Lecture 47 - Determination of Wavelength of Spectral Lines using Constant Deviation Spectrometer
Lecture 48 - Determination of Wavelength of Spectral Lines using Constant Deviation Spectrometer (Continued..
Lecture 49 - Photoelastic Property of Materials
Lecture 50 - Photoelastic Property of Materials (Continued...)
Lecture 51 - Photoelastic Property of Materials (Continued...)
Lecture 52 - Faraday Effect
Lecture 53 - Faraday Effect (Continued...)
Lecture 54 - Electron Diffraction
Lecture 55 - Electron Diffraction (Continued...)
Lecture 56 - Determination of Velocity of Light in Free Space
Lecture 57 - Determination of Velocity of Light in Free Space (Continued...)
Lecture 58 - X-Ray Diffraction and Crystal Structure
Lecture 59 - X-Ray Diffraction and Crystal Structure (Continued...)
Lecture 60 - X-Ray Diffraction and Crystal Structure (Continued...)
Lecture 61 - X-Ray Diffraction and Crystal Structure (Continued...)
Lecture 62

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NPTEL Video Course - Physics - NOC:Electronic Theory of Solids

Subject Co-ordinator - Prof. Arghya Taraphder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Free electrons
Lecture 2 - Weidemann Franz Law
Lecture 3 - Drude Model continued
Lecture 4 - Schrodinger Equation
Lecture 5 - Density of States
Lecture 6 - Properties of Degenerate Fermi Gas
Lecture 7 - Statistics Fermi-Dirac distribution and Maxwell-Boltzmann Distribution
Lecture 8 - Sommerfeld Expansion and Band Formation
Lecture 9 - Bonding and Band Formation
Lecture 10 - Variational Method
Lecture 11 - Bonding and Band Formation (LCAO)
Lecture 12 - Bonding and Band Formation (LCAO) (Continued...)
Lecture 13 - Bloch's Theorem
Lecture 14 - Proof of Bloch's Theorem
Lecture 15 - N atoms Solid
Lecture 16 - Brillouin Zones
Lecture 17 - Tight binding
Lecture 18 - Fermi Surfaces
Lecture 19 - Lattice with basis
Lecture 20 - Energy spectrum (Continued...)
Lecture 21 - Graphene and Fermi Surfaces
Lecture 22 - Fermi Surfaces Instabilities
Lecture 23 - Low Dimensional Systems
Lecture 24 - Integer Quantum Hall Effect (IQHE)
Lecture 25 - Integer Quantum Hall Effect (Continued...)
Lecture 26 - Electron in a Strong Magnetic Field and IQHE
Lecture 27 - Spintronics
Lecture 28 - Magnetism
Lecture 29 - Magnetism

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Lecture 30 - Hund's Rule
Lecture 31 - Curie's Law and Van Vleck Paramagnetism
Lecture 32 - Curie's law for any J, Susceptibility
Lecture 33 - Susceptibility and Thermal Properties
Lecture 34 - Adiabatic Demagnetisation
Lecture 35 - Pauli Paramagnetism
Lecture 36 - Paramagnetism of metals
Lecture 37 - Exchange interaction for 2 electrons
Lecture 38 - Exchange interactions of different types
Lecture 39 - Magnetic Order
Lecture 40 - Magnetic Order of different types and Heisenberg model
Lecture 41 - Ising Model
Lecture 42 - Mean Field Theory
Lecture 43 - Spontaneous magnetisation and 1D Ising Model
Lecture 44 - Symmetries of Ising model, Exact Solution
Lecture 45 - Ferromagnetic Heisenberg Model
Lecture 46 - Ground State and Magnons/Excitations
Lecture 47 - Superconductivity
Lecture 48 - London Equation
Lecture 49 - Meisner Effect from London Equation
Lecture 50 - Cooper problem
Lecture 51 - Instability of the Fermi Surface
Lecture 52 - Ground state of cooper problem, BCS Ground state
Lecture 53 - BCS Theory, Excitation Spectrum
Lecture 54 - BCS
Lecture 55 - Tunneling and Ginzberg Landau Theory
Lecture 56 - Electrodynamics of Superconductivity
Lecture 57 - Type II superconductors
Lecture 58 - Josephson junction
Lecture 59 - Vortices, SQUID, Quantum Supremacy and Qubits
Lecture 60 - Topological state of matter, XY Model, Topological Insulators

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NPTEL Video Course - Physics - NOC:Physics of Linear and Nonlinear Optical Waveguides

Subject Co-ordinator - Prof. Samudra Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Wave Equation, Maxwellâ s equation, Plane wave
Lecture 2 - EM wave in vacuum, Poynting vector, Maxwellâ s equation in Dielectric Medium
Lecture 3 - Poynting Vector, Maxwellâ s equation in dielectric medium (Continued...)
Lecture 4 - Total Internal reflection, Evanescent wave
Lecture 5 - Step-index fiber (SIF), Light guidance in SIF
Lecture 6 - Light guidance in SIF (Skew Ray), V-Parameter, Discrete Ray
Lecture 7 - Cutoff wavelength, Fiber characteristics
Lecture 8 - Fiber Loss, dB units, Dispersion
Lecture 9 - Dispersion, Ray Path constant
Lecture 10 - Ray path constant, Ray equation
Lecture 11 - Ray equation (Continued...)
Lecture 12 - Ray transit time
Lecture 13 - Ray transit time (Continued...)
Lecture 14 - Material dispersion
Lecture 15 - Material dispersion (Continued...)
Lecture 16 - Material Dispersion (Continued...), Dispersion Coefficient
Lecture 17 - Pulse Broadening
Lecture 18 - Pulse Propagation in Dispersive Medium
Lecture 19 - Pulse Propagation in Dispersive Medium (Continued...)
Lecture 20 - Concept of Modes
Lecture 21 - TE and TM Modes
Lecture 22 - TE and TM Modes (Continued...)
Lecture 23 - Modes in Slab waveguide
Lecture 24 - Modes in Slab waveguide (Continued...)
Lecture 25 - Modes in Slab waveguide (Continued...)
Lecture 26 - Modes in Slab Waveguide (Continued...)
Lecture 27 - Waveguide Dispersion
Lecture 28 - Physical Understanding of Modes
Lecture 29 - Power Associated with a Modes

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Lecture 30 - Modes in an Optical Fiber
Lecture 31 - Modes in an optical fiber (Continued...)
Lecture 32 - Modes in an optical fiber (Continued...)
Lecture 33 - LPlm mode structure
Lecture 34 - Optical fiber mode morphology (Continued...)
Lecture 35 - Effective area of mode, Fiber optics components
Lecture 36 - Directional Coupler
Lecture 37 - Coupled Mode Theory
Lecture 38 - Coupled Mode Theory (Continued...)
Lecture 39 - 3 dB power splitter
Lecture 40 - Working principle of WDM coupler
Lecture 41 - Fiber Bragg Grating
Lecture 42 - Fiber Bragg Grating (Continued...)
Lecture 43 - Reflectivity Calculation
Lecture 44 - Reflectivity Calculation (Continued...)
Lecture 45 - Reflectivity calculation of FBG (Continued...)
Lecture 46 - Reflectivity calculation of FBG (Continued...)
Lecture 47 - Reflectivity calculation of FBG (Continued...)
Lecture 48 - Bandwidth of reflectivity
Lecture 49 - Basic nonlinear optics
Lecture 50 - Frequency mixing, Optical Kerr effect
Lecture 51 - Optical Kerr effect (Continued...)
Lecture 52 - Self Phase Modulation
Lecture 53 - Self Phase Modulation (Continued...)
Lecture 54 - Self Phase Modulation (Continued...)
Lecture 55 - Pulse propagation in nonlinear waveguide
Lecture 56 - Pulse propagation in nonlinear waveguide (Continued...)
Lecture 57 - Pulse propagation in nonlinear dispersive waveguide
Lecture 58 - Pulse propagation in nonlinear dispersive waveguide (Continued...)
Lecture 59 - Concept of optical soliton
Lecture 60 - Concept of optical soliton (Continued...)

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NPTEL Video Course - Physics - NOC:Physics of Renewable Energy Systems

Subject Co-ordinator - Prof. Amreesh Chandra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and relevance of the course
Lecture 2 - Energy sources
Lecture 3 - Solar Radiation
Lecture 4 - Solar Photovoltaic Systems
Lecture 5 - Origin of Band Structure and Energy Band Gap
Lecture 6 - Basics of Semiconductors
Lecture 7 - Construction of Solar Cells
Lecture 8 - Characterization of Solar Cells and Future Direction
Lecture 9 - Solar Heaters
Lecture 10 - Introduction to Wind Energy
Lecture 11 - Continuity Equation and its applications
Lecture 12 - Betz Criteria for extracting wind power
Lecture 13 - Wind turbines and their operation
Lecture 14 - Materials Aspects and future direction
Lecture 15 - Introduction to Hydroelectric Power
Lecture 16 - Hydroelectric Power Station and Turbines
Lecture 17 - Wave power and converters
Lecture 18 - Introduction to Tidal Power
Lecture 19 - Tidal Power and Geothermal Energy
Lecture 20 - Introduction to Energy Storage Systems
Lecture 21 - Thermal Energy Storage
Lecture 22 - Basics of Mechanical Energy Storage
Lecture 23 - Pumped Hydroelectric to Flywheels (Mechanical Energy Storage Systems)
Lecture 24 - Introduction to Li-ion battery
Lecture 25 - Characteristics and Parameters of Li-ion batteries
Lecture 26 - Cathode Materials for Li-ion batteries
Lecture 27 - Anode Materials for Li-ion batteries
Lecture 28 - Electrolytes and Separators for Li-batteries
Lecture 29 - From battery to supercapacitors

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Lecture 30 - Construction, development and classification of Supercapacitors
Lecture 31 - Electric double layer capacitors (EDLCs)
Lecture 32 - Pseudocapacitors
Lecture 33 - Electrochemical Techniques for Supercapacitors and Batteries
Lecture 34 - From material to a supercapacitor device
Lecture 35 - Effect of temperature on supercapacitor performance
Lecture 36 - Effect of external magnetic field and frequency on supercapacitors
Lecture 37 - Introduction to Fuel Cells
Lecture 38 - Explanation of Fuel cell systems
Lecture 39 - Microbial Fuel Cells
Lecture 40 - Nanotechnology and Nanomaterials for Energy Applications
Lecture 41 - Synthesis of nanomaterials
Lecture 42 - Carbon- and metal-oxide based nanomaterials
Lecture 43 - Nanocatalysts
Lecture 44 - Characterization techniques for solid materials
Lecture 45 - X-ray diffraction method
Lecture 46 - UV-Visible Spectroscopy
Lecture 47 - Fourier Transform Infrared Spectroscopy
Lecture 48 - SEM, TEM and XPS
Lecture 49 - Particle size and zeta potential analysis
Lecture 50 - BET analysis
Lecture 51 - Electrochemical Impedance Spectroscopy

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NPTEL Video Course - Physics - NOC:Thermal Physics

Subject Co-ordinator - Prof. Debamalya Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Foundation of kinetic theory of gasses
Lecture 2 - Maxwell's law for speed distribution of gas molecules
Lecture 3 - Average speeds in an ideal gas assembly
Lecture 4 - Principle of equipartition of energy
Lecture 5 - Maxwell's law for energy distribution of gas molecules
Lecture 6 - The mean free path of a gas assembly
Lecture 7 - Expression for mean free path
Lecture 8 - Experimental determination of mean free path
Lecture 9 - Pressure an molecular flux from mean free path
Lecture 10 - Problems on mean free path
Lecture 11 - Transport in fluids: introduction
Lecture 12 - Viscosity: transport of momentum
Lecture 13 - Thermal conductivity: trasnport of thermal energy
Lecture 14 - Diffusion coefficient: transport of mass
Lecture 15 - Molecular effusion: theory and applications
Lecture 16 - Brownian motion: concept, features, theory of fluctuation
Lecture 17 - Brownian motion: mean square displacement and vertical distribution of particles
Lecture 18 - Perrin's experiment on Brownian motion - Part 1
Lecture 19 - Perrin's experiment on Brownian motion - Part 2
Lecture 20 - Problems on Brownian motion, Rotational brownian motion
Lecture 21 - Specific heat of solids: Dulong-Petit law and Einstein theory
Lecture 22 - Limitaion of Einstein theory of specific heat
Lecture 23 - Debye theory of specific heat
Lecture 24 - Behavior of real gasses
Lecture 25 - Van der Waals equation of state
Lecture 26 - Critical parameters from Van der Waal's equation
Lecture 27 - Determination of Van der Waals' constants and Boyle temperature
Lecture 28 - Other equations of state
Lecture 29 - Measurement of temperature: Celcius scale, ideal gas scale, absolute zero

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Lecture 30 - The platinum resistance thermometer
Lecture 31 - Basic concepts of classical thermodynamics
Lecture 32 - Basic concepts of classical thermodynamics (Continued...)
Lecture 33 - First law of thermodynamics
Lecture 34 - General description of work done and specific heat
Lecture 35 - General discussion on Heat conduction and elastic properties
Lecture 36 - Cyclic processes
Lecture 37 - The reversible heat engine: Carnot cycle
Lecture 38 - Refrigarator and Carnot Theorem
Lecture 39 - 2nd law and Clausius theorem
Lecture 40 - Concept of Entropy and mathematical form of 2nd law
Lecture 41 - The entropy principle
Lecture 42 - Efficiency of a cycle from T-S diagram
Lecture 43 - The Otto cycle
Lecture 44 - The Diesel cycle
Lecture 45 - Entropy and available energy
Lecture 46 - Thermodynamic relations
Lecture 47 - Application of thermodynamic relation
Lecture 48 - The free energy functions
Lecture 49 - Condition for thermodynamic equilibri
Lecture 50 - Thermodynamics of chemical reaction
Lecture 51 - Equilibruim between phases: The Clapeyron equation
Lecture 52 - 1st order phase transion along liquid-vapor equilibrium
Lecture 53 - Phase diagram and triple point
Lecture 54 - The 2nd latent heat equation
Lecture 55 - Gibbs phase rule and basics of second order phase transion
Lecture 56 - Basic concepts of radiation
Lecture 57 - Diffused radiation and Kirchhoff's law
Lecture 58 - Cavity radiation as a thermodynamic system: Stefan-Boltzmann law
Lecture 59 - Thermodynamics of cavity radiation
Lecture 60 - 3rd law of thermodynamics

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NPTEL Video Course - Physics - NOC:Concepts in Magnetism and Superconductivity

Subject Co-ordinator - Prof. A Taraphder

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction: Magnetism and superconductivity as macroscopic quantum phenomena
Lecture 2 - Bohr magneton, BvL theorem
Lecture 3 - An electron in a magnetic field, magnetism of isolated atoms
Lecture 4 - Magnetism of isolated atoms (Continued...), Diamagnetism
Lecture 5 - Magnetism of atoms-dia and paramagnetic susceptibilities. Hund's rules,Van Vleck paramagnetism
Lecture 6 - Van Vleck paramagnetism (Continued...), Paramagnetism
Lecture 7 - Curie's law for arbitrary J, adiabatic demagnetization
Lecture 8 - Paramagnetism of conduction electrons - Pauli paramagnetism
Lecture 9 - Ions in a solid: crystal field, orbital quenching, Jahn-Teller effect
Lecture 10 - Jahn-Teller effect (Continued...), Magnetic resonance techniques NMR, ESR
Lecture 11 - Resonance techniques (Continued...), Recapitulation and overview
Lecture 12 - Recapitulation, interacting moments and long range order, dipolar exchange
Lecture 13 - Interacting moments, 2-electron system, origin of exchange and spin Hamiltonian
Lecture 14 - Spin Hamiltonian, Heisenberg model, Exchange interactions: direct
Lecture 15 - GMR, spin model and mean-field theory, Ising model
Lecture 16 - Ising model and its properties
Lecture 17 - Ising model and its properties (Continued...), absence of LRO in d=1, mean-field theory
Lecture 18 - Ising model recap, applications, exact solutions
Lecture 19 - Exact solution of Ising model in d=1, exact results in d=2. Mermin-Wagner theorem
Lecture 20 - Recap - Exact solution of Ising model. Mermin-Wagner theorem on the absence
Lecture 21 - Ferromagnetic Heisenberg model ground state
Lecture 22 - Ferromagnetic Heisenberg model, spin-waves and magnons
Lecture 23 - Antiferromagnetic Heisenberg model, AF magnetic structures
Lecture 24 - AF magnetic structures, susceptibility and excitations
Lecture 25 - Antiferromagnets and frustration, spin glass
Lecture 26 - Superconductivity: discovery, properties
Lecture 27 - Superconductivity: Meissner effect, London Equation
Lecture 28 - Electron-phonon interaction, Cooper problem
Lecture 29 - Cooper problem, setting up the BCS theory

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Lecture 30 - BCS wave function, the Superconducting state and calculations of various properties
Lecture 31 - BCS theory (Continued...), energy gap, transition temperature
Lecture 32 - Consequences of BCS theory, gap vs T, Transition temperature, specific heat, tunnelling
Lecture 33 - Transition temperature, specific heat, tunnelling
Lecture 34 - Andreev reflection, Ginzburg-Landau Theory and electrodynamics of superconductors
Lecture 35 - Ginzburg-Landau theory, coherence length and Type I and II superconductors
Lecture 36 - Flux lattice, Flux quantization, Josephson junctions
Lecture 37 - Josephson effect and Josephson junctions
Lecture 38 - SQUID, Quantum computers and Josephson junction Qubits
Lecture 39 - High-Temperature Superconductivity: an enduring enigma
Lecture 40 - Overview and conclusion

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NPTEL Video Course - Physics - NOC:Foundations of Classical Electrodynamics

Subject Co-ordinator - Prof. Samudra Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vector analysis, Scalar and vector fields, vector identities
Lecture 2 - Vector Analysis (Continued...)
Lecture 3 - Use of Levi-Civita Symbol, Coordinate system
Lecture 4 - Coordinate system, Orthogonal Transformation
Lecture 5 - Spherical Coordinate system, Line, surface and volume element
Lecture 6 - Line, surface and volume element (Continued...)
Lecture 7 - Line, surface and volume integral
Lecture 8 - Differential calculus, Gradient
Lecture 9 - Gradient operator, Concept of divergence
Lecture 10 - Divergence operator, Divergence Theorem
Lecture 11 - Curl operator, Stokes Theorem
Lecture 12 - Gradient, Divergence and Curl (A recap), Vector identities
Lecture 13 - Curvilinear coordinate system
Lecture 14 - Curvilinear coordinate system (Continued...)
Lecture 15 - Curvilinear coordinate system (Continued...)
Lecture 16 - Delta Function
Lecture 17 - Delta Function (Continued...)
Lecture 18 - Helmholtz's Theorem
Lecture 19 - Helmholtz's Theorem(Recap), Tutorial
Lecture 20 - Tutorial (Continued...)
Lecture 21 - Concept of charge, Charge density
Lecture 22 - Coulomb's Law
Lecture 23 - Coulomb's Law (Continued...), Charge distribution
Lecture 24 - Charge distribution problem, Gauss's Law
Lecture 25 - Topics More on Gauss's Law
Lecture 26 - Application of Gauss's Law
Lecture 27 - Electrostatic potential
Lecture 28 - Electrostatic potential (Continued...)
Lecture 29 - Electrostatic energy

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Lecture 30 - Electrostatic energy (Continued...)
Lecture 31 - Electrostatic energy calculation
Lecture 32 - Electrostatic dipole
Lecture 33 - Electric dipole (Continued...)
Lecture 34 - Multipole expansion
Lecture 35 - Monopole and Dipole moment
Lecture 36 - Quadrupole moment
Lecture 37 - Dipole and Quadrupole moment (Continued...)
Lecture 38 - Conductor
Lecture 39 - Conductor (Continued...)
Lecture 40 - Boundary condition
Lecture 41 - Electrostatic pressure, Capacitor
Lecture 42 - Energy of the Capacitor, Dielectric
Lecture 43 - Dielectric (Continued...)
Lecture 44 - Displacement Vector
Lecture 45 - Electrostatic boundary value problem
Lecture 46 - Electrostatic boundary value problem (Continued...)
Lecture 47 - Electrostatic boundary value problem (Continued...), Image method
Lecture 48 - Image method (Continued...)
Lecture 49 - Charge particle in magnetic field
Lecture 50 - Biot-Savart Law
Lecture 51 - Application of Biot-Savart Law
Lecture 52 - Ampere's Law
Lecture 53 - Application of Ampere's Law
Lecture 54 - Magnetic vector potential
Lecture 55 - Magnetic vector potential (Continued...)
Lecture 56 - Magnetic dipole moment
Lecture 57 - Magnetic dipole moment (Continued...)
Lecture 58 - Torque and potential energy of magnetic dipole, Magnetization
Lecture 59 - Bound Current
Lecture 60 - Magnetic materials
Lecture 61 - Electromagnetic Induction
Lecture 62 - Self and mutual inductance
Lecture 63 - Wave equation, Maxwellâ s Equation
Lecture 64 - Maxwells Equation (Continued...)
Lecture 65 - Maxwells Equation: a complete overview
Lecture 66 - Maxwells Equation: a complete overview (Continued...)
Lecture 67 - Lorentz Gauge, Maxwell's wave equation
Lecture 68 - Maxwell's wave equation (Coninued...)

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Lecture 69 - Maxwell's Equation in matter
Lecture 70 - Maxwell's Equation in matter (Continued...)
Lecture 71 - Tutorial 2 (Electrostatic)
Lecture 72 - Tutorial 3 (Magnetostatic)
Lecture 73 - Tutorial 4 (Magnetostatic and EM Wave)

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NPTEL Video Course - Physics - NOC:Physics of Functional Materials and Devices

Subject Co-ordinator - Prof. Amreesh Chandra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to solid state materials - From conventional to functional
Lecture 2 - Ceramics and Composites - I
Lecture 3 - Ceramics and Composites - II
Lecture 4 - Polymers
Lecture 5 - Introduction to Nanomaterials and functionality
Lecture 6 - Synthesis protocols - I
Lecture 7 - Synthesis protocols - II
Lecture 8 - Synthesis protocols - III
Lecture 9 - Crystal structure - I
Lecture 10 - Crystal structure - II
Lecture 11 - Crystal structure - III
Lecture 12 - Crystal imperfections
Lecture 13 - Alloys and Melts
Lecture 14 - Theory of Solids
Lecture 15 - Nearlly free electron model
Lecture 16 - Bonds in molecules and solids
Lecture 17 - Transformations kinetics and reaction rates
Lecture 18 - Themodynamics
Lecture 19 - Phase and phase transitions
Lecture 20 - Diffusion and various properties
Lecture 21 - Mechanical properties of solids
Lecture 22 - Thermal Properties of Solids
Lecture 23 - Negative and Zero Expansion Ceramics
Lecture 24 - Heat Capacity
Lecture 25 - Thermogravimetric (TGA) analysis
Lecture 26 - Introduction to magnetism and Magnetic properties of solids
Lecture 27 - From magnetic to multiferroic materials
Lecture 28 - Magnetic materials and their applications
Lecture 29 - Magnetism at nanoscale

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Lecture 30 - GMR materials
Lecture 31 - CMR materials
Lecture 32 - Ferrofluids
Lecture 33 - Spintronics and devices
Lecture 34 - Introduction to the basic properties of liquids and melts
Lecture 35 - Heat capacity and diffusion of liquids and melts
Lecture 36 - Viscosity, electric and thermal conduction of liquids and melts
Lecture 37 - Sensors
Lecture 38 - Electrochemical Sensors
Lecture 39 - Introduction to energy storage devices and basics of supercapacitors
Lecture 40 - Supercapacitors - II
Lecture 41 - Magnetic supercapacitors
Lecture 42 - Battery - I
Lecture 43 - Battery - II
Lecture 44 - Solar Cells - I
Lecture 45 - Solar Cells - II
Lecture 46 - X-ray Diffraction (XRD)
Lecture 47 - Fourier Transform Infrared Spectroscopy
Lecture 48 - UV- Vis Spectroscopy
Lecture 49 - Scanning and Transmission Electron Microscopy
Lecture 50 - Summary

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NPTEL Video Course - Physics - NOC:Fundamentals of Attosecond Science and Technology (FAST)

Subject Co-ordinator - Prof. Sivarama Krishnan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to waves, 1D wave equation and its solutions
Lecture 2 - 1D Light waves
Lecture 3 - Characteristics of light waves - amplitude, absolute phase, wavelenght and frequency
Lecture 4 - Phase, Phase velocity and Phase delay
Lecture 5 - Complex notation for the description light waves and superposition
Lecture 6 - Maxwell's equations to the 3D wave equation and its solutions
Lecture 7 - Recap of Week 1
Lecture 8 - 3D wave equation and plane waves
Lecture 9 - Complex notation for Electric fields, Superposition and interference
Lecture 10 - Fabry-Perot inteferometer and it transmittance
Lecture 11 - Physical interpretation of FP transmittance
Lecture 12 - Recap of Fabry-Perot modes
Lecture 13 - Free spectral range of a Fabry-Perot etalon
Lecture 14 - Resonator modes and optical pulses - insight
Lecture 15 - Table - Top Coherent and Incoherent Imaging
Lecture 16 - Recap of Etalon free spectral range
Lecture 17 - Line width and finesse of an etalon
Lecture 18 - Actual resonator modes
Lecture 19 - Resonator configurations and stability
Lecture 20 - Recap of optical resonators
Lecture 21 - Introduction of light pulses
Lecture 22 - Complex amplitude, Gaussian pulse
Lecture 23 - Recap of light pulses
Lecture 24 - Introduction of Fourier Transforms
Lecture 25 - Tutorial 1
Lecture 26 - Motivating Fourier Transforms
Lecture 27 - Fourier Transform Properties
Lecture 28 - Frequency domain electric field
Lecture 29 - Recap of Fourier transform properties

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Lecture 30 - Frequency domain description of pulses
Lecture 31 - Spectral Phase
Lecture 32 - Recap of spectral phase
Lecture 33 - Instantaneous Frequency and group delay
Lecture 34 - Phase wrapping, blanking, and Tayor series expansion
Lecture 35 - Recap of instantaneous frequency, phase wrapping, and phase blanking
Lecture 36 - Frequency domain phase expansion, group delay dispersion
Lecture 37 - Absolute Phase
Lecture 38 - Recap of concepts + discussion
Lecture 39 - Absolute Phase (revisited)
Lecture 40 - Carrier envelope phase, frequency comb
Lecture 41 - Discussion
Lecture 42 - Recap of concepts
Lecture 43 - First order phase
Lecture 44 - Second order phase
Lecture 45 - Recap of first order and second order phase
Lecture 46 - Chirped pulse: Instantaneous frequency and Fourier transform
Lecture 47 - Group delay, nonlinearly chirped pulse
Lecture 48 - Recap of chirped pulses
Lecture 49 - Quadratic chirp pulses
Lecture 50 - Higher order spectral phase
Lecture 51 - Recap and discussion on higher order phase
Lecture 52 - Relative importance of intensity and phase
Lecture 53 - Pulse propagation through a medium
Lecture 54 - Recap of pulse propagation and pulse length
Lecture 55 - Discussion of RMS pulse width and uncertainty principle
Lecture 56 - Time-bandwidth product
Lecture 57 - Recap of previous module
Lecture 58 - Introduction of Lorentz Oscillator Model
Lecture 59 - Effect of matter on light
Lecture 60 - Recap of Lorentz oscillator, Polarization tensor
Lecture 61 - Dynamics of electrons in the Lorentz oscillator
Lecture 62 - Solving the inhomogeneous wave equation
Lecture 63 - Inhomogeneous wave equation, absorption coefficient, refractive index
Lecture 64 - Nonlinear response of matter
Lecture 65 - Origin of nonlinear optical effects
Lecture 66 - Wave equation in an inert gas
Lecture 67 - Perturbation theory and second harmonics
Lecture 68 - Numerical simulation strategy

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Lecture 69 - Atoms in the presence of fields
Lecture 70 - Ionization models
Lecture 71 - Attosecond pulse generation and metrology
Lecture 72 - Nonlinear optics review
Lecture 73 - Nonlinear response of matter to light
Lecture 74 - Sum and difference frequency generation
Lecture 75 - Recap of sum and difference frequency generation, second harmonic generation
Lecture 76 - Generalized nonlinear effects, conservation laws in SHG
Lecture 77 - Phase matching in SHG, polarization dependent refractive index

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NPTEL Video Course - Physics - NOC:Wave Optics

Subject Co-ordinator - Prof. Samudra Roy

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Concept of wave, Wave Equation
Lecture 4 - Plane wave, Spherical wave
Lecture 5 - Maxwell's wave equation, Poynting Vector
Lecture 6 - Superposition of waves
Lecture 7 - Superposition of wave (Complex method)
Lecture 8 - Random and coherent sourse, standing wave formation
Lecture 9 - Group and Phase velocity
Lecture 10 - Material Dispersion
Lecture 11 - Material Dispersion (Continued...)
Lecture 12 - Concept of Coherence
Lecture 13 - Concept of Coherence (Continued...)
Lecture 14 - Concept of Coherence (Continued...)
Lecture 15 - Concept of Coherence (Continued...)
Lecture 16 - Two beam interference
Lecture 17 - Young's double slit experiment
Lecture 18 - Youngâ s double slit experiment (Continued...)
Lecture 19 - Interference by division of amplitude
Lecture 20 - Interference by division of amplitude (Continued...)
Lecture 21 - Newton's Ring
Lecture 22 - Newtonâ s Ring (Continued...)
Lecture 23 - Newtonâ s Ring (Continued...)
Lecture 24 - Optical Interferometers
Lecture 25 - Michelson Interferometer
Lecture 26 - Multiple beam interference
Lecture 27 - Febry-Perot Interferometer
Lecture 28 - Febry-Perot Interferometer (Continued...)
Lecture 29 - Resolving power of Fabry-Perot interferometer

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Lecture 30 - Diffraction of Light
Lecture 31 - Huygenâ s Theory
Lecture 32 - Fraunhofer Diffraction
Lecture 33 - Single-slit Diffraction
Lecture 34 - Single-slit Diffraction (Continued...)
Lecture 35 - Doubleâ Slit Diffraction
Lecture 36 - Multiâ Slit Diffraction
Lecture 37 - Multi-Slit Diffraction (Continued...)
Lecture 38 - Grating spectra
Lecture 39 - Grating spectra (Continued...)
Lecture 40 - Resolving power of grating
Lecture 41 - Fraunhofer diffraction for a circular aperture
Lecture 42 - Fraunhofer diffraction for a rectangular aperture
Lecture 43 - Fresnel Diffraction
Lecture 44 - Fresnelâ s half period zone
Lecture 45 - Fresnelâ s half period zone (Continued...)
Lecture 46 - Zone Plate
Lecture 47 - Fresnelâ s diffraction from an aperture
Lecture 48 - Fresnelâ s diffraction for a circular aperture
Lecture 49 - Fresnelâ s diffraction for a rectangular aperture
Lecture 50 - Fresnelâ s diffraction for a rectangular aperture (Continued...)
Lecture 51 - Fresnelâ s diffraction for semi-infinite opaque screen
Lecture 52 - Polarization of light (Basic concept)
Lecture 53 - Circularly polarized light
Lecture 54 - Matrix treatment of polarization
Lecture 55 - Jones Matrix for polarization
Lecture 56 - Jones Matrix for polarization (Continued...)
Lecture 57 - Jones Matrix for polarization (Continued...)
Lecture 58 - Jones Matrix for polarization (Continued...)
Lecture 59 - Jones matrix for polarization (Continued...)
Lecture 60 - Production of polarized light
Lecture 61 - Production of polarized light (Continued...)
Lecture 62 - Birefrigent Crystal
Lecture 63 - Birefrigent Crystal (Continued...)
Lecture 64 - Index Ellipsoid
Lecture 65 - Analyzing Polarised Light
Lecture 66 - Babinet Compensator

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NPTEL Video Course - Physics - NOC:Physics of Nanomaterials

Subject Co-ordinator - Prof. Amreesh Chandra

Co-ordinating Institute - IIT Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to nanomaterials and nanotechnology
Lecture 2 - Classification of Nanomaterials
Lecture 3 - Need of nanomaterials
Lecture 4 - Application of nanomaterials
Lecture 5 - Concept and Quantum Mechanical Explanation of Electron Confinement
Lecture 6 - Energy Band Diagram in Solid State Materials
Lecture 7 - Crystal Structures and Phase Transitions in Nanomaterials
Lecture 8 - Dimensionality Effects on the Electrical properties
Lecture 9 - Introduction to Synthesis Methods for Nanomaterials
Lecture 10 - Kinetically and Thermodynamically Controlled Routes
Lecture 11 - Top Down and Bottom Up Synthesis Routes - 1
Lecture 12 - Top Down and Bottom Up Synthesis Routes - 2
Lecture 13 - Low Dimensional Structures - Quantum Wells, Wires and Dots; Conduction Electrons and Dimensional
Lecture 14 - Fermi Gas and Density of States
Lecture 15 - Fermi Gas and Density of States
Lecture 16 - Coulomb Potential and Single Electron Tunnelling
Lecture 17 - Metal Nanoclusters
Lecture 18 - Semiconducting Nanoparticle Clusters
Lecture 19 - Molecular Clusters
Lecture 20 - Quantum Devices - Infrared Detectors and Quantum Dot lasers
Lecture 21 - Application of carbon nanotubes
Lecture 22 - Carbon clusters and nanotubes
Lecture 23 - Electrical, Vibrational and Mechanical Properties of Carbon Nanotubes
Lecture 24 - Application of carbon nanotubes
Lecture 25 - Magnetism at Nanoscale
Lecture 26 - Nanostructured Magnetic Materials
Lecture 27 - Dynamics of Nanomagnets - I
Lecture 28 - Dynamics of Nanomagnets - II
Lecture 29 - Giant Magnetoresistance

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Lecture 30 - Colossal Magnetoresistance
Lecture 31 - Nanocarbon Ferromagnets
Lecture 32 - Superparamagnetism and ferrofluids
Lecture 33 - Self Assembly and Catalysis
Lecture 34 - Process of Self Assembly
Lecture 35 - Monolayers and Porous Materials
Lecture 36 - Nature of Catalysis,Pillard Clays and Colloids
Lecture 37 - Nanomaterials for Energy Devices
Lecture 38 - Secondary Batteries
Lecture 39 - Supercapacitors
Lecture 40 - Porous Silicon, Photoluminescence and Photovoltaics
Lecture 41 - Introduction to useful various techniques
Lecture 42 - Particle size determination
Lecture 43 - Phase Transition Using X-ray Diffraction
Lecture 44 - Strain Estimation
Lecture 45 - TEM and SEM
Lecture 46 - Infrared and Raman Spectroscopy
Lecture 47 - Porosity and Specific Surface Areas
Lecture 48 - Infrared and Raman Spectroscopy

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NPTEL Video Course - Physics - Special Topics in Atomic Physics

Subject Co-ordinator - Prof. P.C. Deshmukh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introductory lecture about this course
Lecture 2 - Quantum Mechanics and Symmetry of the Hydrogen Atom
Lecture 3 - Hydrogen atom
Lecture 4 - Hydrogen atom
Lecture 5 - Degeneracy of the Hydrogen Atom
Lecture 6 - Wavefunctions of the Hydrogen Atom
Lecture 7 - Angular Momentum in Quantum Mechanics
Lecture 8 - Angular Momentum in Quantum Mechanics
Lecture 9 - Angular Momentum in Quantum Mechanics
Lecture 10 - Angular Momentum in Quantum Mechanics Dimensionality of the Direct-Product (Composite) Vector Sp
Lecture 11 - Angular Momentum in Quantum Mechanics CGC matrix, Wigner D Rotation Matrix, Irreducible Tensor C
Lecture 12 - Angular Momentum in Quantum Mechanics - more on ITO, and the Wigner-Eckart Theorem
Lecture 13 - Angular Momentum in Quantum Mechanics Wigner-Eckart Theorem - 2
Lecture 14 - Relativistic Quantum Mechanics of the Hydrogen Atom - 1
Lecture 15 - Relativistic Quantum Mechanics of the Hydrogen Atom - 2
Lecture 16 - Relativistic Quantum Mechanics of the Hydrogen Atom - PAULI Equation - Foldy - Wouthysen Transfo
Lecture 17 - Relativistic Quantum Mechanics of the Hydrogen Atom - Foldy - Wouthysen Transformations - 2
Lecture 18 - Relativistic Quantum Mechanics of the Hydrogen Atom - Foldy - Wouthysen Transformations - 3
Lecture 19 - Relativistic Quantum Mechanics of the Hydrogen Atom - Spherical Symmetry of the Coulomb Potentia
Lecture 20 - Hartree-Fock Self-Consistent Field formalism - 1
Lecture 21 - Hartree-Fock Self-Consistent Field formalism - 2
Lecture 22 - Hartree-Fock Self-Consistent Field formalism - 3
Lecture 23 - Hartree-Fock Self-Consistent Field formalism - 4
Lecture 24 - Hartree-Fock Self-Consistent Field formalism - 5
Lecture 25 - Perturbative treatment of relativistic effectsâ ¦ Schrodinger's and Dirac QM
Lecture 26 - Perturbative treatment of relativistic effectsâ ¦ Schrodinger's and Dirac QM
Lecture 27 - Probing the atom - Collisions and Spectroscopy - boundary conditions - 1
Lecture 28 - Atomic Probes - Collisions and Spectroscopy - boundary conditions - 2
Lecture 29 - Atomic Probes - Collisions and Spectroscopy - Scattering phase shifts and boundary conditions

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Lecture 30 - Atomic Probes - Time reversal symmetry - applications in atomic collisions and photoionization p
Lecture 31 - Atomic Photoionization cross sections, angular distributions of photoelectrons - 1
Lecture 32 - Atomic Photoionization cross sections, angular distributions of photoelectrons - 2
Lecture 33 - Atomic Photoionization cross sections, angular distributions of photoelectrons - 3
Lecture 34 - Atomic Photoionization cross sections, angular distributions of photoelectrons - 4
Lecture 35 - Atomic Photoionization cross sections, angular distributions of photoelectrons Cooper Zare Formu
Lecture 36 - Stark- Zeeman Spectroscopy - Stark effect
Lecture 37 - Stark- Zeeman Spectroscopy - Stark effect on n=2 excited state of the H atom Zeeman effect
Lecture 38 - Stark- Zeeman Spectroscopy - Normal, Anomalous Zeeman effect; Paschen- Back effect
Lecture 39 - Stark- Zeeman Spectroscopy - Anomalous Zeeman effect
Lecture 40 - Zeeman effect Fine structure, Hyperfine structure - Elemental, rudimentary introduction to Laser

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NPTEL Video Course - Physics - Classical Field Theory

Subject Co-ordinator - Prof. Suresh Govindarajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is Classical Field Theory?
Lecture 2 - Symmetries and Invariances - I
Lecture 3 - Symmetries and Invariances - II
Lecture 4 - Group Theory in Physics - I
Lecture 5 - Group Theory in Physics - II
Lecture 6 - Finite Groups - I
Lecture 7 - Finite Groups - II
Lecture 8 - Basics of CFT - I
Lecture 9 - Basics of CFT - II
Lecture 10 - Basics of CFT - III
Lecture 11 - Green Functions - I
Lecture 12 - Green Functions - II
Lecture 13 - Noether's Theorem - I
Lecture 14 - Noether's Theorem - II
Lecture 15 - Kink Soliton
Lecture 16 - Hidden Symmetry
Lecture 17 - Local Symmetries
Lecture 18 - The Abelian Higgs model
Lecture 19 - Lie Algebras - I
Lecture 20 - Lie Algebras - II
Lecture 21 - Magnetic Vortices - I
Lecture 22 - Magnetic Vortices - II
Lecture 23 - Non-abelian gauge theories - I
Lecture 24 - Non-abelian gauge theories - II
Lecture 25 - Irreps of Lie algebras - I
Lecture 26 - Irreps of Lie algebras - II
Lecture 27 - The Standard Model - I
Lecture 28 - The Standard Model - II
Lecture 29 - Irreps of the Lorentz/Poincare algebras

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Lecture 30 - The Dirac mononpole
Lecture 31 - The 't Hooft-Polaykov monopole
Lecture 32 - Revisiting Derrickâ s Theorem
Lecture 33 - The Julia-Zee dyon
Lecture 34 - Instantons - I
Lecture 35 - Instantons - II
Lecture 36 - Instantons - III
Lecture 37 - Instantons - IV
Lecture 38 - Dualities
Lecture 39 - Geometrization of Field Theory

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NPTEL Video Course - Physics - Topics in Nonlinear Dynamics

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview
Lecture 2 - Critical points of a dynamical system
Lecture 3 - Two-dimensional flows
Lecture 4 - Stable and unstable manifolds
Lecture 5 - Hamiltonian dynamics - Part I
Lecture 6 - Hamiltonian dynamics - Part II
Lecture 7 - Hamiltonian dynamics - Part III
Lecture 8 - Hamiltonian dynamics - Part IV
Lecture 9 - Hamiltonian dynamics - Part V
Lecture 10 - Elementary bifurcations
Lecture 11 - Limit cycles
Lecture 12 - PoincarÃ´e index
Lecture 13 - Illustrative examples
Lecture 14 - Quiz 1. Questions and answers
Lecture 15 - Bead on a rotating hoop
Lecture 16 - Types of dynamical behaviour
Lecture 17 - Discrete time dynamics - Part I
Lecture 18 - Discrete time dynamics - Part II
Lecture 19 - Discrete time dynamics - Part III
Lecture 20 - Discrete time dynamics - Part IV
Lecture 21 - Coarse-grained dynamics in phase space - Part I
Lecture 22 - Coarse-grained dynamics in phase space - Part II & Stochastic dynamics - Part I
Lecture 23 - Stochastic dynamics - Part II
Lecture 24 - Stochastic dynamics - Part III
Lecture 25 - Coarse-grained dynamics in phase space - Part IV & Stochastic dynamics - Part IV
Lecture 26 - Discrete time dynamics - Part V
Lecture 27 - Quiz 2. Questions and answers
Lecture 28 - Stochastic dynamics - Part V
Lecture 29 - Stochastic dynamics - Part VI

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NPTEL Video Course - Physics - Condensed Matter Physics

Subject Co-ordinator - Prof. G. Rangarajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles of Condensed Matter Physics
Lecture 2 - Symmetry in Perfect Solids
Lecture 3 - Symmetry in Perfect Solids (Continued...)
Lecture 4 - Symmetry in Perfect Solids - Worked Examples
Lecture 5 - Diffraction Methods For Crystal Structures
Lecture 6 - Diffraction Methods For Crystal Structures (Continued...)
Lecture 7 - Diffraction Methods For Crystal Structures - Worked Examples
Lecture 8 - Physical Properties of Crystals
Lecture 9 - Physical Properties of Crystals (Continued...)
Lecture 10 - Physical Properties of Crystals - Worked Examples
Lecture 11 - Cohesion in Solids
Lecture 12 - Cohesion in Solids - Worked Examples
Lecture 13 - The Free Electron Theory of Metals
Lecture 14 - The Free Electron Theory of Metals - Worked Examples
Lecture 15 - The Free Electron Theory of Metals - Electrical Conductivity
Lecture 16 - The Free Electron Theory of Metals - Electrical Conductivity - Worked Examples
Lecture 17 - Thermal Conductivity of Metals
Lecture 18 - Thermal Conductivity of Metals - Worked Examples
Lecture 19 - The Concept of Phonons
Lecture 20 - Debye Theory of Specific Heat, Lattice Vibrations
Lecture 21 - Debye Theory of Specific Heat, Lattice Vibrations - Worked Examples
Lecture 22 - Lattice Vibrations (Continued) Phonon thermal conductivity
Lecture 23 - Lattice Vibrations (Continued) Phonon Thermal Conductivity - Worked Examples
Lecture 24 - Anharmonicity and Thermal Expansion
Lecture 25 - Dielectric (Insulating) Solids
Lecture 26 - Dispersion and Absorption of Electromagnetic Waves in Dielectric Media, Ferro-and Antiferroelect
Lecture 27 - Optical Properties of Metals; Ionic Polarization in Alkali Halides; Piezoelectricity
Lecture 28 - Dielectric Solids - Worked Examples
Lecture 29 - Dia - and Paramagnetism

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Lecture 30 - Paramagnetism of Transition Metal and Rare Earth Ions
Lecture 31 - Quenching of Orbital Angular Momentum; Ferromagnetism
Lecture 32 - Exchange Interactions, Magnetic Order, Neutron Diffraction
Lecture 33 - Hysteresis and Magnetic Domains; Spin Waves and Magnons
Lecture 34 - Magnetic Resonance
Lecture 35 - Magnetism and Magnetic Resonance - Worked Examples
Lecture 36 - Magnetism - Worked Examples (Continued...)
Lecture 37 - Pauli Paramagnetism and Landau Diamagnetism
Lecture 38 - Band Magnetism; Itinerant Electrons; Stoner Model
Lecture 39 - Superconductivity - Perfect Electrical Conductivity and Perfect Diamagnetism
Lecture 40 - Type I and Type II Superconductors
Lecture 41 - Ginsburg - Landau Theory, Flux Quantization
Lecture 42 - Cooper Pairs
Lecture 43 - Microscopic (BCS) Theory of Superconductivity
Lecture 44 - BCS Theory (Continued...)
Lecture 45 - Josephson Effect (Continued...); High Temperature Superconductors
Lecture 46 - Superconductors - Worked Examples
Lecture 47 - Energy Bands in Solids
Lecture 48 - Electron Dynamics in a Periodic Solid
Lecture 49 - Semiconductors
Lecture 50 - Semiconductors (Continued...)
Lecture 51 - Semiconductors - Worked Examples
Lecture 52 - Defects in Solids - Point Defects
Lecture 53 - Point Defects in Solids - Worked Examples
Lecture 54 - Defects in Solids - Line and Surface Defects
Lecture 55 - Dislocations in Solids - Worked Examples
Lecture 56 - Quantum Fluids and Quantum Solids
Lecture 57 - Quantum Liquids and Quantum Solids - Worked Examples
Lecture 58 - Epilogue

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NPTEL Video Course - Physics - Quantum Field Theory

Subject Co-ordinator - Dr. Prasanta Tripathy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Introduction to Classical Field Theory
Lecture 3 - Quantization of Real Scalar Field - I
Lecture 4 - Quantization of Real Scalar Field - II
Lecture 5 - Quantization of Real Scalar Field - III
Lecture 6 - Quantization of Real Scalar Field - IV
Lecture 7 - Quantization of Complex Scalar Field
Lecture 8 - Interacting Field Theory - I
Lecture 9 - Interacting Field Theory - II
Lecture 10 - Interacting Field Theory - III
Lecture 11 - Interacting Field Theory - IV
Lecture 12 - Interacting Field Theory - V
Lecture 13 - Interacting Field Theory - VI
Lecture 14 - Interacting Field Theory - VII
Lecture 15 - Quantuzation of Electromagnetic Field - I
Lecture 16 - Quantuzation of Electromagnetic Field - II
Lecture 17 - Fermion Quantization - I
Lecture 18 - Fermion Quantization - II
Lecture 19 - Fermion Quantization - III
Lecture 20 - Fermion Quantization - IV
Lecture 21 - Fermion Quantization - V
Lecture 22 - Fermion Quantization - VI
Lecture 23 - The S-Matrix Expansion in QED - I
Lecture 24 - The S-Matrix Expansion in QED - II
Lecture 25 - Feynman Rules in QED - I
Lecture 26 - Feynman Rules in QED - II
Lecture 27 - Compton Scattering - I
Lecture 28 - Compton Scattering - II
Lecture 29 - Compton Scattering - III

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Lecture 30 - Moller Scattering - I
Lecture 31 - Moller Scattering - II
Lecture 32 - Vertex Correction - I
Lecture 33 - Vertex Correction - II
Lecture 34 - Vertex Correction - III
Lecture 35 - Vertex Correction - IV
Lecture 36 - Electron Selfenergy
Lecture 37 - Photon Selfenergy - I
Lecture 38 - Photon Selfenergy - II

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NPTEL Video Course - Physics - Quantum Mechanics I

Subject Co-ordinator - Prof. S. Lakshmi Bala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quantum Mechanics â An Introduction
Lecture 2 - Linear Vector Spaces - I
Lecture 3 - Linear Vector Spaces - II
Lecture 4 - Linear Vector Spaces - III
Lecture 5 - Postulates of Quantum Mechanics - I
Lecture 6 - Postulates of Quantum Mechanics - II
Lecture 7 - The Uncertainty Principle
Lecture 8 - The Linear Harmonic Oscillator
Lecture 9 - Introducing Quantum Optics
Lecture 10 - An Interesting Quantum Superposition
Lecture 11 - The Displacement and Squeezing Operators
Lecture 12 - Exercises in Finite Dimensional Linear Vector Spaces
Lecture 13 - Exercises on Angular Momentum Operators and their algebra
Lecture 14 - Exercises on Quantum Expectation Values
Lecture 15 - Composite Systems
Lecture 16 - The Quantum Beam Splitter
Lecture 17 - Addition of Angular Momenta - I
Lecture 18 - Addition of Angular Momenta - II
Lecture 19 - Addition of Angular Momenta - III
Lecture 20 - Infinite Dimensional Linear Vector Spaces
Lecture 21 - Square-Integrable Functions
Lecture 22 - Ingredients of Wave Mechanics
Lecture 23 - The Schrodinger equation
Lecture 24 - Wave Mechanics of the Simple Harmonic Oscillator
Lecture 25 - One-Dimensional Square Well Potential
Lecture 26 - The Square Well and the Square Potential Barrier
Lecture 27 - The Particle in a one-dimensional Box
Lecture 28 - A Charged Particle in a Uniform Magnetic Field
Lecture 29 - The Wavefunction

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Lecture 30 - The Central Potential
Lecture 31 - The Spherical Harmonics
Lecture 32 - Central Potential
Lecture 33 - Illustrative Exercises - I
Lecture 34 - Illustrative Exercises - II
Lecture 35 - Ehrenfest's Theorem
Lecture 36 - Perturbation Theory - I
Lecture 37 - Perturbation Theory - II
Lecture 38 - Perturbation Theory - III
Lecture 39 - Perturbation Theory - IV
Lecture 40 - Time-dependent Hamiltonians
Lecture 41 - The Jaynes-Cummings model

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NPTEL Video Course - Physics - Special Topics in Classical Mechanics

Subject Co-ordinator - Prof. P.C. Deshmukh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Equations of Motion (i)
Lecture 3 - Equations of Motion (ii)
Lecture 4 - Equations of Motion (iii)
Lecture 5 - Equations of Motion (iv)
Lecture 6 - Equations of Motion (v)
Lecture 7 - Oscillators, Resonances, Waves (i)
Lecture 8 - Oscillators, Resonances, Waves (ii)
Lecture 9 - Oscillators, Resonances, Waves (iii)
Lecture 10 - Oscillators, Resonances, Waves (iv)
Lecture 11 - Polar Coordinates (i)
Lecture 12 - Polar Coordinates (ii)
Lecture 13 - Dynamical Symmetry in the Kepler Problem (i)
Lecture 14 - Dynamical Symmetry in the Kepler Problem (ii)
Lecture 15 - Real Effects of Pseudo-Forces (i)
Lecture 16 - Real Effects of Pseudo-Forces (ii)
Lecture 17 - Real Effects of Pseudo-Forces (iii)
Lecture 18 - Real Effects of Pseudo-Forces (iv)
Lecture 19 - Special Theory of Relativity (i)
Lecture 20 - Special Theory of Relativity (ii)
Lecture 21 - Special Theory of Relativity (iii)
Lecture 22 - Special Theory of Relativity (iv)
Lecture 23 - Potentials Gradients Fields (i)
Lecture 24 - Potentials Gradients Fields (ii)
Lecture 25 - Potentials Gradients Fields (iii)
Lecture 26 - Gauss Law Eq of continuity (i)
Lecture 27 - Gauss Law Eq of continuity (ii)
Lecture 28 - Gauss Law Eq of continuity (iii)
Lecture 29 - Fluid Flow Bernoulli Principle (i)

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Lecture 30 - Fluid Flow Bernoulli Principle (ii)
Lecture 31 - Classical Electrodynamics (i)
Lecture 32 - Classical Electrodynamics (ii)
Lecture 33 - Classical Electrodynamics (iii)
Lecture 34 - Classical Electrodynamics (iv)
Lecture 35 - Chaotic Dynamical Systems (i)
Lecture 36 - Chaotic Dynamical Systems (ii)
Lecture 37 - Chaotic Dynamical Systems (iii)
Lecture 38 - Chaotic Dynamical Systems (iv)
Lecture 39 - Chaotic Dynamical Systems (v)
Lecture 40 - The Scope and Limitations of Classical Mechanics

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NPTEL Video Course - Physics - Special, Select Topics in the Theory of Atomic Collisions and Spectroscopy

Subject Co-ordinator - Prof. P.C. Deshmukh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the STiTACS course
Lecture 2 - Quantum Theory of collisions
Lecture 3 - Quantum Theory of collisions
Lecture 4 - Quantum Theory of collisions
Lecture 5 - Quantum Theory of collisions
Lecture 6 - Quantum Theory of collisions
Lecture 7 - Quantum Theory of collisions
Lecture 8 - Quantum Theory of collisions
Lecture 9 - Quantum Theory of collisions
Lecture 10 - Quantum Theory of collisions
Lecture 11 - Quantum Theory of collisions
Lecture 12 - Quantum Theory of collisions
Lecture 13 - Many body theory, electron correlations
Lecture 14 - Second Quantization Creation, Destruction and Number operators
Lecture 15 - Many-particle Hamiltonian & Schrodinger Equation in 2nd Quantization
Lecture 16 - Many-electron problem in quantum mechanics
Lecture 17 - Hartree-Fock Self-Consistent-Field
Lecture 18 - Exchange, Statistical, Fermi-Dirac correlations
Lecture 19 - Limitations of the Hartree-Fock Self-Consistent-Field formalism
Lecture 20 - Many-Body formalism, II Quantization
Lecture 21 - Density fluctuations in an electron gas
Lecture 22 - Bohm-Pines approach to Random Phase Approximation
Lecture 23 - Bohm-Pines approach to Random Phase Approximation (Continued...)
Lecture 24 - Bohm-Pines approach to Random Phase Approximation (Continued...)
Lecture 25 - Schrodinger, Heisenberg and Dirac Â picturesÂ of QM
Lecture 26 - DysonÂ s chronological operator
Lecture 27 - Gell-Mann-Low Theorem
Lecture 28 - Reyleigh-Schrodinger perturbation methods and adiabatic switching
Lecture 29 - Feynman Diagrams

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Lecture 30 - I Order Feynman Diagrams
Lecture 31 - II and higher order Feynman Diagrams
Lecture 32 - Linear response of electron correlations
Lecture 33 - Lippman Schwinger equation of potential scattering
Lecture 34 - Born Approximation
Lecture 35 - Coulomb scattering
Lecture 36 - Scattering of partial waves
Lecture 37 - Scattering at high energy
Lecture 38 - Resonances in Quantum Collisions
Lecture 39 - Breit-Wigner Resonances
Lecture 40 - Fano parameterization of Breit-Wigner formula
Lecture 41 - Discrete state embedded in the continuum
Lecture 42 - Resonance life times
Lecture 43 - Wigner-Eisenbud formalism of time-delay in scattering
Lecture 44 - Photoionization and Photoelectron Angular Distributions
Lecture 45 - Ionization and Excitation of Atoms by Fast Charged Particles
Lecture 46 - Photo-absorption by Free and Confined Atoms and Ions

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NPTEL Video Course - Physics - Selected Topics in Mathematical Physics

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Analytic functions of a complex variable - Part I
Lecture 2 - Analytic functions of a complex variable - Part II
Lecture 3 - Calculus of residues - Part I
Lecture 4 - Calculus of residues - Part II
Lecture 5 - Calculus of residues - Part III
Lecture 6 - Calculus of residues - Part IV
Lecture 7 - Linear response; dispersion relations - Part I
Lecture 8 - Linear response; dispersion relations - Part II
Lecture 9 - Analytic continuation and the gamma function - Part I
Lecture 10 - Analytic continuation and the gamma function - Part II
Lecture 11 - MÃ¶bius transformations - Part I
Lecture 12 - MÃ¶bius transformations - Part II
Lecture 13 - MÃ¶bius transformations - Part III
Lecture 14 - Multivalued functions; integral representations - Part I
Lecture 15 - Multivalued functions; integral representations - Part II
Lecture 16 - Multivalued functions; integral representations - Part III
Lecture 17 - Multivalued functions; integral representations - Part IV
Lecture 18 - Laplace transforms - Part I
Lecture 19 - Laplace transforms - Part II
Lecture 20 - Fourier transforms - Part I
Lecture 21 - Fourier transforms - Part II
Lecture 22 - Fourier transforms - Part III
Lecture 23 - Fundamental Green function forÎ 2 - Part I
Lecture 24 - Fundamental Green function forÎ 2 - Part II
Lecture 25 - The diffusion equation - Part I
Lecture 26 - The diffusion equation - Part II
Lecture 27 - The diffusion equation - Part III
Lecture 28 - The diffusion equation - Part IV
Lecture 29 - Green function for (Î 2 + k2); nonrelativistic scattering - Part I

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Lecture 30 - Green function for (Î 2 + k2); nonrelativistic scattering - Part II
Lecture 31 - Green function for (Î 2 + k2); nonrelativistic scattering - Part III
Lecture 32 - The wave equation - Part I
Lecture 33 - The wave equation - Part II
Lecture 34 - The rotation group and all that - Part I
Lecture 35 - The rotation group and all that - Part II
Lecture 36 - The rotation group and all that - Part III

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NPTEL Video Course - Physics - Nuclear Reactors and Safety - An Introduction

Subject Co-ordinator - Dr.G.Vaidyanathan

Co-ordinating Institute - SRM University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy Sources
Lecture 2 - Nuclear Power Production Cycle
Lecture 3 - Basic Physics of Nuclear Fission
Lecture 4 - Basic Physics of Nuclear Fission (Continued...)
Lecture 5 - Nuclear Reactors
Lecture 6 - Reactors Generation
Lecture 7 - Radiation Sources and Protection
Lecture 8 - Biological Effects of Radiation
Lecture 9 - Safety Principles
Lecture 10 - Safety Principles (Continued...)
Lecture 11 - Safety Approach
Lecture 12 - Risk and Probabilistic safety analysis (PSA)
Lecture 13 - History of Events in Nuclear Power Plants and Radiation facilities
Lecture 14 - Other Events
Lecture 15 - Validation and Dynamic Analysis
Lecture 16 - Validation and Dynamic Analysis (Continued...)
Lecture 17 - Quality Assurance
Lecture 18 - Siting of Nuclear Plants
Lecture 19 - Siting of Nuclear Plants (Continued...)
Lecture 20 - Engineered Safety Systems
Lecture 21 - Engineered Safety Systems (Continued...)
Lecture 22 - Assessment of Radiological Consequences of Incidents
Lecture 23 - Safety Regulation in India
Lecture 24 - Safety Regulation in India (Continued...)
Lecture 25 - Safety Regulation in India (Continued...)
Lecture 26 - Safety Practices in Indian NPPs
Lecture 27 - Safety Practices in Indian NPPs (Continued...)
Lecture 28 - Safety Practices in Indian NPPs (Continued...)
Lecture 29 - Passive Safety

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Lecture 30 - Passive Safety (Continued...)

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NPTEL Video Course - Physics - Physical Applications of Stochastic Processes

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Discrete probability distributions - Part 1
Lecture 2 - Discrete probability distributions - Part 2
Lecture 3 - Continuous random variables
Lecture 4 - Central Limit Theorem
Lecture 5 - Stable distributions
Lecture 6 - Stochastic processes
Lecture 7 - Markov processes - Part 1
Lecture 8 - Markov processes - Part 2
Lecture 9 - Markov processes - Part 3
Lecture 10 - Birth-and-death processes
Lecture 11 - Continuous Markov processes
Lecture 12 - Langevin dynamics - Part 1
Lecture 13 - Langevin dynamics - Part 2
Lecture 14 - Langevin dynamics - Part 3
Lecture 15 - Langevin dynamics - Part 4
Lecture 16 - ItÂ o and Fokker-Planck equations for di?usion processes
Lecture 17 - Level-crossing statistics of a continuous random process
Lecture 18 - Diffusion of a charged particle in a magnetic field
Lecture 19 - Power spectrum of noise
Lecture 20 - Elements of linear response theory
Lecture 21 - Random pulse sequences
Lecture 22 - Dichotomous di?usion
Lecture 23 - First passage time - Part 1
Lecture 24 - First passage time - Part 2
Lecture 25 - First passage and recurrence in Markov chains
Lecture 26 - Recurrent and transient random walks
Lecture 27 - Non-Markovian random walks
Lecture 28 - Statistical aspects of deterministic dynamics - Part 1
Lecture 29 - Statistical aspects of deterministic dynamics - Part 2

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NPTEL Video Course - Physics - NOC:Mechanics, Heat Oscillations and Waves

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Nature of Physical Laws
Lecture 2 - Fundamental Constants and Dimensional Analysis
Lecture 3 - Dimensional analysis and scaling
Lecture 4 - sketching Elementary Functions
Lecture 5 - The fundamental forces of nature
Lecture 6 - Scalars, Victors and All That
Lecture 7 - Plane Polar Coordinates
Lecture 8 - Vectors In a Plane, Scalars and Pseudoscalars
Lecture 9 - Kinematics In a Plane
Lecture 10 - Vectors in 3-Dimensional Space
Lecture 11 - Vectors in 3-Dimensional space (Continued...)
Lecture 12 - The Finite Rotation Formula, Polar Coordinates in 3-dimensions
Lecture 13 - Cylindrical and Spherical polar coordinates
Lecture 14 - Motion in a circle - Acceleration
Lecture 15 - Newtons laws of motion
Lecture 16 - Conservation Laws and Newtons Equations
Lecture 17 - Conservation of Angular Momentum
Lecture 18 - Two-Body Scattering
Lecture 19 - Two-Body Collision Kinematics
Lecture 20 - Conservative Forces - The Concept of a Potential
Lecture 21 - Central Potential and Central Force
Lecture 22 - The 2-Body Central Force Problem
Lecture 23 - Keplers Laws of Planetary Motion
Lecture 24 - Non-Inertial Forces (Pseudo-forces)
Lecture 25 - More on the Kepler problem; Satellite motion
Lecture 26 - Linear Elasticity of Solids
Lecture 27 - Simple Harmonic Motion
Lecture 28 - Some Physical Examples of Simple Harmonic Motion
Lecture 29 - More on Simple Harmonic Motion

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Lecture 30 - Damped Simple Harmonic Motion
Lecture 31 - Wave Motion - Travelling and Standing Waves
Lecture 32 - Wave Motion - Wave Equation, General Solution
Lecture 33 - Fluid Dynamics - Hydrostatic Equilibrium
Lecture 34 - Fluid Dynamics - Equation of Continuity
Lecture 35 - Fluid Flow - Bernoullis Principle
Lecture 36 - Circulation and Vorticity
Lecture 37 - What is Thermodynamics?
Lecture 38 - The Classical Ideal Gas
Lecture 39 - The Laws of Thermodynamics
Lecture 40 - Specific Heat of an Ideal Gas
Lecture 41 - Van der Waals Equation
Lecture 42 - Phase Transitions
Lecture 43 - Summary

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NPTEL Video Course - Physics - Nonequilibrium Statistical Mechanics

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Recapitulation of equilibrium statistical mechanics
Lecture 2 - The Langevin model (Part 1)
Lecture 3 - The Langevin model (Part 2)
Lecture 4 - The Langevin model (Part 3)
Lecture 5 - The Langevin model (Part 4)
Lecture 6 - Linear response theory (Part 1)
Lecture 7 - Linear response theory (Part 2)
Lecture 8 - Linear response (Part 3)
Lecture 9 - Linear response(Part 4)
Lecture 10 - Linear response (Part 5)
Lecture 11 - Linear response (Part 6)
Lecture 12 - Linear response theory (Part 7)
Lecture 13 - Quiz 1 - Questions and answers
Lecture 14 - Linear response theory (Part 8)
Lecture 15 - Linear response theory (Part 9)
Lecture 16 - The dynamic mobility
Lecture 17 - Fokker-Planck equations (Part 1)
Lecture 18 - Fokker-Planck equations (Part 2)
Lecture 19 - Fokker-Planck equations (Part 3)
Lecture 20 - The generalized Langevin equation (Part 1)
Lecture 21 - The generalized Langevin equation (Part 2)
Lecture 22 - Diffusion in a magnetic field
Lecture 23 - The Boltzmann equation for a dilute gas (Part 1)
Lecture 24 - The Boltzmann equation for a dilute gas (Part 2)
Lecture 25 - The Boltzmann equation for a dilute gas (Part 3)
Lecture 26 - The Boltzmann equation for a dilute gas (Part 4)
Lecture 27 - The Boltzmann equation for a dilute gas (Part 5)
Lecture 28 - Quiz 2 - Questions and answers
Lecture 29 - Critical phenomena (Part 1)

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Lecture 30 - Critical phenomena (Part 2)
Lecture 31 - Critical phenomena (Part 3)
Lecture 32 - Critical phenomena (Part 4)
Lecture 33 - Critical phenomena (Part 5)
Lecture 34 - Critical phenomena (Part 6)
Lecture 35 - Critical phenomena (Part 7)
Lecture 36 - The Wiener process (standard Brownian motion)

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NPTEL Video Course - Physics - NOC:Statistical Mechanics

Subject Co-ordinator - Prof. Ashwin Joy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Discrete Probability
Lecture 2 - Continous Probability
Lecture 3 - Characteristic Function
Lecture 4 - Gausssian Distribution
Lecture 5 - Binomial Distribution
Lecture 6 - Poisson Distribution
Lecture 7 - Central Limit Theorem
Lecture 8 - Many Random Variables
Lecture 9 - Entropy and Probability
Lecture 10 - Entropy Maximization
Lecture 11 - Transformation of Random Variables
Lecture 12 - Tutorial
Lecture 13 - Mathematical Preliminaries - 1
Lecture 14 - Microcanonical Ensemble
Lecture 15 - Two Level System (Microcanonical Ensemble)
Lecture 16 - Classical Ideal Gas (Microcanonical Ensemble)
Lecture 17 - Entropy of Mixing
Lecture 18 - Canonical Ensemble
Lecture 19 - Two Level System (Canonical Ensemble)
Lecture 20 - Classical Ideal Gas (Canonical Ensemble)
Lecture 21 - Gibbs Canonical Ensemble
Lecture 22 - Classical Ideal Gas (Gibbs Canonical Ensemble)
Lecture 23 - N Spins in a Uniform Magnetic Field
Lecture 24 - Grand Canonical Ensemble
Lecture 25 - Ideal Gas (Grand Canonical Ensemble)
Lecture 26 - N Non - Interacting Spins in Constant Magnetic Field
Lecture 27 - Qunatum Statistical Mechanics
Lecture 28 - Statistics of Fermions and Bosons
Lecture 29 - Quantum to Classical Correspondance

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Lecture 30 - Vibrations of Solid (Low Temperature)
Lecture 31 - Vibrations of Solid (Continuation)
Lecture 32 - Free Electrons(Fermi Gas) in a Metal
Lecture 33 - Free Electrons(Fermi Gas) in a Metal (Continuation)
Lecture 34 - Problem solving demo - Part 1
Lecture 35 - Problem solving demo - Part 2

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NPTEL Video Course - Physics - NOC:Computational Physics

Subject Co-ordinator - Prof. Prasenjit Ghosh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Fortran - Part 1
Lecture 2 - Introduction to Fortran - Part 2
Lecture 3 - Introduction to Fortran - Part 3
Lecture 4 - Introduction to Fortran - Part 4
Lecture 5 - Introduction to Fortran - Part 5
Lecture 6 - Numerical Integration - Part 1
Lecture 7 - Numerical Integration - Part 2
Lecture 8 - Numerical Integration - Part 3
Lecture 9 - Numerical Integration - Part 4
Lecture 10 - Numerical Integration - Part 5
Lecture 11 - Numerical Integration - Part 6
Lecture 12 - Numerical Integration - Part 7
Lecture 13 - Numerical Integration - Part 8
Lecture 14 - Numerical Integration - Part 9
Lecture 15 - Numerical Integration - Part 10
Lecture 16 - Monte Carlo Simulation Introduction - Part 1
Lecture 17 - Monte Carlo Simulation Introduction - Part 2
Lecture 18 - Implementing the Ising model on computer
Lecture 19 - Periodic Boundary conditions and the Metropolis scheme
Lecture 20 - Testing the simulation and relaxation to equilibrium, finte size effects
Lecture 21 - Monte Carlo Simulation Analysis - Part 1
Lecture 22 - Monte Carlo Simulation Analysis - Part 2
Lecture 23 - Monte Carlo Simulation Analysis
Lecture 24 - Monte Carlo Simulation Analysis
Lecture 25 - Calculating T_c using Binders cumulant; Principle of detailed balance
Lecture 26 - Differential Equations Euler and Runge Kutta - Part 1
Lecture 27 - Differential Equations Euler and Runge Kutta - Part 2
Lecture 28 - Differential Coupled Equation Non Linear Equation - Part 1
Lecture 29 - Differential Coupled Equation Non Linear Equation - Part 2

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Lecture 30 - Coupled Differential Equation Visualisation and Making Movie
Lecture 31 - Differential Equations With Specified Boundary Conditions - Part 1
Lecture 32 - Differential Equations With Specified Boundary Conditions - Part 2
Lecture 33 - Partial Differential equations - 1
Lecture 34 - Partial Differential equations - 2
Lecture 35 - Partial Differential equations - 3
Lecture 36 - Differential Equation for Quantum Mechanical Problems
Lecture 37 - Differential Equation for Quantum Mechanical Problems
Lecture 38 - Differential Equation for Quantum Mechanical Problems
Lecture 39 - Differential Equation for Quantum Mechanical Problems
Lecture 40 - Differential Equation for Quantum Mechanical Problems
Lecture 41 - Differential Equation for Quantum Mechanical Problems
Lecture 42 - Differential Equation for Quantum Mechanical Problems
Lecture 43 - Differential Equation for Quantum Mechanical Problems
Lecture 44 - Differential Equation for Quantum Mechanical Problems
Lecture 45 - Differential Equation for Quantum Mechanical Problems
Lecture 46 - Molecular Dynamics Introduction - Part 1
Lecture 47 - Molecular Dynamics Introduction - Part 2
Lecture 48 - Molecular Dynamics Details and Algorithm - Part 1
Lecture 49 - Molecular Dynamics Details and Algorithm - Part 2
Lecture 50 - Molecular Dynamics Details and Algorithm - Part 3
Lecture 51 - Molecular Dynamics Analysis - Part 1
Lecture 52 - Molecular Dynamics Analysis - Part 2
Lecture 53 - Molecular Dynamics Neighbours Lists - Part 1
Lecture 54 - Molecular Dynamics Neighbours Lists - Part 2
Lecture 55 - Molecular Dynamics
Lecture 56 - Molecular Dynamics Diffusion Constant Calculation - Part 1
Lecture 57 - Molecular Dynamics Diffusion Constant Calculation - Part 2
Lecture 58 - Molecular Dynamics Diffusion Constant Calculation - Part 3

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NPTEL Video Course - Physics - NOC:Waves and Oscillations

Subject Co-ordinator - Prof. M. S. Santhanam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Simple Harmonic Motion
Lecture 2 - Superposition of Oscillations
Lecture 3 - Superposition of Oscillations
Lecture 4 - Superposition of Oscillations
Lecture 5 - Simple Harmonic Motion
Lecture 6 - Damped oscillator - Part 1
Lecture 7 - Damped oscillator - Part 2
Lecture 8 - Damped oscillator and Q-factor
Lecture 9 - Damped oscillator
Lecture 10 - Forced oscillator - Part 1
Lecture 11 - Forced oscillator - Part 2
Lecture 12 - Resonances
Lecture 13 - Q-factor of forced oscillator
Lecture 14 - Applications of forced oscillator
Lecture 15 - Forced Oscillator
Lecture 16 - Coupled Oscillations - Part 1
Lecture 17 - Coupled Oscillations - Part 2
Lecture 18 - Solving for normal modes
Lecture 19 - Coupled oscillations - More examples
Lecture 20 - Coupled oscillator
Lecture 21 - Coupled Oscillations of Loaded String
Lecture 22 - Solutions for Loaded String
Lecture 23 - Oscillations of Loaded String
Lecture 24 - Continuum Limit of Loaded String
Lecture 25 - Wave equation and its solutions
Lecture 26 - Wave equation - impedance and velocities
Lecture 27 - Standing waves
Lecture 28 - Transverse waves in periodic structures
Lecture 29 - Wave equation

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Lecture 30 - Reflection and transmission of waves
Lecture 31 - Impedance matching
Lecture 32 - Energy of vibrating string
Lecture 33 - Dispersion of waves
Lecture 34 - Bandwidth theorem and problems
Lecture 35 - Longitudnal Waves and Speed of Sound
Lecture 36 - Longitudnal Standing Waves
Lecture 37 - Sound Intensity
Lecture 38 - Longitudnal Waves
Lecture 39 - Fourier Series - Part 1
Lecture 40 - Fourier Series - Part 2
Lecture 41 - Fourier Series and Energy of Vibrating String
Lecture 42 - Frequency Spectrum and Fourier Transforms
Lecture 43 - Fourier Series
Lecture 44 - Waves in Optical Systems
Lecture 45 - Waves in Optical Systems
Lecture 46 - Waves in Optical Systems
Lecture 47 - Waves in Optical Systems
Lecture 48 - Waves in Optical Systems
Lecture 49 - Interference
Lecture 50 - Interference
Lecture 51 - Michelson and Fabry-Perot Interferometers
Lecture 52 - Young's Double Slit Experiment
Lecture 53 - Diffraction
Lecture 54 - Beyond Linear Oscillators
Lecture 55 - Beyond Linear Oscillators
Lecture 56 - Beyond Linear Oscillators
Lecture 57 - Beyond Linear Waves
Lecture 58 - Waves in Quantum Mechanics and Summary

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NPTEL Video Course - Physics - NOC:Physics through Computational Thinking

Subject Co-ordinator - Prof. Auditya Sharma, Prof. Ambar Jain

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mathematica, Wolfram language and Wolfram Cloud
Lecture 2 - Technical Prelim 1
Lecture 3 - Plotting Simple Functions
Lecture 4 - Function Behaviour near Extrema
Lecture 5 - Radicals and Logarithms
Lecture 6 - Properties of Functions
Lecture 7 - Vector Fields, Vector and Streamline Plots and Contour Plots
Lecture 8 - Introduction to Non-dimesionalisation
Lecture 9 - Non-dimensionalization and visual thinking
Lecture 10 - Non-dimensionalisation and Parametric Plot
Lecture 11 - Technical Prelim 2
Lecture 12 - Introduction to Simple Harmonic Oscillator
Lecture 13 - Simple Harmonic Oscillator with a spring mass system
Lecture 14 - More Examples of Simple Harmonic Oscillator
Lecture 15 - Anharmonic Oscillator
Lecture 16 - Introduction to Data Analysis - 1
Lecture 17 - Introduction to Data Analysis - 2
Lecture 18 - Curve fitting
Lecture 19 - Linear superposition of oscillations
Lecture 20 - Technical Prelim 3
Lecture 21 - Damped Harminic Oscillator
Lecture 22 - Solving Initial Value Problem with Mathemtica
Lecture 23 - Damped Harmonic Oscillator
Lecture 24 - Technical Prelim 4
Lecture 25 - Introduction to Euler's Method for Solving Differential Equation
Lecture 26 - Technical Prelim 5
Lecture 27 - Writing Euler's Method as a custom function
Lecture 28 - Mean Global Error in Euler's method and Application of Euler's method to damped oscillator
Lecture 29 - Improved Euler (RK2) and RK4 Methods for solving ODEs

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Lecture 30 - Driven oscillations
Lecture 31 - Driven oscillations using the Improved Euler method
Lecture 32 - Falling Bodies
Lecture 33 - Escape velocity
Lecture 34 - Driven oscillations
Lecture 35 - Linear systems
Lecture 36 - Linear systems
Lecture 37 - Linearization - 1
Lecture 38 - Linearization - 2
Lecture 39 - The Monte Carlo Method - 1
Lecture 40 - The Monte Carlo Method - 2
Lecture 41 - The Monte Carlo Method - 3
Lecture 42 - The Monte Carlo Method - 4
Lecture 43 - The Monte Carlo Method - 5
Lecture 44 - Random Walks - 1
Lecture 45 - Random Walks - 2
Lecture 46 - Random Walks - 3
Lecture 47 - Random Walks - 4
Lecture 48 - Random Walks - 5
Lecture 49 - Random Walks - 6
Lecture 50 - Random Walks - 7

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NPTEL Video Course - Physics - NOC:Electromagnetism

Subject Co-ordinator - Prof. Nirmal Ganguli

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Vector algebra
Lecture 2 - Vector algebra in component form
Lecture 3 - Vector triple products
Lecture 4 - Vector differential calculus
Lecture 5 - Divergence
Lecture 6 - Curl
Lecture 7 - Tutorial on differential vector calculus
Lecture 8 - More problems on vector differential calculus
Lecture 9 - Vector integral calculus
Lecture 10 - Surface integral
Lecture 11 - Volume integral
Lecture 12 - Fundamental theorems of vector calculus
Lecture 13 - The divergence theorem (Gauss's theorem)
Lecture 14 - The curl theorem (Stokes' theorem)
Lecture 15 - Curvilinear coordinates
Lecture 16 - Generic curvilinear coordinate systems
Lecture 17 - Differential vector calculus in curvilinear coordinate systems
Lecture 18 - Special curvilinear coordinate systems
Lecture 19 - Vector calculus in spherical coordinate system
Lecture 20 - Vector calculus in cylindrical coordinate system
Lecture 21 - Introduction to Dirac delta function
Lecture 22 - Tutorial on vector calculus and curvilinear coordinates
Lecture 23 - Introduction to electrostatics
Lecture 24 - Continuous charge distribution
Lecture 25 - Electric field due to a line charge distribution
Lecture 26 - Electric field lines, Flux, Gauss law
Lecture 27 - Application of Gauss law with cylindrical symmetry
Lecture 28 - Application of Gauss law on a flat 2D surface
Lecture 29 - Tutorial on Dirac delta function and electrostatics

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Lecture 30 - Tutorial on electrostatics
Lecture 31 - The curl of an electric field
Lecture 32 - Scalar potential
Lecture 33 - Calculation of electric potential from different approaches
Lecture 34 - Boundary conditions on electric field and potential
Lecture 35 - Work and energy of an assembly of point charges
Lecture 36 - General idea of energy in electrostatics
Lecture 37 - Electrostatics with conductors
Lecture 38 - Capacitors
Lecture 39 - Laplace equation
Lecture 40 - Boundary conditions and the uniqueness theorems
Lecture 41 - The method of images
Lecture 42 - Induced charge
Lecture 43 - Force and energy
Lecture 44 - Another example of the method of images
Lecture 45 - Electric dipoles
Lecture 46 - Multipole expansion, continuous charge distriution, and assembly of point charges
Lecture 47 - Electric field due to a dipole
Lecture 48 - Introduction to electric polarization in matter
Lecture 49 - Electric polarization and bound charges
Lecture 50 - Electric displacement vector and Gauss law
Lecture 51 - Boundary conditions on the displacement vector and linear dielectric materials
Lecture 52 - Parallel plate capacitors
Lecture 53 - Energy in dielectric materials
Lecture 54 - Force on dielectric materials
Lecture 55 - Motion of a charged particle in electromagnetic field
Lecture 56 - Work done by a magnetic field
Lecture 57 - Electric current
Lecture 58 - Surface and volume current
Lecture 59 - Biot Savart law
Lecture 60 - Biot Savart law with surface and volume currents
Lecture 61 - A tutorial on currents and magnetic field
Lecture 62 - Straight line current
Lecture 63 - Divergence and curl of a generic magnetic field
Lecture 64 - Ampere's law in integral form and its applications
Lecture 65 - Magnetic field in a long solenoid
Lecture 66 - A comparison between electrostatics nad magnetostatics
Lecture 67 - Magnetic vector potential
Lecture 68 - Tutorial on magnetic fields

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Lecture 69 - Calculation of vector potential
Lecture 70 - Boundary conditions on magnetic field
Lecture 71 - Magnetic dipole
Lecture 72 - Multipole expansion of the vector potential
Lecture 73 - Magnetism, force and torque on magnetic dipole
Lecture 74 - Fringing magnetic field
Lecture 75 - Magnetization
Lecture 76 - A tutorial on the magnetic dipole moment
Lecture 77 - Ampere's law in magnetized materials
Lecture 78 - Electrodynamics
Lecture 79 - Electromagnetic induction
Lecture 80 - Laws of electromagnetism so far
Lecture 81 - Maxwell's correction to electromagnetism
Lecture 82 - Fictitious discussion about symmetry
Lecture 83 - Maxwell's equations in matter and the boundary conditions

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NPTEL Video Course - Physics - NOC:Introduction to Classical Mechanics

Subject Co-ordinator - Prof. Anurag Tripathi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction. Symmetries of space and time
Lecture 2 - Generalized coordinates and degrees of freedom
Lecture 3 - Virtual Work
Lecture 4 - Virtual Work (rigid body)
Lecture 5 - d'Alembert Principle
Lecture 6 - Euler Lagrange Equation for a holonomic system
Lecture 7 - Euler Lagrange Equations. Examples
Lecture 8 - Euler Lagrange Equations. Examples (Continued...)
Lecture 9 - Properties of Lagrangian
Lecture 10 - Kinetic term in generalized coordinates
Lecture 11 - Cyclic coordinates
Lecture 12 - Conservation laws - Conservation of Energy
Lecture 13 - Energy Function, Jacobi's Integral
Lecture 14 - Momemtum conservation
Lecture 15 - Matrices and all that
Lecture 16 - Matrices, Forms, and all that
Lecture 17 - Principal axis transformation
Lecture 18 - Small Oscilaltions
Lecture 19 - Oscillations, Normal Coordinates
Lecture 20 - Oscillations, Triatomic molecule
Lecture 21 - Triatomic molecule normal coordinates
Lecture 22 - Coupled pendulums, normal modes
Lecture 23 - Coupled pendulums, Beats
Lecture 24 - Oscillations, General solution
Lecture 25 - Forced oscillations
Lecture 26 - Damped oscillations
Lecture 27 - Forced Damped oscillations
Lecture 28 - one dimensional systems
Lecture 29 - Two-body problem

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Lecture 30 - Two-body problem, Kepler's second law
Lecture 31 - Two-body problem, Kepler problem
Lecture 32 - Two-body problem, Conic Sections in Polar Coordinates
Lecture 33 - Two-body problem, Ellipse in polar coordinates
Lecture 34 - Orbits in Kepler Problem
Lecture 35 - Apsidal distances, eccentricity of orbits
Lecture 36 - Kepler's Third law; Laplace-Runge-Lenz vector
Lecture 37 - Rigid Body, degrees of freedom
Lecture 38 - Rigid Body, Transfromation matrix
Lecture 39 - Rigid Body, Euler Angles
Lecture 40 - Parameterization using Euler Angles
Lecture 41 - Rigid Body, Euler's Theorem
Lecture 42 - General motion of a rigid body
Lecture 43 - Moment of Inertia Tensor
Lecture 44 - Principal Moments
Lecture 45 - Langrangian of a rigid body
Lecture 46 - Motion of a free symmetric top
Lecture 47 - Angular velocity using Euler angles
Lecture 48 - Lagrangian of a heavy symmetric top
Lecture 49 - First integrals of a heavy symmetric top
Lecture 50 - Nutation and Precission of a heavy symmetric top
Lecture 51 - Sleeping Top
Lecture 52 - Rotating Frames. Euler Equations
Lecture 53 - Calculus of Variations
Lecture 54 - Method of Lagrange Multipliers
Lecture 55 - Calculus of Variations
Lecture 56 - Calculus of Variations
Lecture 57 - Cartesian Tensors
Lecture 58 - Hamiltonian Mechanics
Lecture 59 - Hamiltonian Mechanics
Lecture 60 - Hamiltonian Mechanics
Lecture 61 - Hamiltonian Mechanics
Lecture 62 - Hamiltonian Mechanics
Lecture 63 - Hamiltonian Mechanics
Lecture 64 - Examples of Generating Functions
Lecture 65 - Harmonic Oscillator (Canonical Transformations)
Lecture 66 - Invariance of Poisson Brackets
Lecture 67 - Normal modes of triatomic molecule using Mathematica

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NPTEL Video Course - Physics - NOC:Fluid Dynamics for Astrophysics

Subject Co-ordinator - Prof. Prasad Subramanian

Co-ordinating Institute - IISER - Pune

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Continuum hypothesis, distribution function and stress-viscosity relation
Lecture 3 - Continuum hypothesis, distribution function and stress-viscosity relation - Recap
Lecture 4 - Fluid Kinematics
Lecture 5 - Fluid Kinematics - Recap
Lecture 6 - Conservation laws: Mass conservation and incomprehensibility
Lecture 7 - Conservation laws: Momentum conservation and Euler equation
Lecture 8 - Conservation laws - Recap
Lecture 9 - Potential flows
Lecture 10 - Bernoulli constant, its applications and voracity equation
Lecture 11 - Recap - Potential flows, Bernoulli constant and its applications
Lecture 12 - Voracity dynamics -- Kelvin's voracity theorem and Magus effect
Lecture 13 - Navier-Stokes equation
Lecture 14 - Navier-Stokes equation (Continued....) and energy equation
Lecture 15 - Energy equation in a conservative form
Lecture 16 - Boundary conditions in Navier-Stokes equation, d'Alembert's paradox
Lecture 17 - Poiseuille flow, deriving viscosity from microscopics
Lecture 18 - Dimensionless numbers -- Mach number, Reynolds number
Lecture 19 - DimDimensionless numbers (Continued...) -- plasma beta, magnetic Reynolds number, Alfven Mach nu
Lecture 20 - Reynolds number and dynamic similarity
Lecture 21 - Reynolds number recap, Low Re flows, and drag on a sphere (Stokes law)
Lecture 22 - High Re flows -- turbulent drag law, vortex shedding and drag crisis
Lecture 23 - Lift on a body, introduction to compressible flows
Lecture 24 - Compressible flows -- derivation of sound speed and dispersion relation
Lecture 25 - Subsonic and supersonic flows
Lecture 26 - Propagation of sonic information, shock tube problem and piston problem
Lecture 27 - Criterion for neglect of compressibility, method of characteristics
Lecture 28 - Shock thickness
Lecture 29 - Shock thickness recap, shock jump conditions

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Lecture 30 - Shock jump conditions (Continued...), transonic 1D flows, converging/diverging channels
Lecture 31 - Coverging/diverging channels, de Laval nozzle and its application to astrophysical jets
Lecture 32 - Spherically symmetric transonic flows
Lecture 33 - Spherically symmetric transonic flows (Continued...)
Lecture 34 - Solar wind : Parker's solution
Lecture 35 - Solar wind : Modifications in Parker's solution
Lecture 36 - Spherical accretion onto a compact object : Eddington luminosity and accretion rate
Lecture 37 - Spherical accretion onto a compact object : Solutions for flow properties
Lecture 38 - Spherical accretion (Continued...), disk accretion--Roche lobe overflow
Lecture 39 - Disk accretion : Mass conservation and vertical hydrostatic equilibrium
Lecture 40 - Disk accretion : Removal of angular momentum, Shakura-Sunyaev viscosity parameter
Lecture 41 - Disk accretion : Viscous dissipation and the energy equation, two-temperature criterion
Lecture 42 - Particle acceleration in astrophysical settings : Shocks and non-thermal energy distribution
Lecture 43 - Particle acceleration in astrophysical settings : Diffusive shock acceleration
Lecture 44 - Spherical blast waves : Bomb explosion and supernova explosion
Lecture 45 - Spherical blast waves : Sedov-Taylor solution
Lecture 46 - Spherical blast waves : Sedov-Taylor solution (Continued....)
Lecture 47 - Magnetohydrodynamics (MHD) : Introduction
Lecture 48 - Magnetohydrodynamics (MHD) : The induction equation
Lecture 49 - Magnetohydrodynamics (MHD) : Currents in MHD, momentum equation and magnetic stress tensor
Lecture 50 - Magnetohydrodynamics (MHD) : Magnetic stresses and magnetic buoyancy
Lecture 51 - Magnetohydrodynamics (MHD) : Plasma beta, force-free fields and potential configurations
Lecture 52 - Magnetohydrodynamics (MHD) : Magnetic flux-freezing
Lecture 53 - Magnetohydrodynamics (MHD) : Magnetic flux-freezing (Continued....), magnetic dynamos
Lecture 54 - Magnetohydrodynamics (MHD) : Dynamo theory
Lecture 55 - Magnetohydrodynamics (MHD) : Waves in MHD - Alfven waves
Lecture 56 - Magnetohydrodynamics (MHD) : Waves in MHD - Alfven waves and magnetosonic waves
Lecture 57 - Magnetohydrodynamics (MHD) : Waves in MHD - Magnetosonic waves
Lecture 58 - Magnetohydrodynamics (MHD) : Shocks in MHD
Lecture 59 - Magnetohydrodynamics (MHD) : Shocks in MHD - Shock jump conditions
Lecture 60 - Non-ideal MHD : Introduction to magnetic reconnection
Lecture 61 - Non-ideal MHD : Magnetic reconnection - The Sweet-Parker model
Lecture 62 - Non-ideal MHD : Magnetic reconnection - The Petscheck model
Lecture 63 - Sun's atmosphere : Solar corona and the coronal heating problem
Lecture 64 - Solar eruptions : Coronal Mass Ejections (CMEs) and solar flares

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NPTEL Video Course - Physics - NOC:Quantum Transport

Subject Co-ordinator - Prof. Madhu Thalakulam

Co-ordinating Institute - IISER - Thiruvananthapuram

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Classical and Semi-classical Transport: Overview
Lecture 3 - Quantum Transport Regimes
Lecture 4 - Band-bending and Metal semiconductor Interfaces
Lecture 5 - Semiconductor Heterostructures
Lecture 6 - 2DEG and Electrostatic Gating
Lecture 7 - Device Fabrication - Photolithography
Lecture 8 - Device Fabrication - Electron-beam Lithography
Lecture 9 - Quantum hall Effect - Overview
Lecture 10 - Quantum Hall Effect: Quantization of electron orbitals, Landau levels and Flux quantization
Lecture 11 - Quantum Hall Effect: Lanau level, filling factor and Shubnikov-de-Haas effect
Lecture 12 - Quantum Hall Effect: Edge states and Resistance Quantization
Lecture 13 - Weak Localization
Lecture 14 - Aharonov-Bohm Effect
Lecture 15 - Ballistic 1D transport-Quantum Point contacts
Lecture 16 - Ballistic 1D transport-Current from transmission
Lecture 17 - Ballistic 1D transport-Where is the power dissipation?
Lecture 18 - 0D Transport - Single Electron Tunneling
Lecture 19 - Single Electron Transistors, Coulomb Blockade
Lecture 20 - Quantum Dots, Shell filling, Artificial Atoms
Lecture 21 - Transport on Double Quantum Dots - I
Lecture 22 - Transport on Double Quantum Dots - II
Lecture 23 - Superconductivity-Introduction
Lecture 24 - Superconducting tunnel junctions-Josephson effect - 1
Lecture 25 - Superconducting tunnel junctions-Josephson effect - 2
Lecture 26 - Charge sensing with quantum point contacts
Lecture 27 - Charge sengin with single electron transistors
Lecture 28 - Real-time charge sensing
Lecture 29 - Quantum Electrical Metrology - I

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Lecture 30 - Quantum Electrical Metrology - II
Lecture 31 - Qubits - Overview
Lecture 32 - Superconducting qubits
Lecture 33 - Quantum dot qubits

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NPTEL Video Course - Physics - NOC:Statistical Mechanics (2021)

Subject Co-ordinator - Prof. Dipanjan Chakraborty

Co-ordinating Institute - IISER - Mohali

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Thermodynamics
Lecture 2 - Laws of Thermodynamics
Lecture 3 - Second Law of Thermodynamics and Heat Engines
Lecture 4 - Entropy, Clausius Inequality, Thermodynamic Processes and Systems
Lecture 5 - Extensivity of Entropy and Internal Energy, Gibbs Duhem relation
Lecture 6 - Exact and Inexact differentials, Legendre Transformation
Lecture 7 - Free Energy in Thermodynamics
Lecture 8 - Maxwell's relations - Part I
Lecture 9 - Maxwell's relations - Part II
Lecture 10 - Maxwell's relations - Part III
Lecture 11 - Response Functions and manipulating Partial Derivatives
Lecture 12 - Working With Thermodynamics
Lecture 13 - Joule Expansion and Joule Thomson Effect
Lecture 14 - Stability of Thermodynamic Potentials
Lecture 15 - Consequences of Stability of Thermodynamic Potentials
Lecture 16 - Conditions of Equilibrium and Gibbs Phase Rule
Lecture 17 - Introduction to Probability
Lecture 18 - Discrete and Continuous Distributions
Lecture 19 - Central Limit Theorem and Statistical Entropy
Lecture 20 - Classical Probability Density and Liouville Equation
Lecture 21 - Classical Probability Density, Ergodicity and Microcanonical Ensemble
Lecture 22 - Microcanonical Ensemble
Lecture 23 - Examples of Microcanonical Ensemble - Two Level System
Lecture 24 - Examples of Microcanonical Ensemble - Magnetic System and Ideal Gas - Part I
Lecture 25 - Examples of Microcanonical Ensemble - Magnetic System and Ideal Gas - Part II
Lecture 26 - Examples of Microcanonical Ensemble - Ultra-Relativistic Gas
Lecture 27 - Microcanonical Ultrarelativistic Gas and Quantum Solid
Lecture 28 - Microcanonical Excluded Volume
Lecture 29 - Canonical Ensemble

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Lecture 30 - Canonical Ensemble Paramagnet
Lecture 31 - Canonical Ensemble Ideal Gas
Lecture 32 - Canonical Ensemble Einstein Solid
Lecture 33 - Grand Canonical Ensemble
Lecture 34 - Grand Canonical Ensemble Ideal Gas - Part I
Lecture 35 - Grand Canonical Ensemble Ideal Gas - Part II
Lecture 36 - MicroCanonical to Canonical - Part I
Lecture 37 - MicroCanonical to Canonical - Part II
Lecture 38 - Interacting System - Part I
Lecture 39 - Interacting System - Part II
Lecture 40 - Van-Der Waals Equation of State
Lecture 41 - Quantum Statistical Mechanics Density Matrix
Lecture 42 - Density Matrix in different Ensembles
Lecture 43 - Free Particle Quantum Canonical Partition Function Free
Lecture 44 - Single Particle Quantum Partition Function Harmonic Oscillator - Part I
Lecture 45 - Single Particle Quantum Partition Function Harmonic Oscillator - Part II
Lecture 46 - Wigner Transformation
Lecture 47 - N-Particle partition function
Lecture 48 - Canonical Formulation of Ideal Gas
Lecture 49 - Grand Canonical Formulation of Ideal Gas
Lecture 50 - High Temperature Expansion
Lecture 51 - Degenerate Fermi Gas
Lecture 52 - Ideal Fermi Gas close to T=0, Chemical Potential and Specific Heat
Lecture 53 - Relativistic Fermi Gas at T=0
Lecture 54 - Ideal Bose Gas
Lecture 55 - Bose-Einstein Condensation
Lecture 56 - Pressure of an Ideal Bose Gas
Lecture 57 - Specific Heat of an Ideal Bose Gas - Part 1
Lecture 58 - Specific Heat of an Ideal Bose Gas - Part 2
Lecture 59 - Bose-Einstein Condensation in a Harmonically Trapped Bose Gas
Lecture 60 - Specific Heat of a Harmonically Trapped Bose Gas
Lecture 61 - General Treatment of a Bose gas - Part 1
Lecture 62 - General Treatment of a Bose gas - Part 2
Lecture 63 - Discontinuity in the Specific Heat of a Bose Gas - Part 1
Lecture 64 - Discontinuity in the Specific Heat of a Bose Gas - Part 2
Lecture 65 - Ultra Relativistic Bose Gas Stefan Boltzmann Law

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NPTEL Video Course - Physics - NOC:Solid State Physics (2021)

Subject Co-ordinator - Prof. Nirmal Ganguli

Co-ordinating Institute - IISER - Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is solid?
Lecture 2 - Bravais lattice
Lecture 3 - Indexing of crystal planes
Lecture 4 - Simple crystal structures
Lecture 5 - Diffraction of waves by crystals
Lecture 6 - Fourier analysis of diffraction
Lecture 7 - Diffraction condition
Lecture 8 - Laue equations and Ewald construction
Lecture 9 - Introduction to Brillouin zone
Lecture 10 - Brillouin zones for bcc and fcc lattice
Lecture 11 - Fourier analysis of the basis and structure factor
Lecture 12 - Atomic form factor
Lecture 13 - Van der Waals attraction
Lecture 14 - Repulsive interaction
Lecture 15 - Equilibrium lattice constant and cohesive energy
Lecture 16 - Ionic crystals
Lecture 17 - Evaluation of the Madelungconstant
Lecture 18 - Covalent crystals: Linearcombination of atomic orbitals
Lecture 19 - Electron tunneling in covalentbonds
Lecture 20 - Metallic bonds
Lecture 21 - The Drude theory of metals
Lecture 22 - Hall effect and magnetoresistance
Lecture 23 - AC electrical conductivity
Lecture 24 - Thermal conductivity
Lecture 25 - Introduction to Sommerfeld theory - I
Lecture 26 - Introduction to Sommerfeld theory - II
Lecture 27 - Electronic states at finite temperature
Lecture 28 - Fermi-Dirac distribution
Lecture 29 - Thermal properties of the free electron gas

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Lecture 30 - The Sommerfeld theory for conduction in metals
Lecture 31 - Thermal conductivity
Lecture 32 - One dimensional chain of atoms
Lecture 33 - One dimensional chain of atoms
Lecture 34 - Periodic boundary condition
Lecture 35 - Energy levels in periodic array of quantum wells
Lecture 36 - Tunneling of electrons
Lecture 37 - Reflection and transmission amplitudes and coefficients
Lecture 38 - Transfer matrix for a rectangular barrier
Lecture 39 - Electron tunneling through a periodic potential
Lecture 40 - The tight-binding approximation
Lecture 41 - Tridiagonal matrices and continued fraction
Lecture 42 - Plane-wave basis for nearly free electrons
Lecture 43 - Nearly free electron approximation
Lecture 44 - Dynamical aspects of electrons in band theory
Lecture 45 - Semiconductor crystals
Lecture 46 - Effective mass
Lecture 47 - Carrier concentration
Lecture 48 - Mobility, impurity conductivity, and Fermi surface
Lecture 49 - Vibration of crystals with monatomic basis
Lecture 50 - Analyzing the dispersion relation
Lecture 51 - Phonons with diatomic basis
Lecture 52 - Quantization of elastic waves
Lecture 53 - Phonon heat capacity
Lecture 54 - Phonon density of states
Lecture 55 - Introduction to diamagnetism
Lecture 56 - Issues with the classical theory of diamagnetism
Lecture 57 - Quantum theory of diamagnetism
Lecture 58 - The quantum theory of paramagnetism
Lecture 59 - Rare earth atoms, Hund's rule
Lecture 60 - Crystal field splitting
Lecture 61 - Quenching of orbital angular momentum
Lecture 62 - Paramagnetic susceptibility of conduction electrons
Lecture 63 - Ferromagnetism
Lecture 64 - Antiferromagnetism and ferrimagnetism
Lecture 65 - Introduction to superconductivity
Lecture 66 - Thermodynamics of superconducting transition,London equation
Lecture 67 - BCS theory of superconductivity
Lecture 68 - Flux quantization in a superconducting ring

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Lecture 69 - Single particle tunneling and Josephson effect
Lecture 70 - AC Josephson effect and microscopic quantum interference

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NPTEL Video Course - Physics - NOC:Introduction to Quantum Field Theory (Theory of Scalar Fields)

Subject Co-ordinator - Prof. Anurag Tripathi

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Quantum Filed Theory
Lecture 2 - Quantizing Schrodinger Field
Lecture 3 - Quantizing Schrodinger Field (Continued...)
Lecture 4 - Symmetry and normalization of the states
Lecture 5 - A multiparticle system of Bosons
Lecture 6 - Klein-Gordon Equation
Lecture 7 - Quantization of Klein-Gordon Theory
Lecture 8 - Quantization of Klein-Gordon Theory (Continued...)
Lecture 9 - Quantization of Klein-Gordon Theory (Continued...)
Lecture 10 - Quantization of Klein-Gordon Theory (Continued...)
Lecture 11 - Quantization of Klein-Gordon Theory (Continued...)
Lecture 12 - Qunatization of Klein-Gordon Theory (Continued...)
Lecture 13 - Quantization of Klein-Gordon Theory (Continued...)
Lecture 14 - Feynman propagator - 2
Lecture 15 - Feynman propagator - 3
Lecture 16 - Symmetries
Lecture 17 - Lorentz transformations
Lecture 18 - Lorentz transformations (Continued...)
Lecture 19 - Lorentz Group
Lecture 20 - Groups and Generators
Lecture 21 - SU(3) Generators
Lecture 22 - Representation of groups. Poincare group
Lecture 23 - Poincare Algebra
Lecture 24 - Symmetries in Classical Field Theories
Lecture 25 - Symmetries (Continued...)
Lecture 26 - Symmetries (Continued...)
Lecture 27 - Symmetries (Continued...)
Lecture 28 - Noether's theorem: The Proof
Lecture 29 - Noether's theorem (Continued...)

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Lecture 30 - Momentum in KG Theory
Lecture 31 - Noether Currents corresponding to Lorentz symmetry
Lecture 32 - Conserved currents and charges due to Lorentz symmetry
Lecture 33 - Conserved charges as symmetry generators
Lecture 34 - Consequences of symmetry
Lecture 35 - A boring world: Scattering in a free theory
Lecture 36 - Phi-4 Theory
Lecture 37 - Phi-4 Theory: Manipulating the ground state
Lecture 38 - Phi-4 Theory: Interaction picture - 1
Lecture 39 - Phi-4 Theory: Interaction picture - 2
Lecture 40 - Phi-4 Theory: Interaction picture (Continued...)
Lecture 41 - Phi-4 Theory: Interaction picture (Continued...)
Lecture 42 - Wick's Theorem
Lecture 43 - Wick's Theorem (Continued...)
Lecture 44 - Feynman Diagrams
Lecture 45 - Feynman Diagrams (Continued...)
Lecture 46 - Momentum space Feynman rules for G(x1,..xN)
Lecture 47 - Feynman rules for G(p1,p2,,,,pN)
Lecture 48 - Feynman rules for G(p1,p2,,,,pN) (Continued...)
Lecture 49 - Cancellation of Bubble diagrams
Lecture 50 - Examples of Feynman Diagrams
Lecture 51 - Survery

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NPTEL Video Course - Physics - NOC:Introduction to Quantum Field Theory (Theory of Scalar Fields) - Part 2

Subject Co-ordinator - Prof. Anurag Tripathi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Scattering Matrix
Lecture 2 - Scattering Matrix (Continued...)
Lecture 3 - Scattering Matrix (Continued...)
Lecture 4 - Creating single particle states - 1
Lecture 5 - Creating single particle states - 2
Lecture 6 - Annihilating single particle states
Lecture 7 - Creating Multiparticle States
Lecture 8 - LSZ reduction
Lecture 9 - LSZ reduction (Continued...)
Lecture 10 - S matrix
Lecture 11 - S matrix (Continued...)
Lecture 12 - S matrix (Continued...)
Lecture 13 - Pole and residue of the propagator
Lecture 14 - Kallen-Lehmann spectral representation
Lecture 15 - Kallen-Lehmann spectral representation (Continued...)
Lecture 16 - High Energy Experiment Setup - 1
Lecture 17 - High Energy Experiment Setup - 2
Lecture 18 - Scattering cross-section
Lecture 19 - Differential cross-section
Lecture 20 - 2-2 scattering cross-section
Lecture 21 - Loop diagrams - 1
Lecture 22 - Wick rotated Green's functions
Lecture 23 - UV divergences - Part 1
Lecture 24 - UV divergences - Part 2
Lecture 25 - UV divergences - Part 3
Lecture 26 - Explicit evalutation of Feynman integrals
Lecture 27 - Few more Feynman integrals
Lecture 28 - UV Singularity structure in dimensional regularization
Lecture 29 - Renormalization - Part 1

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Lecture 30 - Renormalization - Part 2
Lecture 31 - Renormalization - Part 3
Lecture 32 - Renormalization - Part 4
Lecture 33 - Renormalization - Part 5
Lecture 34 - Renormalization Group Equation - 1
Lecture 35 - Renormalization Group Equation - 2
Lecture 36 - Renormalization Group Equation - 3
Lecture 37 - Solution of Callan Symanzik Equation
Lecture 38 - UV and IR fixed points and Asymptotic Freedom
Lecture 39 - Behaviour near fixed point

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NPTEL Video Course - Physics - NOC:Radio Astronomy

Subject Co-ordinator - Prof. Abhirup Datta

Co-ordinating Institute - IIT - Indore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Radio Astronomy
Lecture 2 - Review of Electromagnetism - Part 1
Lecture 3 - Review of Electromagnetism - Part 2
Lecture 4 - Radio Astronomy - Tutorial 1
Lecture 5 - Milestones in Radio Astronomy
Lecture 6 - Radio Astronomy Fundamentals - Part 1
Lecture 7 - Radio Astronomy Fundamentals - Part 2
Lecture 8 - Radiative Transfer - Tutorial 1
Lecture 9 - Fundamentals of Antenna
Lecture 10 - Fundamental of Antenna Theory - Part 1
Lecture 11 - Fundamental of Antenna Theory - Part 2
Lecture 12 - Fundamental of Antenna Theory - Part 3
Lecture 13 - Signal Processing and Receivers
Lecture 14 - Signal Proceeding and Receivers - Part 2
Lecture 15 - Radio Telescopes
Lecture 16 - Single Dish Observations
Lecture 17 - Demonstration of Antenna Design and Simulation - Part 1
Lecture 18 - Demonstration Of Antenna Design and Simulation - Part 2
Lecture 19 - What Have we Learnt so Far? - A Review
Lecture 20 - Demonstration of Antenna Design and Simulation - Part 3
Lecture 21 - Co-ordinate System
Lecture 22 - Radio Interferometers
Lecture 23 - Example Questions
Lecture 24 - Python Crash Course
Lecture 25 - Few Concepts with the help of python as a computational tool
Lecture 26 - Live session
Lecture 27 - Example Questions
Lecture 28 - Radio Interferometry and Aperture Synthesis
Lecture 29 - Introduction to CASA

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Lecture 30 - Examples
Lecture 31
Lecture 32
Lecture 33 - Revision
Lecture 34 - Revision

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NPTEL Video Course - Physics - NOC:Foundations of Quantum Theory: Non-Relativistic Approach

Subject Co-ordinator - Prof. Sandeep Kumar Goyal, Prof. Kinjalk Lochan

Co-ordinating Institute - IISER - Mohali

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Axiomatic Approach to Quantum Mechanics - Part 1
Lecture 2 - Axiomatic Approach to Quantum Mechanics - Part 2
Lecture 3 - Linear Vector Space
Lecture 4 - Linear Operators - Part 1
Lecture 5 - Linear Operators - Part 2
Lecture 6 - Qubits: Introduction
Lecture 7 - Qubits: State Tomography
Lecture 8 - Qubits: Density Operators - Part 1
Lecture 9 - Qubits: Density Operators - Part 2
Lecture 10 - Qubits: Unitary Transformation
Lecture 11 - Qubits: Bloch Sphere
Lecture 12 - Composite Systems: Pure States, Schmidt Decomposition, Operators Acting on Composite Systems - P
Lecture 13 - Composite Systems: Pure States, Schmidt Decomposition, Operators Acting on Composite Systems - P
Lecture 14 - Composite Systems: Density Operators
Lecture 15 - Quantum Maps: Positive Maps
Lecture 16 - Quantum Maps: Completely Positive Maps - Part 1
Lecture 17 - Quantum Maps: Completely Positive Maps - Part 2
Lecture 18 - Measurements: Introduction
Lecture 19 - Measurements: POVM
Lecture 20 - Measurements: Optical Scheme for POVM
Lecture 21 - Measurements: State Discrimination
Lecture 22 - Measurements: Weak Measurements
Lecture 23 - Entanglement: Introduction
Lecture 24 - Entanglement Measures
Lecture 25 - EPR Paradox and Bohrâ s Argument, Bohmâ s Argument and Merminâ s Argument - Part 1
Lecture 26 - EPR Paradox and Bohrâ s Argument, Bohmâ s Argument and Merminâ s Argument - Part 2
Lecture 27 - Hidden Variable Theory, Bell model, Bell Inequality, Bell CHSH Inequality
Lecture 28 - Open Quantum Systems: Introduction - Part 1
Lecture 29 - Open Quantum Systems: Introduction - Part 2

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Lecture 30 - Open Quantum Systems: Introduction - Part 3
Lecture 31 - Open Quantum Systems: Optical Master Equation, Thermalization
Lecture 32 - Open Quantum Systems: Solving Master Equaitons
Lecture 33 - Open Quantum Systems: Quantum Trajectory Aproach
Lecture 34 - Open Quanutm Systems: Decoherence

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NPTEL Video Course - Physics - NOC:Foundations of Quantum Theory: Relativistic Approach

Subject Co-ordinator - Prof. Kinjalk Lochan

Co-ordinating Institute - IISER Mohali

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Perturbation theory 1.1
Lecture 2 - Perturbation theory 1.2
Lecture 3 - Perturbation theory 1.3
Lecture 4 - Perturbation theory 1.4
Lecture 5 - Time dependent perturbation theory 1.1
Lecture 6 - Time dependent perturbation theory 1.2
Lecture 7 - Time dependent perturbation theory 1.3
Lecture 8 - Special Relativity 1.1
Lecture 9 - Special Relativity 1.2
Lecture 10 - Special Relativity 1.3
Lecture 11 - Relativistic Quantum Mechanics 1.1
Lecture 12 - Relativistic Quantum Mechanics 1.2
Lecture 13 - Relativistic Quantum Mechanics 1.3
Lecture 14 - Relativistic Quantum Mechanics 1.4
Lecture 15 - Quantum Field Theory 1.1
Lecture 16 - Quantum Field Theory 1.2
Lecture 17 - Quantum Field Theory 1.3
Lecture 18 - Quantum Field Theory 1.4
Lecture 19 - Quantum Field Theory 2.1
Lecture 20 - Quantum Field Theory 2.2
Lecture 21 - Quantum Field Theory 2.3
Lecture 22 - Spinor Field quantization 1.1
Lecture 23 - Spinor Field quantization 1.2
Lecture 24 - Spinor Field quantization 1.3
Lecture 25 - Spinor Field quantization 1.4
Lecture 26 - Electromagnetic Field Quantization 1.1
Lecture 27 - Electromagnetic Field Quantization 1.2
Lecture 28 - Electromagnetic Field Quantization 1.3
Lecture 29 - Quantum Fields expectation

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Lecture 30 - Quantum Field Coherent State
Lecture 31 - Thermal Fields 1.1
Lecture 32 - Thermal Fields 1.2
Lecture 33 - Matter-Field interaction 1.1
Lecture 34 - Matter-Field interaction 1.2
Lecture 35 - Matter-Field interaction 1.3
Lecture 36 - Atom-Field Coupling
Lecture 37 - Excitation of atom through field interaction
Lecture 38 - Spontaneous and Stimulated emission
Lecture 39 - Lindblad Master Equation
Lecture 40 - Relativistic corrections in transitions
Lecture 41 - Change in atomic characteriscs via field interaction
Lecture 42 - Shift in eigen energies via field interaction

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NPTEL Video Course - Physics - NOC:Introduction to General Relativity

Subject Co-ordinator - Prof. Shubho R. Roy, Prof. Arpan Bhattacharyya

Co-ordinating Institute - IIT Hyderabad and IIT Gandhinagar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Newton's Gravitation - Part I
Lecture 2 - Newton's Gravitation - Part II
Lecture 3 - Newton's Gravitation - Part III
Lecture 4 - Newton's Gravitation - Part IV
Lecture 5 - Newton's Gravitation - Tutorial 1
Lecture 6 - Newton's Gravitation - Tutorial 2
Lecture 7 - Special Relativity Review
Lecture 8 - Minkowski Spacetime
Lecture 9 - Lorentz Group - Part I
Lecture 10 - Lorentz Group - Part II
Lecture 11 - Topology of Lorentz Group
Lecture 12 - Lorentz Group: Tutorial
Lecture 13 - Relativistic index/component notation
Lecture 14 - Tensor analysis - I
Lecture 15 - Tensor analysis - II
Lecture 16 - Tensor analysis - III
Lecture 17 - Introduction to differential forms
Lecture 18 - Exterior Calculus
Lecture 19 - Differential Forms: Tutorial
Lecture 20 - Free Point Particle - I
Lecture 21 - Free Point Particle - II
Lecture 22 - Point Particle with interactions
Lecture 23 - Tensor Fields
Lecture 24 - Point Particle with interactions: Tutorial
Lecture 25 - Covariant equations for Fluid mechanics - I
Lecture 26 - Covariant equations for Fluid mechanics - II
Lecture 27 - Stress-Energy-Momentum Tensor: Tutorial
Lecture 28 - Electrodynamics in Lorentz covariant form - I
Lecture 29 - Electrodynamics in Lorentz covariant form - II

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Lecture 30 - Electrodynamics in Lorentz covariant form: Tutorial
Lecture 31 - Alternative route to Maxwell's equations from Electrostatics - I
Lecture 32 - Alternative route to Maxwell's equations from Electrostatics - II
Lecture 33 - Towards a Lorentz covariant formulation for Newton's gravitation - I
Lecture 34 - Towards a Lorentz covariant formulation for Newton's gravitation - II
Lecture 35 - Consistent coupling of gravity to matter - I
Lecture 36 - Consistent coupling of gravity to matter - II
Lecture 37 - Covariance vs Invariance principles
Lecture 38 - Mathematical Preliminaries-I : Basics of Point-Set Topology - 1
Lecture 39 - Mathematical Preliminaries-I : Basics of Point-Set Topology - 2
Lecture 40 - Mathematical Preliminaries-I : Basics of Differential Geometry - 1
Lecture 41 - Mathematical Preliminaries-I : Basics of Differential Geometry - 2
Lecture 42 - Mathematical Preliminaries-I : Calculus on manifolds - 1
Lecture 43 - Mathematical Preliminaries-I : Calculus on manifolds - 2
Lecture 44 - Mathematical Preliminaries-II : Riemannian manifolds
Lecture 45 - Mathematical Preliminaries-II : Riemannian Geometry
Lecture 46 - Mathematical Preliminaries-II : Riemannian Geometry
Lecture 47 - Mathematical Preliminaries-II : Riemannian Geometry
Lecture 48 - Mathematical Preliminaries-II : Riemannian Geometry
Lecture 49 - Geodesic Deviation and the Riemann Curvature tensor
Lecture 50 - Principle of Minimal Coupling
Lecture 51 - Einstein Field Equations - I
Lecture 52 - Einstein Field Equations - II
Lecture 53 - Weak field limit: Linearized GR
Lecture 54 - Gravitational Waves
Lecture 55 - Gravitational Radiation
Lecture 56 - Schwarzschild Solution - I
Lecture 57 - Schwarzschild Solution - II
Lecture 58 - Schwarzschild Solution - III
Lecture 59 - Timelike geodesics in Schwarzschild geometry
Lecture 60 - Precession of perihelion of planets
Lecture 61 - Lightlike geodesics in Schwarzschild geometry
Lecture 62 - Gravitational Deflection and Retardation of light
Lecture 63 - Cosmology-I : Kinematics - Part 1
Lecture 64 - Cosmology-I : Kinematics - Part 2
Lecture 65 - Cosmology-II : Dynamics - Part 1
Lecture 66 - Cosmology-II : Dynamics - Part 2
Lecture 67 - Cosmology-II : Dynamics - Part 3
Lecture 68 - Cosmology-II : Dynamics - Part 4

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NPTEL Video Course - Physics - NOC:Quantum Computation and Quantum Information

Subject Co-ordinator - Prof. Chiranjib Mitra

Co-ordinating Institute - IISER Kolkata

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical Introduction to classical and quantum Computation
Lecture 2 - The Hilbert Space of Multiple Qubits
Lecture 3 - Deutsch Algorithm
Lecture 4 - Principle of Information Eraser
Lecture 5 - Bloch sphere representation of Spin states
Lecture 6 - Rotation on Bloch-sphere - I
Lecture 7 - Rotation on Bloch-sphere - II
Lecture 8 - Euler decomposition
Lecture 9 - Density matrices - I
Lecture 10 - Density matrices - II
Lecture 11 - Density matrices - III
Lecture 12 - Classical Information Theory - I
Lecture 13 - Classical Information Theory - II
Lecture 14 - Classical Information Theory - III
Lecture 15 - Classical Information Theory - IV
Lecture 16 - Introduction to Von-Neumann Entropy
Lecture 17 - Two qubits: Entanglement
Lecture 18 - Reduced Density matrices
Lecture 19 - Entanglement: Schmidt Decomposition
Lecture 20 - Schmidt Decomposition - I
Lecture 21 - Schmidt Decomposition - II
Lecture 22 - Singular Value Decomposition
Lecture 23 - EPR paradox and Bell's inequality - I
Lecture 24 - EPR paradox and Bell's inequality - II
Lecture 25 - Bell's inequality - III
Lecture 26 - Bell's inequality - IV
Lecture 27 - Quantum protocols: Dense coding and Teleportation
Lecture 28 - Quantum Dense coding
Lecture 29 - Quantum Teleportation

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Lecture 30 - Generation of Entangled Photons
Lecture 31 - Bell State Analyzer
Lecture 32 - Experimental Teleportation and Dense Coding
Lecture 33 - Classical Cryptography - 1
Lecture 34 - Classical Cryptography - 2
Lecture 35 - Quantum Version of the Factoring Algorithm
Lecture 36 - Quantum Fourier Transform - 1
Lecture 37 - Quantum Fourier Transform - 2
Lecture 38 - Quantum Fourier Transform - 3
Lecture 39 - Quantum Fourier Transform - 4
Lecture 40 - Quantum Fourier Transform - 5
Lecture 41 - Quantum Fourier Transform - 6
Lecture 42 - Shor's Algorithm - 1
Lecture 43 - Shor's Algorithm - 2
Lecture 44 - Shor's Algorithm - 3
Lecture 45 - Shor's Algorithm - 4
Lecture 46 - Decoherence - 1
Lecture 47 - Decoherence - 2
Lecture 48 - Decoherence - 3
Lecture 49 - Decoherence - 4
Lecture 50 - Decoherence - 5
Lecture 51 - Decoherence - 6
Lecture 52 - Decoherence - 7
Lecture 53 - Decoherence - 8
Lecture 54 - Decoherence - 9
Lecture 55 - Decoherence - 10
Lecture 56 - Decoherence - 11
Lecture 57 - Positive Operator Valued Measurements
Lecture 58 - Entanglement in mixed states
Lecture 59 - Convexity and Peres-Horodecki criterion
Lecture 60 - Concurrence and the Spin-Flip Analysis

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NPTEL Video Course - Physics - NOC:Fiber Optics

Subject Co-ordinator - Prof. Vipul Rastogi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Need for Optical Communication
Lecture 3 - Salient Features of Optical Fiber - I
Lecture 4 - Salient Features of Optical Fiber - II
Lecture 5 - Optical Fiber Fabrication
Lecture 6 - Transmission Characteristics - I
Lecture 7 - Transmission Characteristics - II
Lecture 8 - Transmission Characteristics - III
Lecture 9 - Propagation in Infinitely Extended Dielectric
Lecture 10 - EM Waves in Dielectrics
Lecture 11 - Electromagnetic Analysis of Waveguides - I
Lecture 12 - Electromagnetic Analysis of Waveguides - II
Lecture 13 - Electromagnetic Analysis of Waveguides - III
Lecture 14 - Electromagnetic Analysis of Waveguides - IV
Lecture 15 - Electromagnetic Analysis of Waveguides - V
Lecture 16 - Electromagnetic Analysis of Waveguides - VI
Lecture 17 - Electromagnetic Analysis of Waveguides - VII
Lecture 18 - Electromagnetic Analysis of Waveguides - VIII
Lecture 19 - Optical Fiber Waveguide - I
Lecture 20 - Optical Fiber Waveguide - II
Lecture 21 - Optical Fiber Waveguide - III
Lecture 22 - Optical Fiber Waveguide - IV
Lecture 23 - Optical Fiber Waveguide - V
Lecture 24 - Splice Loss
Lecture 25 - Waveguide Dispersion - I
Lecture 26 - Waveguide Dispersion - II
Lecture 27 - Recap
Lecture 28 - Optical Fiber Components and Devices - I
Lecture 29 - Optical Fiber Components and Devices - II

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Lecture 30 - Optical Fiber Components and Devices - III
Lecture 31 - Optical Fiber Components and Devices - IV
Lecture 32 - Optical Fiber Components and Devices - V
Lecture 33 - Optical Sources and Detectors - I
Lecture 34 - Optical Sources and Detectors - II
Lecture 35 - Optical Sources and Detectors - III
Lecture 36 - Optical Sources and Detectors - IV
Lecture 37 - Optical Sources and Detectors - V
Lecture 38 - System Design Aspects
Lecture 39 - Optical Fiber Measurements
Lecture 40 - Summary and Recent Advances

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NPTEL Video Course - Physics - NOC:Solar Photovoltaics Fundamentals, Technology and Applications

Subject Co-ordinator - Prof. Soumitra SataPathi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Energy and its Sources
Lecture 2 - Introduction to Solar Energy
Lecture 3 - Introduction of Quantum Mechanics in Solar Photovoltaics - I
Lecture 4 - Introduction of Quantum Mechanics in Solar Photovoltaics - II
Lecture 5 - Introduction of Quantum Mechanics in Solar Photovoltaics - III
Lecture 6 - Band Theory
Lecture 7 - Energy Band Diagram
Lecture 8 - Charge Carrier Dynamics in Semiconductor
Lecture 9 - P-N junction model and Diode working principle
Lecture 10 - Current-Voltage Characteristics of Solar Cell
Lecture 11 - Equivalent Circuits of Solar Cells, Fill Factor
Lecture 12 - Fabrication Process of Semiconductor Grade Silicon
Lecture 13 - Fabrication Process of Single crystalline Silicon
Lecture 14 - Thin Film deposition Techniques
Lecture 15 - Thin Film Solar Cells
Lecture 16 - Photo Physics of Dye Sensitized Solar Cells
Lecture 17 - Fabrication of Dye Sensitized Solar Cells
Lecture 18 - Design of Novel dyes
Lecture 19 - Design of Electrolytes
Lecture 20 - Quantum Dot Solar Cells
Lecture 21 - Fabrication of Organic Solar Cells
Lecture 22 - Physics of Bulk Hetero Junction (BHJ) Solar Cells
Lecture 23 - Photo Physics of Organic Solar Cells
Lecture 24 - Morphology Optimization of Organic Solar Cells
Lecture 25 - Perovskite Solar Cells
Lecture 26 - Fabrication of Perovskite Solar Cells
Lecture 27 - Photo Physics of Perovskite Solar Cells
Lecture 28 - Stability in Perovskite Solar Cells
Lecture 29 - Morphology Optimization of Perovskite Solar Cells

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Lecture 30 - Perovskite Single Crystal Solar Cells
Lecture 31 - Photophysics in Perovskite Single Crystal Solar Cells
Lecture 32 - Applicationss of Perovskite Single Crystal Solar Cells
Lecture 33 - Organic Nano Particles Based Solar Cells
Lecture 34 - Morphology Optimization in Organic Nanoparticle Based Solar Cells
Lecture 35 - Multijunction Tandem Solar Cells
Lecture 36 - Introduction to Characterization Techniques
Lecture 37 - Vacuum Technology in Solar Photovoltaics
Lecture 38 - Introduction of Pressure Gauges
Lecture 39 - Electron Microscopy in Solar Photovoltaics
Lecture 40 - Impedance Spectroscopy

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NPTEL Video Course - Physics - NOC:Introduction to Atmospheric and Space Sciences

Subject Co-ordinator - Prof. M V Sunil Krishna

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction to the Earth's Atmosphere and Source of Energy - The Sun
Lecture 2 - Primary Source of Energy on the Earth - The Sun
Lecture 3 - Evolution of the Earth's Atmosphere
Lecture 4 - Earth's Second Atmosphere and Rise of Oxygen
Lecture 5 - Atmosphere of Other Planets in Solar System
Lecture 6 - Structure of Earth's Atmosphere
Lecture 7 - Vertical Structure of Atmosphere
Lecture 8 - Characterization of Atmosphere Based on Electrical Properties
Lecture 9 - Coupling of Solar Radiation with the Earth's Atmosphere
Lecture 10 - Forces and Their Classifications
Lecture 11 - Forces - Gravitational Force
Lecture 12 - Forces - Viscous Force
Lecture 13 - Forces - Coriolis Force
Lecture 14 - Coriolis Force and Curvature Effect
Lecture 15 - Hydrostatic Equation
Lecture 16 - Hypsometric Equation
Lecture 17 - Atmospheric Thermodynamics
Lecture 18 - Thermodynamics - Dry Air
Lecture 19 - Thermodynamics - Moist Air
Lecture 20 - Geopotential and Scale Height
Lecture 21 - Specific Heats
Lecture 22 - Air Parcel and Potential Temperature
Lecture 23 - Moisture Parameters
Lecture 24 - Saturation Mixing Ratio and Relative Humidity
Lecture 25 - Pseudo-Adiabatic Processes
Lecture 26 - Convection of Air
Lecture 27 - Atmospheric Stability and Cloud Formation
Lecture 28 - Cloud Formation
Lecture 29 - Cloud Formation and Lifting

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Lecture 30 - Cloud Morphology
Lecture 31 - Secondary Cloud Classification and Fog
Lecture 32 - Atmospheric Stability
Lecture 33 - Atmospheric Stability Conditions
Lecture 34 - Stable Unstable and Neutral Atmosphere
Lecture 35 - Cloud Seeding and Precipitation
Lecture 36 - Measuring Precipitation
Lecture 37 - Droplet Growth and Curvature Effect
Lecture 38 - Droplet Growth and Solute Effect
Lecture 39 - Radial Growth of Droplets by Diffusion
Lecture 40 - Radial Growth of Droplets by Diffusion (Continued...)
Lecture 41 - Ionospheric Layers and Photochemistry
Lecture 42 - Ionization Processes
Lecture 43 - Ionospheric Chemical Reactions and Layers
Lecture 44 - Chapman's Theory of Layer Production
Lecture 45 - Chapman's Theory of Layer Production (Continued...)
Lecture 46 - Chapman's Alpha Layer
Lecture 47 - Hydrogen in Ionosphere
Lecture 48 - Debye's Shielding
Lecture 49 - Debye's Shielding and Debye's Potential
Lecture 50 - Debye's Potential (Continued...)
Lecture 51 - Particle Motion in Uniform Electric Field
Lecture 52 - Particle Motion in Uniform Magnetic Field
Lecture 53 - Particle Motion in Uniform Magnetic Field and Guiding Center
Lecture 54 - Particle Motion in Uniform Electric and Magnetic Fields
Lecture 55 - Gradient Magnetic Field
Lecture 56 - Gradient Drift and Curvature Drift
Lecture 57 - Vacuum Drift and Planetary Ring Current
Lecture 58 - Magnetic Mirroring
Lecture 59 - Magnetic Mirroring and Loss Cone
Lecture 60 - Airglow and Aurora

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NPTEL Video Course - Physics - NOC:Optical Sensors

Subject Co-ordinator - Prof. Sachin Kumar Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Sensor Fabrication and Characterization
Lecture 3 - Basic Optics for Optical Sensing - I
Lecture 4 - Basic Optics for Optical Sensing - II
Lecture 5 - Basic Optics for Optical Sensing - III
Lecture 6 - Basic Optics for Optical Sensing - IV
Lecture 7 - Basic Optics for Optical Sensing - V
Lecture 8 - Basic Optics for Optical Sensing - VI
Lecture 9 - Basic Optics for Optical Sensing - VII
Lecture 10 - Plasmons - I
Lecture 11 - Plasmons - II
Lecture 12 - Plasmons - III
Lecture 13 - Plasmons - IV
Lecture 14 - Plasmons - V
Lecture 15 - Plasmons - VI
Lecture 16 - Multiple Optical Sensors of Different Mechanisms
Lecture 17 - Interference based Sensors
Lecture 18 - Interference, Diffraction and Optical Fiber Sensors
Lecture 19 - Review of Biomaterial Optics
Lecture 20 - Terahertz Based Detection and Circular Dichroism

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NPTEL Video Course - Physics - NOC:Advanced Atmospheric Physics

Subject Co-ordinator - Prof. M V Sunil Krishna

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Atmospheric Forces and Dynamics - Part 1
Lecture 2 - Atmospheric Forces and Dynamics - Part 2
Lecture 3 - Total Derivative (Introduction)
Lecture 4 - Total Derivative of a Vector in a Rotating Frame of Reference
Lecture 5 - Momentum Equations and its Vectorial Form in Spherical Polar Coordinates - Part 1
Lecture 6 - Momentum Equations and its Vectorial Form in Spherical Polar Coordinates - Part 2
Lecture 7 - Momentum Equations and its Vectorial Form in Spherical Polar Coordinates - Part 3
Lecture 8 - Total Derivative and Lagrangian
Lecture 9 - Continuity Equation: Eulerian
Lecture 10 - Energy Equations - Part 1
Lecture 11 - Energy Equations - Part 2
Lecture 12 - Scaling analysis - Part 1
Lecture 13 - Scaling analysis - Part 2
Lecture 14 - Scaling Analysis of Governing Equations - Part 1
Lecture 15 - Scaling Analysis of Governing Equations - Part 2
Lecture 16 - Scaling Analysis - Part 3, A Tutorial
Lecture 17 - Scaling Analysis - Part 4, A Tutorial
Lecture 18 - Introduction of Atmospheric Waves - Part 1
Lecture 19 - Introduction of Atmospheric Waves - Part 2
Lecture 20 - Problems based on Total Derivative - Part 1
Lecture 21 - Problems based on Total Derivative - Part 2
Lecture 22 - Shallow Water Gravity Waves - Part 1
Lecture 23 - Shallow Water Gravity Waves - Part 2
Lecture 24 - Acoustic Waves
Lecture 25 - Internal Gravity Waves - Part 1
Lecture 26 - Internal Gravity Waves - Part 2
Lecture 27 - Internal Gravity Waves - Part 3
Lecture 28 - Pressure as a vertical coordinate - Part 1
Lecture 29 - Pressure as a vertical coordinate - Part 2

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Lecture 30 - Pressure as a vertical coordinate - Part 3
Lecture 31 - General circulation and global winds
Lecture 32 - Introduction to different types of Fronts
Lecture 33 - Geostrophic winds
Lecture 34 - Natural coordinate and Inertial flows
Lecture 35 - Cyclostrophic winds and Rossby number
Lecture 36 - Gradient winds
Lecture 37 - Thermal winds
Lecture 38 - Problems on thermal winds
Lecture 39 - Ionosphere introduction (Basics)- Part 1
Lecture 40 - Ionosphere introduction (Different layers) - Part 2
Lecture 41 - Ionosphere introduction (Photochemistry) - Part 3
Lecture 42 - Ionosphere introduction (Recombination) - Part 4
Lecture 43 - Composite F layer - Part 1
Lecture 44 - Composite F layer - Part 2
Lecture 45 - Composite F layer H/He ions - Part 3
Lecture 46 - The Sun - Earth Energetics and Aurora
Lecture 47 - Airglows and Aurora
Lecture 48 - Sun's magnetic field, Formation of Aurora, and Solar cycle
Lecture 49 - Sun's internal structure, Prominences
Lecture 50 - Solar wind - Magnetosphere interactions
Lecture 51 - Solar wind interactions with different planets
Lecture 52 - Solar wind properties and its interaction with different planets
Lecture 53 - Static Model of Corona
Lecture 54 - Parker's Theory of Solar Wind Acceleration - Part 1
Lecture 55 - Parker's Theory of Solar Wind Acceleration - Part 2
Lecture 56 - Parker's Theory of Solar Wind Acceleration - Part 3
Lecture 57 - Parker's Theory of Solar Wind Acceleration - Part 4
Lecture 58 - Introduction to Space Weather - Part 1
Lecture 59 - Introduction to Space Weather - Part 2
Lecture 60 - Introduction to Space Weather - Part 3

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NPTEL Video Course - Physics - NOC:Nuclear Astrophysics

Subject Co-ordinator - Prof. Anil Kumar Gourishetty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Historical Background, Observational Astronomy, Properties of Sun and of Stars
Lecture 2 - Properties of Galaxies and Universe
Lecture 3 - Background of elemental abundance curve
Lecture 4 - Evidences of Nucleosynthesis - I
Lecture 5 - Evidences of Nucleosynthesis - II
Lecture 6 - Evidences of Nucleosynthesis - III and Mass gaps
Lecture 7 - H-R Diagram
Lecture 8 - M-L relation, Hubbleâ s Law and Echo of Big Bang
Lecture 9 - Thermonuclear reactions and Reaction cross-section
Lecture 10 - Reaction rate
Lecture 11 - Reaction rate and Neutron induced reactions
Lecture 12 - Gamma induced reactions and Inverse reactions
Lecture 13 - Inverse reactions
Lecture 14 - Inverse reactions and Mean life time of a nuclei
Lecture 15 - Mean life time of a nuclei and Time dependent abundance evolution
Lecture 16 - Non-resonant charged particle induced reactions
Lecture 17 - Astrophysical S-factor and Non-resonant charged particle induced reactions
Lecture 18 - Gamow peak and Electron screening effect
Lecture 19 - Resonant reactions
Lecture 20 - Resonant reactions
Lecture 21 - Neutron induced non-resonant reactions
Lecture 22 - Burning stages of stars and Hydrogen burning
Lecture 23 - pp chain
Lecture 24 - pp chain and CN cycle
Lecture 25 - CNO cycle, Shell model and Gamma decay
Lecture 26 - Formation of 12C
Lecture 27 - Survival of 12C
Lecture 28 - Carbon, Neon, Oxygen and Silicon burning
Lecture 29 - Nucleosynthesis beyond Iron

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Lecture 30 - s-, r- and p-process
Lecture 31 - Charged particle and Neutron beams
Lecture 32 - Accelerators and Targets
Lecture 33 - Backing materials and Target preparation
Lecture 34 - Contaminants and Radiation sources
Lecture 35 - Detectors - I
Lecture 36 - Detectors - II
Lecture 37 - Activity method
Lecture 38 - Kinematics - I
Lecture 39 - Kinematics - II
Lecture 40 - Time of flight method and Indirect methods

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NPTEL Video Course - Physics - NOC:Applied Optics

Subject Co-ordinator - Prof. Akhilesh Kumar Mishra

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview
Lecture 2 - Introduction to Geometrical Optics
Lecture 3 - Ray Theory, Fermat's Principle
Lecture 4 - Refraction from Single Interface
Lecture 5 - Refraction from double interface
Lecture 6 - Matrix method in paraxial optics - I
Lecture 7 - Matrix Method in Paraxial Optics - II
Lecture 8 - Thick and Thin Lenses, Unit Planes
Lecture 9 - Nodal Planes, System of Thin Lenses
Lecture 10 - Problems on Geometrical Optics
Lecture 11 - Concept of Wavefront, Huygens Principle - I
Lecture 12 - Concept of Wavefront, Huygens Principle - II
Lecture 13 - Superposition of Waves
Lecture 14 - Introduction to Polarization, Linear and Circular Polarization
Lecture 15 - Elliptical Polarization
Lecture 16 - Interference of Light Waves, Interference of Polarized Light - I
Lecture 17 - Interference of Light Waves, Interference of Polarized Light - II
Lecture 18 - Young's Double Slit Experiment - I
Lecture 19 - Young's Double Slit Experiment - II
Lecture 20 - Interference with White Light, Displacement of Fringes, Fresnel's Biprism
Lecture 21 - Interference by Division of Amplitude
Lecture 22 - Thin Parallel Films, Wedge Shaped Films
Lecture 23 - Newton's Rings
Lecture 24 - Michelson Interferometer and Its Applications - I
Lecture 25 - Michelson Interferometer and Its Applications - II
Lecture 26 - Multiple Beam Interference
Lecture 27 - Fabry-Perot Interferometer and Etalon - I
Lecture 28 - Fabry-Perot Interferometer and Etalon - II
Lecture 29 - Concept of Coherence - I

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Lecture 30 - Concept of Coherence - II
Lecture 31 - Introduction to Diffraction
Lecture 32 - Fraunhofer Diffraction
Lecture 33 - Single Slit Diffraction
Lecture 34 - Double Slit Diffraction
Lecture 35 - Multiple Slit Diffraction
Lecture 36 - Diffraction at a Rectangular Aperture
Lecture 37 - Diffraction at a Circular Aperture
Lecture 38 - Diffraction Grating
Lecture 39 - Grating Spectrum and Resolving Power
Lecture 40 - Fresnel Diffraction
Lecture 41 - Fresnel Half Period Zones
Lecture 42 - Vibration Curve
Lecture 43 - Circular Obstacle, Zone Plates
Lecture 44 - Rectangular Aperture
Lecture 45 - Diffraction of a Plane Wave by a Long Narrow Slit
Lecture 46 - Brewster's Law, Malus' Law
Lecture 47 - Phenomenon of Double Refraction
Lecture 48 - Normal and Oblique Incidence
Lecture 49 - Production of Polarized Light
Lecture 50 - Quarter and Half Wave Plates
Lecture 51 - Analysis of Polarized Light and Optical Activity
Lecture 52 - Plane Wave Propagation in Anisotropic Media - I
Lecture 53 - Plane Wave Propagation in Anisotropic Media - II
Lecture 54 - Antireflecting Coating
Lecture 55 - Basic Concepts of Holography - I
Lecture 56 - Basic Concepts of Holography - II
Lecture 57 - Basic Concepts and Ray Optics Consideration of Optical Fiber
Lecture 58 - Introduction to Lasers - I
Lecture 59 - Introduction to Lasers - II
Lecture 60 - Trifle

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NPTEL Video Course - Physics - NOC:Newtonian Mechanics With Examples

Subject Co-ordinator - Prof. Shiladitya Sengupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Scalars vectors, and tensors - basic definitions
Lecture 2 - Scalars, vectors and tensors - most general definition
Lecture 3 - Elementary vector algebra - I (unit vector, dot product)
Lecture 4 - Elementary vector algebra - II (cross product, triple product)
Lecture 5 - Review of Newtonâ s laws of motion - tools for analysis
Lecture 6 - Newtonâ s laws of motion - third and second law
Lecture 7 - Newtonâ s laws of motion - first law
Lecture 8 - Solving mechanics problems - how to draw free body diagram correctly
Lecture 9 - Mechanical equilibrium (statics) using force and torque balance
Lecture 10 - Mechanical equilibrium (statics) using force and torque balance - more examples
Lecture 11 - Mechanical equilibrium of rope like structures, nature of tension force
Lecture 12 - Massless, flexible suspension cable in mechanical equilibrium
Lecture 13 - Massive flexible suspension cable in mechanical equilibrium
Lecture 14 - Mechanical equilibrium of truss (framework) - nature of internal forces
Lecture 15 - Mechanical equilibrium of truss (framework) - examples
Lecture 16 - Mechanical equilibrium of truss - uniqueness of solution, beam with distributed load
Lecture 17 - Mechanical equilibrium of truss - more on beam with distributed load
Lecture 18 - Mechanical equilibrium - more examples, principle of virtual work, constrained motion
Lecture 19 - Mechanical equilibrium: constraints, degrees of freedom, work done by constrained force
Lecture 20 - d'Alembert - Lagrange principle of virtual work - statement and examples
Lecture 21 - Equivalence of principles of force, torque balance and virtual work, stability analysis
Lecture 22 - Mechanical equilibrium: stability analysis, energy diagram technique
Lecture 23 - Friction between solids - Amonton-Coulomb laws, common misconceptions
Lecture 24 - Friction between solids - worked out examples
Lecture 25 - Friction between solid and fluid - drag force
Lecture 26 - Friction examples - projectile motion with drag force, tying a rope
Lecture 27 - Work-energy theorem in one dimension, importance of conservation laws
Lecture 28 - Work-energy theorem in higher dimensions, conservative forces
Lecture 29 - Momentum balance principle, critical review: projectile motion in real-life

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Lecture 30 - Projectile motion - effect of lift and thrust force by examples
Lecture 31 - More on rocket motion - comparing effect of thrust in deep space and at lift off
Lecture 32 - Collisions in daily life - application of energy and momentum balance principles
Lecture 33 - Collision at micro-meter, atomic and sub-atomic scales - Brownian motion, Compton effect
Lecture 34 - Concepts necessary for translation and rotation of rigid bodies - centre of mass
Lecture 35 - Centre of mass of composite objects
Lecture 36 - Concepts necessary for translation and rotation of rigid bodies - moment of inertia
Lecture 37 - More on moment of inertia - 3D objects, composite objects, engineering applications
Lecture 38 - Symmetry of mass distribution - product of inertia
Lecture 39 - Determining the principal axes of rotation and moment of inertia about them
Lecture 40 - Example of finding principal axes, introduction to rotation, the angular velocity vector
Lecture 41 - Rotation of rigid bodies - the angular momentum vector
Lecture 42 - Rotation of rigid bodies - torque
Lecture 43 - Translation and rotation of rigid bodies - computing rules
Lecture 44 - Translation and rotation of rigid bodies - examples (rolling, collision with rotation)

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NPTEL Video Course - Physics - NOC:Plasma Physics and Applications

Subject Co-ordinator - Prof. M.V. Sunil Krishna

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Plasma - I
Lecture 2 - Introduction to Plasma - II
Lecture 3 - Plasma Oscillations
Lecture 4 - Debye Shielding
Lecture 5 - Debye Potential - I
Lecture 6 - Debye Potential - II
Lecture 7 - Debye Length and Plasma Criteria
Lecture 8 - More Aspects of Debye Shielding
Lecture 9 - Numerical Problems on Debye Shielding - I
Lecture 10 - Plasma as a Gas and Distribution of Velocities
Lecture 11 - Numerical Problems on Debye Shielding - II
Lecture 12 - Single-Particle Motion in Uniform Electric Field
Lecture 13 - Single-Particle Motion in Uniform Magnetic Field - I
Lecture 14 - Single-Particle Motion in Uniform Magnetic Field - II
Lecture 15 - Single-Particle Motion in Uniform Magnetic Field - III
Lecture 16 - Single-Particle Motion Under Uniform Magnetic field - IV
Lecture 17 - Motion in Perpendicular Electric and Magnetic fields - I
Lecture 18 - Motion in Perpendicular Electric and Magnetic fields - II
Lecture 19 - Gradient Drift
Lecture 20 - Gradient and Curvature Drifts
Lecture 21 - Vacuum Drift
Lecture 22 - Numerical Problems on Drifts
Lecture 23 - Magnetic Mirroring - I
Lecture 24 - Magnetic Mirroring - II
Lecture 25 - Magnetic Mirroring - III
Lecture 26 - Magnetic Mirroring - IV
Lecture 27 - Motion in Time Varying Magnetic Field - I
Lecture 28 - Motion in Time Varying Magnetic Field - II
Lecture 29 - Motion in Time Varying Electric field - I

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Lecture 30 - Motion in Time Varying Electric field - II
Lecture 31 - Plasma as a Fluid: Equation of Continuity
Lecture 32 - Plasma as a Fluid: Fluid Equation - I
Lecture 33 - Plasma as a Fluid: Fluid Equation - II
Lecture 34 - Plasma as a fluid: Governing Equations
Lecture 35 - MHD Approximation - I
Lecture 36 - MHD Approximation - II
Lecture 37 - Plasma as a fluid: Electric and Magnetic Properties - I
Lecture 38 - Plasma as a fluid: Electric and Magnetic Properties - II
Lecture 39 - Plasma as a fluid: Fluid Drift - I
Lecture 40 - Plasma as a fluid: Fluid Drift - II
Lecture 41 - Magnetic Pressure
Lecture 42 - Wave in Plasma: Perturbation Theory
Lecture 43 - Wave in Plasma: Plasma Oscillation
Lecture 44 - Wave in Plasma: Dispersion Relation
Lecture 45 - Ion Acoustic Wave - I
Lecture 46 - Ion Acoustic Wave - II
Lecture 47 - Ion Acoustic Wave - III
Lecture 48 - Invalidity of Plasma Approximation - I
Lecture 49 - Invalidity of Plasma Approximation - II
Lecture 50 - Electromagnetic Waves in Plasma
Lecture 51 - Collisions and Diffusion in Plasma - I
Lecture 52 - Collisions and Diffusion in Plasma - II
Lecture 53 - Ambipolar Diffusion - I
Lecture 54 - Ambipolar Diffusion - II
Lecture 55 - Diffusion Equation
Lecture 56 - Diffusion in Presence of B - I
Lecture 57 - Diffusion in Presence of B - II
Lecture 58 - Instabilities in Plasma
Lecture 59 - Laser Produced Plasma and Pulsed Laser Deposited (PLD) Thin Film - I
Lecture 60 - Laser Produced Plasma and Pulsed Laser Deposited (PLD) Thin Film - II
Lecture 61 - Surface Modification of Metallic Components by Plasma Nitriding - I
Lecture 62 - Surface Modification of Metallic Components by Plasma Nitriding - II

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NPTEL Video Course - Physics - NOC:Solar Terrestrial Physics

Subject Co-ordinator - Prof. MV Sunil Krishna

Co-ordinating Institute - IIT Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction
Lecture 2 - Solar Terrestrial Radiation
Lecture 3 - Sun and Interplanetary Space - I
Lecture 4 - Sun and Interplanetary Space - II
Lecture 5 - Sun and Interplanetary Space - III
Lecture 6 - Sun and Solar Activity - I
Lecture 7 - Sun and Solar Activity - II
Lecture 8 - Sun and Solar Activity - III
Lecture 9 - Plasma Properties of Geospace - I
Lecture 10 - Plasma Properties of Geospace - II
Lecture 11 - Plasma Properties in Geospace - III
Lecture 12 - Plasma Properties in Geospace - IV
Lecture 13 - Plasma Properties in Geospace - V
Lecture 14 - Fluid theory of plasma - I
Lecture 15 - Fluid Theory of Plasma - II
Lecture 16 - Fluid Theory of Plasma - III
Lecture 17 - Governing Equations - I
Lecture 18 - Governing Equations - II
Lecture 19 - MHD Approximation - I
Lecture 20 - MHD Approximation - II
Lecture 21 - Magneto plasma - I
Lecture 22 - Magneto plasma - II
Lecture 23 - Planetary Magnetic Fields
Lecture 24 - Earthâ s Magnetosphere - I
Lecture 25 - Earthâ s Magnetosphere - II
Lecture 26 - Aurora and Airglow - I
Lecture 27 - Aurora and Airglow - II
Lecture 28 - Airglow Emissions and Introduction to Space Weather
Lecture 29 - Introduction to Space Weather - I

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Lecture 30 - Introduction to Space Weather - II
Lecture 31 - Ionosphere - I
Lecture 32 - Ionosphere - II
Lecture 33 - Ionosphere - III
Lecture 34 - Ionosphere - IV
Lecture 35 - Ionosphere - V
Lecture 36 - Ionosphere (Structures and Photochemisrty)
Lecture 37 - Ionospheric Layers
Lecture 38 - Chapman's Layer - 1
Lecture 39 - Chapman's Layer - 2
Lecture 40 - Chapman's Layer - 3
Lecture 41 - Ionospheric Peak, Chapman Layer and Inferences - I
Lecture 42 - Ionospheric Peak, Chapman Layer and Inferences - II
Lecture 43 - Diffusion and Vertical Transport in Ionosphere
Lecture 44 - Vertical Transport in Ionosphere - I
Lecture 45 - Vertical Transport in Ionosphere - II
Lecture 46 - F Region (Production and Recombination)
Lecture 47 - Ionospheric F2 layer
Lecture 48 - Ionospheric F2 layer and Protonosphere
Lecture 49 - Diffusion in the presence of magnetic field - I
Lecture 50 - Diffusion in the presence of magnetic field - II
Lecture 51 - Ionospheric Conductivity - I
Lecture 52 - Ionospheric Conductivity - II
Lecture 53 - Ionospheric Conductivity - III
Lecture 54 - Ionospheric Conductivity (Collision and Gyro Frequencies)
Lecture 55 - Equatorial Ionosphere (Ionospheric Dynamo)
Lecture 56 - Ionospheric Missions and Satellite Observations - I
Lecture 57 - Ionospheric Missions and Satellite Observations - II
Lecture 58 - Ionospheric Missions and Satellite Observations - III
Lecture 59 - Numerical Problems - I
Lecture 60 - Numerical Problems - II
Lecture 61 - Numerical Problems - III

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NPTEL Video Course - Physics - Relativistic Quantum Mechanics

Subject Co-ordinator - Prof. Apoorva D Patel

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction, The Klein-Gordon equation
Lecture 2 - Particles and antiparticles, Two component framework
Lecture 3 - Coupling to electromagnetism, Solution of the Coulomb problem
Lecture 4 - Bohr-Sommerfeld semiclassical solution of the Coulomb problem, The Dirac equation and the Cliffor
Lecture 5 - Dirac matrices, Covariant form of the Dirac equation, Equations of motion, Spin, Free particle so
Lecture 6 - Electromagnetic interactions, Gyromagnetic ratio
Lecture 7 - The Hydrogen atom problem, Symmetries, Parity, Separation of variables
Lecture 8 - The Frobenius method solution, Energy levels and wavefunctions
Lecture 9 - Non-relativistic reduction, The Foldy-Wouthuysen transformation
Lecture 10 - Interpretation of relativistic corrections, Reflection from a potential barrier
Lecture 11 - The Klein paradox, Pair creation process and examples
Lecture 12 - Zitterbewegung, Hole theory and antiparticles
Lecture 13 - Charge conjugation symmetry, Chirality, Projection operators, The Weyl equation
Lecture 14 - Weyl and Majorana representations of the Dirac equation, Unitary and antiunitary symmetries
Lecture 15 - Time reversal symmetry, The PCT invariance
Lecture 16 - Arrow of time and particle-antiparticle asymmetry, Band theory for graphene
Lecture 17 - Dirac equation structure of low energy graphene states, Relativistic signatures in graphene prop
Lecture 18 - Groups and symmetries, The Lorentz and Poincare groups
Lecture 19 - Group representations, generators and algebra, Translations, rotations and boosts
Lecture 20 - The spinor representation of SL(2,C), The spin-statistics theorem
Lecture 21 - Finite dimensional representations of the Lorentz group, Euclidean and Galilean groups
Lecture 22 - Classification of one particle states, The little group, Mass, spin and helicity
Lecture 23 - Massive and massless one particle states
Lecture 24 - P and T transformations, Lorentz covariance of spinors
Lecture 25 - Lorentz group classification of Dirac operators, Orthogonality and completeness of Dirac spinors
Lecture 26 - Propagator theory, Non-relativistic case and causality
Lecture 27 - Relativistic case, Particle and antiparticle contributions, Feynman prescription and the propaga
Lecture 28 - Interactions and formal perturbative theory, The S-matrix and Feynman diagrams
Lecture 29 - Trace theorems for products of Dirac matrices

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Lecture 30 - Photons and the gauge symmetry
Lecture 31 - Abelian local gauge symmetry, The covariant derivative and invariants
Lecture 32 - Charge quantisation, Photon propagator, Current conservation and polarisations
Lecture 33 - Feynman rules for Quantum Electrodynamics, Nature of perturbative expansion
Lecture 34 - Dyson's analysis of the perturbation series, Singularities of the S-matrix, Elementary QED proce
Lecture 35 - The T-matrix, Coulomb scattering
Lecture 36 - Mott cross-section, Compton scattering
Lecture 37 - Klein-Nishina result for cross-section
Lecture 38 - Photon polarisation sums, Pair production through annihilation
Lecture 39 - Unpolarised and polarised cross-sections
Lecture 40 - Helicity properties, Bound state formation
Lecture 41 - Bound state decay, Non-relativistic potentials
Lecture 42 - Lagrangian formulation of QED, Divergences in Green's functions, Superficially divergent 1-loop
Lecture 43 - Infrared divergences due to massless particles, Renormalisation and finite physical results
Lecture 44 - Symmetry constraints on Green's functions, Furry's theorem, Ward-Takahashi identity, Spontaneous
Lecture 45 - Status of QED, Organisation of perturbative expansion, Precision tests

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NPTEL Video Course - Physics - NOC:Control System Design

Subject Co-ordinator - Prof. G R Jayanth

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Linear Systems
Lecture 3 - Homogeneous linear time invariant ordinary differential equations
Lecture 4 - In-homogeneous linear time invariant ordinary differential equations
Lecture 5 - Fourier transforms - Part 1
Lecture 6 - Fourier transforms - Part 2
Lecture 7 - Laplace transforms - Part 1
Lecture 8 - Laplace transforms - Part 2
Lecture 9 - Introduction to feedback control - Part 1
Lecture 10 - Introduction to feedback control - Part 2
Lecture 11 - Nyquist stability theory - Part 1
Lecture 12 - Nyquist stability theory - Part 2
Lecture 13 - Nyquist stability theory - Part 3
Lecture 14 - Bode plots
Lecture 15 - Steps for performing control design - Part 1
Lecture 16 - Steps for performing control design - Part 2
Lecture 17 - General controllers - Part 1
Lecture 18 - General controllers - Part 2
Lecture 19 - General controllers - Part 3
Lecture 20 - Bode plot-based control design - Part 1
Lecture 21 - Bode plot-based control design - Part 2
Lecture 22 - Introduction to root-locus
Lecture 23 - Control system design using root-locus
Lecture 24 - Control of systems with some known parameters - Part 1
Lecture 25 - Control of systems with some known parameters - Part 2
Lecture 26 - Limitations of 1-degree of freedom control
Lecture 27 - Introduction to 2-degree of freedom control
Lecture 28 - 2-Degree of freedom robust control design for plants with gain uncertainty - Part 1
Lecture 29 - 2-Degree of freedom robust control design for plants with uncertain gain - Part 2

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Lecture 30 - 2-Degree of freedom robust control design for plants with uncertain pole
Lecture 31 - 2-Degree of freedom robust control design for plants with multiple uncertainties in their struct
Lecture 32 - Issues connected with 2-Degree of freedom control design using root-locus
Lecture 33 - Introduction to Nichols plot
Lecture 34 - Feedback control design using Nichols plot
Lecture 35 - Robust control design using Quantitative feedback theory - Part 1
Lecture 36 - Robust control design using Quantitative feedback theory - Part 2
Lecture 37 - Tutorial on QFT Toolbox software - Part 1
Lecture 38 - Tutorial on QFT Toolbox software - Part 2
Lecture 39 - Tutorial on QFT Toolbox software - Part 3
Lecture 40 - Fundamental properties of the loop gain - Part 1
Lecture 41 - Fundamental properties of the loop gain - Part 2
Lecture 42 - Ideal Bode Characteristic - Part 1
Lecture 43 - Ideal Bode Characteristic - Part 2
Lecture 44 - Introduction to nonminimum phase systems
Lecture 45 - Fundamental properties of nonminimum phase systems - Part 1
Lecture 46 - Fundamental properties of nonminimum phase systems - Part 2
Lecture 47 - Fundamental properties of unstable systems
Lecture 48 - Consequences of actuator bandwidth limitations while controlling unstable systems
Lecture 49 - Describing functions - Part 1
Lecture 50 - Describing functions - Part 2

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NPTEL Video Course - Physics - NOC:Bonds and Bands in Solids

Subject Co-ordinator - S. Ramashesha

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Born-Oppenheimer approximation
Lecture 2 - Self-consistent field (SCF) method
Lecture 3 - Simple MO Theory of Hydrogen Molecule
Lecture 4 - Blochâ s theorem
Lecture 5 - Tight binding approximation
Lecture 6 - Energy band theory - 1
Lecture 7 - Energy band theory - 2
Lecture 8 - Density of states
Lecture 9 - Energy band theory - 3
Lecture 10 - Energy band theory - 4
Lecture 11 - Drudeâ s classical free electron model - 1
Lecture 12 - Drudeâ s classical free electron model - 2
Lecture 13 - Drudeâ s classical free electron model - 3
Lecture 14 - Drudeâ s classical free electron model - 4
Lecture 15 - Sommerfeldâ s quantum free electron model
Lecture 16 - Specific heat of Fermi gas
Lecture 17 - Energy dispersion relation in a periodic potential - 1
Lecture 18 - Energy dispersion relation in a periodic potential - 2
Lecture 19 - Brief overview of space groups and constant energy surface in 2D
Lecture 20 - Energy band and effective mass
Lecture 21 - Effective mass
Lecture 22 - kâ p perturbation method
Lecture 23 - Revisiting Blochâ s theorem and tight binding functions
Lecture 24 - Symmetries in crystal Hamiltonian - 1
Lecture 25 - Symmetries in crystal Hamiltonian - 2
Lecture 26 - Tight binding method - 1
Lecture 27 - Tight binding method - 2
Lecture 28 - Tight binding method - 3
Lecture 29 - Plane wave method

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Lecture 30 - Pseudo potential method
Lecture 31 - Cellular method of energy band calculation
Lecture 32 - Muffin tin potential and APW functions
Lecture 33 - Augmented plane wave method of energy band calculation - 1
Lecture 34 - Augmented plane wave method of energy band calculation - 2
Lecture 35 - Greenâ s function method of energy band calculation - 1
Lecture 36 - Greenâ s function method of energy band calculation - 2
Lecture 37 - Cyclotron resonance technique
Lecture 38 - De Haas-van Alphen effect
Lecture 39 - De Haas-van Alphen effect conclusion.Introduction to point impurity effect on band structure
Lecture 40 - Point impurity in crystal
Lecture 41 - Friedel Oscillations
Lecture 42 - Lindhard dielectric constant
Lecture 43 - Dielectric anomaly. Crystal momentum
Lecture 44 - Spatial and time reversal symmetries in crystals
Lecture 45 - Time reversal symmetry (Continued...)
Lecture 46 - Spin orbit interaction
Lecture 47 - Disordered solids and transport in disordered solids
Lecture 48 - Optical properties of semiconductors
Lecture 49 - Excitonic states in semiconductors
Lecture 50 - Excitonic states in semiconductors (Continued...)
Lecture 51 - Molecular orbital calculation - I
Lecture 52 - Mott-Hubbard transition
Lecture 53 - Hubbard model
Lecture 54 - Electron repulsion and magnetic exchange
Lecture 55 - Beyond on-site electron repulsions;Pariser-Parr-Pople model
Lecture 56 - Electron-hole symmetry and Pairing theorem. Solitons
Lecture 57 - Density waves in 1-d systems and Lattice vibrations - I
Lecture 58 - Lattice vibrations - II
Lecture 59 - Lattice vibrations - III
Lecture 60 - Lattice vibrations - IV

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NPTEL Video Course - Physics - NOC:Advanced NMR Techniques in Solution and Solid-State

Subject Co-ordinator - Prof. N. Suryaprakash

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to NMR
Lecture 2 - NMR concepts and spin physics - I
Lecture 3 - NMR concepts and spin physics - II
Lecture 4 - Internal interaction parameters and chemical shifts
Lecture 5 - Chemical shifts
Lecture 6 - Scalar couplings
Lecture 7 - Multiplicity patterns of coupled spins and analysis of 1H NMR spectrum
Lecture 8 - Multiplicity pattern and analysis of NMR spectra - II
Lecture 9 - Analysis of NMR spectra and their analysis
Lecture 10 - Heteronuclear NMR
Lecture 11 - Introduction to Fourier series
Lecture 12 - Complex form of Fourier series
Lecture 13 - Fourier theorems
Lecture 14 - Fourier transformation in NMR
Lecture 15 - Pople notation, construction of spin Hamiltonian
Lecture 16 - Quantum mechanical analysis of AX spectra
Lecture 17 - Quantum mechanical analysis of AB spin system
Lecture 18 - Quantum mechanical analysis of coupled spin systems
Lecture 19 - RF pulses and their phases
Lecture 20 - Receiver phase and phase cycling
Lecture 21 - Evolution of chemical shift
Lecture 22 - Evolution of J couplings: polarization transfer
Lecture 23 - selective saturation in homo and heteronuclear spin systems, coupled anddecoupled INEPT
Lecture 24 - INEPT and DEPT
Lecture 25 - Coherence transfer pathway
Lecture 26 - Examples of coherence pathway selection
Lecture 27 - Pulse field gradients - I
Lecture 28 - Pulse field gradients - II
Lecture 29 - Selective excitation, selective inversion

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Lecture 30 - Relaxation phenomenon
Lecture 31 - T1 relaxation concepts and measurements
Lecture 32 - Spectral density function and relaxation mechanisms
Lecture 33 - T1 Relaxation mechanisms
Lecture 34 - T1 Relaxation mechanisms and T2 relaxation
Lecture 35 - Measurement of T1 and T2
Lecture 36 - Decoupling and NOE concepts
Lecture 37 - DQ and ZQ relaxation pathways
Lecture 38 - Positive and Negative NOE and spectral density functions
Lecture 39 - NOE and correlation time
Lecture 40 - Product operators
Lecture 41 - Product operator analysis
Lecture 42 - Productor operator analysis of pulse sequences
Lecture 43 - Product operators for two J coupled spins
Lecture 44 - Spin echo sequences
Lecture 45 - Introduction to 2D NMR
Lecture 46 - 2D NMR concepts, 2D experiments
Lecture 47 - 2D COSY experiment
Lecture 48 - 2D COSY and its variants
Lecture 49 - TOCSY Heteronuclear 2D experiments
Lecture 50 - coupled and decoupled HSQC, HMBC, INADEQUATE, 2D Jresolved
Lecture 51 - Introduction to multiple quantum NMR
Lecture 52 - DQ and ZQ of coupled spins
Lecture 53 - MQ and relative signs of couplings
Lecture 54 - MQ and spin system filtering
Lecture 55 - Introduction to solid state NMR
Lecture 56 - CSA and dipolar couplings
Lecture 57 - Magic Angle Spinning
Lecture 58 - WAHUHA and Cross Polarization
Lecture 59 - Cross Polarization
Lecture 60 - CP at high speeds, Side band suppression, TOSS

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NPTEL Video Course - Physics - NOC:Particle Physics and the Standard Model

Subject Co-ordinator - Prof. Nirmal Raj

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Field content and symmetries
Lecture 3 - Stability of particles vs symmetry
Lecture 4 - Parity
Lecture 5 - Parity violation
Lecture 6 - Charge conjugation
Lecture 7 - CP and CPT symmetries
Lecture 8 - CP violation in weak forces
Lecture 9 - CP violation and time reversal
Lecture 10 - Special lecture: Feynman diagrams
Lecture 11 - More Feynman diagrams
Lecture 12 - Spin and statistics
Lecture 13 - Spinors: Round 1
Lecture 14 - Introduction to group theory
Lecture 15 - Isospin
Lecture 16 - Consequences of isospin
Lecture 17 - Continuous groups
Lecture 18 - Introduction to quantum field theory
Lecture 19 - Action principle
Lecture 20 - Spin-0 fields: zero-point energy
Lecture 21 - Cosmological constant problem
Lecture 22 - Spin-1 fields
Lecture 23 - Proca Lagrangian
Lecture 24 - Maxwell Lagrangian
Lecture 25 - Spin-1/2 fields: Dirac Lagrangian
Lecture 26 - Lorentz group
Lecture 27 - Spinors: Round 2
Lecture 28 - Gauge invariance and QED
Lecture 29 - Non-abelian gauges

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Lecture 30 - Asymptotic freedom
Lecture 31 - Standard Model field content
Lecture 32 - The Higgs field
Lecture 33 - Breaking symmetry: Round 1
Lecture 34 - Breaking symmetry: Round 2
Lecture 35 - Goldstoneâ s theorem
Lecture 36 - Higgs mechanism
Lecture 37 - CKM matrix
Lecture 38 - CKM parameterisation
Lecture 39 - Weak CP violation
Lecture 40 - FCNCs and PMNS matrix
Lecture 41 - Unitarity triangles
Lecture 42 - Neutrino oscillations
Lecture 43 - Oscillation length
Lecture 44 - Atmospheric neutrinos
Lecture 45 - Solar neutrinos and matter effects
Lecture 46 - Neutrino mass ordering
Lecture 47 - Neutrino experiments
Lecture 48 - Particle collider configurations
Lecture 49 - Cross section
Lecture 50 - Deriving 2-to-2 cross section
Lecture 51 - Centre-of-momentum frame cross section
Lecture 52 - Particle decay
Lecture 53 - Proton decay
Lecture 54 - Dimensionality of time and particle decay
Lecture 55 - Scattering without QFT
Lecture 56 - Forward-backward asymmetry
Lecture 57 - Deep inelastic scattering
Lecture 58 - Quark parton model, summary of course

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NPTEL Video Course - Physics - NOC:Quantum Mechanics in the Relativistic Regime

Subject Co-ordinator - Prof. Sudhir Kumar Vempati

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Recap of NRQM
Lecture 2 - Finite Step Potential: Schrodinger equation solution
Lecture 3 - Properties of wavefunction
Lecture 4 - Matrix Mechanics
Lecture 5 - Basics of STR
Lecture 6 - Natural Units
Lecture 7 - Relativistic effects in Quantum Mechanics
Lecture 8 - Building Relativistic Wave Theories
Lecture 9 - Solutions to the KG equation
Lecture 10 - Introduction to Relativistic Lagrangian
Lecture 11 - Scalar Quantum Electrodynamics (SQED)
Lecture 12 - Non-Relativistic Limit of the KG Equation: The Schrodinger Equation
Lecture 13 - Revisiting KG Equation's Negative Energy Solutions
Lecture 14 - Klein Paradox
Lecture 15 - Scalar Quantum Electrodynamics (SQED)
Lecture 16 - Dirac Theory
Lecture 17 - Dirac Equation and its solution
Lecture 18 - Dirac Spinors
Lecture 19 - Properties of Spinor
Lecture 20 - Group Theory
Lecture 21 - Rotation Groups and their Properties
Lecture 22 - Lie Group and Lorentz Boost
Lecture 23 - Group Representations - I
Lecture 24 - Group Representations - II
Lecture 25 - Symmetry and Isomorphism
Lecture 26 - Lorentz Group - I
Lecture 27 - Lorentz Group - II
Lecture 28 - Decomposition of Lorentz Group
Lecture 29 - Boost and Rotation Generators

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Lecture 30 - Poincare Group
Lecture 31 - Representations of Poincare group
Lecture 32 - Solution of Dirac equation
Lecture 33 - Properties of Dirac Spinors and Probability Currents
Lecture 34 - Parity Violation and Axial Currents
Lecture 35 - Dirac interpretation for Negative Energy states
Lecture 36 - Dirac Hole Theory
Lecture 37 - Properties and Interpretations of Anti-Particle
Lecture 38 - Solutions of Massless Dirac Equation
Lecture 39 - Real Solutions of Dirac Equation
Lecture 40 - Properties of Majorana Fermions - I
Lecture 41 - Properties of Majorana Fermions - II
Lecture 42 - Examples of Majorana Fermions in different systems
Lecture 43 - Propagator Theory - I
Lecture 44 - Propagator Theory - II
Lecture 45 - Greenâ s Functions as Propagators
Lecture 46 - Solving for Greenâ s function
Lecture 47 - Photon Propagator
Lecture 48 - KG Propagator and its Properties
Lecture 49 - Scattering in SQED
Lecture 50 - Pion-Pion Scattering Channels
Lecture 51 - Pion-Pion Matrix Amplitude
Lecture 52 - Dirac Propagator and its Properties
Lecture 53 - Dyson equation and series
Lecture 54 - QED (Compton Scattering)
Lecture 55 - Dynamical Photon field processes
Lecture 56 - Employing trace theorems to calculate matrix element
Lecture 57 - Tree level QED processes
Lecture 58 - Pion mediated Processes
Lecture 59 - Loops and Renormalization
Lecture 60 - Bound states in RQM
Lecture 61 - Non-relativistic reduction of Dirac equation
Lecture 62 - Relativistic Corrections to H atom

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NPTEL Video Course - Physics - NOC:Statistical Mechanics of Phases and Phase Transitions

Subject Co-ordinator - Prof. Vijay Balakrishna Shenoy

Co-ordinating Institute - IISc Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Review of Prerequisites
Lecture 3 - Models, Symmetries, and Scales - 1
Lecture 4 - Models, Symmetries, and Scales - 2
Lecture 5 - Characterization of Phases
Lecture 6 - Fields and Grounds States
Lecture 7 - Interacting Particles Model
Lecture 8 - Liquid-Gas Phase Diagram
Lecture 9 - Monte Carlo Method
Lecture 10 - Ising Model Monte Carlo
Lecture 11 - Analytical Solution to Ising Model
Lecture 12 - Transfer Matrix Approach
Lecture 13 - Domain Wall Excitations in 2D
Lecture 14 - 2D Ising Dual
Lecture 15 - Series Expansion - I
Lecture 16 - Series Expansion - II
Lecture 17 - Quantum Models
Lecture 18 - Transverse Field Ising Model
Lecture 19 - TFIM Ground State
Lecture 20 - Perturbation Theory of TFIM
Lecture 21 - TFIM Dual
Lecture 22 - TFIM as Fermion Model
Lecture 23 - Solution of 2D Ising Model
Lecture 24 - Approximate Methods
Lecture 25 - Variational Principle in Action
Lecture 26 - Mean Field Theory
Lecture 27 - Mean Field Theory in Action
Lecture 28 - Bose Condensation
Lecture 29 - â•´He and Â³He Mixture - Blume-Emery-Griffiths Model

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Lecture 30 - Landau's Phenomenological Approach to Ising Model
Lecture 31 - Landau's Phenomenological Approach for Ising Tricriticality
Lecture 32 - Landau Theory for Continuous Symmetry
Lecture 33 - Landau-Ginzburg (LG) Theory
Lecture 34 - Functional Integral and Free Energy
Lecture 35 - Saddle Point Gaussian Approximation (SPGA)
Lecture 36 - LG-SPGA and Excitations
Lecture 37 - LG-SPGA and Correlations
Lecture 38 - Scaling Hypothesis
Lecture 39 - Renormalization Group (RG)
Lecture 40 - Real Space RG - 1D Ising Model
Lecture 41 - Real Space RG - 2D Ising Model
Lecture 42 - Wilsonian RG - Gaussian Theory
Lecture 43 - Wilsonian RG - O(n) LG Theory
Lecture 44 - Beyond Gaussian - O(n) LG Theory
Lecture 45 - Wilsonian RG - O(n) Non-Linear Sigma Model
Lecture 46 - 2D XY Model - Kosterlitz-Thouless Transition
Lecture 47 - Special Topics - 1: Quantum Memories
Lecture 48 - Special Topics - 2: Associative Memories - Hopfield Model

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NPTEL Video Course - Special Lecture Series - ACM Summer School on Graph Theory and Graph Algorithms

Subject Co-ordinator - Dr. N S. Narayanaswamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Graph Theory - Part 1
Lecture 2 - Introduction to Graph Theory - Part 2
Lecture 3 - Introduction to Graph Algorithms - Part 1
Lecture 4 - Introduction to Graph Algorithms - Part 2
Lecture 5 - Havel Hakimi Theorem - Part 1
Lecture 6 - Havel Hakimi Theorem - Part 2
Lecture 7 - Havel Hakimi Theorem - Part 3
Lecture 8 - Graph Traversals - Part 1
Lecture 9 - Graph Traversals - Part 2
Lecture 10 - Topological Sort and Mengers Theorem - Part 1
Lecture 11 - Topological Sort and Mengers Theorem - Part 2
Lecture 12 - Topological Sort and Mengers Theorem - Part 3
Lecture 13 - Hamiltonian Graphs - Part 1
Lecture 14 - Hamiltonian Graphs - Part 2
Lecture 15 - Shortest path Algorithms 1 - Part 1
Lecture 16 - Shortest path Algorithms 1 - Part 2
Lecture 17 - Shortest path Algorithms 1 - Part 3
Lecture 18 - Shortest path Algorithms 1 - Part 4
Lecture 19 - Matching in Graphs - Part 1
Lecture 20 - Matching in Graphs - Part 2
Lecture 21 - Some Graph Theoretic Puzzles - Part 1
Lecture 22 - Some Graph Theoretic Puzzles - Part 2
Lecture 23 - Network Flow Algorithms - Part 1
Lecture 24 - Network Flow Algorithms - Part 2
Lecture 25 - Network Flow Algorithms - Part 3
Lecture 26 - Network Flow Algorithms - Part 4
Lecture 27 - Network Flow Algorithms - Part 5
Lecture 28 - Network Flow Algorithms - Part 6
Lecture 29 - Network Flows - Part 1

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Lecture 30 - Network Flows - Part 2
Lecture 31 - Network Flows - Part 3
Lecture 32 - Network Flows - Part 4
Lecture 33 - Turanâ s and Madrurâ s theorem - Part 1
Lecture 34 - Turanâ s and Madrurâ s theorem - Part 2
Lecture 35 - NP Computations - Part 1
Lecture 36 - NP Computations - Part 2
Lecture 37 - Spectral Graph Theory-I - Part 1
Lecture 38 - Spectral Graph Theory-I - Part 2
Lecture 39 - Spectral Graph Theory-I - Part 3
Lecture 40 - NP Computations II - Part 1
Lecture 41 - NP Computations II - Part 2
Lecture 42 - Graph Coloring - Part 1
Lecture 43 - Graph Coloring - Part 2
Lecture 44 - Spectral Graph Theory-II - Part 1
Lecture 45 - Spectral Graph Theory-II - Part 2
Lecture 46 - NP Computations Reductions - Part 1
Lecture 47 - NP Computations Reductions - Part 2
Lecture 48 - NP Computations Reductions - Part 3
Lecture 49 - Spectral Graph Theory-III - Part 1
Lecture 50 - Planar Graphs - Part 1
Lecture 51 - Planar Graphs - Part 2
Lecture 52 - NP Computations and Approximation Algorithms - Part 1
Lecture 53 - NP Computations and Approximation Algorithms - Part 2
Lecture 54 - Spectral Graph Theory-IV - Part 1
Lecture 55 - Spectral Graph Theory-IV - Part 2
Lecture 56 - Approximation Algorithms I - Part 1
Lecture 57 - Approximation Algorithms I - Part 2
Lecture 58 - Social Network Analysis - Part 1
Lecture 59 - Social Network Analysis - Part 2
Lecture 60 - Spectral Graph Theory-V - Part 1
Lecture 61 - Spectral Graph Theory-V - Part 2
Lecture 62 - Approximation Algorithms II - Part 1
Lecture 63 - Approximation Algorithms II - Part 2
Lecture 64 - Spectral Graph Theory-VI - Part 1
Lecture 65 - Spectral Graph Theory-VI - Part 2
Lecture 66 - RSA Crypto - Part 1
Lecture 67 - RSA Crypto - Part 2
Lecture 68 - Approximation Algorithms III - Part 1

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Lecture 69 - Approximation Algorithms III - Part 2
Lecture 70 - Spectral Graph Theory-VII - Part 1
Lecture 71 - Spectral Graph Theory-VII - Part 2
Lecture 72 - Exact Exponential Algorithms - Part 1
Lecture 73 - Exact Exponential Algorithms - Part 2
Lecture 74 - Interconnection Networks - Part 1
Lecture 75 - Interconnection Networks - Part 2
Lecture 76 - Kernelization - Part 1
Lecture 77 - Kernelization - Part 2
Lecture 78 - Kernelization - Part 3
Lecture 79 - Introduction to Parameterized Algorithms - Part 1
Lecture 80 - Introduction to Parameterized Algorithms - Part 2
Lecture 81 - Chardal Graphs - Part 1
Lecture 82 - Chardal Graphs - Part 2
Lecture 83 - Branching - Part 1
Lecture 84 - Branching - Part 2
Lecture 85 - Interval Graphs and Split Graphs - Part 1
Lecture 86 - Interval Graphs and Split Graphs - Part 2
Lecture 87 - Vertex cover linear vertex kernel using LP - Part 1
Lecture 88 - Vertex cover linear vertex kernel using LP - Part 2
Lecture 89 - Comparability Graphs - Part 1
Lecture 90 - Comparability Graphs - Part 2
Lecture 91 - Introduction to Randomized Algorithms and Karger's Min-cut Algorithm - Part 1
Lecture 92 - Introduction to Randomized Algorithms and Karger's Min-cut Algorithm - Part 2
Lecture 93 - Probability Methods to Ramsey Number - Part 2
Lecture 94 - Probability Methods to Ramsey Number - Part 2
Lecture 95 - Color Coding - Part 1
Lecture 96 - Color Coding - Part 2
Lecture 97 - Fast Min-cut Algorithm and its analysis - Part 1
Lecture 98 - Fast Min-cut Algorithm and its analysis - Part 2
Lecture 99 - Box Representations of Graphs - Part 1
Lecture 100 - Box Representations of Graphs - Part 2
Lecture 101 - Hardness for FPT - Part 1
Lecture 102 - Hardness for FPT - Part 2
Lecture 103 - Application of min-cut Algorithm

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NPTEL Video Course - Special Lecture Series - ACM Summer School in Data Science

Subject Co-ordinator - Prof. Murugaiyan Amirthalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Probability - Part 1
Lecture 2 - Probability - Part 2
Lecture 3 - Probability - Part 3
Lecture 4 - Math Foundation - Part 1
Lecture 5 - Math Foundation - Part 2
Lecture 6 - Math Foundation - Part 3
Lecture 7 - Math Foundation 2 - Part 1
Lecture 8 - Math Foundation 2 - Part 2
Lecture 9 - Math Foundation 2 - Part 3
Lecture 10 - Introduction to probability for Data science - Part 1
Lecture 11 - Introduction to probability for Data science - Part 2
Lecture 12 - Introduction to probability for Data science - Part 3
Lecture 13 - Introduction to Statistics for Data science - Part 1
Lecture 14 - Introduction to Statistics for Data science - Part 2
Lecture 15 - Introduction to Statistics for Data science - Part 3
Lecture 16 - Clustering I - Part 1
Lecture 17 - Clustering I - Part 2
Lecture 18 - Clustering I - Part 3
Lecture 19 - Clustering II - Part 1
Lecture 20 - Clustering II - Part 2
Lecture 21 - Clustering II - Part 3
Lecture 22 - Dimensionality Reduction - Part 1
Lecture 23 - Dimensionality Reduction - Part 2
Lecture 24 - Dimensionality Reduction - Part 3
Lecture 25 - Supervised Learning I - Part 1
Lecture 26 - Supervised Learning I - Part 2
Lecture 27 - Supervised Learning I - Part 3
Lecture 28 - Supervised Learning II - Part 1
Lecture 29 - Supervised Learning II - Part 2

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Lecture 30 - Supervised Learning II - Part 3
Lecture 31 - Supervised Learning III - Part 1
Lecture 32 - Supervised Learning III - Part 2
Lecture 33 - Supervised Learning III - Part 3
Lecture 34 - Linear Models For Classification - Part 1
Lecture 35 - Linear Models For Classification - Part 2
Lecture 36 - Linear Models For Classification - Part 3
Lecture 37 - Tree Based Methods - Part 1
Lecture 38 - Tree Based Methods - Part 2
Lecture 39 - SVMs - Part 1
Lecture 40 - SVMs - Part 2
Lecture 41 - SVMs - Part 3
Lecture 42 - Ensemble Methods - Part 1
Lecture 43 - Ensemble Methods - Part 2
Lecture 44 - Ensemble Methods - Part 3
Lecture 45 - Learning Theory - Part 1
Lecture 46 - Learning Theory - Part 2
Lecture 47 - Introduction to Probabilistic Modeling - Part 1
Lecture 48 - Introduction to Probabilistic Modeling - Part 2
Lecture 49 - Introduction to Probabilistic Modeling - Part 3
Lecture 50 - Probabilistic/Bayesian Models for Regression - Part 1
Lecture 51 - Probabilistic/Bayesian Models for Regression - Part 2
Lecture 52 - Probabilistic/Bayesian Models for Regression - Part 3
Lecture 53 - Probabilistic Classification, Latent Variable Models - Part 1
Lecture 54 - Probabilistic Classification, Latent Variable Models - Part 2
Lecture 55 - Probabilistic Classification, Latent Variable Models - Part 3
Lecture 56 - Deep Learning I - Part 1
Lecture 57 - Deep Learning I - Part 2
Lecture 58 - Deep Learning I - Part 3
Lecture 59 - Deep Learning II - Part 1
Lecture 60 - Deep Learning II - Part 2
Lecture 61 - Deep Learning II - Part 3
Lecture 62 - Deep Learning III - Part 1
Lecture 63 - Deep Learning III - Part 2
Lecture 64 - Deep Learning III - Part 3
Lecture 65 - Reinforcement learning I - Part 1
Lecture 66 - Reinforcement learning I - Part 2
Lecture 67 - Reinforcement learning II - Part 1
Lecture 68 - Reinforcement learning II - Part 2

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Lecture 69 - Map-Reduce and Spark - Part 1
Lecture 70 - Map-Reduce and Spark - Part 2
Lecture 71 - Map-Reduce and Spark - Part 3
Lecture 72 - Scalable Machine Learning - Part 1
Lecture 73 - Scalable Machine Learning - Part 2

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NPTEL Video Course - Special Lecture Series - Topics in Theoritical Computer Science

Subject Co-ordinator - Dr. N S. Narayanaswamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Finite Automata
Lecture 2 - TMs, Halting Problems
Lecture 3 - Concurrency
Lecture 4 - Blockchain and Bitcoin
Lecture 5 - Complexity Theory
Lecture 6 - Lower Bounds, Dealing with NP hardness
Lecture 7 - Online and streaming algorithms
Lecture 8 - Zero Knowledge Proofs
Lecture 9 - Verification, Games

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NPTEL Video Course - Special Lecture Series - Researching Anglo-Indians in India and the Diaspora

Subject Co-ordinator - Prof. Merin Simi Raj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Keynote Address
Lecture 2 - A Synopsis of 'Two Cheers'
Lecture 3 - Higher Education Among Anglo-Indians
Lecture 4 - Perception of trust, risk and intimacy among elderly Anglo-Indians living in Tollygunge home in K
Lecture 5 - The Daunting Spirit and the Empowering Voice of Eunice De Souza
Lecture 6 - Origin Myth and Anglo-Indian Identity
Lecture 7 - Keynote Address
Lecture 8 - Shame and Guilt in Alison McQueens The Secret Children
Lecture 9 - Re-visiting McCluskieganj
Lecture 10 - The Imaging of the Anglo-Indian Woman in Colonialist Literature
Lecture 11 - Expostulating Celluloid Stereotypes
Lecture 12 - Chutney Mary
Lecture 13 - In Search of a New Home
Lecture 14 - (Re)discovering Anglo-Indians of Visakhapatnam - An Overview
Lecture 15 - Genealogy of Sporting Culture through a Study of Anglo-Indian Institutions of Asansol
Lecture 16 - Keynote Address
Lecture 17 - Crowdsourcing as a Research Tool
Lecture 18 - Researching Community, Writing Cultures
Lecture 19 - Revisiting the Anglo-Indian Community
Lecture 20 - Minoritizing English

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NPTEL Video Course - Special Lecture Series - Dravidian Temple Architecture and Construction Techniques

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Dravidian Temple Architecture and Construction Techniques - Part 1
Lecture 2 - Introduction to Dravidian Temple Architecture and Construction Techniques - Part 2
Lecture 3 - Introduction to Dravidian Temple Architecture and Construction Techniques - Part 3
Lecture 4 - Introduction to Dravidian Temple Architecture and Construction Techniques - Part 4
Lecture 5 - Introduction to Dravidian Temple Architecture and Construction Techniques - Part 5
Lecture 6 - Naal Kurithal - Part 1
Lecture 7 - Naal Kurithal - Part 2
Lecture 8 - Naal Kurithal - Part 3
Lecture 9 - Naal Kurithal - Part 4
Lecture 10 - Naal Kurithal - Part 5
Lecture 11 - Naal Kurithal - Part 6
Lecture 12 - Ayadhi Calculations - Part 1
Lecture 13 - Ayadhi Calculations - Part 2
Lecture 14 - Ayadhi Calculations - Part 3
Lecture 15 - Ayadhi Calculations - Part 4
Lecture 16 - Ayadhi Calculations - Part 5
Lecture 17 - Ayadhi Calculations - Part 6
Lecture 18 - Ayadhi Calculations - Part 7
Lecture 19 - Ayadhi Calculations - Part 8
Lecture 20 - Ayadhi Calculations - Part 9
Lecture 21 - Ayadhi Calculations - Part 10
Lecture 22 - Ayadhi Calculations - Part 11
Lecture 23 - Alavukal - Part 1
Lecture 24 - Alavukal - Part 2
Lecture 25 - Alavukal - Part 3
Lecture 26 - Alavukal - Part 4
Lecture 27 - Alavukal - Part 5
Lecture 28 - Alavukal - Part 6
Lecture 29 - Dhisai Aridhal - Part 1

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Lecture 30 - Dhisai Aridhal - Part 2
Lecture 31 - Dhisai Aridhal - Part 3
Lecture 32 - Dhisai Aridhal - Part 4
Lecture 33 - Dhisai Aridhal - Part 5
Lecture 34 - Site Analysis - Part 1
Lecture 35 - Site Analysis - Part 2
Lecture 36 - Site Analysis - Part 3
Lecture 37 - Site Analysis - Part 4
Lecture 38 - Site Analysis - Part 5
Lecture 39 - Site Analysis - Part 6
Lecture 40 - Site Analysis - Part 7
Lecture 41 - Site Analysis - Part 8
Lecture 42 - Site Analysis - Part 9
Lecture 43 - Formulation of Structure - Part 1
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Lecture 47 - Formulation of Structure - Part 5
Lecture 48 - Formulation of Structure - Part 6
Lecture 49 - Formulation of Structure - Part 7
Lecture 50 - Formulation of Structure - Part 8
Lecture 51 - Formulation of Structure - Part 9
Lecture 52 - Formulation of Structure - Part 10
Lecture 53 - Formulation of Structure - Part 11
Lecture 54 - Formulation of Structure - Part 12
Lecture 55 - Formulation of Structure - Part 13
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Lecture 57 - Formulation of Structure - Part 15
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Lecture 60 - Formulation of Structure - Part 18
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Lecture 62 - Formulation of Structure - Part 20
Lecture 63 - Formulation of Structure - Part 21
Lecture 64 - Formulation of Structure - Part 22
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Lecture 66 - Formulation of Structure - Part 24
Lecture 67 - Formulation of Structure - Part 25
Lecture 68 - Formulation of Structure - Part 26

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Lecture 69 - Formulation of Structure - Part 27
Lecture 70 - Formulation of Structure - Part 28
Lecture 71 - Formulation of Structure - Part 29
Lecture 72 - Formulation of Structure - Part 30
Lecture 73 - Formulation of Structure - Part 31
Lecture 74 - Formulation of Structure - Part 32
Lecture 75 - Formulation of Structure - Part 33
Lecture 76 - Formulation of Structure - Part 34
Lecture 77 - Formulation of Structure - Part 35
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Lecture 86 - Formulation of Structure - Part 44
Lecture 87 - Formulation of Structure - Part 45
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Lecture 89 - Characteristics of a Mandapam - Part 1
Lecture 90 - Characteristics of a Mandapam - Part 2
Lecture 91 - Characteristics of a Mandapam - Part 3
Lecture 92 - Characteristics of a Mandapam - Part 4
Lecture 93 - Characteristics of a Mandapam - Part 5
Lecture 94 - Characteristics of a Mandapam - Part 6

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NPTEL Video Course - Special Lecture Series - ACM Summer School in Data Science (Bangalore)

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Web Browser Security
Lecture 2 - Trusted Computing
Lecture 3 - Buffer Overflow Vulnerability and Protection Techineques
Lecture 4 - Secure Software Engineering
Lecture 5 - Challenges and Opportunities with Cloud Security
Lecture 6 - Cognitive Security with Watson
Lecture 7 - IBM MaaS360 Architecture Overview
Lecture 8 - Unified Risk Management Approach
Lecture 9 - Data Encryption and Post Quantum Cryptography (PQC)
Lecture 10 - Network Security - I
Lecture 11 - Network Security - II
Lecture 12 - Network Security - III
Lecture 13 - Network Security - IV
Lecture 14 - Network Security - V
Lecture 15 - Network Security - VI
Lecture 16 - Security
Lecture 17 - Security
Lecture 18 - Security
Lecture 19 - Security Gap Analysis - I
Lecture 20 - Security Gap Analysis - II

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NPTEL Video Course - Special Lecture Series - ACM Summer School on Algorithmic Game Theory

Subject Co-ordinator - Prof. Meghana Nasre

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Stable Matchings
Lecture 2 - Men-Optimality of the Men-Proposing Gale-Shapley Algorithm
Lecture 3 - GS
Lecture 4 - GS
Lecture 5 - The Hospital Residents Problem
Lecture 6 - Popular Matchings in the stable marriage problem
Lecture 7 - Popularity in the House Allocation Problem - 1
Lecture 8 - Popularity in the House Allocation Problem - 2
Lecture 9 - Strategic Behavior in Popular Matchings
Lecture 10 - Stable Roommates
Lecture 11 - An Introduction to Voting
Lecture 12 - The Game of Trust - Nicky Case's Interactive Essay
Lecture 13 - Arrow's Theorem
Lecture 14 - Gibbard-Satterethwaite Theorem
Lecture 15 - Domain Restrictions and Multiwinner Elections
Lecture 16 - Incentive Design in Crowdsourcing Applications
Lecture 17 - Adversarial Approaches in Deep Learning - Part 1
Lecture 18 - Adversarial Approaches in Deep Learning - Part 2
Lecture 19 - Algorithmic for Computing Market Equilibrium
Lecture 20 - Tournament Fixing and Superkings
Lecture 21 - Tournament Fixing Parameterized by FAS
Lecture 22 - Tournament Fixing with Bribery
Lecture 23 - An Introduction to Cake-Cutting
Lecture 24 - Two Algorithms for Finding Proportional Allocations
Lecture 25 - Envy-Freenes and Approximate EF
Lecture 26 - Sperner's Lemma and Applications
Lecture 27 - Cake Cutting with a Secret Agent
Lecture 28 - Fairness Notions for Indivisible Goods
Lecture 29 - Computing EF1 Allocations

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Lecture 30 - An Introduction to Rent Division
Lecture 31 - Rent Division and Maximum Weight Matchings
Lecture 32 - Hall's Theorem and Maximin Share
Lecture 33 - Probability Review - Part 1
Lecture 34 - Probability Review - Part 2
Lecture 35 - Predicting Election Outcomes
Lecture 36 - Reservoir Sampling and Preference Elicitation

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NPTEL Video Course - Special Lecture Series - ACM Summer School on Graph Theory and Graph Algorithms (Dr. N.S

Subject Co-ordinator - Dr. N.S. Narayanaswamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic Graph theory and Graph Algorithms - Part 1
Lecture 2 - Basic Graph theory and Graph Algorithms - Part 2
Lecture 3 - Basic Graph theory and Graph Algorithms - Part 3
Lecture 4 - Basic Graph theory and Graph Algorithms - Part 4
Lecture 5 - Basic Graph theory and Graph Algorithms - Part 5
Lecture 6 - Geometric Algorithms - Part 1
Lecture 7 - Geometric Algorithms - Part 2
Lecture 8 - Geometric Algorithms - Part 3
Lecture 9 - Geometric Algorithms - Part 4
Lecture 10 - Geometric Algorithms - Part 5
Lecture 11 - Geometric Algorithms - Part 6
Lecture 12 - Introduction to Computational Complexity,P,NP classes
Lecture 13 - NPC Reductions through examples - Part 1
Lecture 14 - NPC Reductions through examples - Part 2
Lecture 15 - NPC Reductions through examples - 3SAT
Lecture 16 - Subset Sum, Knapsack
Lecture 17 - Directed Hamiltonian Path-NPC Reduction
Lecture 18 - Introduction to LPnDuality theorem
Lecture 19 - Design of Approx.algorithms using primal dual scheme - Hitting set
Lecture 20 - Approx Vertex Cover
Lecture 21 - Appox for Min Cost VC, Approx for Min cost Set Cover
Lecture 22 - 2-factor approx for metric TSP, 1.5 Approx christofides Algo
Lecture 23 - knapsack Approx, 1/2 - factor Approx, 1- Îµ Approx
Lecture 24 - Perfect graphs,weak and strong perfect graph conjecture,line graphs,interval graphs
Lecture 25 - Î± perfection of interval graphs,chordal graphs,expansion lemma, proof for weak perfect conjectu
Lecture 26 - Î± perfection of interval graphs,chordal graphs,expansion lemma, proof for weak perfect conjectu
Lecture 27 - Comparability graph, Permutation graphs, AT-free graphs, Trapezoidal graphs, Circular arc graphs
Lecture 28 - Fixed Parameter Algorithms, -VC, Cluster vertex deletion, - Branching
Lecture 29 - Kernelization, -VC, CrownDecomposition, Feedback vertex set, Herative compression, Analysing bra

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Lecture 30 - Kernelization, -VC, CrownDecomposition, Feedback vertex set, Herative compression, Analysing bra
Lecture 31 - Kernelization, -VC, CrownDecomposition, Feedback vertex set, Herative compression, Analysing bra
Lecture 32 - Hardness in Parameterized Complexity - W - hard reductions Exponential algorithms - Part 1
Lecture 33 - Hardness in Parameterized Complexity - W - hard reductions Exponential algorithms - Part 2

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NPTEL Video Course - Special Lecture Series - ACM Summer School on Compiler Design and Construction

Subject Co-ordinator - Prof. Subhajit Roy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lattice Theory - Part 1
Lecture 2 - Lattice Theory - Part 2
Lecture 3 - Lattice Theory - Part 3
Lecture 4 - Lattice Theory - Part 4
Lecture 5 - Lattice Theory - Part 5
Lecture 6 - Lattice Theory - Part 6
Lecture 7 - Lattice Theory - Part 7
Lecture 8 - Lattice Theory - Part 8
Lecture 9 - Lattice Theory - Part 9
Lecture 10 - Machine Dependent Optimizations - Part 1
Lecture 11 - Machine Dependent Optimizations - Part 2
Lecture 12 - Machine Dependent Optimizations - Part 3
Lecture 13 - Machine Dependent Optimizations - Part 4
Lecture 14 - Machine Dependent Optimizations - Part 5
Lecture 15 - Machine Dependent Optimizations - Part 6
Lecture 16 - Machine Dependent Optimizations - Part 7
Lecture 17 - Machine Dependent Optimizations - Part 8
Lecture 18 - Machine Dependent Optimizations - Part 9
Lecture 19 - Machine Dependent Optimizations - Part 10
Lecture 20 - Program Execution Environment - Part 1
Lecture 21 - Program Execution Environment - Part 2
Lecture 22 - Program Execution Environment - Part 3
Lecture 23 - Program Execution Environment - Part 4
Lecture 24 - Program Execution Environment - Part 5
Lecture 25 - Program Execution Environment - Part 6
Lecture 26 - Program Execution Environment - Part 7
Lecture 27 - Program Execution Environment - Part 8
Lecture 28 - Optimizing Virtual Function Calls
Lecture 29 - High Level Optimizations - Part 1

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Lecture 30 - High Level Optimizations - Part 2
Lecture 31 - High Level Optimizations - Part 3
Lecture 32 - High Level Optimizations - Part 4
Lecture 33 - High Level Optimizations - Part 5
Lecture 34 - High Level Optimizations - Part 6

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NPTEL Video Course - Special Lecture Series - ACM Summer School on Geometric Algorithms and their Applicatior

Subject Co-ordinator - Prof. Arijit Bishnu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Computational Geometry
Lecture 2 - Convex hull
Lecture 3 - Quick hull
Lecture 4 - Plane sweep algorithm
Lecture 5 - Voronoi Diagram - I
Lecture 6 - Convex Geometry - I
Lecture 7 - Convex Geometry - II
Lecture 8 - Incidence Geometry - I
Lecture 9 - Incidence Geometry - II
Lecture 10 - Plane sweep algorithm
Lecture 11 - Polygon Triangulation
Lecture 12 - Geometric and Abstract Simplicial Complexes
Lecture 13 - Convex Polytopes and Polyhedra
Lecture 14 - Art Gallery Theorem
Lecture 15 - Smallest Enclosing Disc
Lecture 16 - Point Hyperplane Duality
Lecture 17 - Voronoi Diagrams and Delaunay triangulations - I
Lecture 18 - Voronoi Diagrams and Delaunay triangulations - II
Lecture 19 - Point Location
Lecture 20 - Range Searching (KD Tree)
Lecture 21 - Range Searching (Range Tree)
Lecture 22 - Visibility Graph and motion planning
Lecture 23 - Geometric Approximation
Lecture 24 - Application of incidence geometry in combinatorics
Lecture 25 - Robot motion planning and visibility
Lecture 26 - Reeb Graph Introduction and Morse Theory basics
Lecture 27 - Reeb Graph Properties
Lecture 28 - Reeb Graph Algorithms, Applications
Lecture 29 - Arrangements - I

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Lecture 30 - Linear Programming
Lecture 31 - Arrangements - II
Lecture 32 - Zone Theorem and Application
Lecture 33 - Randomized Incremental Construction - I
Lecture 34 - Randomized Incremental Construction - II
Lecture 35 - VC-dimension, Epsilon-nets, LP-based approximation for Geometric Covering
Lecture 36 - Quasi-uniform Sampling for Weighted Covering Problems.
Lecture 37 - Local Search for Packing and Covering
Lecture 38 - PTAS via Local Search - I

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NPTEL Video Course - Special Lecture Series - ACM Summer School on Algorithmic and Theoretical Aspects of Mac

Subject Co-ordinator - Meenakshi D'Souza

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Learning on Finite State Automata and Decision Session - 1
Lecture 2 - Learning on Finite State Automata and Decision Session - 2
Lecture 3 - Learning on Finite State Automata and Decision Session - 3
Lecture 4 - Probability Session - 1
Lecture 5 - Probability Session - 2
Lecture 6 - Probability Session - 3
Lecture 7 - Probability Session - 4
Lecture 8 - Probability Session - 5
Lecture 9 - Probability Session - 6
Lecture 10 - Probability Session - 7
Lecture 11 - Probability Session - 8
Lecture 12 - Probability Session - 9
Lecture 13 - Probability Session - 10
Lecture 14 - Algebra for Machine Learning Session - 1
Lecture 15 - Algebra for Machine Learning Session - 2
Lecture 16 - Algebra for Machine Learning Session - 3
Lecture 17 - Crptography and Machine Learning
Lecture 18 - Neural Networks Session - 1
Lecture 19 - Neural Networks Session - 2
Lecture 20 - Neural Networks Session - 3
Lecture 21 - Neural Networks Session - 4
Lecture 22 - Neural Networks Session - 5
Lecture 23 - Enterprise Applications of ML Session - 1
Lecture 24 - Basic of Algorithm Design Session - 1
Lecture 25 - Basic of Algorithm Design Session - 2
Lecture 26 - Basic of Algorithm Design Session - 3
Lecture 27 - Basic of Algorithm Design Session - 4
Lecture 28 - Introduction to Optimization Session - 1
Lecture 29 - Introduction to Optimization Session - 2

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Lecture 30 - Introduction to Reinforcement Learning Session - 1
Lecture 31 - Introduction to Reinforcement Learning Session - 2
Lecture 32 - Introduction to Reinforcement Learning Session - 3
Lecture 33 - Introduction to Reinforcement Learning Session - 4
Lecture 34 - Introduction to Reinforcement Learning Session - 5
Lecture 35 - Introduction to Reinforcement Learning Session - 6
Lecture 36 - Introduction to Reinforcement Learning Session - 7
Lecture 37 - Introduction of Cryptography Session - 1
Lecture 38 - Introduction of Cryptography Session - 2
Lecture 39 - Introduction of Cryptography Session - 3
Lecture 40 - Compressive Sensing Session - 1
Lecture 41 - Compressive Sensing Session - 2
Lecture 42 - Compressive Sensing Session - 3
Lecture 43 - Compressive Sensing Session - 4
Lecture 44 - Compressive Sensing Session - 5
Lecture 45 - Compressive Sensing Session - 6
Lecture 46 - Compressive Sensing Session - 7
Lecture 47 - Compressive Sensing Session - 8

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NPTEL Video Course - Special Lecture Series - ACM Winter School on Hybrid Cloud

Subject Co-ordinator - Prof. Sashikumar Ganesan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Department Introduction
Lecture 2 - Introduction to Cloud Computing - Part 1
Lecture 3 - Introduction to Cloud Computing - Part 2
Lecture 4 - Cloud IaaS and Virtualization
Lecture 5 - System Virtualization
Lecture 6 - Mechanisms for System Virtualization
Lecture 7 - Containers - Part 1
Lecture 8 - Containers - Part 2
Lecture 9 - AI and Hybrid Cloud
Lecture 10 - Container Orchestration - Part 1
Lecture 11 - Container Orchestration - Part 2
Lecture 12 - Container Orchestration - Part 3
Lecture 13 - Application Devops - Part 1
Lecture 14 - Application Devops - Part 2
Lecture 15 - Application Devops - Part 3
Lecture 16 - Application Devops - Part 4
Lecture 17 - Application Devops - Part 5
Lecture 18 - Application Devops - Part 6
Lecture 19 - Cloud as Destributed System - Part 1
Lecture 20 - Cloud as Destributed System - Part 2

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NPTEL Video Course - Special Lecture Series - ACM Indian Summer School on Programming Languages: Principles a

Subject Co-ordinator - Dr. Abhijat Vichare

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Basic Concepts - Dr. Abhijat Vichare - Session - 1
Lecture 2 - Review of Basic Concepts - Dr. Abhijat Vichare - Session - 2
Lecture 3 - Review of Basic Concepts - Dr. Abhijat Vichare - Session - 3
Lecture 4 - Introduction to Lex and Yacc - Sameera Deshpande - Session - 1
Lecture 5 - Introduction to Lex and Yacc - Sameera Deshpande - Session - 2
Lecture 6 - Hello world, Revisiting the first program we write in c - Siddhesh Poyarekar - Session - 1
Lecture 7 - Compiler as system - Vivek Buzruk - Session - 1
Lecture 8 - Compiler as system - Vivek Buzruk - Session - 2
Lecture 9 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 1
Lecture 10 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 2
Lecture 11 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 3
Lecture 12 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 4
Lecture 13 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 5
Lecture 14 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 6
Lecture 15 - Undefined Behavior Compiler Optimization - Prathamesh K Session - 1
Lecture 16 - Program Semantics - Prof. Subhajit Roy Session - 1
Lecture 17 - Program Semantics - Prof. Subhajit Roy Session - 2
Lecture 18 - Program Semantics - Prof. Subhajit Roy Session - 3
Lecture 19 - Program Semantics - Prof. Subhajit Roy Session - 4
Lecture 20 - Program Semantics - Prof. Subhajit Roy Session - 5
Lecture 21 - Program Semantics - Prof. Subhajit Roy Session - 6
Lecture 22 - Program Semantics - Prof. Subhajit Roy Session - 7
Lecture 23 - Program Semantics - Prof. Subhajit Roy Session - 8
Lecture 24 - Introduction to Optimizations - Prof. V. Krishna N Session - 1
Lecture 25 - Introduction to Optimizations - Prof. V. Krishna N Session - 2
Lecture 26 - Introduction to Optimizations - Prof. V. Krishna N Session - 3
Lecture 27 - Introduction to Optimizations - Prof. V. Krishna N Session - 4
Lecture 28 - Compiler as system - Vivek S. Buzruk Session - 1
Lecture 29 - Compiler as system - Vivek S. Buzruk Session - 2

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NPTEL Video Course - Special Lecture Series - ACM Winter School 2019 on High Performance Computing

Subject Co-ordinator - Dr. Mainak Chaudhuri

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basics of Computer Architecture and OS
Lecture 2 - An Introduction to High Performence Computing
Lecture 3 - Introduction to OpenMP
Lecture 4 - Advanced OpenMP
Lecture 5 - Introduction to MPI
Lecture 6 - Advanced MPI
Lecture 7 - Supercomputing in India
Lecture 8 - Job Scheduling
Lecture 9 - Introduction to GPU
Lecture 10 - Introduction to Open ACC
Lecture 11 - CPU and GPU Memory
Lecture 12 - Optimizations and GPU Profiling
Lecture 13 - CUDA C
Lecture 14 - HPC Networking - I
Lecture 15 - HPC Networking - II
Lecture 16 - Research in HPS
Lecture 17 - Case Study - Parallel Graph Algorithms
Lecture 18 - Case Study - Solving PDEs at Extreme Scale

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NPTEL Video Course - Special Lecture Series - Thermodynamics of Materials

Subject Co-ordinator - Prof. Sir H. K. D. H. Bhadeshia

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic thermodynamic functions: Enthalpy, entropy, configurational entropy, Gibbs free energy
Lecture 2 - State of equilibrium: Chemical potential, activity, equilibrium between solutions
Lecture 3 - Case study: Mechanical alloying, alloying by deformation.
Lecture 4 - Computer calculation of phase diagrams
Lecture 5 - Thermodynamics of irreversible processes: Multiple irreversible processes
Lecture 6 - Quasichemical solutions

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NPTEL Video Course - Special Lecture Series - ACM India Summer School on Program Execution

Subject Co-ordinator - Unknown

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - ACM Summer School on Program Execution - Introduction
Lecture 2 - Basics of Architecture - Part 1
Lecture 3 - Basics of Architecture - Part 2
Lecture 4 - Basics of Architecture - Part 3
Lecture 5 - Basics of Architecture - Part 4
Lecture 6 - A Review of Architectural Features for supporting Program Execution - Part 1
Lecture 7 - A Review of Architectural Features for supporting Program Execution - Part 2
Lecture 8 - A Review of Architectural Features for supporting Program Execution - Part 3
Lecture 9 - A Review of Architectural Features for supporting Program Execution - Part 4
Lecture 10 - Review of OS - IPC and beyond - Part 1
Lecture 11 - Review of OS - IPC and beyond - Part 2
Lecture 12 - From Programs to Processess (and threads) - Part 1
Lecture 13 - From Programs to Processess (and threads) - Part 2
Lecture 14 - Network Protocol Fundamentals
Lecture 15 - Web protocols and Web Software - Part 1
Lecture 16 - Web protocols and Web Software - Part 2
Lecture 17 - Storage Systems - Part 1
Lecture 18 - Storage Systems - Part 2
Lecture 19 - Storage Systems - Part 3
Lecture 20 - Basics of High Performance Computing - Part 1
Lecture 21 - Basics of High Performance Computing - Part 2
Lecture 22 - Basics of High Performance Computing - Part 3
Lecture 23 - The Evolution of Linux as an Enterprise Operating System
Lecture 24 - The Hypervisor - Lord of the Rings - Part 1
Lecture 25 - The Hypervisor - Lord of the Rings - Part 2
Lecture 26 - Hands on Lab - Create a VM and Play
Lecture 27 - Containers and Kubernetes Era - Part 1
Lecture 28 - Containers and Kubernetes Era - Part 2
Lecture 29 - Containers and Kubernetes Era - Part 3

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Lecture 30 - The Future of Compute - Part 1
Lecture 31 - The Future of Compute - Part 2

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NPTEL Video Course - Special Lecture Series - ACM India Summer School on Programming Language Analysis and Op

Subject Co-ordinator - Girish Bharambe

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Panel Discussion Q and A - Part 1
Lecture 2 - Panel Discussion Q and A - Part 2
Lecture 3 - Runtime and Linkers - Discussion - 1
Lecture 4 - Runtime and Linkers - Discussion - 2
Lecture 5 - Runtime and Linkers - Linkers
Lecture 6 - Runtime and Linkers - Program Execution - Loader
Lecture 7 - Runtime and Linkers - Static Libraries - Dynamic Linking
Lecture 8 - Code Generation and Backend - An Introduction to LLVM Backend
Lecture 9 - Code Generation and Backend - An Introduction to Loop Backend
Lecture 10 - Code Generation and Backend - Code Generation with LLVM - Part 1
Lecture 11 - Code Generation and Backend - Code Generation with LLVM - Part 2
Lecture 12 - Machine Independent Optimizations - High Level Optimizations - 1
Lecture 13 - Machine Independent optimizations - High Level Optimizations - 2
Lecture 14 - Machine Independent optimizations - High Level Optimizations - 3
Lecture 15 - Machine Independent optimizations - High Level Optimizations - 4
Lecture 16 - Machine Independent optimizations - High Level Optimizations - 5
Lecture 17 - Machine Independent optimizations - High Level Optimizations - 6
Lecture 18 - Machine Architecture and Machine Dependent Optimizations - Machine Architecture - 1
Lecture 19 - Machine Architecture and Machine Dependent Optimizations - Machine Architecture - 2
Lecture 20 - Machine Architecture and Machine Dependent Optimizations - Machine Architecture - 3
Lecture 21 - Machine Architecture and Machine Dependent Optimizations - Register Allocation - 1
Lecture 22 - Machine Architecture and Machine Dependent Optimizations - Register Allocation - 2
Lecture 23 - Machine Architecture and Machine Dependent Optimizations - Register Allocation - 3
Lecture 24 - Machine Architecture and Machine Dependent Optimizations - Instruction Scheduling - 1
Lecture 25 - Machine Architecture and Machine Dependent Optimizations - Instruction Scheduling - 2
Lecture 26 - Machine Dependent Optimizations - Dependence Analysis and Loop transformations - 1
Lecture 27 - Machine Dependent Optimizations - Dependence Analysis and Loop transformations - 2
Lecture 28 - Control-Flow Analyses and Static Single Assignment form - Control Flow Analysis - 1
Lecture 29 - Control-Flow Analyses and Static Single Assignment form - Control Flow Analysis - 2

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Lecture 30 - Control-Flow Analyses and Static Single Assignment form - Depth First Analysis of Flow Graphs
Lecture 31 - Control-Flow Analyses and Static Single Assignment form - Dominators
Lecture 32 - Control-Flow Analyses and Static Single Assignment form - Natural Loops (for Reducible Flow-Grap
Lecture 33 - Control-Flow Analyses and Static Single Assignment form - The Static Single Assignment SSA Form
Lecture 34 - Control-Flow Analyses and Static Single Assignment form - The Static Single Assignment SSA Form
Lecture 35 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I Part 1
Lecture 36 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I Part 2
Lecture 37 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 3
Lecture 38 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 4
Lecture 39 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 5
Lecture 40 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 6
Lecture 41 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 7
Lecture 42 - Polyhedral Compilation and Loop Optimizations - Affine Control Loops
Lecture 43 - Polyhedral Compilation and Loop Optimizations - Siplifying Reductions Revised - 1
Lecture 44 - Polyhedral Compilation and Loop Optimizations - Siplifying Reductions Revised - 2
Lecture 45 - Polyhedral Compilation and Loop Optimizations - Siplifying Reductions Revised - 3
Lecture 46 - Polyhedral Compilation and Loop Optimizations - Classical Optimization
Lecture 47 - Polyhedral Compilation and Loop Optimizations - What is Program Analysis
Lecture 48 - Polyhedral Compilation and Loop Optimizations - Live Variable Analysis - 1
Lecture 49 - Polyhedral Compilation and Loop Optimizations - Live Variable Analysis - 2
Lecture 50 - Polyhedral Compilation and Loop Optimizations - Available Expression Analysis
Lecture 51 - Polyhedral Compilation and Loop Optimizations - Common Features of Bit Vector Frameworks
Lecture 52 - Polyhedral Compilation and Loop Optimizations - The Birth of a Compiler - 1
Lecture 53 - Polyhedral Compilation and Loop Optimizations - The Birth of a Compiler - 2
Lecture 54 - Polyhedral Compilation and Loop Optimizations - The Structure of Modern Compiler Modern Challeng
Lecture 55 - Polyhedral Compilation and Loop Optimizations - Conclusion

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NPTEL Video Course - Special Lecture Series - ACM Summer School on Shape Modelling

Subject Co-ordinator - Aditya Tatu

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Linear Algebra and Optimization - 1
Lecture 2 - Linear Algebra and Optimization - 2
Lecture 3 - Linear Algebra and Optimization - 3
Lecture 4 - Linear Algebra and Optimization - 4
Lecture 5 - Curvature - Part 1
Lecture 6 - Curvature - Part 2
Lecture 7 - Curvature - Part 3
Lecture 8 - Introduction To Parametric Curves and Surfaces - 1
Lecture 9 - Introduction To Parametric Curves and Surfaces - 2
Lecture 10 - Introduction To Parametric Curves and Surfaces - 3
Lecture 11 - Introduction To Parametric Curves and Surfaces - 4
Lecture 12 - Introduction To Parametric Curves and Surfaces - 5
Lecture 13 - Introduction To Parametric Curves and Surfaces - 6
Lecture 14 - Introduction To Parametric Curves and Surfaces - 7
Lecture 15 - Introduction To Parametric Curves and Surfaces - 8
Lecture 16 - Introduction To Parametric Curves and Surfaces - 9
Lecture 17 - Implicit Surfaces - Part 1
Lecture 18 - Implicit Surfaces - Part 2
Lecture 19 - Implicit Surfaces - Part 3
Lecture 20 - MeshLab - Part 1
Lecture 21 - MeshLab - Part 2
Lecture 22 - MeshLab - Part 3
Lecture 23 - MeshLab - Part 4
Lecture 24 - Discrete Surface - Part 1
Lecture 25 - Discrete Surface - Part 2
Lecture 26 - Discrete Surface - Part 3
Lecture 27 - Discrete Surface - Part 4
Lecture 28 - Discrete Surface - Part 5
Lecture 29 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 1

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Lecture 30 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 2
Lecture 31 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 3
Lecture 32 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 4
Lecture 33 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 5
Lecture 34 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 6
Lecture 35 - Internal Digital R and I - Part 1
Lecture 36 - Internal Digital R and I - Part 2
Lecture 37 - Internal Digital R and I - Part 3
Lecture 38 - Rigid and Non rigid Shape Matching - Part 1
Lecture 39 - Rigid and Non rigid Shape Matching - Part 2
Lecture 40 - Rigid and Non rigid Shape Matching - Part 3
Lecture 41 - Rigid and Non rigid Shape Matching - Part 4
Lecture 42 - Geometric Deep Learning - Part 1
Lecture 43 - Geometric Deep Learning - Part 2
Lecture 44 - Geometric Deep Learning - Part 3
Lecture 45 - Geometric Deep Learning - Part 4
Lecture 46 - Geometric Deep Learning - Part 5
Lecture 47 - Geometric Deep Learning - Frame Works
Lecture 48 - Geometric Deep Learning - Lab 1
Lecture 49 - Geometric Deep Learning - Lab 2
Lecture 50 - Geometric Deep Learning - Lab 3

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NPTEL Video Course - Special Lecture Series - ACM India Summer School on Shape Modelling

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - ACM India Summer School on Shape Modelling - Introduction
Lecture 2 - Linear Algebra and Optimization Refresher - 1
Lecture 3 - Linear Algebra and Optimization Refresher - 2
Lecture 4 - Linear Algebra and Optimization Refresher - 3
Lecture 5 - Linear Algebra and Optimization Refresher - 4
Lecture 6 - Overview of Python 3 + {Numpy, Scipy, Matplotlib} - Part 1
Lecture 7 - Overview of Python 3 + {Numpy, Scipy, Matplotlib} - Part 2
Lecture 8 - Curves and Surfaces - Part 1
Lecture 9 - Curves and Surfaces - Part 2
Lecture 10 - Curves and Surfaces - Part 3
Lecture 11 - Curves and Surfaces - Part 4
Lecture 12 - Curves and Surfaces - Part 5
Lecture 13 - Curves and Surfaces - Part 6
Lecture 14 - Curves and Surfaces - Part 7
Lecture 15 - Algorithms in Computational Geometry - Part 1
Lecture 16 - Algorithms in Computational Geometry - Part 2
Lecture 17 - Algorithms in Computational Geometry - Part 3
Lecture 18 - Algorithms in Computational Geometry - Part 4
Lecture 19 - Algorithms in Computational Geometry - Part 5
Lecture 20 - Algorithms in Computational Geometry Lab - Part 1
Lecture 21 - Algorithms in Computational Geometry Lab - Part 2
Lecture 22 - Algorithms in Computational Geometry Lab - Part 3
Lecture 23 - Discrete Surfaces - Part 1
Lecture 24 - Discrete Surfaces - Part 2
Lecture 25 - Discrete Surfaces - Part 3
Lecture 26 - Discrete Surfaces - Part 4
Lecture 27 - Discrete Surfaces - Part 5
Lecture 28 - Implicit and Discrete Surfaces
Lecture 29 - Discrete Surfaces - Part Lab - Part 1

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Lecture 30 - Discrete Surfaces - Part Lab - Part 2
Lecture 31 - Discrete Laplace Beltrami Operator - Part 1
Lecture 32 - Discrete Laplace Beltrami Operator - Part 2
Lecture 33 - Discrete Laplace Beltrami Operator - Part 3
Lecture 34 - Discrete Laplace Beltrami Operator - Part 4
Lecture 35 - Discrete Laplace Beltrami Operator - Part 5
Lecture 36 - Discrete Laplace Beltrami Operator - Part 6
Lecture 37 - Lab Libigl-Python-Blindings - Part 1
Lecture 38 - Lab Libigl-Python-Blindings - Part 2
Lecture 39 - Procrustes Shape Analysis - Part 1
Lecture 40 - Procrustes Shape Analysis - Part 2
Lecture 41 - Procrustes Shape Analysis - Part 3
Lecture 42 - Procrustes Shape Analysis - Part 4
Lecture 43 - Lab Procrustes Shape Analysis Template - Part 1
Lecture 44 - Lab Procrustes Shape Analysis Template - Part 2
Lecture 45 - Lab Procrustes Shape Analysis Template - Part 3
Lecture 46 - Shape Deformation/Animation, Shape Matching - Part 1
Lecture 47 - Shape Deformation/Animation, Shape Matching - Part 2
Lecture 48 - Shape Deformation/Animation, Shape Matching - Part 3
Lecture 49 - Shape Deformation/Animation, Shape Matching - Part 4
Lecture 50 - Shape Deformation/Animation, Shape Matching - Part 5
Lecture 51 - Geometric Deep Learning - Part 1
Lecture 52 - Geometric Deep Learning - Part 2
Lecture 53 - Geometric Deep Learning - Part 3
Lecture 54 - Geometric Deep Learning - Part 4
Lecture 55 - Geometric Deep Learning - Part 5
Lecture 56 - Geometric Deep Learning - Part 6
Lecture 57 - Topological Descriptors For Data and Shape Analysis - Part 1
Lecture 58 - Topological Descriptors For Data and Shape Analysis - Part 2
Lecture 59 - Topological Descriptors For Data and Shape Analysis - Part 3
Lecture 60 - Topological Descriptors For Data and Shape Analysis - Part 4
Lecture 61 - Panel Discussion On Shape Modelling In Academia and Industry - Part 1
Lecture 62 - Panel Discussion On Shape Modelling In Academia and Industry - Part 2

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NPTEL Video Course - Special Lecture Series - ACM India Winter School on Topics in Digital Trust

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - ACM Day 1 Session 1
Lecture 2 - ACM Day 1 Session 2 - Part I
Lecture 3 - ACM Day 1 Session 2 - Part II
Lecture 4 - ACM Day 1 Session 3 - Part I
Lecture 5 - ACM Day 1 Session 3 - Part II
Lecture 6 - ACM Day 2 Session 1 - Part I
Lecture 7 - ACM Day 2 Session 1 - Part II
Lecture 8 - ACM Day 2 Session 2 - Part I
Lecture 9 - ACM Day 2 Session 2 - Part II
Lecture 10 - ACM Day 3 Session 1 - Part 1
Lecture 11 - ACM Day 3 Session 1 - Part 2
Lecture 12 - ACM Day 3 Session 2 - Part 1
Lecture 13 - ACM Day 3 Session 2 - Part 2
Lecture 14 - ACM Day 3 Session 3 - Part I
Lecture 15 - ACM Day 3 Session 3 - Part II
Lecture 16 - ACM Day 3 Session 4 - Part I
Lecture 17 - ACM Day 3 Session 4 - Part II
Lecture 18 - ACM Day 4 session 1 - Part I
Lecture 19 - ACM Day 4 session 1 - Part II
Lecture 20 - ACM Day 4 session 2 - Part I
Lecture 21 - ACM Day 4 session 2 - Part II
Lecture 22 - ACM Day 5 session 1 - Part 1
Lecture 23 - ACM Day 5 session 1 - Part 2
Lecture 24 - ACM Day 5 session 2 - Part 1
Lecture 25 - ACM Day 5 session 2 - Part 2
Lecture 26 - ACM Day 6 session 1 - Part 1
Lecture 27 - ACM Day 6 session 1 - Part 2
Lecture 28 - ACM Day 6 session 2 - Part 1
Lecture 29 - ACM Day 6 session 2 - Part 2

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Lecture 30 - ACM Day 7 session 1 - Part I
Lecture 31 - ACM Day 7 session 1 - Part II
Lecture 32 - ACM Day 7 Session 2
Lecture 33 - ACM Day 8 Session 1
Lecture 34 - ACM Day 8 Session 2
Lecture 35 - ACM Day 8 Session 3
Lecture 36 - ACM Day 8 Session 4
Lecture 37 - ACM Day 9 Session 1
Lecture 38 - ACM Day 9 Session 2
Lecture 39 - ACM Day 9 Session 3
Lecture 40 - ACM Day 9 Session 4
Lecture 41 - ACM Day 9 Session 5 - Part 1
Lecture 42 - ACM Day 9 Session 5 - Part 2
Lecture 43 - ACM Day 10 Session 1
Lecture 44 - ACM Day 10 Session 2 - Part 1
Lecture 45 - ACM Day 10 Session 2 - Part 2
Lecture 46 - ACM Day 10 Session 3 - Part 1
Lecture 47 - ACM Day 10 Session 3 - Part 2

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NPTEL Video Course - Special Lecture Series - ACM Winter School on Design, Implementation and Verification of

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mathematical Logic - Session 1
Lecture 2 - Mathematical Logic - Session 2
Lecture 3 - Industry Perspectives on Compiler Design
Lecture 4 - Processor Datapath and Introduction to ILP Architecture - Session 1
Lecture 5 - Processor Datapath and Introduction to ILP Architecture - Session 2
Lecture 6 - Instruction Level Parallelism - Session 1
Lecture 7 - Multithreading and Multicores
Lecture 8 - Instruction Level Parallelism - Session 2
Lecture 9 - DRAM Memory Organization
Lecture 10 - Reactive Synthesis: A High-Level Introduction - Session 1
Lecture 11 - Reactive Synthesis: A High-Level Introduction - Session 2
Lecture 12 - Reactive Synthesis: A High-Level Introduction - Session 3
Lecture 13 - Reactive Synthesis: A High-Level Introduction - Session 4
Lecture 14 - Reduced Ordered Binary Dedision Diagrams and And-Inverter Graphs - Session 1
Lecture 15 - Reduced Ordered Binary Dedision Diagrams and And-Inverter Graphs - Session 2
Lecture 16 - Reduced Ordered Binary Dedision Diagrams and And-Inverter Graphs - Session 3
Lecture 17 - Runtime Environments - I
Lecture 18 - Runtime Environments - II
Lecture 19 - Hexagon DSPs in Snapdragon
Lecture 20 - Types and Program Analysis
Lecture 21 - Local and Global Optimizations
Lecture 22 - Introduction to Data-Flow and Control-Flow Analyses
Lecture 23 - Code Generation and Register Allocation
Lecture 24 - The Static Single Assignment Form and Application to Program Optimizations
Lecture 25 - Garbage Collection
Lecture 26 - Program Testing and Verification - Session 1
Lecture 27 - Program Testing and Verification - Session 2

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NPTEL Video Course - Special Lecture Series - Topics In Theoretical Computer Science (2023)

Subject Co-ordinator - Prof. Prajakta Nimbhorkar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - NP-Completeness
Lecture 2 - Hilbert's Tenth Problem
Lecture 3 - SAT Solvers
Lecture 4 - Polynomial Identity Testing
Lecture 5 - Finite Graphs for Infinite Functions
Lecture 6 - A Panorama of Computational Problems

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NPTEL Video Course - Special Lecture Series - NPTEL Special Lectures Series

Subject Co-ordinator - Mr. Ravikrishnan .A, Srivastava, Raman .K

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Microbial Social Networks: From Deep Sea to Outer Space
Lecture 2 - Data-Driven Analysis to Improve Road Safety
Lecture 3 - The Power of Generative AI: AI that can see and talk
Lecture 4 - Astronomical Challenges in Atomic Scale chip Manufacturing
Lecture 5 - Evaluating Fault - Tolerant Schemes for noisy hardware
Lecture 6 - Tighter and Stronger Quantum Speed Limits for General Quantum States
Lecture 7 - Robust, bright photon sources for quantum communication and quantum sensing applications
Lecture 8 - Particle transport problems at different scales: From circulating fluidized beds to dry powder
Lecture 9 - Simulation and Data: 6 Steps from Theory to Impact through Disasters, Engineering and Heritage
Lecture 10 - The Attosecond Worldâ there's plenty of time at the bottom
Lecture 11 - Quantum diffusion during cosmic inflation
Lecture 12 - Squashed quantum non-Markovianity: a measure of genuine quantum non-Markovianity in states
Lecture 13 - Gravitational-Wave Astronomy: New discoveries, puzzles and prospects
Lecture 14 - Bounds on the Superconducting Transition Temperature
Lecture 15 - Probing the primordial universe with electromagnetic and gravitational waves
Lecture 16 - Elephants have a bigger brain than humans, so how come they don't study you
Lecture 17 - Investigating quantum speed limits with superconducting qubits
Lecture 18 - Orbital Angular Momentum Entanglement

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NPTEL Video Course - Special Lecture Series - ACM India Summer School on IoT and Embedded Systems

Subject Co-ordinator - Prof. Meenakshi DSouza

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - ACM India Summer School on IoT and Embedded Systems - Introduction
Lecture 2 - Embedded Sysyem: An Introduction
Lecture 3 - Introduction to Embedded Sysyems
Lecture 4 - Introduction to IoT
Lecture 5 - AWS IoT: Tutorial and demonstration
Lecture 6 - IoT: Components, operating systems and protocols
Lecture 7 - Arduino programming
Lecture 8 - Arduino programming: Tutorial
Lecture 9 - IoT Applications
Lecture 10 - IoT Applications: Tutorial and demonstration - 1
Lecture 11 - IoT Applications: Tutorial and demonstration - 2
Lecture 12 - Cloud, edge and fog computing for IoT - Part I
Lecture 13 - Cloud, edge and fog computing for IoT - Part II
Lecture 14 - IoT Communication

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NPTEL Video Course - Special Lecture Series - ACM India Summer School on Algorithms for Data Science (2023)

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - ACM India Summer School on Algorithms for Data Science
Lecture 2 - Introducation to Probability
Lecture 3 - Selection Problems
Lecture 4 - Median from Read-Only Memory
Lecture 5 - Majority and Heavy Hitters
Lecture 6 - Introducation to ProbabilityTail inequalities
Lecture 7 - Chernoff Bounds
Lecture 8 - Quickselect and Quicksort
Lecture 9 - Introduction to Randomized Algorithms: Graph Minimum Cut
Lecture 10 - Introduction to Streaming Algorithm and Reservoir Sampling
Lecture 11 - Approximate Counting in Streaming: MORRIS Counter
Lecture 12 - Median of Means Technique Applied to Approximate Counting
Lecture 13 - Counting Distinct Elements in Streaming
Lecture 14 - 2-Universal Hashing and Applications for Derandomizing
Lecture 15 - Approximate Heavy Hitters
Lecture 16 - Frequency Moments
Lecture 17 - Graph Streaming Algorithms
Lecture 18 - Locality Sensitive Hashing - Part 1
Lecture 19 - Locality Sensitive Hashing - Part 2
Lecture 20 - Locality Sensitive Hashing - Part 3
Lecture 21 - Graph Streaming Lower Bounds
Lecture 22 - Bloom Filters
Lecture 23 - Frequent Pattern Mining - Part 1
Lecture 24 - Frequent Pattern Mining - Part 2
Lecture 25 - Is AI ready for The real world?
Lecture 26 - Online Learning and Multiarmed Bandits - Part 1
Lecture 27 - Online Learning and Multiarmed Bandits - Part 2
Lecture 28 - Reinforcement Learning - Part 1
Lecture 29 - Reinforcement Learning - Part 2

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Lecture 30 - Singular Value Decomposition - Part 1
Lecture 31 - Singular Value Decomposition - Part 2
Lecture 32 - Graph Centralities
Lecture 33 - Johnson Lindenstrauss Lemma
Lecture 34 - Graph Centralities Clustering and Partition

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NPTEL Video Course - Special Lecture Series - ACM India Summer School on Cybersecurity for Women

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Mathamatical Foundation for Cryptography - Part 1
Lecture 2 - Mathamatical Foundation for Cryptography - Part 2
Lecture 3 - Modern Cryptography
Lecture 4 - Modern Cryptography
Lecture 5 - Modern Cryptography - Asymmetric Cryptography
Lecture 6 - Network Security protocols and mechanisms - Part 1
Lecture 7 - Network Security protocols and mechanisms - Part 2
Lecture 8 - IOT Security Protocols - Part 1
Lecture 9 - IOT Security Protocols - Part 2
Lecture 10 - Introduction to Ethical Hacking - Part 1
Lecture 11 - Introduction to Ethical Hacking - Part 2
Lecture 12 - DevSecOps Embedding Security into DevOps - Part 1
Lecture 13 - Web App Security
Lecture 14 - Navigating the privacy landscape
Lecture 15 - Hardware security
Lecture 16 - Introduction to Blockchain
Lecture 17 - Social Engineering and OSINT - Part 1
Lecture 18 - Social Engineering and OSINT - Part 2
Lecture 19 - Cloud Security and Secure Coding Practices - Part 1
Lecture 20 - Cloud Security and Secure Coding Practices - Part 2
Lecture 21 - Career Opportunities, Challenges and Support
Lecture 22 - Quantum Cryptography - Part 1
Lecture 23 - Quantum Cryptography - Part 2
Lecture 24 - AI in cybersecurity

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NPTEL Video Course - Special Lecture Series - ACM Winter Schools - Cryptography and Cybersecurity

Subject Co-ordinator - Dr. Aswani Kumar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Cryptography
Lecture 2 - Classical Ciphers - Part 1
Lecture 3 - Classical Ciphers - Part 2
Lecture 4 - Foundations of Cryptography - Part 1
Lecture 5 - Foundations of Cryptography - Part 2
Lecture 6 - Foundations of Cryptography - Part 3
Lecture 7 - Block and Stream ciphers, Fiestel Networks
Lecture 8 - Data Encryption Standard
Lecture 9 - Cybersecurity - Part 1
Lecture 10 - Cybersecurity - Part 2
Lecture 11 - Enterprise Security - Part 1
Lecture 12 - Enterprise Security - Part 2
Lecture 13 - Advanced Encryption Standard
Lecture 14 - Information Gathering and Social Engineering
Lecture 15 - Cybersecurity : A Practical Approach - Part 1
Lecture 16 - Cybersecurity : A Practical Approach - Part 2
Lecture 17 - Cybersecurity : A Practical Approach - Part 3
Lecture 18 - Cybersecurity : A Practical Approach - Part 4
Lecture 19 - Cybersecurity : A Practical Approach - Part 5
Lecture 20 - Public Key Cryptography
Lecture 21 - Network Security - Firewalls, ACL, NAT, AAA, FTD - Part 1
Lecture 22 - Network Security - Firewalls, ACL, NAT, AAA, FTD - Part 2
Lecture 23 - Network Security - VPN, PKI, Certificates, SSL,SAML - Part 1
Lecture 24 - Network Security - VPN, PKI, Certificates, SSL,SAML - Part 2
Lecture 25 - Virtual Private Networks (VPN)
Lecture 26 - Hash Functions, Digital Signatures and Quantum Cryptography
Lecture 27 - Packets, Protocols and Attacks in Cyberspace - Part 1
Lecture 28 - Packets, Protocols and Attacks in Cyberspace - Part 2

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NPTEL Video Course - Special Lecture Series - ACM Winter School on Network Science

Subject Co-ordinator - Prof. Loyimee Gogoi

Co-ordinating Institute - Ahmedabad University

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Representing Networks
Lecture 2 - Strategic Network Formation - Session 1
Lecture 3 - Strategic Network Formation - Session 2
Lecture 4 - Strategic Network Formation - Session 3
Lecture 5 - Strategic Network Formation - Session 4
Lecture 6 - Network Visualization - Session 1
Lecture 7 - Network Visualization - Session 2
Lecture 8 - Social Network Analysis
Lecture 9 - Neural Networks - Basics
Lecture 10 - Network Analysis in Telecom
Lecture 11 - Strong and Weak Ties
Lecture 12 - Link Analysis
Lecture 13 - Statistical Mechanics of Complex Networks - Session 1
Lecture 14 - Statistical Mechanics of Complex Networks - Session 2
Lecture 15 - Statistical Mechanics of Complex Networks - Session 3
Lecture 16 - Statistical Mechanics of Complex Networks - Session 4
Lecture 17 - Hate Speech - Session 1
Lecture 18 - Hate Speech - Session 2
Lecture 19 - Dynamics on Networks - Session 1
Lecture 20 - Dynamics on Networks - Session 2
Lecture 21 - Dynamics on Networks - Session 3
Lecture 22 - Dynamics on Networks - Session 4
Lecture 23 - Causal Discovery and Network Science
Lecture 24 - Games and Networks - Session 1
Lecture 25 - Games and Networks - Session 2

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NPTEL Video Course - Special Lecture Series - ACM Winter School on Recent Trends in AI and ML

Subject Co-ordinator - Dr. Chandranath Adak

Co-ordinating Institute - IIT - Patna

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - NLP Foundation - Part I
Lecture 2 - NLP Foundation - Part II
Lecture 3 - Fundamentals of Machine Learning - Part I
Lecture 4 - Fundamentals of Machine Learning - Part II
Lecture 5 - Artificial Intelligence - An Introduction
Lecture 6 - Logistic Regression and Neural Networks
Lecture 7 - Large Scale SVM Algorithms and Applications
Lecture 8 - Ensemble Deep Learning For Alzheimer's Disease Dianosis
Lecture 9 - From Smart Sensing to Smart Living - The Era of IoT, AI:ML and Data Science
Lecture 10 - Machine Learning - Naive Bayes Classification
Lecture 11 - Cluster Analysis - Basic Concepts and Algorithms
Lecture 12 - Algorithms of Unsupervised Learning
Lecture 13 - Backbone functions of Deep Neural Networks Activation, Loss, Optimization functions
Lecture 14 - Convolutional Neural Networks
Lecture 15 - Reinforcement Learning - Experience, Adapt, Excel - Part I
Lecture 16 - Neoteric Frontiers in cloud, edge and Quantum Computing for Bigdata, IoT and AI Applications
Lecture 17 - Reinforcement Learning - Experience, Adapt, Excel - Part II
Lecture 18 - Economic Impact of New Category Recommendation Evidence from a Randomized Field Experiment
Lecture 19 - Neural Text Generation
Lecture 20 - RL Algorithms
Lecture 21 - An Overview of AI, NLP, ML Research Activities
Lecture 22 - LLMs and Ethics
Lecture 23 - Reinforcement Learning with Human Feedback
Lecture 24 - The LLM Journey
Lecture 25 - Representation Learning for Large Scale Pretrained Models
Lecture 26 - Computer Vision Application

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NPTEL Video Course - Special Lecture Series - ACM India Pingala Interactions in Computing (PIC) 2024

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - PIC 2024 Inauguration
Lecture 2 - Exciting Trends in Machine Learning
Lecture 3 - Towards Inclusive and Responsible Language Technologies
Lecture 4 - Chat with Jeffrey Dean and Partha Talukdar
Lecture 5 - Indo-International Collaboration Case Studies - 1
Lecture 6 - Indo-International Collaboration Case Studies - 2
Lecture 7 - Indo-International Collaboration Case Studies - 3
Lecture 8 - Connectivity is the Thing
Lecture 9 - Chat with Robert Metcalfe
Lecture 10 - Bad Algorithms
Lecture 11 - Chat with Saket Saurabh
Lecture 12 - Converting Research to Business
Lecture 13 - Robust Query Processing: Where Geometry Beats ML !
Lecture 14 - Data, More Data, Too Much Data
Lecture 15 - Chat with Jayant Haritsa and Tova Milo
Lecture 16 - Efficient Verification of Compution on Untrusted Platforms
Lecture 17 - Cryptography: the Art of Paradox
Lecture 18 - Chat with Shweta Agrawal and Yael Kalai
Lecture 19 - ACM: Goals, Priorities, Initiatives
Lecture 20 - Valedictory Function

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NPTEL Video Course - Special Lecture Series - ACM INDIA ARCS 2024

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Welcome and Opening Remarks
Lecture 2 - Keynote 1
Lecture 3 - Lightning Talks - Part 1
Lecture 4 - Academia Industry Career Opportunities - Sitare-University
Lecture 5 - Academia Industry Career Opportunities - Flame University
Lecture 6 - Academia Industry Career Opportunities - Processor Research Labs
Lecture 7 - ACMI-W Panel Discussion
Lecture 8 - ACMI-W OCCW-Award
Lecture 9 - ACM-India Activities for PhD-Students
Lecture 10 - Keynote 2
Lecture 11 - Lightning Talks - Part 2
Lecture 12 - ECR Award Talk - Siddharth Barman
Lecture 13 - Doctoral Dissertation Award Talks 1
Lecture 14 - Doctoral Dissertation Award Talks 2
Lecture 15 - ECR Talk 1 - Manas-Thakur
Lecture 16 - ECR Talk 2 - Deeksha-Bhartiya
Lecture 17 - ECR Talk 3 - Shikhar-Patranabais

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NPTEL Video Course - Special Lecture Series - ACM INDIA Annual Event 2024

Subject Co-ordinator - Meenakshi D'Souza, Hirendra Nath Ghosh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Inauguration - Meenakshi D'Souza, Hirendra Nath Ghosh
Lecture 2 - ACM: Goals, Priorities, Initiatives - Yannis Ioannidis
Lecture 3 - ACM India at a Glance - Venkatesh Raman
Lecture 4 - Fireside Chat with Robert Metcalfe - Robert Metcalfe, Pravin Bhagwat
Lecture 5 - Human Factors of Formal Methods - Shriram Krishnamurthi
Lecture 6 - ACM India Awards Ceremony 1 - Hemant Pande
Lecture 7 - ACM India Awards Ceremony 2 - Hemant Pande
Lecture 8 - Efficient Verification of Computation on Untrusted Platforms - Yael Kalai
Lecture 9 - The Story of 14Trees - Pravin Bhagwat

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NPTEL Video Course - Special Lecture Series - ACM INDIA Winter School - Full-Stack Networking (FSN)

Subject Co-ordinator - Multi-Faculty

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Full-Stack Networking School
Lecture 2 - Linux Netwoking Stack, Evolution of NICs, Evolution of Network packet processors
Lecture 3 - Demo Session 1: Hands on with basic Linux networking commands
Lecture 4 - Demo Session 2: Netfilter and iptables
Lecture 5 - Intro to virtualization containers
Lecture 6 - Demo session 1: Hands on with Docker
Lecture 7 - Demo session 1: Hands on with Containers
Lecture 8 - Demo session 1: Hands on with Kubernetes
Lecture 9 - Container Networking : CNI service mesh, L7 Proxies, Overlay networks
Lecture 10 - Container Networking : AWS, VPC, NAT, gateways
Lecture 11 - Demo Session 1
Lecture 12 - Multicloud
Lecture 13 - Invited talk- Research Career
Lecture 14 - eBPF
Lecture 15 - eBPF for Networking
Lecture 16 - Invited talks: Application Connectivity for the Multi-Cloud Era
Lecture 17 - Application layer networking
Lecture 18 - Invited talk: Performance Measurement and Optimization
Lecture 19 - Invited talk: Chaos Engineering
Lecture 20 - Websockets
Lecture 21 - RPC: Remote Procedure Calls
Lecture 22 - Invited talk: TiHAN Edge cloud testbed with WiFi/5G
Lecture 23 - Demo Session: Application Layer Networking
Lecture 24 - Message Queues
Lecture 25 - Invited talks: Towards Expressive and Performant Service Meshes
Lecture 26 - Advanced HTTP
Lecture 27 - WiFi Tuned
Lecture 28 - Multipath Networking
Lecture 29 - Demo Session - Multipath networking

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NPTEL Video Course - Textile Engineering - Theory of Yarn Structures

Subject Co-ordinator - Prof. Bohuslav Neckar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fibers and Yarns
Lecture 2 - Fibers and Yarns
Lecture 3 - Compression of Fibrous Assemblies
Lecture 4 - Compression of Fibrous Assemblies (Continued...)
Lecture 5 - Pores Among Fibers
Lecture 6 - Pores Among Fibers (Continued...)
Lecture 7 - Orientation of Fibers
Lecture 8 - Orientation of Fibers (Continued...)
Lecture 9 - Mechanics of Parallel Fiber Bundles
Lecture 10 - Mechanics of Parallel Fiber Bundles (Continued...)
Lecture 11 - Modelling of Internal Yarn Geometry
Lecture 12 - Modelling of Internal Yarn Geometry
Lecture 13 - Relations Among Yarn Count T, Twist Z, Packing Density, And Diameter D
Lecture 14 - Relations Among Yarn Count T, Twist Z, Packing Density, And Diameter D (Continued...)
Lecture 15 - Relations Among Yarn Count T, Twist Z, Packing Density, And Diameter D (Continued...)
Lecture 16 - Relations Among Yarn Count T, Twist Z, Packing Density, And Diameter D (Continued...)
Lecture 17 - Bundle Theory of Yarn Unevenness
Lecture 18 - Bundle Theory of Yarn Unevenness (Continued...)
Lecture 19 - Yarn Strength as a Stochastic Process
Lecture 20 - Yarn Strength as a Stochastic Process (Continued...)

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NPTEL Video Course - Textile Engineering - NOC:Science of Clothing Comfort

Subject Co-ordinator - Dr. Apurba Das

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Science of Clothing Comfort-Outline
Lecture 2 - Understanding Clothing and Clothing Comfort
Lecture 3 - Understanding Clothing and Clothing Comfort (Continued...)
Lecture 4 - Understanding Clothing and Clothing Comfort (Continued...)
Lecture 5 - Psychology and Comfort
Lecture 6 - Psychology and Comfort (Continued...)
Lecture 7 - Psychology and Comfort (Continued...)
Lecture 8 - Psychology and Comfort (Continued...)
Lecture 9 - Neurophysiological Processes in Clothing Comfort
Lecture 10 - Neurophysiological Processes in Clothing Comfort (Continued...)
Lecture 11 - Neurophysiological Processes in Clothing Comfort (Continued...)
Lecture 12 - Neurophysiological Processes in Clothing Comfort (Continued...)
Lecture 13 - Neurophysiological Processes in Clothing Comfort (Continued...)
Lecture 14 - Neurophysiological Processes in Clothing Comfort (Continued...)
Lecture 15 - Tactile Aspects of Clothing Comfort
Lecture 16 - Tactile Aspects of Clothing Comfort (Continued...)
Lecture 17 - Tactile Aspects of Clothing Comfort (Continued...)
Lecture 18 - Tactile Aspects of Clothing Comfort (Continued...)
Lecture 19 - Understanding Clothing and Clothing Comfort (Continued...)
Lecture 20 - Tactile Aspects of Clothing Comfort (Continued...)
Lecture 21 - Tactile Aspects of Clothing Comfort (Continued...)
Lecture 22 - Clothing Comfort Related to Thermal Transmission
Lecture 23 - Clothing Comfort Related to Thermal Transmission (Continued...)
Lecture 24 - Clothing Comfort Related to Thermal Transmission (Continued...)
Lecture 25 - Clothing Comfort Related to Thermal Transmission (Continued...)
Lecture 26 - Clothing Comfort Related to Thermal Transmission (Continued...)
Lecture 27 - Clothing Comfort Related to Thermal Transmission (Continued...)
Lecture 28 - Clothing Comfort Related to Thermal Transmission (Continued...)
Lecture 29 - Moisture Transmission and Clothing Comfort

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Lecture 30 - Moisture Transmission and Clothing Comfort (Continued...)
Lecture 31 - Moisture Transmission and Clothing Comfort (Continued...)
Lecture 32 - Moisture Transmission and Clothing Comfort (Continued...)
Lecture 33 - Moisture Transmission and Clothing Comfort (Continued...)
Lecture 34 - Moisture Transmission and Clothing Comfort (Continued...)
Lecture 35 - Moisture Transmission and Clothing Comfort (Continued...)
Lecture 36 - Combined Heat and Mass Transmission and Clothing Comfort
Lecture 37 - Combined Heat and Mass Transmission and Clothing Comfort (Continued...)
Lecture 38 - Thermo-Physiological Comfort of Functional Clothing
Lecture 39 - Garment Fit and Comfort
Lecture 40 - Garment Fit and Comfort (Continued...)

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NPTEL Video Course - Textile Engineering - NOC:Yarn Manufacture-I: Principle of Carding and Drawing

Subject Co-ordinator - Prof. Ravi Chattopadhyay

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Impurities and Contaminants in Cotton
Lecture 2 - Opening Principle and Opening Devices
Lecture 3 - Cleaning Principle
Lecture 4 - Machines and their Layout
Lecture 5 - Bale Opening Machines
Lecture 6 - Machines in Blow Room - Part II
Lecture 7 - Opening Cleaning Machines - Part II
Lecture 8 - Mixing/Blending
Lecture 9 - Transportation of Tuft
Lecture 10 - Lap formation and Material Flow Regulation
Lecture 11 - Process Performance
Lecture 12 - Introduction
Lecture 13 - Card Feed Zone
Lecture 14 - Carding Zone
Lecture 15 - Analysis of flat action
Lecture 16 - Sliver Formation
Lecture 17 - Package Formation
Lecture 18 - Card Clothing
Lecture 19 - Card Setting, Draft, Production
Lecture 20 - Fibre Configuration and Neps in Card sliver
Lecture 21 - Carding Process
Lecture 22 - Numerical Problems and Solution
Lecture 23 - Introduction and Drafting principle
Lecture 24 - Design Features and operating principle of drawframe
Lecture 25 - Drafting Rolles,Web Condensation and Packaging
Lecture 26 - Drafting Roller Arranegement
Lecture 27 - Drafting Theory,Wave Fromation and Control
Lecture 28 - Drafting Force and Roller Slip
Lecture 29 - Significance of Process Parameters

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Lecture 30 - Draft and production Calculation
Lecture 31 - Blending on Drawframe
Lecture 32 - Process Monitoring and Control
Lecture 33 - Drawframe Autoleveller
Lecture 34 - Card Autoleveller
Lecture 35 - Numericals on Drawing

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NPTEL Video Course - Textile Engineering - NOC:Evaluations of Textile Materials

Subject Co-ordinator - Dr. Apurba Das

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Evaluation of Textile Materials - Outline
Lecture 2 - Evaluation of Textile Materials - Outline (Continued...)
Lecture 3 - Sampling Methods and Sample Size
Lecture 4 - Sampling Methods and Sample Size (Continued...)
Lecture 5 - Sampling Methods and Sample Size (Continued....)
Lecture 6 - Sampling Methods and Sample Size
Lecture 7 - Sampling Methods and Sample Size
Lecture 8 - Sampling Methods and Sample Size
Lecture 9 - Evaluation of Fibre Length
Lecture 10 - Evaluation of Fibre Length (Continued...)
Lecture 11 - Evaluation of Fibre Length (Continued...)
Lecture 12 - Evaluation of Fibre Fineness
Lecture 13 - Evaluation of Fibre Fineness - 1
Lecture 14 - Evaluation of Cotton Fibre Maturity
Lecture 15 - Evaluation of Cotton Fibre Properties
Lecture 16 - Evaluation of Linear Density of Textile Materials
Lecture 17 - Evaluation of Linear Density of Textile Materials (Continued...)
Lecture 18 - Evaluation of Tensile Properties of Textile Materials
Lecture 19 - Evaluation of Tensile Properties of Textile Materials (Continued...)
Lecture 20 - Evaluation of Tensile Properties of Textile Materials-1 (Continued...)
Lecture 21 - Evaluation of Tensile Properties of Textile Materials-2 (Continued...)
Lecture 22 - Evaluation of Tensile Properties of Textile Materials-3 (Continued...)
Lecture 23 - Evaluation of Tensile Properties of Textile Materials-4 (Continued...)
Lecture 24 - Evaluation of Tensile Properties of Textile Materials-5 (Continued...)
Lecture 25 - Evaluation of Yarn and Fabric Hairiness
Lecture 26 - Evaluation of Yarn and Fabric Hairiness (Continued...)
Lecture 27 - Evaluation of Yarn Twist
Lecture 28 - Evaluation of Yarn Twist (Continued...)
Lecture 29 - Evaluation of Moisture in Textiles

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Lecture 30 - Evaluation of Moisture in Textiles (Continued...)
Lecture 31 - Evaluation of Yarn Evenness
Lecture 32 - Evaluation of Yarn Evenness-1 (Continued...)
Lecture 33 - Evaluation of Yarn Evenness-2 (Continued...)
Lecture 34 - Evaluation of Yarn Evenness-3 (Continued...)
Lecture 35 - Evaluation of Yarn Evenness-3 (Continued...)
Lecture 36 - Evaluation of Yarn Evenness-4 (Continued...)
Lecture 37 - Evaluation of Bursting and Tear Strength of Fabrics
Lecture 38 - Evaluation of Pilling and Abrasion Properties of Fabrics
Lecture 39 - Evaluation of Low Stress Mechanical Properties of Textile Materials
Lecture 40 - Evaluation of Low Stress Mechanical Properties of Textile Materials (Continued...)

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NPTEL Video Course - Textile Engineering - NOC:Testing of Functional and Technical Textiles

Subject Co-ordinator - Dr. Apurba Das

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Testing of Low Stress mechanical Properties of Textile Fabrics
Lecture 2 - Testing of Low Stress mechanical Properties of Textile Fabrics (Continued...)
Lecture 3 - Testing of Low Stress mechanical Properties of Textile Fabrics (Continued...)
Lecture 4 - Testing of Transmission Characteristics of Textile Fabrics
Lecture 5 - Testing of Transmission Characteristics of Textile Fabrics (Continued...)
Lecture 6 - Testing of Transmission Characteristics of Textile Fabrics (Continued...)
Lecture 7 - Testing of Transmission Characteristics of Textile Fabrics (Continued...)
Lecture 8 - Testing of Transmission Characteristics of Textile Fabrics (Continued...)
Lecture 9 - Testing of Transmission Characteristics of Textile Fabrics (Continued...)
Lecture 10 - Testing of Fibre Reinforced Composite Materials
Lecture 11 - Testing of Fibre Reinforced Composite Materials (Continued...)
Lecture 12 - Testing of Fibre Reinforced Composite Materials (Continued...)
Lecture 13 - Testing of Fibre Reinforced Composite Materials (Continued...)
Lecture 14 - Testing of Fibre Reinforced Composite Materials (Continued...)
Lecture 15 - Testing of Fibre Fabrics
Lecture 16 - Testing of Fibre Fabrics (Continued...)
Lecture 17 - Testing of Fibre Fabrics (Continued...)
Lecture 18 - Testing of Geotextiles
Lecture 19 - Testing of Geotextiles (Continued...)
Lecture 20 - Testing of Geotextiles (Continued...)
Lecture 21 - Testing of Ballistics Protective Clothing
Lecture 22 - Testing of UV Radiation Protective Textiles
Lecture 23 - Testing of Compression Bandages
Lecture 24 - Testing of Electromagnetic Shielding Textiles

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NPTEL Video Course - Textile Engineering - NOC:Theory of Yarn Structure

Subject Co-ordinator - Dr. Dipayan Das

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Building Block of Yarns
Lecture 2 - The Building Block of Yarns (Continued...)
Lecture 3 - Basic Characteristics of Yarns
Lecture 4 - Basic Characteristics of Yarns (Continued...)
Lecture 5 - Basic Characteristics of Yarns (Continued...)
Lecture 6 - Relations Among Yarn Count, Twist, and Diameter
Lecture 7 - Relations Among Yarn Count, Twist, and Diameter (Continued...)
Lecture 8 - Helical Model of Fibers in Yarns
Lecture 9 - Helical Model of Fibers in Yarns (Continued...)
Lecture 10 - Helical Model of Fibers in Yarns (Continued...)
Lecture 11 - Helical Model of Fibers in Yarns (Continued...)
Lecture 12 - Mass Irregularity of Yarns
Lecture 13 - Mass Irregularity of Yarns (Continued...)
Lecture 14 - Mass Irregularity of Yarns (Continued...)
Lecture 15 - Mass Irregularity of Yarns (Continued...)
Lecture 16 - Radial Migration of Fibres in Yarns
Lecture 17 - Radial Migration of Fibres in Yarns (Continued...)
Lecture 18 - Radial Migration of Fibres in Yarns (Continued...)
Lecture 19 - Yarn Shrinkage due to Washing
Lecture 20 - Tensile Mechanics of Yarns
Lecture 21 - Tensile Mechanics of Yarns (Continued...)
Lecture 22 - Tensile Mechanics of Yarns (Continued...)
Lecture 23 - Tensile Mechanics of Yarns (Continued...)
Lecture 24 - Tensile Mechanics of Yarns (Continued...)

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NPTEL Video Course - Textile Engineering - NOC:Advanced Textile Printing Technology

Subject Co-ordinator - Prof. Kushal Sen

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Conventional Printing
Lecture 2 - Colourants
Lecture 3 - Dyes and pigments
Lecture 4 - Thickeners
Lecture 5 - Measurement of viscosity
Lecture 6 - Discharge and resist printing
Lecture 7 - Transfer Printing
Lecture 8 - Sublimation Transfer Printing
Lecture 9 - Sublimation Transfer Printing
Lecture 10 - Free path length and mechanism of transfer
Lecture 11 - Transfer Printing Machines and Other Transfer Methods
Lecture 12 - Introduction to Digital Textile Printing
Lecture 13 - Revision and Doubt Clarification Session - 1
Lecture 14 - Digital Textile Printing
Lecture 15 - Inkjet Technologies
Lecture 16 - Revision and Doubt Clarification Session - 2
Lecture 17 - Inkjet Technologies
Lecture 18 - Inkjet Printing
Lecture 19 - Printing inks
Lecture 20 - Water-based inks
Lecture 21 - Water-based inks (Continued...)

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NPTEL Video Course - Textile Engineering - NOC:Textured Yarn Technology

Subject Co-ordinator - Prof. Kushal Sen

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to texturing
Lecture 2 - General principles involved in the manufacture of textured yarns
Lecture 3 - General principles involved in the manufacture of textured yarns (Continued...)
Lecture 4 - Bulked yarns
Lecture 5 - Mechanisms of setting and texturing
Lecture 6 - Thermo-mechanical texturing
Lecture 7 - Characterization and optimization
Lecture 8 - Influence of material and process parameters
Lecture 9 - Influence of process parameters
Lecture 10 - Influence of process parameters (Continued...)
Lecture 11 - Revision and clarification of doubts - Session 1
Lecture 12 - Influence of process parameters (Continued...)
Lecture 13 - Draw Texturing
Lecture 14 - Simultaneous draw texturing with POY
Lecture 15 - Draw Texturing (Continued...)
Lecture 16 - Draw Texturing Machines and Process Parameters
Lecture 17 - Draw Texturing
Lecture 18 - Draw Texturing
Lecture 19 - Friction Draw Texturing
Lecture 20 - Friction Draw Texturing (Continued...)
Lecture 21 - Air-Jet Texturing
Lecture 22 - Air-Jet Texturing (Continued...)
Lecture 23 - Air-Jet Texturing (Continued...)
Lecture 24 - Air-Jet Texturing
Lecture 25 - Air-Jet Texturing
Lecture 26 - Air-Texturing Jets
Lecture 27 - Interlacement
Lecture 28 - Bulked continuous filament yarns
Lecture 29 - Hi-bulk yarns

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Lecture 30 - Revision and Clarification of Doubts Session 2
Lecture 31 - Hi-bulk yarns (Continued...)
Lecture 32 - Texturing of spun yarns
Lecture 33 - Texturing of spun yarns (Continued...)
Lecture 34 - Solvent texturing

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NPTEL Video Course - Textile Engineering - NOC:Textile Finishing

Subject Co-ordinator - Prof. Kushal Sen

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Finishing
Lecture 2 - Wrinkle Resistant Finishing
Lecture 3 - Wrinkle Resistant Finishing (Continued...)
Lecture 4 - Wrinkle Resistant Finishing
Lecture 5 - Catalysis and Catalysts
Lecture 6 - Other Crosslinking agents
Lecture 7 - Non-nitrogenous Agents
Lecture 8 - Control of Formaldehyde Release
Lecture 9 - Stiff and Soft Finishing
Lecture 10 - Soft Finishing (Continued...)
Lecture 11 - Soft Finishing (Continued...)
Lecture 12 - Emulsion Softeners
Lecture 13 - Water Proofing and Water Repellency
Lecture 14 - Water Repellency (Continued...)
Lecture 15 - Water Repellency (Continued...)
Lecture 16 - Waterproof Breathable Textiles
Lecture 17 - Soil Repellency and Soil Release
Lecture 18 - Soil Release Finishing
Lecture 19 - Fire Retardant Finishing
Lecture 20 - Chemistry of Flame Retardants
Lecture 21 - More Flame retardants and evaluation of fire retardancy
Lecture 22 - Antimicrobial Finishing
Lecture 23 - Finishing of Wool
Lecture 24 - Shrink Resistant Wool
Lecture 25 - Wool Setting
Lecture 26 - Mothproofing of Wool
Lecture 27 - Biopolishing
Lecture 28 - Finishing of synthetics
Lecture 29 - Finishing of synthetics

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Lecture 30 - Low Liquor Application
Lecture 31 - Waste heat recovery
Lecture 32 - Principles of some Finishing machines

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NPTEL Video Course - Textile Engineering - NOC:Principles of Combing, Roving preparation and Ring spinning

Subject Co-ordinator - Prof. Ravi Chattopadhyay

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Pre-combing operation - Part 1
Lecture 2 - Pre-combing operation - Part 2
Lecture 3 - Introduction to Comber - Part 1
Lecture 4 - Introduction to Comber - Part 2
Lecture 5 - Sequence of Operation
Lecture 6 - Combing Mechanism
Lecture 7 - Timing Diagram
Lecture 8 - Sliver Formation
Lecture 9 - Theoretical Aspects in Combing - Part 1
Lecture 10 - Theoretical Aspects in Combing - Part 2
Lecture 11 - Parameters Influencing Combing Performance
Lecture 12 - Analysis of Drive
Lecture 13 - Calculation of Process Performance Parameters
Lecture 14 - Introduction, Working Principle and Creel
Lecture 15 - Dxrafting Unit - Part 1
Lecture 16 - Dxrafting Unit - Part 2
Lecture 17 - Flyer Twisting
Lecture 18 - Package Formation
Lecture 19 - Bobbin Speed Regulation
Lecture 20 - Building Motion and Drive Analysis
Lecture 21 - Calculation for Change Gears amd Production
Lecture 22 - Introduction and Working Principle
Lecture 23 - Creel and Drafting Unit
Lecture 24 - Twisting Process and Twisting Elements
Lecture 25 - Bobbin Building
Lecture 26 - Spinning Geometry
Lecture 27 - Analysis of Forces on Traveller
Lecture 28 - Analysis of Forces on Ballon
Lecture 29 - Analysis of Drive, Production Calculation

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Lecture 30 - End Breaks

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NPTEL Video Course - Textile Engineering - NOC:Science and Technology of Weft and Warp Knitting

Subject Co-ordinator - Prof. Bipin Kumar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Kintting
Lecture 2 - Knitting Glossary
Lecture 3 - Loop Formation in Weft Knitting
Lecture 4 - Lab Demo 1
Lecture 5 - Automation in Loop Formation
Lecture 6 - Flat Bed Machine Needle/Cam Interaction
Lecture 7 - Circular Knitting
Lecture 8 - Single Bed Weft Knitting-Flat and Circular M/C
Lecture 9 - Lab Demo 2
Lecture 10 - Lab Demo 3
Lecture 11 - Single Bed Weft Knitting Fabric Curling
Lecture 12 - Weft Knitting Double Flat Beds
Lecture 13 - Weft Knitting Double Circular Beds
Lecture 14 - Weft Knitting V-Bed Machine
Lecture 15 - Analysis of a Double Jersey Fabric
Lecture 16 - Single and Double Jersey Construction
Lecture 17 - Weft Knit Stiches - Loop, Tuck and Float
Lecture 18 - Lab Demo 6 (Part 1) Knitting Notations
Lecture 19 - Lab Demo 6 (Part 2) Knitting Notations
Lecture 20 - Fabric Analysis - Influence of Loop Length
Lecture 21 - Fabric Design - Float and Tuck Formation
Lecture 22 - Fabric Analysis - Influence of Float and Tuck Stitches
Lecture 23 - Fabric Analysis - Shrinkage (Relaxation)
Lecture 24 - Fabric Analysis - Extensibility and Recovery
Lecture 25 - Knitting Calculation - Yarn Selection
Lecture 26 - Knitting Calculation - Production (Circular)
Lecture 27 - Knitting Calculation - Production (Flat)
Lecture 28 - Knitting Calculation - Fabric Calculations
Lecture 29 - Knitting Calculation - Geometrical Modeling

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Lecture 30 - Knitting Calculation - Fabric Spirality in Single Jersy (Tubular)
Lecture 31 - Advancement in Knitting Technology
Lecture 32 - Knitting Designs Possibilities
Lecture 33 - Knitting Designs Possibilities - 1
Lecture 34 - Design Software
Lecture 35 - Weft Knitting- Revision
Lecture 36 - Introduction to Warp Knitting
Lecture 37 - Warp Knitting Technology- Loop Formation
Lecture 38 - Swinging and Shogging Motions (Overlap and Underlap)
Lecture 39 - Warp Knit - Structural Identification
Lecture 40 - Warp Knit Fabric Notation - Lapping Diagram and Lapping Plan
Lecture 41 - Warp Knit Structure - Design Principles
Lecture 42 - Single Bar Warp Knit Constructions
Lecture 43 - Double Bar Warp Knit Constructions
Lecture 44 - Lapping Plan Execution - Pattern Disc and Pattern Drum
Lecture 45 - Chain Links Arrangement - Single and Double Bar Constructions
Lecture 46 - Warp Knits
Lecture 47 - Warp Knits
Lecture 48 - Weft and Warp Knitting - Summary
Lecture 49 - Technical Applications of Knitting
Lecture 50 - Technical Applications of Knitting (Continued...)

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NPTEL Video Course - Textile Engineering - NOC:Technical Textiles

Subject Co-ordinator - Dr. Apurba Das

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Technical Textiles
Lecture 2 - Introduction to Technical Textiles (Continued...)
Lecture 3 - Textile Reinforced Composites
Lecture 4 - Textile Reinforced Composites (Continued...)
Lecture 5 - Textile Reinforced Composites (Continued...)
Lecture 6 - Textile Reinforced Composites (Continued...)
Lecture 7 - Textile Reinforced Composites (Continued...)
Lecture 8 - Textile Reinforced Composites (Continued...)
Lecture 9 - Textile Reinforced Composites (Continued...)
Lecture 10 - Textile Reinforced Composites (Continued...)
Lecture 11 - Textile Reinforced Composites (Continued...)
Lecture 12 - Textile Reinforced Composites (Continued...)
Lecture 13 - Filter Fabrics
Lecture 14 - Filter Fabrics (Continued...)
Lecture 15 - Filter Fabrics (Continued...)
Lecture 16 - Geotextiles
Lecture 17 - Geotextiles (Continued...)
Lecture 18 - Geotextiles (Continued...)
Lecture 19 - Geotextiles (Continued...)
Lecture 20 - Extreme Cold Protective Clothing
Lecture 21 - Extreme Cold Protective Clothing (Continued...)
Lecture 22 - Extreme Heat Protective Clothing
Lecture 23 - Extreme Heat Protective Clothing (Continued...)
Lecture 24 - Sports Textiles
Lecture 25 - Sports Textiles (Continued...)
Lecture 26 - Sports Textiles (Continued...)
Lecture 27 - Ultraviolet Protective Textiles
Lecture 28 - Ultraviolet Protective Textiles (Continued...)
Lecture 29 - Ultraviolet Protective Textiles (Continued...)

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Lecture 30 - Ballistic Protective Textiles
Lecture 31 - Compression Bandage
Lecture 32 - Compression Bandage (Continued...)
Lecture 33 - Compression Bandage (Continued...)
Lecture 34 - Automotive Textiles
Lecture 35 - Textiles in Hygiene
Lecture 36 - Additional Lecture on Geotextiles
Lecture 37 - Additional Lecture on Geotextiles (Continued...)
Lecture 38 - Additional Lecture on Composites
Lecture 39 - Additional Lecture on Composites (Continued...)
Lecture 40 - Additional Lecture on Composites (Continued...)

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NPTEL Video Course - Textile Engineering - NOC:Textile Product Design and Development

Subject Co-ordinator - Prof. R Chattopadhyay

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1
Lecture 2
Lecture 3
Lecture 4
Lecture 5
Lecture 6
Lecture 7
Lecture 8
Lecture 9
Lecture 10
Lecture 11
Lecture 12
Lecture 13
Lecture 14
Lecture 15
Lecture 16
Lecture 17
Lecture 18
Lecture 19
Lecture 20
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26
Lecture 27
Lecture 28
Lecture 29

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NPTEL Video Course - Textile Engineering - NOC:New Spinning Technologies

Subject Co-ordinator - Prof. R Chattopadhyay

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - New Spinning Technology
Lecture 2 - Sliver Feed Arrangement
Lecture 3 - Principle of Yarn Formation
Lecture 4 - Twist Equation
Lecture 5 - Rotor: Construction, Geometry and Drive
Lecture 6 - Package Formation
Lecture 7 - Significance of Fibre and Process Parameters
Lecture 8 - Rotor Selection
Lecture 9 - Spinning Tension
Lecture 10 - Production and Energy Consumption Calculation
Lecture 11 - Rotor Yarn: Structure, Properties and Application
Lecture 12 - Air Jet Spinning: Introduction
Lecture 13 - High Draft System
Lecture 14 - Yarn Formation Mechanism
Lecture 15 - Structure and Characteristics of Air-Jet Yarn
Lecture 16 - Material and Process Parameters
Lecture 17 - Friction Spinning: Dref-2
Lecture 18 - Dref-3 Friction Spinning
Lecture 19 - Yarn Formation, Structure and Applications
Lecture 20 - Vortex Spinning
Lecture 21 - Influence of Machine and Process Parameters
Lecture 22 - Wrap Spinning
Lecture 23 - Wrap Spinning (Continued...)
Lecture 24 - SIRO Spinning
Lecture 25 - Compact Spinning
Lecture 26 - Spinning by Adhesive and Felting Process
Lecture 27 - Self Twist Spinning
Lecture 28 - Comparitive Analysis Between Spinning Technologies
Lecture 29 - Productivity Enhancement: Limitations

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NPTEL Video Course - Textile Engineering - Natural Dyes

Subject Co-ordinator - Dr. Padma S Vankar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Natural Dyes
Lecture 2 - Natural Dyes
Lecture 3 - Natural Dyes
Lecture 4 - Natural Dyes
Lecture 5 - Natural Dyes
Lecture 6 - Natural Dyes
Lecture 7 - Natural Dyes
Lecture 8 - Natural Dyes
Lecture 9 - Natural Dyes
Lecture 10 - Natural Dyes
Lecture 11 - Natural Dyes
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Lecture 27 - Natural Dyes
Lecture 28 - Natural Dyes
Lecture 29 - Natural Dyes

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Lecture 30 - Natural Dyes
Lecture 31 - Natural Dyes
Lecture 32 - Natural Dyes
Lecture 33 - Natural Dyes
Lecture 34 - Natural Dyes
Lecture 35 - Natural Dyes
Lecture 36 - Natural Dyes
Lecture 37 - Natural Dyes
Lecture 38 - Natural Dyes
Lecture 39 - Natural Dyes
Lecture 40 - Natural Dyes

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